

Education Committee Meeting

Thursday, September 3, 2026 6:00 PM

Board Room: Educational Services Center, 16 Welden Drive, Doylestown, PA 18901

1. CALL TO ORDER

2. PUBLIC COMMENT

3. REVIEW OF PREVIOUS MEETING REPORT

4. INFORMATION ITEMS

4.A. 2025 Pennsylvania Youth Survey (PAYS) Review

Speaker (s) : Justin Rubenstein, Student Services Supervisor

4.B. QUEST Program and K - 5 Course of Study Revisions

Speaker (s) : Amy Logue, Teacher

4.C. Family Consumer Science 7, Family Consumer Science 8, and Food For Life Courses of Study Revisions

Speaker (s) : Betsey Coyne, Teacher

5. RECOMMENDATIONS FOR APPROVAL AT NEXT SCHOOL BOARD MEETING

5.A. Personal Finance 1 Revision and Compass 6, Compass 7, Compass 8, and Integrated Technology 6 Courses of Study

Speaker (s) : Hannah Woodring, Teacher and Business, Integrated Technology, & Compass Department Coordinator

5.B. Grade 3 Art Revision, Grade 4 Art Revision, Sculpture Revision, and Ceramics 4 Course of Study

Speaker (s) : Deborah Thomas, Teacher and Art Department Coordinator

5.C. Biology Revision and Environmental Science Course of Study

Speaker (s) : Mary Courtney, Science Supervisor

6. ADJOURNMENT

6.A. Next scheduled Education Committee Meeting: October 1, 2026

Central Bucks School District
Education Committee Meeting
Thursday, August 6, 2026
6:00 P.M.

Meeting Location: CBSD Board Room
Educational Services Center
16 Welden Drive, Doylestown, PA
18901

In Attendance:

Amanda O'Connor, Chairperson
Dana Foley, Committee Member
Heather Reynolds, Committee Member
Karen Smith, Board Member
Joanna Wexler, Ph.D., Superintendent
Charles Malone, Ed.D., Assistant Superintendent
Helen Zaleski, Ed.D., Assistant Superintendent (present virtually via Microsoft Teams)
Richard Kratz, Director of Teaching and Learning
Jason Jaffe, Director of Technology and Innovation
Stephanie Radcliffe, School Board Secretary

1. **Call to Order:** The meeting was called to order at 6:01 p.m.
2. **Public Comment:** There was no public comment at the August 6, 2026 committee meeting.
3. **Review of Previous Meeting Report:** The previous committee meeting report was reviewed.

4. Information Items

4.A. Course Updates: Advanced Mathematics 5, Accelerated Algebra 1, Honors Geometry, Code and Create Updates - Mathematics Supervisor Brian Novick presented an update to the Committee, including information about course of study documents for Advanced Math 5, Accelerated Algebra 1, Honors Geometry, and Code & Create.

5. Recommendations for Approval at Next School Board Meeting

5.A. Academic Math 6 Course of Study Approval, Math Intervention 7 Course of Study Approval, Math Intervention 8 Course of Study Approval, AP Cybersecurity Course of Study Approval, Calculus 3 Course of Study Approval, Introduction to Python Course of Study Approval - Mathematics Supervisor Brian Novick presented courses of study proposals to the Committee. Overviews and course content was discussed for Academic Math 6, Intervention Math 7 and 8, Calculus 3, a new computer science elective called Introduction to Python and a new Advanced Placement course called AP Cybersecurity. The committee agrees to move these items to the full Board.

5.B. Navigate Course of Study Approval - Social Studies Supervisor Chris Johnson presented a course of study proposal to the Committee. Navigate is a Tier 1 universal course that supports learners through a shared learning experience, establishes common academic systems across

content areas. There are no additional costs related to Navigate as it will use resources already in use such as Canvas, Gale, Discovery Education. The committee agrees to move this item to the full Board.

5.C. French 1A and French 1B Course of Study Approval, Spanish 1A and Spanish 1B Approval, Passports and Perspectives Course of Study Approval – World Language and ELD Supervisor Stacy Gray presented courses of study proposals to the Committee. Summative unit assessment and course grading was discussed for Passports & Perspectives, French 1A, French B, Spanish 1A, and Spanish 1B. Ms. Gray shared a handout regarding course sequences, which is attached to this report. The committee agrees to move these items to the full Board.

5.D. Kindergarten Decodable Books Adoption and Read Naturally Intervention Adoption – Reading Supervisor Ashley Christie presented to the Committee regarding resource adoption proposals. Ms. Christie discussed the Read Naturally Intervention Pilot for elementary students and Decodable Books for full-day kindergarten students at a cost of \$30,384.00 plus shipping and handling. The committee agrees to move these items to the full Board.

5.E. STEM 6 Course of Study Approval, STEM 7 Course of Study Approval, STEM 8 Course of Study Approval, STEAM Robotics 1, STEAM Robotics 2, STEAM Design 1 Exploring, STEAM Design 1, STEAM Design 2, STEAM Design 3, STEAM Fabrication 1 Exploring, STEAM Fabrication 1, STEAM Fabrication 2, STEAM Fabrication 3 – Technology Education Coordinator Jon Taylor presented courses of study proposals to the Committee. Characterizations of the courses was discussed for the STEM and STEAM proposals. The committee agrees to move these items to the full Board.

5.F. MTSS Management Programs Pilot – MTSS Supervisor Cassandra Oshinsky presented a Pilot proposal to the Committee for Branching Minds & Infinite Campus MTSS tool, which are digital platforms to help manage MTSS intervention plans and data. The cost for the Pilot is \$13,850.00 after the PDE grant allotment. The committee agrees to move this item to the full Board.

6. **Adjournment:** The meeting was adjourned at 7:57 p.m.

Next scheduled Education Committee Meeting: September 3, 2026.

World Languages Realignment

Course Sequences for Realignment

	Middle School			High School			
	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Scenario #1	No WL	French 1a Spanish 1a	French 1b Spanish 1b	Spanish 2 French 2 Chinese 1 Latin 1	French 3 French 3H Spanish 3 Spanish 3H Chinese 2 Latin 2	French 4 French 4H Spanish 4 Spanish 4H Chinese 3 Latin 3	AP French French 5 AP Spanish Spanish 5
Scenario #2	No WL	MTSS 1st sem /P&P 2 nd sem	French 1a Spanish 1a	Level 1	Level 2	Level 3	Level 4
Scenario #3	No WL	1a* 1 st sem/MTSS 2 nd sem	P&P sem 1/join existing French 1a sem 2 P&P sem 1/join existing Spanish 1a sem 2	Level 1	Level 2	Level 3	Level 4
Scenario #4	No WL	MTSS all year	Spanish 1a French 1a	Level 1	Level 2	Level 3	Level 4
Scenario #5	No WL	1a all year	MTSS all year	Level 1	Level 2	Level 3	Level 4
Scenario #6	No WL	1a all year	MTSS sem 1/P&P sem 2	Level 1	Level 2	Level 3	Level 4
Scenario #7	No WL	1a all year	1b sem 1/MTSS sem 2	Level 1 OR *Level 2 with teacher recommendation	Level 2	Level 3	Level 4
New to CB in 8 th grade	-----	-----	Spanish 1a French 1a	Level 1	Level 2	Level 3	Level 4
New to CB in 9 th grade *Currently students can only take Spanish in this scenario but after realignment they will be able to start any language!				French 1 Spanish 1 Chinese 1 Latin 1			
NOTES ➤ P&P = Passports & Perspectives ➤ Students MUST complete 1A and 1B to be placed into level 2 in high school. See scenario #7 for students with a high level of proficiency in that language.							



2025 Pennsylvania Youth Survey (PAYS) Data Review

Justin Rubenstein, Supervisor of Student Services

**September,
2026**



Goal of Presentation



To provide an overview analysis of the 2025 PAYS Survey Data and next steps for consideration.



10-15 minutes



What is the PAYS Survey?

Since 1989, the Commonwealth has conducted a survey of school students in the 6th, 8th, 10th and 12th grades to learn about their behavior, attitudes and knowledge concerning alcohol, tobacco, other drugs and violence every 2 years.



PAYS Survey Breakdown

Substance Use	Mental Health	Screen Time	Gambling	Community and School Climate and Safety	Indicators of Risk	Risk and Protective Factors



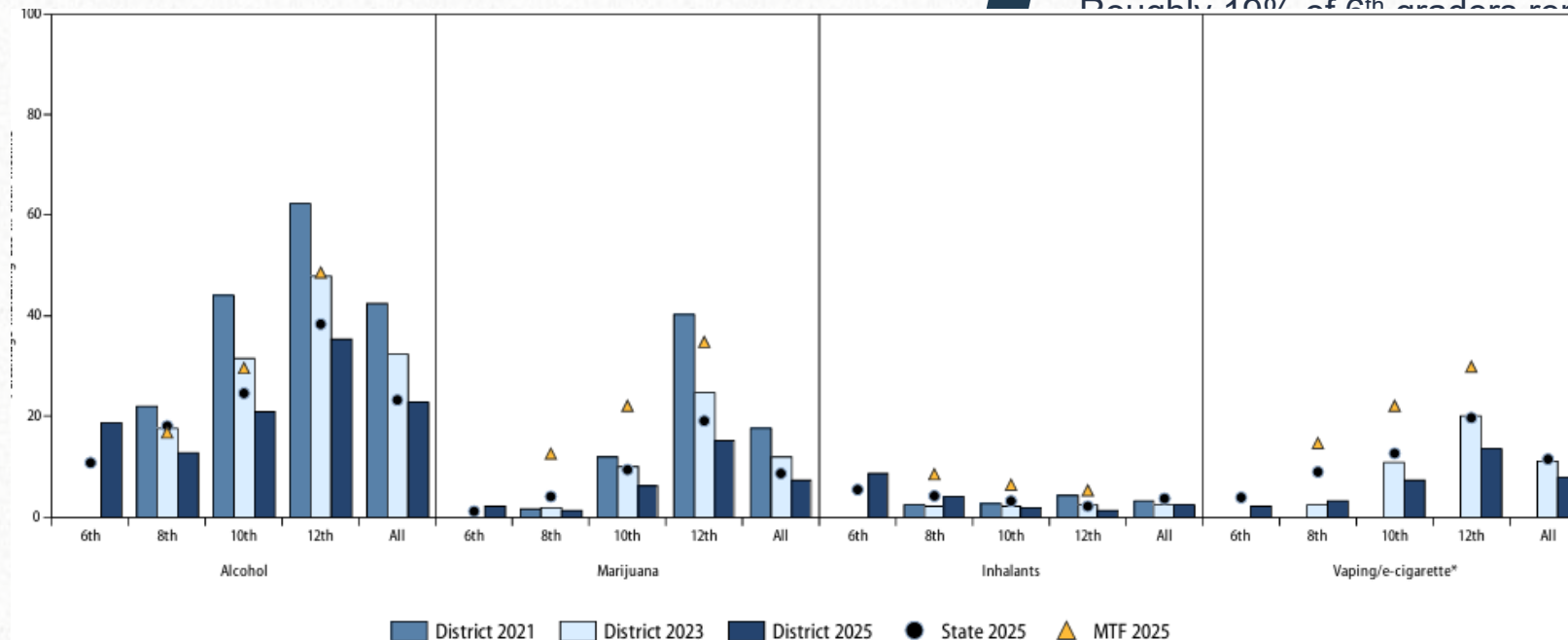
Substance Use

Highlights

- Below state average
- Improvement in reporting seen in all areas from 2021 to now

Areas for Further Consideration

- Use of alcohol still reported as being highest among alcohol, marijuana, inhalants, and vaping
- Vaping nicotine or marijuana increases with age
- Roughly 40% of 6th graders reporting to state





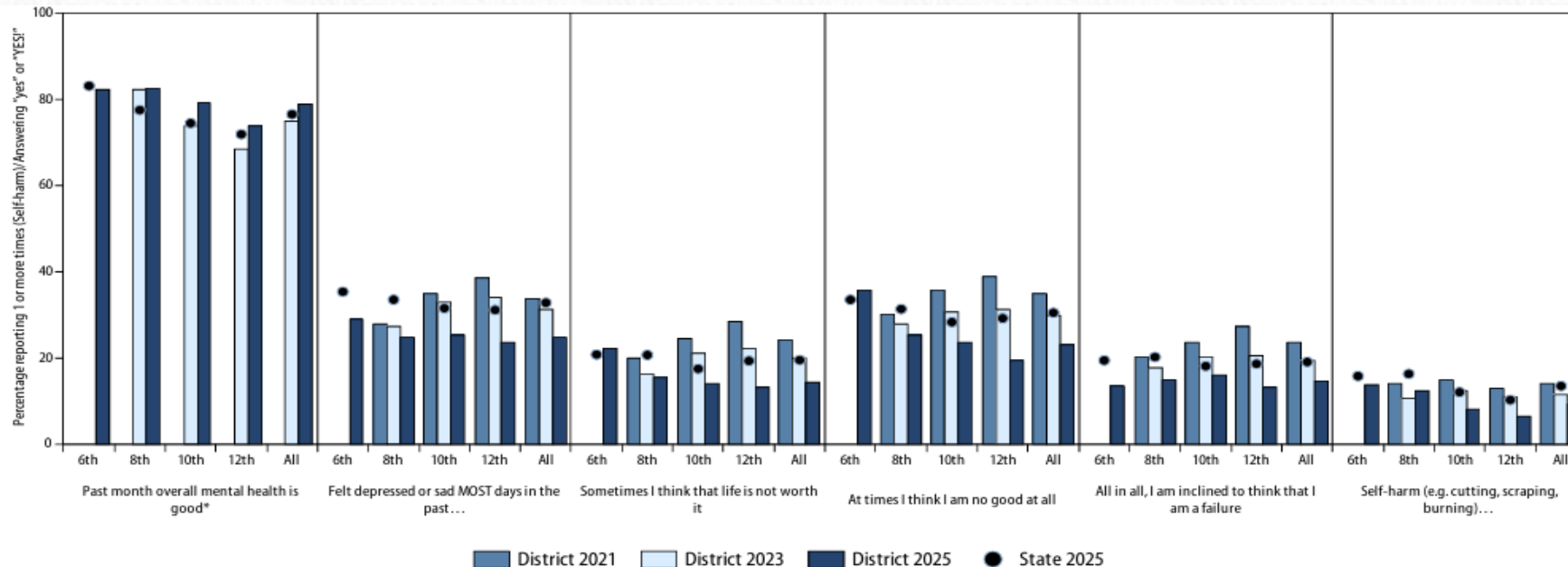
Overall Mental Health

Highlights

- All downward trends and lower than state averages
- Improvement in reporting seen in all areas from 2021 to now

Areas for Further Consideration

- Slight increases in mental health difficulty in 8th grade
- 24% experience depressive symptoms, 11% self-harming





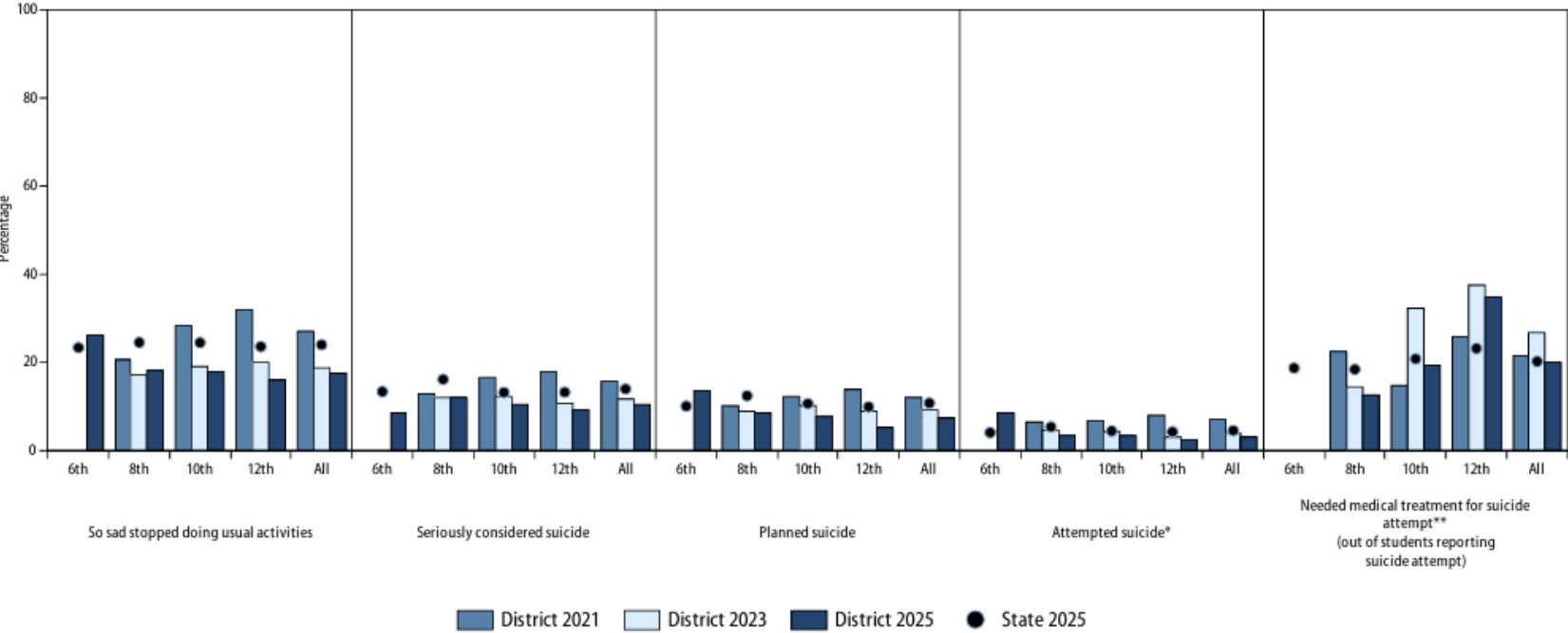
Particular Focus on Suicidality

Highlights

- Downward trends in most grades

Areas for Further Consideration

- Higher than state averages in 6th grade for planning and attempting
- Rates still higher than we would like to see: 10% seriously considered suicide, with 7% planning it and 3% attempting; seeing younger





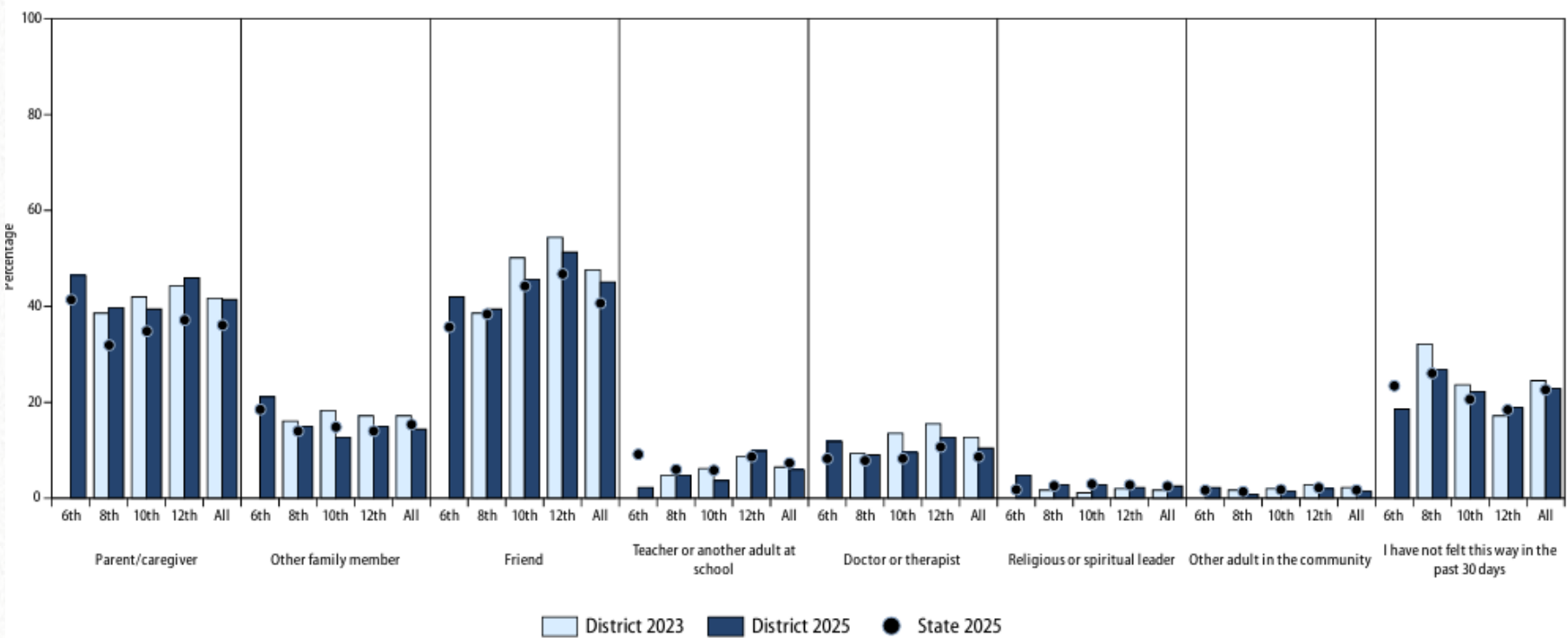
Who Students are Talking to

Highlights

- Of the students feeling sad, lonely, or worried, many are talking to someone.
- Most are talking to parents/caregivers and friends

Areas for Further Consideration

- Students are not talking to school staff as much
- Target prevention resources to peers and caregivers





Bulling and Depression/Suicide

Highlights

- Below state averages

Areas for Further Consideration

- 40% bullied students felt sad/hopeless daily, 27% seriously considered suicide, 20% made a suicidal plan, and 8% attempted
- Of students bullied who felt sad/hopeless, 58% miss school more often
- Target prevention resources to peers and caregivers



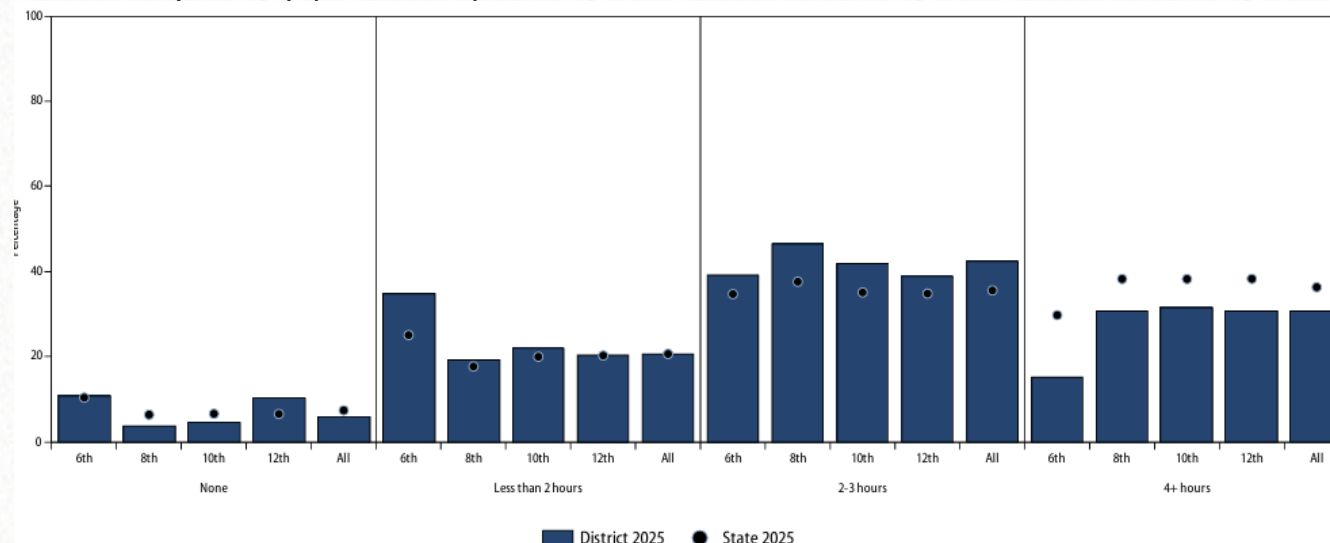
Screentime

Highlights

- Below state averages for 6th graders having phones and social media accounts, and for excessive device use
- Above state average for parents/caregivers having set rules about screentime and social media use
- Below state averages for excessive social media use per day (4+ hours)

Areas for Further Consideration

- 30% students spending 4+ hours on electronics
- While below state averages for excessive use, above state averages for 2-3 hours social media use per day
- Still 20% of students spending 4+hours on social media





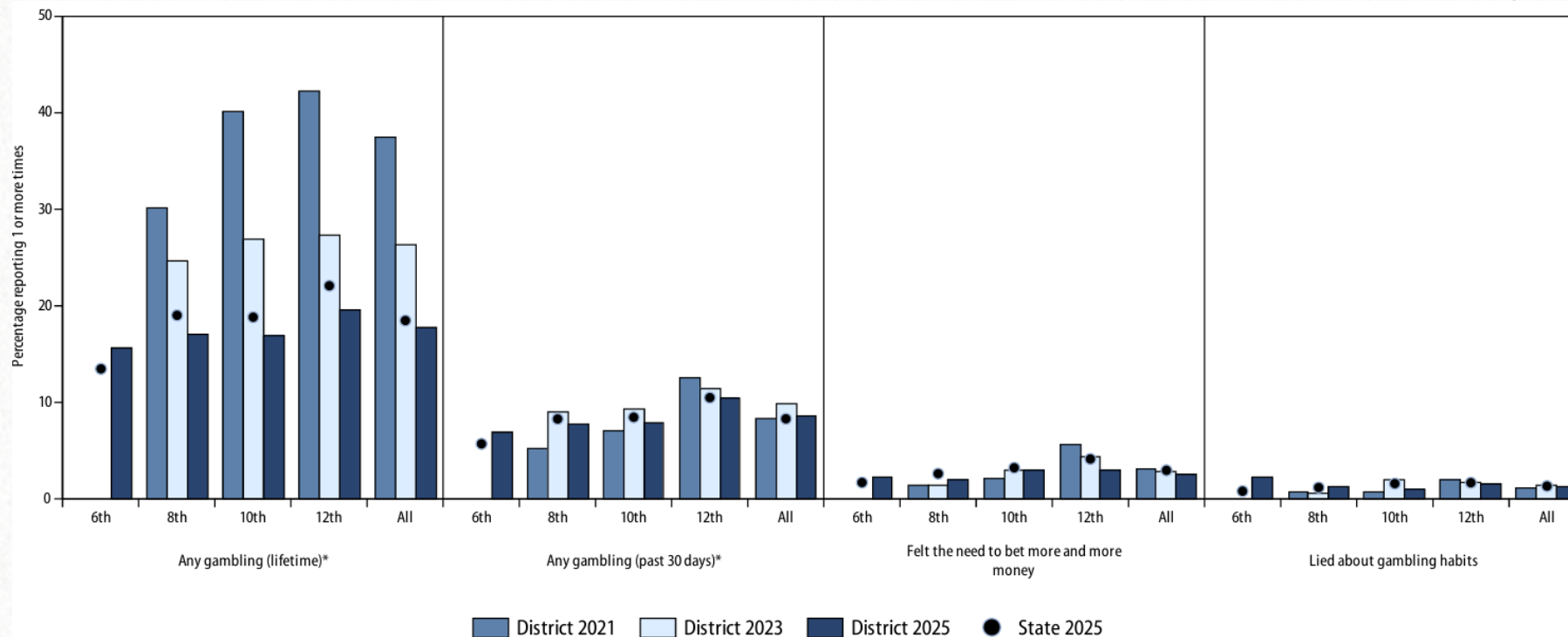
Gambling

Highlights

- Frequent gambling rates are fairly low

Areas for Further Consideration

- 17% of students engaged in gambling in their lifetime
- Games and sports related gambling the





School Climate and Safety

Highlights

- 89% of students reported a lot of opportunities to talk 1:1 with teachers
- 90% have a lot of chances to be part of class discussions/activities
- 89% of students feel safe at school
- Adults are stopping bullying when seeing it at school
- Frequent bullying occurring at low rates

Areas for Further Consideration

- 46% students view learning in school as going to be important later in life
- Schoolwork viewed as meaningful by 32% of students
- When bullying is occurring, mostly on school property and through online/social media



Indicators of Risk

Highlights

- 89% of students reported a lot of opportunities to talk 1:1 with teachers
- ATOD use is lower when perception of risk is high, when parental disapproval is high, and when peer disapproval is high

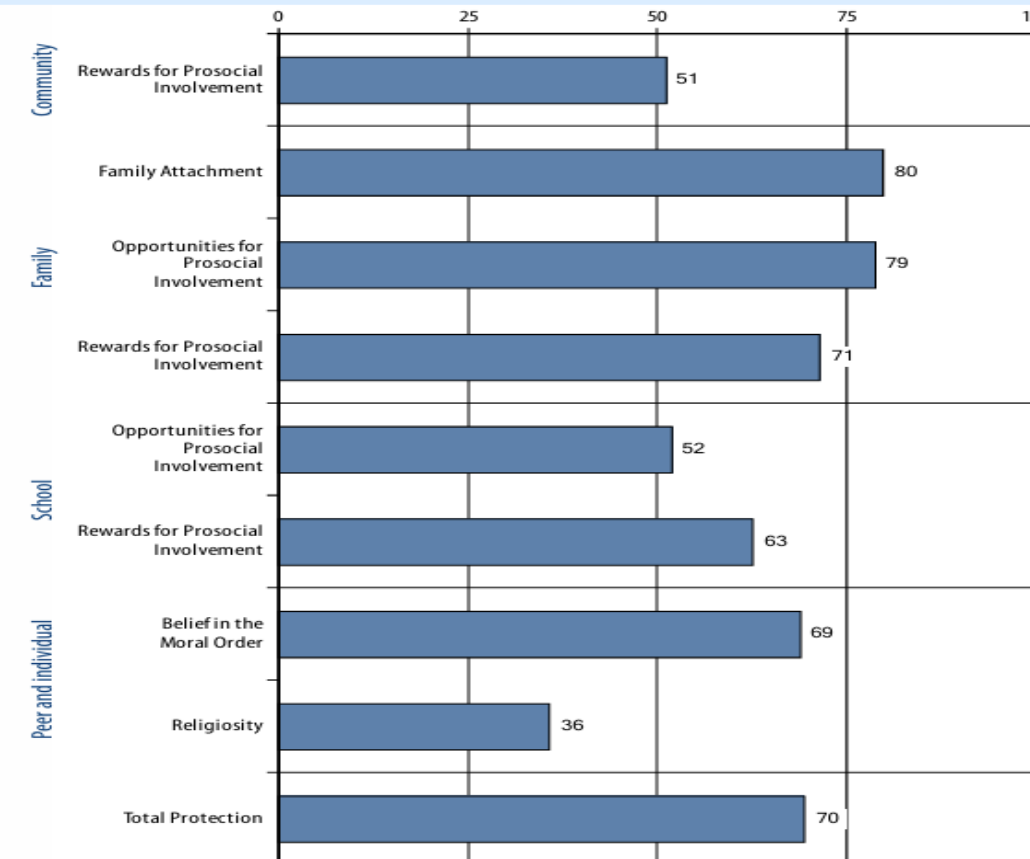
Areas for Further Consideration

- 31% students sleeping less than 7 hrs/night with rates increasing with age
- 24% of students experienced death of friend or family member
- 10% of students worried about running out of food
- 25% reporting that when using ATOD's a parent or caregiver gave it to them, with only siblings or friends being higher



Protective Factors

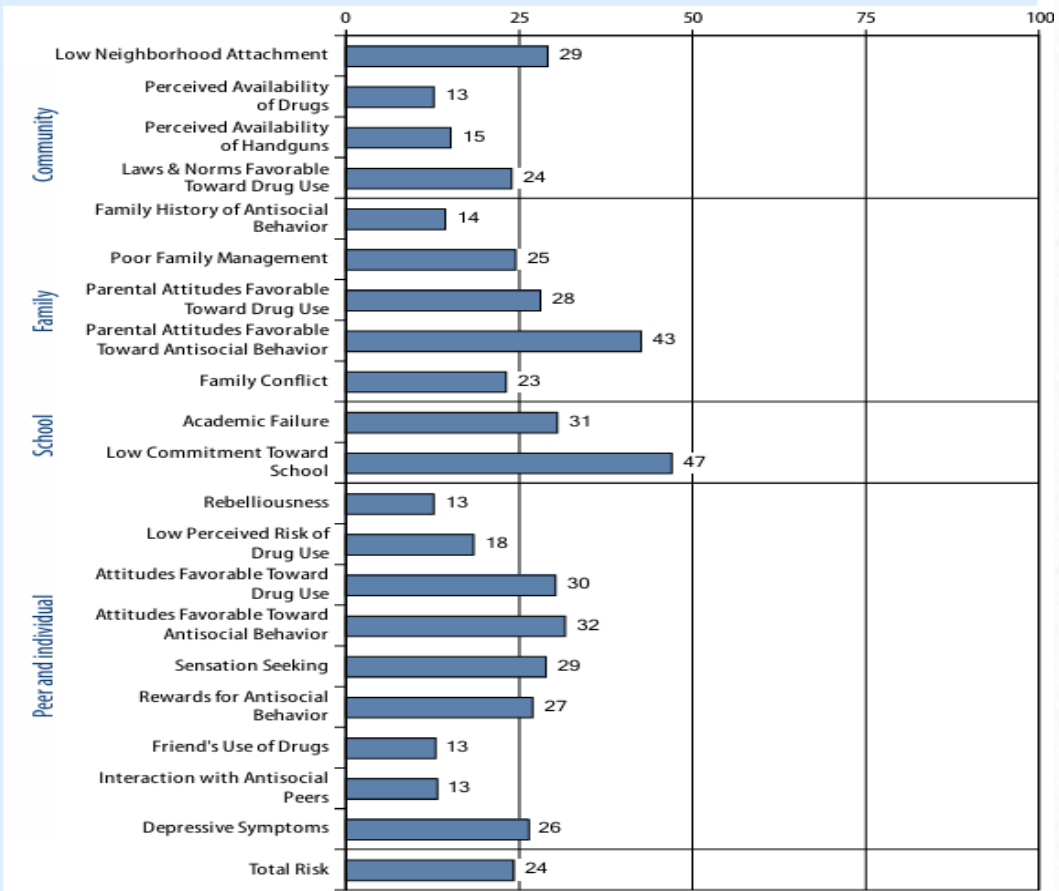
Central Bucks School District
Protective Factors, 2025 Pennsylvania Youth Survey





Risk Factors

Central Bucks School District
Risk Factors, 2025 Pennsylvania Youth Survey





Areas For Consideration

Areas for Consideration

- Use of alcohol still reported as being highest among alcohol, marijuana, inhalants, and vaping, and willingness to try at younger ages
- Slight increases in mental health difficulty in 8th grade, with higher depressive symptoms than other MH issues
- Suicide rates still higher than we would like to see: 10% seriously considered suicide, with 7% planning it and 3% attempting; seeing younger trends
- 40% bullied students felt sad/hopeless daily, 27% seriously considered suicide, 20% made a suicidal plan, and 8% attempted
- Of students bullied who felt sad/hopeless, 58% miss school more often
- Schoolwork viewed as meaningful by 32% of students
- Low commitment to school
- Parental attitudes towards poor behavior

Recommendations for Next Steps



Next Steps

- Continue to develop and bolster PBIS, anti-bullying, tiered counseling models
- Consider mental health universal screening
- Continue to expand upon suicide prevention and ATOD prevention
- Increase family engagement and education
- Staff training on warning signs of mental health and D&A challenges
- Continued focus on creative opportunities and ways to provide meaningful learning opportunities and engage students



QUEST Program Update

QUEST DEPARTMENT

September 2026

Introductions



Amy Logue
QUEST Teacher-
Linden Elementary
QUEST Department
Coordinator



Goal of Presentation



- To present the revised QUEST curriculum



This presentation will be approximately 10 minutes in length.



Agenda



Background



Course Revision Overview



Next Steps



Background

2015

- Original QUEST Course of Study was written
- The QUEST program was started for grades 1-6

2021-2022

- QUEST Units of Study were reviewed
- Determined which units needed to be updated or revised

2022-2023

- QUEST teachers collaborated to revise the Course of Study
- Several new units were field tested

2023-2026

- QUEST kindergarten Course of Study was developed
- Kindergarten curriculum implemented in pioneer schools

2025-2026

- QUEST teachers collaborated to revise the Course of Study to reflect changes related to realignment



Overview

QUEST teachers worked together to make adjustments to the curriculum related to realignment.

Fabrication lessons were written and added to the existing curriculum.

Kindergarten curriculum was field tested and revised based on teacher feedback.

Digital Literacy lessons were created for each grade level.

QUEST- 5th Grade Curriculum Revisions

■ QUEST Units

- ▷ **NEW:** Coding- Micro:bit and Make Code
- ▷ Catapults
- ▷ **NEW:** Digital Literacy
- ▷ **REVISED:** Electric City (enrichment)

QUEST- 4th Grade Curriculum Revisions

■ QUEST Units

- ▷ Gravity Cars/ Video Creation and Editing
- ▷ **NEW:** Coding and Robotics
- ▷ **NEW:** Digital Literacy
- ▷ **REVISED:** Biomedical Engineering (Enrichment)

QUEST- 3rd Grade Curriculum Revisions

■ QUEST Units

- ▷ Coding- LEGO Spike Crazy Carnival Games
- ▷ **REVISED:** Mission to the Moon Design Project
- ▷ **NEW:** Digital Literacy
- ▷ **REVISED:** Simple Machines- Rube Goldberg Challenge (Enrichment)

QUEST- 2nd Grade Curriculum Revisions

■ QUEST Units

- ▷ Harnessing the Wind
- ▷ Coding- LEGO Spike Great Adventures
- ▷ Pollination Design Project
- ▷ **NEW:** Digital Literacy

QUEST- 1st Grade Curriculum Revisions

■ QUEST Units

- ▷ Once Upon a Design
- ▷ Book and Build
- ▷ Coding- LEGO Spike Amazing Amusement Park
- ▷ **NEW:** Digital Literacy

QUEST- Kindergarten Curriculum Revisions

■ QUEST Units

- ▷ Engineering with the Three Little Pigs
- ▷ Coding with Indi
- ▷ LEGO Science EDU- Push and Pull
- ▷ **NEW:** Storybook STEM- Three Billy Goats Gruff
- ▷ **NEW:** Digital Literacy

Next Steps



Implementation of revised curriculum



Collect information to determine efficacy of new units of study



QUEST

Course Level: Elementary

Grade: 5

Time/Credit: 40 minutes per week

Development Date: August 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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Central Bucks School District
Teaching and Learning Principles

- 1. QUEST is a process through which students discover how math, science, reading, writing, social studies, and the arts are a daily part of their lives.**

Therefore, we will design lesson plans that require students to apply and integrate the content of our elementary curriculum to solve real world, unpredictable challenges.

- 2. We are preparing students to be complex thinkers, self-directed learners, effective communicators, responsible citizens, collaborative workers, and quality producers.**

Therefore, we will design lesson plans that require students to use skills in critical and creative thinking, communication, and collaboration to explore questions about issues in their natural world and community.

- 3. Learning takes place when new information is linked with existing knowledge in meaningful ways.**

Therefore, it is a priority to ensure students understand why they are learning the content. We will begin instruction with an anticipatory set that demonstrates relevancy to students' lives, scaffold instruction to build on existing knowledge, and close lessons with activities that reinforce the connection and relevancy of the material.

- 4. Learning involves connecting to the present, the past, and the possibilities of the future.**

Therefore, we will make relevant connections to the real world and provide opportunities for students to understand how the present connects to the past and affects the future.

- 5. The learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience.**

Therefore, we will help students activate prior knowledge, connect old and new information, and use what they have learned in authentic situations.

- 6. Process and product are equally important in the learning process.**

Therefore, self-reflection and self-assessment will be modeled, and opportunities for self-evaluation and prompt, meaningful feedback will be provided. Our students will receive regular and specific feedback related to progress against standards and timely opportunities to use the feedback to re-do and improve.

- 7. Technology should be an integral part of the student's experience, enhancing learning and the ability to express ideas.**

Therefore, we will model and encourage the use of technology as a tool for instruction, research, application, collaboration, and communication.

- 8. Research shows active learning is essential.**

Therefore, we will design tasks that require students to research, analyze, investigate, solve problems, make decisions, and create products.

- 9. Learning is social. Our learning is closely associated with our connection with others.**

Therefore, we will provide opportunities for students to build relationships with and among each other by facilitating discussions, building empathy, and fostering a climate of intrinsic motivation.

- 10. Relevance is essential to teaching and learning.**

Therefore, learning will include real world exposure, cross-curricular connections, and high interest materials.

- 11. Learning is most effective when differences in learners' prior knowledge, interests, and strengths are accommodated.**

Therefore, we will differentiate instruction and assessment to accommodate different learning styles and educational needs.

12. To maximize learning, students need multiple opportunities to practice and take risks.

Therefore, we will provide a supportive environment based on self-discovery and the respectful exchange of ideas.

13. Motivation influences learning.

Therefore, we will inspire students' curiosity with novel, rigorous, and relevant tasks that provide personal choice and control.

14. Formative assessment is vital for learning.

Therefore, we will create a variety of differentiated assessments that measure knowledge, application of skills, process and product, self-evaluation, and growth.

Central Bucks School District
Enduring Understandings

Students will understand that:

Critical Thinking

- Effective critical thinkers identify and ask significant questions that clarify various points of view and lead to better solutions.
- Effective critical thinkers effectively analyze and evaluate evidence, arguments, claims, and beliefs to make sensible decisions.
- Effective critical thinkers solve different kinds of unfamiliar problems in both conventional and innovative ways.
- Effective critical thinkers reflect critically on learning experiences and processes.
- Effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions.

Communication

- Effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts.
- Effective communicators understand that communication is an exchange between the sender and the receiver.
- Effective communicators adjust delivery skills to purpose, audience, and occasion.
- Effective communicators select appropriate media and technologies to enhance presentations.

Collaboration

- Effective collaborators exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.
- Effective collaborators assume shared responsibility for collaborative work, and value the individual contributions made by each team member.
- Effective collaborators are active, critical, and responsible listeners.
- Effective collaborators recognize that communication is essential to understanding themselves and others.
- Effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

Creative Thinking

- Effective creative thinkers elaborate, refine, analyze, and evaluate original ideas to improve and maximize creative efforts.
- Effective creative thinkers demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas.
- Effective creative thinkers view failure as an opportunity to learn and understand that creativity and innovation are part of a long-term, cyclical process of small successes and frequent mistakes.
- Effective creative thinkers act on creative ideas to make a tangible and useful contribution.
- Effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

Research

- Effective researchers begin with essential guiding questions.
- Effective researchers understand that the research process is inherently circular and includes the planning, gathering, analyzing, organizing, synthesizing, and evaluating of information.
- Effective researchers select appropriate resources and evaluate information based on accuracy, validity, authority, and relevance.
- Effective researchers draw conclusions, create meaning, and construct new knowledge.
- Effective researchers use information and technology ethically and responsibly to enhance their understanding and present their findings.
- Effective researchers apply research skills to authentic, real-world issues and contexts.
- Effective researchers apply digital tools to gather, evaluate, and use information.

Science and Engineering

- Science is the search for understanding the natural world, and facts, principles, theories and laws that have been verified by the scientific community and are used to explain and predict natural phenomena and events.
- Engineering is the application of science and mathematics to define real world problems and design solutions.
- Both effective scientists and engineers ask questions and define problems.
- Both effective scientists and engineers develop and use models.
- Both effective scientists and engineers plan and carry out investigations.
- Both effective scientists and engineers analyze and interpret data
- Both effective scientists and engineers use mathematics and computational thinking.
- Both effective scientists and engineers construct explanations and design solutions.
- Both effective scientists and engineers engage in argument from evidence.
- Both effective scientists and engineers obtain, evaluate, and communicate information.

**Central Bucks School District
Essential Questions**

Critical Thinking

- What does it mean to think critically?
- Why is it important to think critically?
- How do effective critical thinkers approach a problem?
- How do effective critical thinkers use conventional and innovative ways to solve unfamiliar problems?
- Why do effective critical thinkers reflect on their learning experiences and processes?
- How do effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions?

Communication

- What is communication?
- Why is effective communication important?
- How do effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts?
- How do effective communicators adjust delivery skills to purpose, audience, and occasion?
- Why is it important to use appropriate media and technologies to enhance presentations?

Collaboration

- What does it mean to collaborate?
- What are the characteristics of an effective collaborator?
- How do effective collaborators listen?
- How do effective collaborators communicate?
- How do effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others?

Creative Thinking

- What does it mean to think creatively?
- Why is it important to think creatively?
- Why is it important to consider real world limits when developing new ideas?
- How can failure be used as an opportunity to learn?
- How do effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology?

Research

- What is the value of research?
- What can be discovered or created through research?
- What makes an effective researcher?
- How do effective researchers apply research skills to authentic, real-world issues and contexts?
- How do effective researchers apply digital tools to gather, evaluate, and use information?

Science and Engineering

- What is the difference between science and engineering?
- What skills do scientists use to explore and understand our world?
- What skills do engineers use to define real world problems and design solutions?

Central Bucks School District – Course of Study Overview QUEST

Desired Results

Course Description:

QUEST is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real world challenges that allow students to apply 21st century skills to become informed citizens and life-long learners. Each unit of study is built around a real-world challenge that ties directly to classroom instruction and requires students to apply cross-curricular skills. Further, the curriculum is heavily focused on teaching students how to use and incorporate technology in new ways.

Grade 5 QUEST Course Description:

Fifth grade QUEST students will be given opportunities to explore the concepts of the engineering design process and 21st century skills. Units of study connect directly to the Grade 4 and Grade 5 curriculums in science, mathematics, social studies, reading, writing, health, and art. Units will continue to expand upon prior QUEST experiences by utilizing a variety of tools to solve real-life problems. Students will navigate Office 365 to collaborate virtually, utilize Excel for analyzing data, deepen their understanding of program code and its capabilities to create a final product, and explore materials, engineering, and circuitry.

Acceptable Evidence.

Assignments, Performance Tasks, Projects, Tests, etc.:

- Informal and Formal Critiques of 21st Century Skills, specifically critical thinking, creativity, collaboration, and communication
- Engineering products (solutions to real-world problems)
- Student Presentations

QUEST 5th Grade – Pacing Guide

Content	Days
Unit 1	
QUEST Introductory Lesson- Cantilevers Lesson 1- Introduce the concept of cantilevers in real world and man-made examples. Lesson 2- Imagine, plan, create, test, and improve cantilevers. Lesson 3- Reflect on the design process and the 4Cs. Coding: Micro:bit and Make Code Lesson 1- Micro:bit- The Micro:bit Is for Making Lesson 2- Introduction to Make Code Lessons 3- Micro:Pet Project Lesson 4- What's a Computer and What's Your Function? Lesson 5- Happy Face/Sad Face Game Lessons 6 (2 days)- Fidget Cube Lesson 7- Variables in Daily Life Lesson 8- Make a Game Scorekeeper Lessons 9 (2 days)- Everything Counts Lesson 10- Conditionals in Daily Life Lesson 11- Rock, Paper, Scissors Lessons 12 (2 days)- Board Game Challenge	18 days
Unit 2	
Catapults Lesson 1- Introduce Catapult Project Lesson 2- Design Process- Ask, Imagine, Plan Lesson 3- Introduce Excel & Review Measurement to nearest eighth inch Lessons 4 (3-4 days)- Fabrication Using Tinkercad and 3D Printing Lesson 5- Design Process- Create Lesson 6 (2-3 days)- Design Process- Test and Improve Lesson 7- Final Test Day and Class Launch Lesson 8- Design Process- Share	11-13 days
Unit 3	
Digital Literacy Lesson 1- Digital Citizenship - Creating Device-Free Moments- Recognize how constant device use can impact attention, memory and experiences. Lesson 2- Digital Citizenship - Dealing with Cyberbullying- Identify cyberbullying behaviors, reflect on their serious impact, and understand how to respond. Lesson 3- AI Literacy - How Do Machines Learn?- Experience how machine learning models are trained and tested using interactive, hands-on activities. Lesson 4- AI Literacy - Bias in Artificial Intelligence- Understand how machines learn from humans using data and patterns.	4 days

Enrichment	
Electric City Lesson 1- Civil Engineering- Identifying places in a town Lessons 2 (3 days)- Civil Engineering- Categorizing places in a town Lesson 3- Electrical Engineering- Creating series circuits Lesson 4- Electrical Engineering- Creating parallel circuits Lesson 5 (2-3 days)- Fabrication Lessons- Fab Maker Studio and Tinkercad Lesson 6- Plan circuits for electric city Lessons 7 (2-3 days)- Collaboratively create electrified city Lesson 8- Share electric city projects	12-14 days

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

Trade Books used within the curriculum include but are not limited to:

Software

- Scratch
- Code.org
- Office 365
- Make Code
- Tinkercad
- Fab Maker Studio

Hardware

- Micro:bits
- Student laptops
- 3D printer
- Silhouette cutter
- Makey Makey circuit boards

Central Bucks School District – Course of Study – QUEST

Unit 1 – Coding with Micro:bit

Desired Results:

Essential Questions:

- How does language evolve?
- How do coded commands instruct a computer?
- Is there only one way to write code?
- Why do engineers make changes to their design?
- How can technology be used in a different way?

Enduring Understandings:

Students will understand that...

- Language evolves by adapting to technology and needs.
- Code is a language that helps people communicate with computers.
- Coded commands provide sequential directions for a task.
- Codes can be written in many ways depending on the technology and task.
- Using feedback from the machine, engineers change or improve their design.
- Technology can be used to create and communicate ideas.

Knowledge:

Students will know...

- Vocabulary: algorithm, array, binary, bits, Boolean, bytes, conditionals, constants, coordinates, functions, inputs, iteration, logic, memory, outputs, processor, spring, sprite, variables
- How to break down code into a specific sequence.
- Engineers utilize code to direct technology.
- Code is the language of computers.
- How to use technology to represent information.
- Feedback can be used to change or improve a design.
- The appropriate vocabulary to communicate ideas in a collaborative group.

Skills:

Students will be able to...

- Use computer science to program a Micro:bit to perform specific tasks.
- Use design thinking and coding by design to create an innovative toy or game.
- Create programs that use sequencing, loops, conditionals, and variables.
- Use the engineering design process to write code.
- Collaborate and communicate effectively with others.

Standards:

Priority:

CSTA Standards

- 1B-CS-01- Describe how internal and external parts of computing devices function to form a system.
- 1B-CS-02- Model how computer hardware and software work together as a system to accomplish tasks.
- 1B-AP-09- Create programs that use variables to store and modify data.

- 1B-AP-10- Create programs that include sequences, events, loops, and conditionals.
- 1B-AP-17- Describe choices made during program development using code comments, presentations, and demonstrations.
- 2-AP-10- Use flowcharts and/or pseudocode to address complex problems as algorithms.
- 2-AP-11- Create clearly named variables that represent different data types and perform operations on their values.
- 2-AP-12- Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.

STEELS Standards

- 3.5.6-8.J- Use tools, materials, and machines to safely diagnose, adjust, and repair systems.
- 3.5.6-8.K- Use devices to control technological systems.
- 3.5.6-8.Q- Apply a technology and engineering design thinking process.
- 3.5.6-8.U- Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design.
- 3.5.6-8.V- Refine design solutions to address criteria and constraints.
- 3.5.6-8.EE- Differentiate between inputs, processes, outputs, and feedback in technological systems.

Acceptable Evidence:

Performance Tasks – Students will collaborate with classmates to create a game that uses a Micro:bit and a program that correctly and effectively uses conditionals.

Real-World Problem-

An ability to understand, participate and work in the digital world is vitally important to your life. By learning digital skills, you may choose STEM subjects as you progress through school and into your career. This, in turn, grows a diverse pipeline of talent, boosting social equity and contributing to the creation of better technology. The real-world challenge is- **“Can you work collaboratively with others to create a game using a Micro:bit and program that correctly and effectively uses conditionals?”**.

Acceptable evidence of learning other than Performance Tasks:

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), journal entries/exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will understand the four components that make up a computer and their functions.
- Students will understand that the Micro:bit takes input, and after processing the input, produces output.
- Students will learn the variety of different types of information the Micro:bit takes in as input.
- Students will apply this knowledge by creating a Micro:bit program that takes input and produces an output.
- Students will learn to exercise creativity, engineering and resourcefulness by coming up with ideas for using simple household or classroom materials to accommodate the Micro:bit’s size and weight as part of their Micro:pet project.
- Students will test and iterate using different materials and sizes in order to create an optimal design to house the Micro:bit and battery pack.
- Students will become familiar with the MakeCode programming environment.
- Students will learn how to download programs from the computer to the Micro:bit.

- Students will learn to exercise communication and collaboration and apply the design thinking process to develop an understanding of a problem or user need and iteratively design an optimal solution.
- Students will apply their understanding of the problem in a creative way by making a “Micro:pet” creature for their partner.
- Students will understand what variables are, why and when to use them in a program.
- Students will learn how to create a variable, set the variable to an initial value, and change the value of the variable within a Micro:bit program.
- Students will learn how to create meaningful and understandable variable names.
- Students will understand that a variable holds one value at a time.
- Students will understand that when you update or change the value held by a variable, the new value replaces the previous value.
- Students will learn how to use the basic mathematical blocks for adding, subtracting, multiplying, and dividing variable values.
- Students will apply the above knowledge and skills to create a unique program that uses variables as an integral part of the project.
- Students will understand what conditional statements are, and why and when to use them in a program.
- Students will learn how to use the Logic blocks ‘If...then’ and ‘If...then...else’.
- Students will practice using the Logic blocks so different conditions yield specified outcomes.
- Students will demonstrate understanding and apply skill by collaborating with classmates to create a game that uses a Micro:bit and a program that correctly and effectively uses conditionals.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students’ strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – Course of Study – QUEST

Unit 2 – Catapults

Desired Results:

Essential Questions:

- How are catapults used to launch objects to reach a given distance?
- How does force affect the speed and distance of a projectile?
- Is there one "right" or best answer to an engineering problem? Why or why not?

Enduring Understandings:

Students will understand that...

- Catapults are a type of simple machine.
- Catapults use energy transfers to perform work.
- Force determines how fast and far an object travels.
- Engineers use a design process to construct solutions to problems.

Knowledge:

Students will know...

- Catapults are a type of simple machine (lever) used to launch objects.
- The lever of a catapult rests on the fulcrum, which allows force to launch the load (object).
- Catapults use energy transfers: elastic energy, motion energy, gravitational energy, etc.
- The optimal angle needed to hit target with a projectile.

Skills:

Students will be able to...

- Follow the scientific method to design an experiment.
- Design and construct a catapult with given materials.
- Communicate and collaborate with team.
- Measure to the nearest 1/8 inch.
- Create an Excel spreadsheet to gather data and calculate accuracy rate.
- Present experiment results to a group through the use of CB's educational technology.

Standards:

Priority:

STEELS Standards

- 3.5.3-5.I- Design solutions by safely using tools, materials, and skills.
- 3.5.3-5.L- Demonstrate how tools and machines extend human capabilities, such as holding, lifting, carrying, fastening, separating, and computing.
- 3.5.3-5.M- Demonstrate essential skills of the engineering design process.
- 3.5.3-5.N- Identify why a product or system is not working properly.
- 3.5.3-5.O- Describe requirements of designing or making a product or system.
- 3.5.3-5.P- Evaluate the strengths and weaknesses of existing design solutions, including their own solutions.
- 3.5.3-5.Q- Practice successful design skills.
- 3.5.3-5.R- Apply tools, techniques, and materials in a safe manner as part of the design process.
- 3.5.3-5.S- Illustrate that there are multiple approaches to design.

- 3.5.3-5.T- Apply universal principles and elements of design.
- 3.5.3-5.U- Evaluate designs based on criteria, constraints, and standards.

Supporting:

Math Standards

- CC.2.4.5.A.1- Solve problems using conversions within a given measurement system.
- CC.2.4.5.A.2- Represent and interpret data using appropriate scale.

Acceptable Evidence:

Performance Tasks – Students will collaborate to design and create a catapult that launches a projectile five feet.

Real-World Challenge-

Catapults are machines that were originally used in medieval times but are still used in many ways today. The military occasionally uses catapults to launch airplanes from ships, and sometimes kids like to launch water balloons outside with their friends. **“Can you design and create a catapult that is able to launch an object and hit a target 5 feet away with 80% accuracy?”.**

Acceptable evidence of learning other than Performance Tasks:

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), journal entries/exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will become familiar with the catapult project expectations and design process.
- Students will complete **Ask, Imagine, and Plan** sections of the Engineering Design Process.
- Students will create an Excel worksheet for data collection.
- Students will review measuring to the nearest eighth of an inch.
- Students will learn how to design 3D structures using Tinkercad and the 3D printer.
- Students will work collaboratively to build catapults.
- Students will conduct unofficial tests with projectiles while building.
- Students will make improvements to their prototypes.
- Students will determine an official “testing” location.
- Each group will launch their catapult for the class.
- Students will present their Excel data.
- Students will compare results.
- Students will create an advertisement to market their catapult and share with the class.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students’ strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – QUEST – Grade 5

Unit 4– Digital Literacy

Desired Results:

Essential Questions:

- Why is it important to sometimes put our devices away and be fully present?
- How can technology affect what we notice, remember, and experience?
- When might a device-free moment help us enjoy an experience more deeply?
- How can we create a healthy balance between using technology and enjoying offline experiences?
- How can we recognize the difference between joking, being mean, bullying, and cyberbullying?
- What makes cyberbullying different from in-person bullying?
- How can cyberbullying affect the people involved, including targets and bystanders?
- What actions can we take to respond safely and responsibly when cyberbullying occurs?
- How do computers and AI systems learn to recognize patterns and make predictions?
- Why do machines need training data to learn new tasks?
- How does supervised learning help AI make decisions about new information?
- How can the quality and variety of data affect what a machine learns?
- Why can AI systems sometimes make unfair or inaccurate decisions?
- How do human choices and perspectives influence the data used to train AI?
- What is algorithmic bias, and how can it affect people and outcomes?
- How can we create fairer and more accurate AI systems?

Enduring Understandings:

Students will understand that...

- Making thoughtful choices about when and how to use technology helps us maintain a healthy balance in our lives.
- Using strategies such as the A.C.T. framework can help students take safe, positive action when faced with cyberbullying.
- AI systems learn by finding patterns in data provided by humans.
- The quality and diversity of training data directly affect AI performance.
- AI can make mistakes or produce biased outcomes when trained on incomplete or unbalanced data.
- Humans play an important role in designing, training, monitoring, and improving AI systems to make them fairer and more effective.

Knowledge:

Students will know...

- Vocabulary: algorithm, algorithmic bias, bias, bullying, cyberbullying, device-free, perspective, supervised learning, target
- To recognize when technology enhances an experience and when putting devices away may help them be more present, focused, and engaged.
- Ways to identify cyberbullying and understand appropriate ways to respond when they encounter harmful online behavior.
- How to evaluate situations, consider consequences, and make thoughtful choices that support their well-being and the well-being of others.
- How machines learn from examples and data.
- Why the data used to train AI matters.

- How bias can affect AI and what people can do to make AI fairer.

Skills:

Students will be able to...

- Identify when a device-free moment may enhance an experience and explain how being fully present can help them notice, remember, and enjoy more of what is happening around them.
- Recognize cyberbullying and distinguish it from joking, being mean, and in-person bullying, using key characteristics to identify harmful online behavior.
- Apply appropriate strategies to respond to cyberbullying, including using the A.C.T. framework and seeking support from trusted adults when needed.
- Explain how AI uses data.
- Evaluate the accuracy of AI predictions.
- Identify and address bias in AI systems.

Standards:

Priority:

STEELS Standards

TE.3-5.3 Information and Communication Technologies

TE.3-5.4 Computational Thinking

TE.3-5.7: Analyze the effects of technology on people and society.

TE.3-5.8: Evaluate responsible and ethical uses of technology.

15.4.5.B: Demonstrate safe, ethical, and socially responsible online behavior.

Acceptable Evidence:

Performance Tasks – Students will create and explain a meaningful device-free experience demonstrating understanding of the value of being fully present. Students will apply the A.C.T. framework to a realistic cyberbullying situation and determine appropriate responses. Students will learn from training data and classify new images using supervised learning. Students will identify bias in a sorting algorithm and redesign the rules to create a fairer system.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, rubrics, exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will participate in a memory challenge to see how well they observe things.
- Students will learn about the science of the brain and “cognitive offloading”.
- Students will engage in a discussion about the value of making time for device-free moments.
- Students will draw a picture of their ideal offline space.
- Students will participate in a discussion about the difference between being mean, bullying, and cyberbullying.
- Students will watch a video that will help them define the term cyberbullying.
- Students will learn a strategy for dealing with cyberbullying (A.C.T.- Ask for help from trusted adults, Collect evidence and report, Take care of yourself).
- Students will practice the steps of the A.C.T. strategy by analyzing a scenario.

- Students will review the definition of Artificial Intelligence and how machines learn.
- Students will imagine how to teach a machine the difference between alligators and crocodiles.
- Students will learn the definition of supervised learning.
- Students will practice supervised learning by pretending to be a robot.
- Students will use the Code.org AI for Oceans activity to experience machine learning.
- Students will engage in a discussion and watch a video to learn about the terms “perspective”, “bias”, and “algorithmic bias”.
- Students will pretend to be a robot and will sort animals according to the robot’s rules.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students’ strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – Course of Study – QUEST Enrichment – Electric City

Desired Results:

Essential Questions:

- What are important considerations when planning a town or city?
- How does electricity move?
- How do you create a circuit that turns on lights and motors?
- How do you create a circuit where some items are turned off while others continue to function?

Enduring Understandings:

Students will understand that...

- Electricity moves in a path called a circuit.
- There are different kinds of circuits (parallel, series, etc.)
- A completed circuit is necessary to operate electrical devices.
- Towns' electrical grids consist of parallel circuits.

Knowledge:

Students will know...

- Electricity must move in a circuit.
- Electricity passes through conductors and is "blocked" or slowed by an insulator.
- Engineers plan cities.
- Parallel circuits are created to allow some electrical devices to be turned off while others continue to function.

Skills:

Students will be able to...

- Create and demonstrate different aspects of circuits.
- Collaborate with a group to compromise, plan, and create.
- Utilize critical thinking to apply understanding of circuits to create the final product.

Standards:

Priority:

STEELS Standards

- 3.2.4.B- Make and communicate observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
- 3.5.3-5.I- Design solutions by safely using tools, materials, and skills.
- 3.5.3-5.M- Demonstrate essential skills of the engineering design process.
- 3.5.3-5.N- Identify why a product or system is not working properly.
- 3.5.3-5.O- Describe requirements of designing or making a product or system.
- 3.5.3-5.P -Evaluate the strengths and weaknesses of existing design solutions, including their own solutions.
- 3.5.3-5.Q- Practice successful design skills.
- 3.5.3-5.R- Apply tools, techniques, and materials in a safe manner as part of the design process.
- 3.5.3-5.S- Illustrate that there are multiple approaches to design.
- 3.5.3-5.T- Apply universal principles and elements of design.
- 3.5.3-5.U -Evaluate designs based on criteria, constraints, and standards.
- 3.5.3-5.BB- Illustrate how, when parts of a system are missing, it may not work as planned.
- 3.5.3-5.DD- Demonstrate how simple technologies are often combined to form more complex systems.

Supporting:

Social Studies Standards

7.1.4.B - Describe and locate places and regions as defined by physical and human features.

7.2.4.A-Identify the physical characteristics of places and regions.

Acceptable Evidence:

Performance Tasks- Students will design a town grid and create series and parallel circuits to electrify the town.

Real-World Challenge-

We live in an amazingly high-tech world, surrounded by electronic gizmos and gadgets. Because our lives are so infused with electronics, *everyone* – engineers, entrepreneurs, students, and artists alike – can greatly benefit from learning more about them. In this unit we will study civil engineering, review series circuits, explore and create parallel circuits. As civil engineers, your real-world challenge is- **“Can you collaborate to create a parallel or series circuit to electrify a town of your design?”**.

Acceptable evidence of learning other than Performance Tasks:

Teacher observation, anecdotal notes, student self-reflection, and/or journal entries/exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students create a “bird’s eye view” sketch of a town.
- Students categorize buildings and develop a shared list of required features.
- Students collaborate to create a town map which includes all required features.
- Students review fourth-grade electrical circuits skills.
- Students will create a simple series circuit using a battery, wire, and light bulb.
- Students will create a parallel circuit.
- Students will explore Fab Maker Studio and Tinkercad as options for designing and fabricating 3D objects for their electric city project.
- Students will collaborate to plan their electrical grid using the rough draft of their town grid.
- Students will plan the creation of electrical circuits in their town.
- Students will implement their plans to electrify their town grids.
- Students will present their electrified town grid to the class.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students’ strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.



QUEST

Course Level: Elementary

Grade: 4

Time/Credit: 40 minutes per week

Development Date: August 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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**Central Bucks School District
Teaching and Learning Principles**

- 1. QUEST is a process through which students discover how math, science, reading, writing, social studies, and the arts are a daily part of their lives.**

Therefore, we will design lesson plans that require students to apply and integrate the content of our elementary curriculum to solve real world, unpredictable challenges.

- 2. We are preparing students to be complex thinkers, self-directed learners, effective communicators, responsible citizens, collaborative workers, and quality producers.**

Therefore, we will design lesson plans that require students to use skills in critical and creative thinking, communication, and collaboration to explore questions about issues in their natural world and community.

- 3. Learning takes place when new information is linked with existing knowledge in meaningful ways.**

Therefore, it is a priority to ensure students understand why they are learning the content. We will begin instruction with an anticipatory set that demonstrates relevancy to students' lives, scaffold instruction to build on existing knowledge, and close lessons with activities that reinforce the connection and relevancy of the material.

- 4. Learning involves connecting to the present, the past, and the possibilities of the future.**

Therefore, we will make relevant connections to the real world and provide opportunities for students to understand how the present connects to the past and affects the future.

- 5. The learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience.**

Therefore, we will help students activate prior knowledge, connect old and new information, and use what they have learned in authentic situations.

- 6. Process and product are equally important in the learning process.**

Therefore, self-reflection and self-assessment will be modeled, and opportunities for self-evaluation and prompt, meaningful feedback will be provided. Our students will receive regular and specific feedback related to progress against standards and timely opportunities to use the feedback to re-do and improve.

- 7. Technology should be an integral part of the student's experience, enhancing learning and the ability to express ideas.**

Therefore, we will model and encourage the use of technology as a tool for instruction, research, application, collaboration, and communication.

- 8. Research shows active learning is essential.**

Therefore, we will design tasks that require students to research, analyze, investigate, solve problems, make decisions, and create products.

- 9. Learning is social. Our learning is closely associated with our connection with others.**

Therefore, we will provide opportunities for students to build relationships with and among each other by facilitating discussions, building empathy, and fostering a climate of intrinsic motivation.

- 10. Relevance is essential to teaching and learning.**

Therefore, learning will include real world exposure, cross-curricular connections, and high interest materials.

11. Learning is most effective when differences in learners' prior knowledge, interests, and strengths are accommodated.

Therefore, we will differentiate instruction and assessment to accommodate different learning styles and educational needs.

12. To maximize learning, students need multiple opportunities to practice and take risks.

Therefore, we will provide a supportive environment based on self-discovery and the respectful exchange of ideas.

13. Motivation influences learning.

Therefore, we will inspire students' curiosity with novel, rigorous, and relevant tasks that provide personal choice and control.

14. Formative assessment is vital for learning.

Therefore, we will create a variety of differentiated assessments that measure knowledge, application of skills, process and product, self-evaluation, and growth.

Central Bucks School District
Enduring Understandings

Students will understand that:

Critical Thinking

- Effective critical thinkers identify and ask significant questions that clarify various points of view and lead to better solutions.
- Effective critical thinkers effectively analyze and evaluate evidence, arguments, claims, and beliefs to make sensible decisions.
- Effective critical thinkers solve different kinds of unfamiliar problems in both conventional and innovative ways.
- Effective critical thinkers reflect critically on learning experiences and processes.
- Effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions.

Communication

- Effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts.
- Effective communicators understand that communication is an exchange between the sender and the receiver.
- Effective communicators adjust delivery skills to purpose, audience, and occasion.
- Effective communicators select appropriate media and technologies to enhance presentations.

Collaboration

- Effective collaborators exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.
- Effective collaborators assume shared responsibility for collaborative work, and value the individual contributions made by each team member.
- Effective collaborators are active, critical, and responsible listeners.
- Effective collaborators recognize that communication is essential to understanding themselves and others.
- Effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

Creative Thinking

- Effective creative thinkers elaborate, refine, analyze, and evaluate original ideas to improve and maximize creative efforts.
- Effective creative thinkers demonstrate originality and inventiveness in work and understand the real-world limits to adopting new ideas.
- Effective creative thinkers view failure as an opportunity to learn and understand that creativity and innovation are part of a long-term, cyclical process of small successes and frequent mistakes.
- Effective creative thinkers act on creative ideas to make a tangible and useful contribution.
- Effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

Research

- Effective researchers begin with essential guiding questions.
- Effective researchers understand that the research process is inherently circular and includes the planning, gathering, analyzing, organizing, synthesizing, and evaluating of information.
- Effective researchers select appropriate resources and evaluate information based on accuracy, validity, authority, and relevance.
- Effective researchers draw conclusions, create meaning, and construct new knowledge.
- Effective researchers use information and technology ethically and responsibly to enhance their understanding and present their findings.
- Effective researchers apply research skills to authentic, real-world issues and contexts.
- Effective researchers apply digital tools to gather, evaluate, and use information.

Science and Engineering

- Science is the search for understanding the natural world, and facts, principles, theories and laws that have been verified by the scientific community and are used to explain and predict natural phenomena and events.
- Engineering is the application of science and mathematics to define real world problems and design solutions.
- Both effective scientists and engineers ask questions and define problems.
- Both effective scientists and engineers develop and use models.
- Both effective scientists and engineers plan and carry out investigations.
- Both effective scientists and engineers analyze and interpret data
- Both effective scientists and engineers use mathematics and computational thinking.
- Both effective scientists and engineers construct explanations and design solutions.
- Both effective scientists and engineers engage in argument from evidence.
- Both effective scientists and engineers obtain, evaluate, and communicate information.

Central Bucks School District

Essential Questions

Critical Thinking

- What does it mean to think critically?
- Why is it important to think critically?
- How do effective critical thinkers approach a problem?
- How do effective critical thinkers use conventional and innovative ways to solve unfamiliar problems?
- Why do effective critical thinkers reflect on their learning experiences and processes?
- How do effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions?

Communication

- What is communication?
- Why is effective communication important?
- How do effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts?
- How do effective communicators adjust delivery skills to purpose, audience, and occasion?
- Why is it important to use appropriate media and technologies to enhance presentations?

Collaboration

- What does it mean to collaborate?
- What are the characteristics of an effective collaborator?
- How do effective collaborators listen?
- How do effective collaborators communicate?
- How do effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others?

Creative Thinking

- What does it mean to think creatively?
- Why is it important to think creatively?
- Why is it important to consider real world limits when developing new ideas?
- How can failure be used as an opportunity to learn?
- How do effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology?

Research

- What is the value of research?
- What can be discovered or created through research?
- What makes an effective researcher?
- How do effective researchers apply research skills to authentic, real-world issues and contexts?
- How do effective researchers apply digital tools to gather, evaluate, and use information?

Science and Engineering

- What is the difference between science and engineering?
- What skills do scientists use to explore and understand our world?
- What skills do engineers use to define real world problems and design solutions?

Central Bucks School District – Course of Study Overview

QUEST

Desired Results

Course Description:

QUEST is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real world challenges that allow students to apply 21st century skills to become informed citizens and life-long learners. Each unit of study is built around a real-world challenge that ties directly to classroom instruction and requires students to apply cross-curricular skills. Further, the curriculum is heavily focused on teaching students how to use and incorporate technology in new ways.

Grade 4 QUEST Course Description:

Fourth grade QUEST students will be given opportunities to explore the concepts of the engineering design process and 21st century skills. Units of study connect directly to the Grade 3 and Grade 4 curriculums in science, mathematics, social studies, reading, writing, health, and art. Units will continue to expand upon prior QUEST experiences by utilizing a variety of tools to solve real-world problems. Students will navigate Office 365 to collaborate virtually, deepen their understanding of program code and its capabilities to create a final product, and explore video editing, filming, and publishing capabilities using editing software.

Acceptable Evidence.

Assignments, Performance Tasks, Projects, Tests, etc.:

- Informal and Formal Critiques of 21st Century Skills, specifically creativity, collaboration, and communication
- Engineering products (solutions to real-world problems)
- Student Presentations

QUEST 4th Grade – Pacing Guide

Content		Days
Unit 1 -		
QUEST Introductory Lesson- Tower of Power Lesson 1: Introduce Tower Challenge Lesson 2: Create, Test, and Improve Towers Lesson 3: Reflect and Review the 4Cs. Gravity Cars/ Video Creation and Editing Project Lesson 1: Introduction to the Gravity Cars Unit. Imagine a design for a car. Lesson 2: Ask and Imagine Part 1- Gravity Car Build Lesson 3: Imagine and Plan- WeVideo Project Lesson 4: Ask and Imagine Part 2- Gravity Car Build Lessons 5 (2 days): Fabrication- Fab Maker Studio and Silhouette Cutter Lesson 6: WeVideo Introduction Lesson 7 (2 days): Fabrication- Tinkercad and 3D Printing Lesson 8: Plan and Create- Gravity Car Build Lesson 9 (2-3 days): Create, Test, and Improve Lesson 10: Share- Gravity Car Race Day Lesson 11 (2-3 days): Share- WeVideo Project		18-20 days
Unit 2 -		
Coding and Robotics QUEST teachers may choose from the following coding menu to address standards and student outcomes.		5-9 days
Option 1- Finch Robots Lesson 1: Finch's First Day Lesson 2: Tower of Terror Lesson 3 (2 days): Jousting Challenge Lesson 4: (2 days): Maze Runner Lesson 5: Drawing Lesson 6: Dance Party	Option 2- Make Code Arcade Lesson 1: Save the Baby Dinos Lesson 2: Whack the Mole Lesson 3: Burstin' Balloons Lesson 4: Monster Truck Racer Lesson 5: Save the Galaxy Lesson 6: 80's Rockstar Maze Lesson 7: Chase the Pizza Lesson 8 (2 days): Makey Makey Game Controllers	
Option 3- Indi Robots Lesson 1: Meet Indi Lesson 2: Coding Challenge Cards Lesson 3: Debugging Challenge Cards Lesson 4: Creating Challenges Lesson 5 (2 days): Indi Out on the Town Lesson 6 (2 days): Road Trip with Indi	Option 4- Code.org Elementary Game Design Lesson 1: Game Design Lesson 2: Variables as Score Lesson 3: Environment and Players Lesson 4: Game Jam Day 1 Lesson 5: Game Jam Day 2	
Option 5- Code.org Maker with Micro:bit Lesson 1: Dance Party Unplugged Lesson 2: Dance Party Lesson 3: Designing for Accessibility Lesson 4: Meet your Micro:bit Lesson 5: Sensory Toy with Micro:bit Lesson 6: Conditional Cards	Option 6 – Scratch Storytelling Lesson 1: Getting Started with Scratch Lesson 2: Characters, Setting, and Dialogue Lesson 3: Movement Lesson 4: Interactive Stories and Sound Lesson 5 (4 days): Create Your Own Story Lesson 6: Reflect and Share	

Lesson 7: If/Else with Bees Lesson 8: Simple Door Alarm Coding with Micro:bit		
Option 7- Scratch- Physical Computing with Makey Makey Lesson 1: Set Up and Test Lesson 2: Makey Secret Code Lesson 3: Foil Piano Lesson 4: Art Comes Alive Lesson 5 (4 days): Create Your Own Unique Project Lesson 6: Reflect and Share		
Unit 3 – (Optional)		
Biomedical Engineering-Assistive Technology Lesson 1: What Is Empathy? Lesson 2: Facing Physical Challenges with Character Strength Lesson 3: Assistive Technology Lesson 4: Introduction to Makey Makey Lesson 5: Makey Makey - Conductors and Insulators Lesson 6: Imagine - Assistive Technology Lesson 7: Plan - Assistive Technology Lesson 8 (3 days) - Create, Test, Improve- Assistive Technology Lesson 9: Share finished products.		11 days
Unit 4- Digital Literacy		
Lesson 1: Digital Citizenship - Group Chat Dynamics- Apply strategies for being supportive in group digital spaces. Lesson 2: AI Literacy - Can Machines Really Learn?- Learn how machines become intelligent. Lesson 3: AI Literacy - What Is an Algorithm?- Learn what an algorithm is and be able to write their own algorithm.		3 days

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

Trade Books used within the curriculum include but are not limited to:

- *Going Places* by Peter and Paul Reynolds

Software

- Office 365
- WeVideo
- Tinkercad

- Scratch
- Code.org
- Fab Maker Studio
- Birdblox App
- Make Code

Hardware

- 3D Printer
- Silhouette Cutter
- Finch Robots
- Indi Robots
- Micro:bits
- Makey Makey Circuit Boards

Central Bucks School District – Course of Study – QUEST

Unit 1 – Gravity Cars/ Video Creation and Editing

Desired Results:

Essential Questions:

- How does an engineer design, create, and demonstrate a project within specific constraints?
- How can we effectively collaborate and communicate with others?
- How can we use the design process to produce a video?

Enduring Understandings:

Students will understand that...

- Understand and demonstrate the steps of the engineering and scientific process.
- Video production requires the use of the design process.

Knowledge:

Students will know...

- Vocabulary: aerodynamic, drag, energy efficient, force, friction, gravity, lift, motion, refine, thrust, vary
- The steps of the engineering process.
- The steps to create a gravity car using specific constraints.
- How to create and edit a video production.

Skills:

Students will be able to...

- Follow the engineering design process to design, create, and test a gravity car.
- Use a budget to purchase materials.
- Communicate and collaborate with a team.
- Use technology to create and produce a video showing the design process.
- Present results to a group.

Standards:

Priority:

STEELS Standards

- 3.2.4.A- Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- 3.5.3-5.C- Follow directions to complete a technological task.
- 3.5.3-5.F Classify resources used to create technologies as either renewable or nonrenewable.
- 3.5.3-5.I- Design solutions by safely using tools, materials, and skills.
- 3.5.3-5.M- Demonstrate essential skills of the engineering design process.
- 3.5.3-5.N- Identify why a product or system is not working properly.
- 3.5.3-5.O- Describe requirements of designing or making a product or system.
- 3.5.3-5.P -Evaluate the strengths and weaknesses of existing design solutions, including their own solutions.
- 3.5.3-5.Q- Practice successful design skills.
- 3.5.3-5.R Apply tools, techniques, and materials in a safe manner as part of the design process.
- 3.5.3-5.S- Illustrate that there are multiple approaches to design.
- 3.5.3-5.T- Apply universal principles and elements of design.
- 3.5.3-5.U -Evaluate designs based on criteria, constraints, and standards.
- 3.5.3-5.BB- Illustrate how, when parts of a system are missing, it may not work as planned.
- 3.5.3-5.DD- Demonstrate how simple technologies are often combined to form more complex systems.

Acceptable Evidence:

Performance Tasks – Students will design, build, test, and demonstrate a gravity car. They will create, edit, and produce a video that highlights the design process and the 4Cs.

Real-World Challenge-

The energy use and pollution associated with transportation is one of the largest issues facing society today. By building energy-efficient cars, engineers can lower the negative impacts that cars have on the environment and ultimately help improve our lives. The energy efficiency of a car is affected by a variety of factors, including size, aerodynamics, weight, and the rolling resistance of the wheels. Engineers must know all about these factors to design better cars. The real-world challenge is- **“Can you design a car that will roll down a track at the fastest possible speed while capturing the engineering design process in a video production?”**

Acceptable evidence of learning other than Performance Tasks:

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), journal entries/exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will review the 4 Cs of 21st century learning.
- Students will join a collaborative WeVideo project.
- Students will understand the parts of the challenge.
- Students will create 3D models of cars, thinking about shape and design.
- Students will follow the steps of the engineering design process.
- Students will work collaboratively to plan a video project that highlights the 4 Cs and shows the process of creating a gravity car.
- Students will learn about the need for energy-efficient cars and describe their characteristics.
- Students will imagine and sketch an idea for a gravity car.
- Students will take pictures and videos to add to their gravity cars video project.
- Students will use Fab Maker studio and the Silhouette cutter to create 3D objects.
- Students will learn how to use the features of WeVideo to create an introduction to their video project.
- Students will utilize the tutorials in Tinkercad to learn the basics of CAD.
- Students will use the 3D printer as an option for fabricating parts for their gravity car.
- Students will use collaboration and communication to share their ideas and make one team design for a gravity car.
- Students will work collaboratively to create, test, and improve a gravity car.
- Students will collect data on speed and distance as they race their gravity car down a ramp.
- Students will work collaboratively to create and edit a video project highlighting the 4 Cs.
- Students will share their finished video projects. They will offer and receive feedback on the 4 Cs videos.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – Course of Study – QUEST

Unit 2 – Coding and Robotics

Desired Results:

Essential Questions:

- How does language evolve?
- How do coded commands instruct a computer?
- Is there only one way to write code?
- Why do engineers make changes to their design?
- How can technology be used in a different way?

Enduring Understandings:

Students will understand that...

- Language evolves by adapting to technology and needs.
- Code is a language that helps people communicate with computers.
- Coded commands provide sequential directions for a task.
- Codes can be written in many ways depending on the technology and task.
- Using feedback from the machine, engineers change or improve their design.
- Technology can be used to create and communicate ideas.

Knowledge:

Students will know...

- Vocabulary: conditionals, data, debug, events, loops, program, randomness, sequences, variables
- How to break down code into a specific sequence.
- Engineers utilize code to direct technology.
- Code is the language of computers.
- How to use technology to represent information.
- Feedback can be used to change or improve a design.
- The appropriate vocabulary to communicate ideas in a collaborative group.

Skills:

Students will be able to...

- Use computer science to create programs and manipulate robots.
- Create programs that use sequencing, loops, and conditionals.
- Use the engineering design process to write code.
- Collaborate and communicate effectively with others.

Standards:

Priority:

CSTA Standards

1B-AP-08- Compare and refine multiple algorithms for the same task and determine which is the most appropriate.

1B-AP-09- Create programs that use variables to store and modify data.

1B-AP-10- Create programs that include sequences, events, loops, and conditionals.

1B-AP-11- Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.

1B-AP-12- Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.

1B-AP-15- Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

1B-AP-16- Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review stages of program development.

Acceptable Evidence:

Performance Tasks – Students will use coding and robotics tools and applications such as Finch robots, Indi robots, Make Code, Code.org, and Scratch to develop computer programs.

Acceptable evidence of learning other than Performance Tasks:

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), journal entries/exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will write code to program a robot to perform tasks.
- Students will code their own minigame-style activity using Make Code Arcade.
- Students will program a Makey Makey circuit board using Make Code and/or Scratch.
- Students will design a custom-made video game using Code.org.
- Students will program a Micro:bit using Code.org.
- Students will write a program that tells a story using Scratch.
- Students will follow the steps of the engineering design process while writing and testing code.
- Students will share their finished projects with their peers and will give and receive feedback.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – Course of Study – QUEST

Unit 3 – Biomedical Engineering- Assistive Technology (Optional)

Desired Results:

Essential Questions:

- How does an assistive device help someone in real life?
- How does a biomedical engineer design, create, and improve an assistive device to fit a person's needs?
- What is the importance of the character strengths of grit, resiliency, and determination?

Enduring Understandings:

Students will understand that...

- Physical limitations cause some people to have to perform tasks in different ways.
- Grit, resiliency, and determination are important character strengths that help us overcome obstacles and difficult situations.
- Assistive/adaptive devices allow people with physical disabilities to gain more freedom.
- Biomedical engineers rely on feedback from clients to improve their designs.

Knowledge:

Students will know...

- Vocabulary: assistive technology, biomedical engineering, client, determination, grit, resiliency
- The need for and importance of biomedical engineering.
- The steps of the engineering process.
- The steps to create assistive technology.
- That technology can be used to communicate information.
- Examples of grit, resiliency, and determination.

Skills:

Students will be able to...

- Follow the engineering design process to plan, test, and improve an assistive device for a specific client.
- Communicate and collaborate with a team.
- Share the finished product.

Standards:

Priority:

STEELS Standards

- 3.5.3-5.D- Predict how certain aspects of their daily lives would be different without given technologies.
- 3.5.3-5.I- Design solutions by safely using tools, materials, and skills.
- 3.5.3-5.J- Explain how technologies are developed or adapted when individual or societal needs and wants change.
- 3.5.3-5.K- Judge technologies to determine the best one to use to complete a given task or meet a need.
- 3.5.3-5.L- Demonstrate how tools and machines extend human capabilities, such as holding, lifting, carrying, fastening, separating, and computing.
- 3.5.3-5.M- Demonstrate essential skills of the engineering design process.
- 3.5.3-5.N- Identify why a product or system is not working properly.
- 3.5.3-5.O- Describe requirements of designing or making a product or system.
- 3.5.3-5.P -Evaluate the strengths and weaknesses of existing design solutions, including their own solutions.
- 3.5.3-5.Q- Practice successful design skills.
- 3.5.3-5.R- Apply tools, techniques, and materials in a safe manner as part of the design process.
- 3.5.3-5.S- Illustrate that there are multiple approaches to design.

- 3.5.3-5.T- Apply universal principles and elements of design.
- 3.5.3-5.U -Evaluate designs based on criteria, constraints, and standards.
- 3.5.3-5.V- Interpret how good design improves the human condition.
- 3.5.3-5.Z- Create a new product that improves someone's life
- 3.5.3-5.BB- Illustrate how, when parts of a system are missing, it may not work as planned.
- 3.5.3-5.DD- Demonstrate how simple technologies are often combined to form more complex systems.

Acceptable Evidence:

Performance Tasks –

- Students will gain an understanding of the need for assistive technology.
- Students will learn about how the body works and about the field of biomedical engineering.
- Students will create an assistive device for a specific client.
- Students will test their assistive device for strength, durability, longevity, lifelikeness, and comfort.
- Students will define and provide examples of grit, resiliency, and determination.

Real-World Challenge-

The human body is an impressive piece of machinery. Each part has a unique function that when put together with the others allows us to live. Unfortunately, many people require assistive technology to help a body part function effectively. Fortunately, scientists have used their understanding of human anatomy and the mechanics of physics to create assistive devices. These scientists are continually improving the strength, durability, longevity, and lifelikeness of assistive devices so people can lead full lives. The real-world challenge is- **“Can you use the engineering design process and the 4C’s (collaboration, creativity, communication and critical thinking) to create an assistive device that meets the needs of a specific client?”**

Acceptable evidence of learning other than Performance Tasks:

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), journal entries/exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will explain the difference between kindness and empathy.
- Students will create happy notes to give to others or post around the school to demonstrate empathy.
- Students will complete tasks without the use of their thumbs and rate the level of difficulty of the task.
- Students will be able to define the words grit, resiliency, and determination.
- Students will read articles and watch videos to identify examples of grit, resiliency, and determination.
- Students will explain what assistive technology is.
- Students will be able to give examples of low tech, mid tech, and high-tech assistive devices.
- Students will play the game Disruptus to generate ideas of how you can take an item and improve upon it.
- Students will create individual client cards so that the designer knows what needs they are meeting.
- Students will explore with the Makey Makey circuit board.
- Students will test materials using the Makey Makey circuit board to see if they are conductors or insulators.
- Students will understand the real-world challenge.
- Students will plan as a team to imagine what their adaptive device will do and plan the materials they will need.
- Students will use materials to create their adaptive device.
- Students will test their device and make improvements as needed.
- Students will test the device to make sure it meets the real-world challenge and the needs of their client.

- Students will be able to share their assistive technology and how it helped their client.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – QUEST – Grade 4

Unit 4– Digital Literacy

Desired Results:

Essential Questions:

- How can I be a good friend in online group conversations?
- What makes group chats different from one-on-one conversations?
- How do my words and actions affect others in a group chat?
- What can I do when someone feels left out, embarrassed, or hurt in a group conversation?
- How can bystanders help create positive and inclusive digital spaces?
- Why is it important to consider different perspectives and feelings in online groups?
- How do machines learn to recognize patterns and make decisions?
- What is a dataset, and why is it important for artificial intelligence?
- How do people use past experiences to make predictions?
- In what ways is machine learning similar to and different from human learning?
- How can the data used to train AI systems affect the fairness and accuracy of their predictions?
- What responsibility do humans have when creating and training AI systems?
- What is an algorithm, and how does it help solve problems?
- How do algorithms affect our daily lives?
- Why must instructions be clear and specific when communicating with computers?
- How can different algorithms achieve the same goal?
- What is debugging, and why is it an important part of problem-solving?
- How do algorithms help computers and AI systems make decisions?

Enduring Understandings:

Students will understand that...

- Good digital citizens recognize that group chats are shared spaces where everyone can contribute to making others feel valued, included, and supported.
- Artificial intelligence relies on data and algorithms to make predictions and decisions. Humans play a critical role in designing, training, and improving these systems to ensure they function effectively and fairly.

Knowledge:

Students will know...

- Vocabulary: algorithm, bias, bystander, data set, debug, prediction, upstander
- How group chats differ from one-on-one conversations and affect multiple people at the same time.
- How individuals may experience the same online interaction differently.
- The impact that exclusion, teasing, or lack of response can have on others.
- How to apply strategies for supporting peers when someone feels hurt, left out, or embarrassed in a group chat.
- How to practice positive bystander behaviors, including checking in privately, speaking up supportively, and redirecting conversations in helpful ways.
- Artificial Intelligence learns from data.
- Predictions are based on prior knowledge and experience.
- Datasets can contain bias.
- Computers require clear, specific instructions and continuous improvement.

Skills:

Students will be able to...

- Explain how group chat dynamics can affect individuals in different ways.
- Recognize situations in which someone may feel excluded, embarrassed, or hurt in a group chat.
- Analyze the role of bystanders in online group conversations.
- Demonstrate empathy by considering the feelings and perspectives of others in digital spaces.
- Identify and apply strategies for supporting peers in group chats.
- Respond appropriately when they witness unkind or exclusionary behavior online.
- Communicate in ways that help others feel valued, included, and respected.
- Make responsible digital citizenship choices that contribute to positive online communities.
- Explain how machines learn from data.
- Make connections between prior knowledge and predictions.
- Recognize and identify bias in datasets.
- Design and evaluate algorithms.
- Debug and improve instructions.

Standards:

Priority:

STEELS Standards

3.5.3-5.D – Apply a process to solve problems through design, testing, and improvement.

3.5.3-5.G – Use data analysis to identify patterns and make predictions.

3.5.3-5.H – Explain how technologies influence individuals and society.

3.5.3-5.I – Describe how information and communication technologies gather, store, analyze, and communicate information.

Acceptable Evidence:

Performance Tasks – Students will evaluate a group chat scenario, determine how different participants might feel, and select effective strategies to support someone who has been hurt or left out. Students will analyze how an AI system uses data and algorithms to make predictions. They will create a step-by-step algorithm for a simple task.

They will apply their understanding of datasets, predictions, algorithms, and bias to real-world AI tools such as voice assistants, recommendation systems, and facial recognition technologies.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, rubrics, exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will engage in a discussion about group chat dynamics.
- Students will analyze a group chat dynamics scenario and work through reflection questions with a partner.
- Students will identify and apply strategies for supporting peers in group chats.
- Students will engage in a discussion about how machines become “intelligent” and will learn about the three steps of machine learning (data set, learning algorithm, prediction).
- Students will understand the definition of the word algorithm and learn the three main parts of an algorithm (input, steps to change input, output).
- Students will engage in a discussion about how computers use algorithms.
- Students will write and debug an algorithm to program their teacher to move from sitting in a chair to walking to the classroom door.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students’ strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.



QUEST

Course Level: Elementary

Grade: 3

Time/Credit: 40 minutes per week

Development Date: August 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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**Central Bucks School District
Teaching and Learning Principles**

1. QUEST is a process through which students discover how math, science, reading, writing, social studies, and the arts are a daily part of their lives.

Therefore, we will design lesson plans that require students to apply and integrate the content of our elementary curriculum to solve real world, unpredictable challenges.

2. We are preparing students to be complex thinkers, self-directed learners, effective communicators, responsible citizens, collaborative workers, and quality producers.

Therefore, we will design lesson plans that require students to use skills in critical and creative thinking, communication, and collaboration to explore questions about issues in their natural world and community.

3. Learning takes place when new information is linked with existing knowledge in meaningful ways.

Therefore, it is a priority to ensure students understand why they are learning the content. We will begin instruction with an anticipatory set that demonstrates relevancy to students' lives, scaffold instruction to build on existing knowledge, and close lessons with activities that reinforce the connection and relevancy of the material.

4. Learning involves connecting to the present, the past, and the possibilities of the future.

Therefore, we will make relevant connections to the real world and provide opportunities for students to understand how the present connects to the past and affects the future.

5. The learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience.

Therefore, we will help students activate prior knowledge, connect old and new information, and use what they have learned in authentic situations.

6. Process and product are equally important in the learning process.

Therefore, self-reflection and self-assessment will be modeled, and opportunities for self-evaluation and prompt, meaningful feedback will be provided. Our students will receive regular and specific feedback related to progress against standards and timely opportunities to use the feedback to re-do and improve.

7. Technology should be an integral part of the student's experience, enhancing learning and the ability to express ideas.

Therefore, we will model and encourage the use of technology as a tool for instruction, research, application, collaboration, and communication.

8. Research shows active learning is essential.

Therefore, we will design tasks that require students to research, analyze, investigate, solve problems, make decisions, and create products.

9. Learning is social. Our learning is closely associated with our connection with others.

Therefore, we will provide opportunities for students to build relationships with and among each other by facilitating discussions, building empathy, and fostering a climate of intrinsic motivation.

10. Relevance is essential to teaching and learning.

Therefore, learning will include real world exposure, cross-curricular connections, and high interest materials.

11. Learning is most effective when differences in learners' prior knowledge, interests, and strengths are accommodated.

Therefore, we will differentiate instruction and assessment to accommodate different learning styles and educational needs.

12. To maximize learning, students need multiple opportunities to practice and take risks.

Therefore, we will provide a supportive environment based on self-discovery and the respectful exchange of ideas.

13. Motivation influences learning.

Therefore, we will inspire students' curiosity with novel, rigorous, and relevant tasks that provide personal choice and control.

14. Formative assessment is vital for learning.

Therefore, we will create a variety of differentiated assessments that measure knowledge, application of skills, process and product, self-evaluation, and growth.

Central Bucks School District
Enduring Understandings

Students will understand that:

Critical Thinking

- Effective critical thinkers identify and ask significant questions that clarify various points of view and lead to better solutions.
- Effective critical thinkers effectively analyze and evaluate evidence, arguments, claims, and beliefs to make sensible decisions.
- Effective critical thinkers solve different kinds of unfamiliar problems in both conventional and innovative ways.
- Effective critical thinkers reflect critically on learning experiences and processes.
- Effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions.

Communication

- Effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts.
- Effective communicators understand that communication is an exchange between the sender and the receiver.
- Effective communicators adjust delivery skills to purpose, audience, and occasion.
- Effective communicators select appropriate media and technologies to enhance presentations.

Collaboration

- Effective collaborators exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.
- Effective collaborators assume shared responsibility for collaborative work, and value the individual contributions made by each team member.
- Effective collaborators are active, critical, and responsible listeners.
- Effective collaborators recognize that communication is essential to understanding themselves and others.
- Effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

Creative Thinking

- Effective creative thinkers elaborate, refine, analyze, and evaluate original ideas to improve and maximize creative efforts.
- Effective creative thinkers demonstrate originality and inventiveness in work and understand the real-world limits to adopting new ideas.
- Effective creative thinkers view failure as an opportunity to learn and understand that creativity and innovation are part of a long-term, cyclical process of small successes and frequent mistakes.
- Effective creative thinkers act on creative ideas to make a tangible and useful contribution.
- Effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

Research

- Effective researchers begin with essential guiding questions.
- Effective researchers understand that the research process is inherently circular and includes the planning, gathering, analyzing, organizing, synthesizing, and evaluating of information.
- Effective researchers select appropriate resources and evaluate information based on accuracy, validity, authority, and relevance.
- Effective researchers draw conclusions, create meaning, and construct new knowledge.
- Effective researchers use information and technology ethically and responsibly to enhance their understanding and present their findings.
- Effective researchers apply research skills to authentic, real-world issues and contexts.
- Effective researchers apply digital tools to gather, evaluate, and use information.

Science and Engineering

- Science is the search for understanding the natural world, and facts, principles, theories and laws that have been verified by the scientific community and are used to explain and predict natural phenomena and events.
- Engineering is the application of science and mathematics to define real world problems and design solutions.
- Both effective scientists and engineers ask questions and define problems.
- Both effective scientists and engineers develop and use models.
- Both effective scientists and engineers plan and carry out investigations.
- Both effective scientists and engineers analyze and interpret data
- Both effective scientists and engineers use mathematics and computational thinking.
- Both effective scientists and engineers construct explanations and design solutions.
- Both effective scientists and engineers engage in argument from evidence.
- Both effective scientists and engineers obtain, evaluate, and communicate information.

Central Bucks School District

Essential Questions

Critical Thinking

- What does it mean to think critically?
- Why is it important to think critically?
- How do effective critical thinkers approach a problem?
- How do effective critical thinkers use conventional and innovative ways to solve unfamiliar problems?
- Why do effective critical thinkers reflect on their learning experiences and processes?
- How do effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions?

Communication

- What is communication?
- Why is effective communication important?
- How do effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts?
- How do effective communicators adjust delivery skills to purpose, audience, and occasion?
- Why is it important to use appropriate media and technologies to enhance presentations?

Collaboration

- What does it mean to collaborate?
- What are the characteristics of an effective collaborator?
- How do effective collaborators listen?
- How do effective collaborators communicate?
- How do effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others?

Creative Thinking

- What does it mean to think creatively?
- Why is it important to think creatively?
- Why is it important to consider real world limits when developing new ideas?
- How can failure be used as an opportunity to learn?
- How do effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology?

Research

- What is the value of research?
- What can be discovered or created through research?
- What makes an effective researcher?
- How do effective researchers apply research skills to authentic, real-world issues and contexts?
- How do effective researchers apply digital tools to gather, evaluate, and use information?

Science and Engineering

- What is the difference between science and engineering?
- What skills do scientists use to explore and understand our world?
- What skills do engineers use to define real world problems and design solutions?

Central Bucks School District – Course of Study Overview

QUEST

Desired Results

Course Description:

QUEST is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real world challenges that allow students to apply 21st century skills to become informed citizens and life-long learners. Each unit of study is built around a real-world challenge that ties directly to classroom instruction and requires students to apply cross-curricular skills. Further, the curriculum is heavily focused on teaching students how to use and incorporate technology in new ways.

Grade 3 QUEST Course Description:

Third grade QUEST students will be given opportunities to explore the concepts of the engineering design process and 21st century skills. Units of study connect directly to the Grade 2 and Grade 3 curriculums in science, mathematics, social studies, reading, writing, health, and art. Units will continue to expand upon prior QUEST experiences by utilizing a variety of tools to solve real-life problems. Students will navigate Office 365 to collaborate virtually, deepen their understanding of program code and its capabilities to create a final product, use creativity software, and robotics. Students will apply critical thinking skills and a growth mindset as they work collaboratively to solve authentic problems.

Acceptable Evidence.

Assignments, Performance Tasks, Projects, Tests, etc.:

- Informal and Formal Critiques of 21st Century Skills, specifically creativity, collaboration, and communication.
- Engineering products (solutions to real world problems)
- Student Presentations

QUEST Third Grade– Pacing Guide

Content	Days
Unit 1 - Coding – LEGO Crazy Carnival Games	
QUEST Introductory Lesson- 4C Stations Lesson 1: Review the 4Cs and participate in creation stations. Lesson 2: Complete stations and reflect. Coding – LEGO Crazy Carnival Games Lesson 1: Code.org Course D/ Lessons 3 and 5 (Lesson 7 for extension) Lesson 2: Introduce LEGO SPIKE- Expectations and exploration of kit materials. Lesson 3: LEGO SPIKE- Mini-Golf Lesson 4: LEGO SPIKE- Bowling Fun Lesson 5: Code.org Course D/ Lesson 9- Loops/Repeat Lesson 6: LEGO SPIKE- A-Maze-ing Lesson 7: LEGO SPIKE- Junior Pinball Lesson 8: LEGO SPIKE- Creative Carnival Games Project Extension/Enrichment- Code.org Course D- Lessons 10, 11, 13 or choose another LEGO SPIKE building challenge (High Stick Hockey, Avoid the Edge) *Intervention and Enrichment is provided throughout each lesson	13-15 days
Unit 2 – Mission to the Moon	
Mission to the Moon Lesson 1: Launch the Mission Lesson 2: Moon Facts Lesson 3: What Makes a Good Moon Base? Lesson 4: Explore Minecraft World Lesson 5: Creative vs. Survival Lesson 6: Team Missions and Moon Locations Lesson 7: Minecraft Tools Lesson 8: Plan the Build Lesson 9: Build Day 1: Structure Lesson 10: Build Day 2: Life Support Lesson 11: Build Day 3: Safety and Energy Lesson 12: Revise and Improve Lesson 13: Document the Mission Lesson 14: Present the Base Lesson 15: Reflect and Extend	15 days
Unit 3 – Digital Literacy	
Lesson 1: Digital Citizenship - When Words Hurt Online- Recognize how words can be interpreted differently online and develop strategies for positive digital communication. Lesson 2: AI Literacy - What Is AI?- Identify examples of AI.	2 days
Enrichment Unit	
Simple Machines – Rube Goldberg Challenge Lesson 1: Who is Rube Goldberg? Lesson 2: Simple Machines within Mousetrap Lesson 3: Simple Machines Lesson 4: Rube Goldberg Machines- Imagine and Plan Lessons 5-7: Rube Goldberg Machines- Create, Test, and Improve Lesson 8: Rube Goldberg Machines- Share	8-10 days

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

Trade Books used within the curriculum:

How To Lift a Lion by Robert E. Wells

The Most Magnificent Thing by Ashley Spires

Software used within the curriculum:

Code.org

LEGO Spike app

Minecraft

Office 365- PowerPoint

Central Bucks School District – Course of Study – QUEST

Unit 1 – Coding: *LEGO Crazy Carnival Games*

Desired Results:

Essential Questions:

- How does language evolve?
- How do coded commands instruct a computer?
- Is there only one way to write code?
- How can we direct a model to move in a certain way?
- How can the movements of an object be changed?
- Why do engineers make changes to their design?
- How can technology be used in a different way?

Enduring Understandings:

Students will understand that...

- Language evolves by adapting to technology and needs.
- Code is a language that helps people communicate with computers.
- Coded commands provide sequential directions for a task.
- Codes can be written in many ways depending on the technology and task.
- We can change the movements of an object by changing the code.
- Using feedback from the machine, engineers change or improve their design.
- Technology can be used to create and communicate ideas.

Knowledge:

Students will know...

- Vocabulary: bumper, capable, energy, evidence, flipper, force, impact, kinetic energy, modify, motion, obstacles, potential energy, predictable, program, ramp, record, target, test, tilt, transfer, unpredictable, upgrade
- How to break down code into a specific sequence.
- Engineers utilize code to direct technology.
- Code is the language of computers.
- Code can be used to program a model to move.
- How to use technology to represent information.
- Feedback can be used to change or improve a design.
- The appropriate vocabulary to communicate ideas in a collaborative group.

Skills:

Students will be able to...

- Follow visual multi-step directions to create models with LEGOs.
- Use technological systems and digital tools to program LEGO models.
- Test the models' movement and power.
- Ask and answer questions within a collaborative group.
- Collaborate within a group to solve problems.

Standards:

Priority:

CSTA Standards

1B-AP-08- Compare and refine multiple algorithms for the same task and determine which is the most appropriate.

1B-AP-10- Create programs that include sequences, events, loops, and conditionals.

1B-AP-12- Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.

1B-DA-07- Use data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea.

STEELS Standards

3.2.3.A- Make and communicate observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

3.2.3.B- Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

3.5.3-5.I- Design solutions by safely using tools, materials, and skills.

3.5.3-5.M- Demonstrate essential skills of the engineering design process.

3.5.3-5.N- Identify why a product or system is not working properly.

3.5.3-5.O- Describe requirements of designing or making a product or system.

3.5.3-5.P- Evaluate the strengths and weaknesses of existing design solutions, including their own solutions.

3.5.3-5.Q- Practice successful design skills.

3.5.3-5.S- Illustrate that there are multiple approaches to design.

3.5.3-5.T- Apply universal principles and elements of design.

3.5.3-5.U -Evaluate designs based on criteria, constraints, and standards.

3.5.3-5.BB- Illustrate how, when parts of a system are missing, it may not work as planned.

3.5.3-5.DD- Demonstrate how simple technologies are often combined to form more complex systems.

Supporting:

ELA Standards

CC.1.5.3.A- Engage effectively in a range of collaborative discussions on grade-level topics and texts, building on others' ideas and expressing their own clearly.

CC.1.4.3.A- Write informative/ explanatory texts to examine a topic and convey ideas and information clearly.

Acceptable Evidence:

Performance Tasks –

Students will work collaboratively with others to use 2D instructions to construct 3D models of new carnival games that show energy transfer.

Real-World Challenge-

Energy is the force capable of generating an action or work. Energy can be transferred from one object to another. The real-world challenge is- **“Can you work collaboratively with others to design, construct, and program a new LEGO carnival game that shows energy transfer?”**.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Observation Checklist

- Measure the students' proficiency for each outcome.
- Create a scale that matches your needs. For example:
 1. Needs additional support
 2. Can work independently
 3. Can teach others

Self-Assessment

- Have each student choose the LEGO brick that they feel best represents their performance.
 - o Yellow: I am working on meeting the outcome of the lesson.
 - o Blue: I am able to meet the outcome of the lesson.
 - o Green: I am able to meet the outcome of the lesson, and I can help a friend do it too. Peer-

Feedback

- In their small groups, have your students discuss their experiences working together.
- Encourage them to use statements like these:
 - o I liked it when you...
 - o I'd like to hear more about how you...

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will understand the beginning concepts of coding using Code.org Course D. They will be able to identify errors in coding and fix the errors in the most efficient way.
- Students will be introduced to the Lego SPIKE kit and app. They will then explore the kits and learn how to maintain them.
- Students will build a mini golf game following directions in the Lego SPIKE app and then use the Design Process to improve the game to make it more fun and exciting.
- Using correct sequential coding they will set the speed and number of motor rotations to make the mini-golf move. They will adjust the code to create iterations of their project.
- Students will build a bowling machine following directions in the Lego SPIKE app and then use the Design Process to improve the game to make it more fun and exciting.
- Using correct sequential coding they will set the angle and motor rotations to make the bowling project move. They will adjust the code to create iterations of their project.
- Students will understand the beginning concepts of coding using Code.org course D. They will be able to identify long code that can be shorted with loops and repeats to create the most efficient code possible.
- Students will build a Lego maze following directions in the Lego SPIKE app and then use the Design Process to improve the game to make it more fun and exciting. Using correct sequential coding, they will create and test a program that counts the number of tilts it takes to complete the maze.
- Students will build a pinball machine following directions in the Lego SPIKE app and then use the Design Process to improve the game to make it more fun and exciting.
- Using correct sequential coding, they will create and test a program that starts the junior pinball game. They will modify the program to make the game more unpredictable.
- Students will build a carnival game in the Lego SPIKE app and then use the Design Process to improve the game to make it more fun and exciting.
- Using correct sequential coding, they will create and test a program that uses at least one motor or sensor.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

Simplify by:

- Shortening the lesson to only include the first challenge
- Selecting one Inspiration Image to help students change their models

Increase the difficulty by:

- Adding different Color Sensor Blocks to the Programming Canvas
- Exploring new and different Coding Blocks in the program
- Creating unique programs to make the LEGO model move in different ways
- Continue to work on advanced levels in Code.org

Central Bucks School District – Course of Study – QUEST Grade 3

Unit 2 – Mission to the Moon

Desired Results:

Essential Questions:

- How are the conditions on the moon different from conditions on Earth?
- Why are certain materials essential to surviving in a new habitat?
- How do you engineer a lunar habitat in Minecraft?
- How is collaboration essential when working through challenges?
- Why is it important to keep track of your thinking to legitimize what you are learning?

Enduring Understandings:

Students will understand that...

- The moon warrants humans to adapt to their challenging climate.
- The necessity of evaluating materials to assess their utility.
- The engineering design process supports the construction of a lunar habitat.
- The value of individuals in a teamwork approach.
- Keeping track of your thinking legitimizes your learning.

Knowledge:

Students will know...

- **Vocabulary:** mission, needs, prototype, shelter, survival
- The conditions and characteristics of the Moon.
- The importance of various materials in order to survive.
- The steps of the engineering design process.
- That teams work together in order to achieve a task.
- Minecraft is tool that is utilized when sharing what you have created with others.

Skills:

Students will be able to...

- Differentiate between humans' needs on the Moon versus Earth.
- Apply the information learned in the NASA Training Center to build a living space.
- Design a sustainable living space on the Moon.
- Collaboratively work in a team, applying creativity, critical thinking, and communication skills.
- Create a digital environment that summarizes their learning.

Standards:

Priority:

STEELS Standards

- 3.1.3.G- Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- 3.1.3.H- Make a claim supported by evidence about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.
- 3.5.3-5.C- Follow directions to complete a technological task.
- 3.5.3-5.M- Demonstrate essential skills of the engineering design process.
- 3.5.3-5.N- Identify why a product or system is not working properly.
- 3.5.3-5.O- Describe requirements of designing or making a product or system.

- 3.5.3-5.P -Evaluate the strengths and weaknesses of existing design solutions, including their own solutions.
- 3.5.3-5.Q- Practice successful design skills.
- 3.5.3-5.R -Apply tools, techniques, and materials in a safe manner as part of the design process.
- 3.5.3-5.S- Illustrate that there are multiple approaches to design.
- 3.5.3-5.T- Apply universal principles and elements of design.
- 3.5.3-5.U -Evaluate designs based on criteria, constraints, and standards.
- 3.5.3-5.BB- Illustrate how, when parts of a system are missing, it may not work as planned.
- 3.5.3-5.DD- Demonstrate how simple technologies are often combined to form more complex systems.

Acceptable Evidence:

Performance Tasks –

Student will understand what it's like to live on the Moon, including climate and lack of living conditions.

Students will evaluate and assess items to take to the Moon.

Students will construct a habitat on the Moon that will sustain human life.

Real-World Challenge-

You are part of a team traveling to the Moon. Your mission is to pack a spaceship with necessary supplies in order to construct a habitat that will sustain human life once you land on the Moon. The structure should provide all the needs of humans in the harsh environment on the surface of the Moon. The real-world challenge is- **“Can you collaborate with your team to create a habitat on the Moon that will sustain human life?”**.

Acceptable evidence of learning other than Performance Tasks:

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), journal entries/exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will understand the Moon base challenge and unit goals.
- Students will learn important facts about the Moon that affect building and survival.
- Students will identify important parts of a lunar base.
- Students will learn how to enter and move through the Minecraft Artemis world.
- Students will compare game modes and understand how each affects gameplay.
- Students will understand Moon environments and how landforms affect building.
- Students will use in-game tools such as camera, journal, and communication tools.
- Students will create a blueprint before construction begins.
- Students will begin constructing the main structure of the Moon base.
- Students will add life-support features to the base.
- Students will improve the base with safety and energy features.
- Students will evaluate and improve the design.
- Students will explain the design using pictures and writing.
- Students will present the Moon base and explain its features.
- Students will reflect on learning and connect it to real-world exploration.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – QUEST – Grade 3

Unit 3 – Digital Literacy

Desired Results:

Essential Questions:

- How can words and messages be interpreted differently online?
- Why can online messages sometimes hurt people's feelings, even when that wasn't the writer's intention?
- How do our words impact others in digital spaces?
- What can we do when we encounter mean or hurtful words online?
- How can we communicate kindly and responsibly when using technology?
- What is artificial intelligence, and how is it different from other kinds of technology?
- How can we tell whether a device or program uses artificial intelligence?
- What does it mean for a machine to "think" or make decisions?
- How do AI systems perceive, learn, reason, plan, and interact with the world?
- Where does the intelligence happen: in the human programmer or in the technology itself?
- How does artificial intelligence impact our daily lives and society?
- What evidence can we use to support our ideas about whether something is AI or not?

Enduring Understandings:

Students will understand that...

- Our words have power online, and responsible digital citizens communicate thoughtfully and use positive strategies when faced with hurtful online interactions.
- Artificial intelligence is a type of technology that can perform tasks that appear intelligent, and we can identify AI by examining how it learns, makes decisions, interacts with its environment, and solves problems.

Knowledge:

Students will know...

- Vocabulary: artificial, generative, intelligence, interpret, interact, perceive, understand
- How online messages can be interpreted differently.
- How words affect others' feelings.
- How to use the S.A.F.E. strategy when responding to mean words online.
- The definition of artificial intelligence (AI) and explain that it is technology created by humans that can perform tasks that appear intelligent.
- The meanings of key AI-related vocabulary, including artificial, intelligence, perceive, understand, interact, and generative.
- The difference between AI and traditional technology by examining how different devices and programs work.
- The characteristics of AI.
- Where the "intelligence" occurs in a system, distinguishing between technologies that simply follow programmed instructions and technologies that make decisions based on data.
- Examples of AI in everyday life, such as digital maps, self-driving cars, voice assistants, and generative AI tools.
- How to analyze technologies and determine whether they use AI, using specific criteria and evidence to support their conclusions.
- How to compare, classify, and evaluate different types of technology.
- How to construct and communicate logical arguments, including a claim, reason, and evidence, when explaining whether something is AI or not.
- That AI impacts society and plays an increasing role in daily life.

Skills:**Students will be able to...**

- Explain how online messages can be interpreted differently by different people.
- Identify how the absence of facial expressions, tone of voice, and body language can lead to misunderstandings in digital communication.
- Describe the impact that words can have on another person's feelings online.
- Analyze online communication scenarios and determine how a message might make someone feel.
- Demonstrate empathy by considering multiple perspectives when reading online messages.
- Recognize examples of mean or hurtful online behavior.
- Apply the S.A.F.E. strategy when responding to mean words online:
- Practice positive digital citizenship by using kind, respectful, and thoughtful language when communicating online.
- Seek support from trusted adults when faced with uncomfortable or hurtful online situations.
- Explain the difference between artificial and natural things.
- Describe intelligence as the ability to learn, understand, reason, solve problems, and make decisions.
- Identify the characteristics of AI.
- Distinguish between AI and non-AI technologies by determining where the "thinking" or decision-making takes place.
- Evaluate everyday technologies and classify them as AI or not AI.
- Use evidence and reasoning to justify their conclusions about whether a device or program uses AI.
- Construct a logical argument that includes a claim, supporting reasons, and evidence.
- Recognize examples of AI in daily life, such as digital maps, self-driving cars, recommendation systems, and generative AI tools.
- Explain how AI differs from technologies that simply follow pre-programmed instructions, such as automatic doors, toasters, or basic spell-checkers.
- Discuss the role and impact of AI in society and how people interact with AI-powered technologies.

Standards:Priority:**STEELS Standards**

3-5.2A: Analyze how technology affects daily life and human interactions.

3-5.2B: Evaluate positive and negative impacts of technology on individuals and society.

3-5.2C: Identify responsible and ethical behaviors when using technology.

3-5.2D: Describe ways individuals can respond safely to challenges that arise when using technology.

3-5.2E: Use evidence to support claims about technology and its role in society.

Acceptable Evidence:

- **Performance Tasks** – Students will be able to explain how online messages can be interpreted differently, describe how words affect others' feelings, and demonstrate how to use the S.A.F.E. strategy when responding to mean words online. Students will play a game to identify and classify technologies as AI or non-AI using the Five Big Ideas of AI as criteria.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, rubrics, exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will match emojis with spoken words.
- Students will participate in a discussion about how written words are sometimes misinterpreted.
- Students will analyze text.
- Students will learn the S.A.F.E. strategy- (Stop and Step Away, Ask a Trusted Adult for Help, Feel your Feelings, and Ease Back In).
- Students will review the meaning of artificial intelligence.
- Students will learn about the 5 Big Ideas of AI (perceive and *understand* its environment, reason and *plan* to make decisions, learn new knowledge and skills, interact with humans and the environment, and the impact on society).
- Students will play a game and apply the definition of AI to several examples to see if they are AI.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – Course of Study – QUEST Grade 3

Enrichment Unit – Rube Goldberg Challenge

Desired Results:

Essential Questions:

- How do machines make work easier?
- How can movement be described?
- How do simple machines make everyday life easier?
- How is communication collaborative?
- What makes a good listener?

Enduring Understandings:

Students will understand that...

- People use simple machines to achieve a task.
- Simple machines are devices that change the force exerted on an object.
- Compound machines are made up of multiple simple machines.
- Rube Goldberg machines are made up of many simple machines to achieve a task in a roundabout way.
- Effective communicators understand that communication is an exchange between the sender and receiver.
- Effective collaborators focus and negotiate to create valuable contributions.

Knowledge:

Students will know...

- Machines make work easier.
- Each simple machine achieves a task in a different way.
- A compound machine is made up of two or more simple machines.
- Rube Goldberg machines accomplish a simple task in a difficult or roundabout manner.
- It is important to listen to all group members by making eye contact and responding to other's comments in a supportive way.
- Effective groups work cooperatively and respectfully to achieve a task.

Skills:

Students will be able to...

- Construct a compound machine made up of multiple simple machines.
- Identify and classify simple machines in their everyday world.
- Present and demonstrate a Rube Goldberg machine to peers.
- Collaborate with group members to achieve the task.

Standards:

Priority:

STEELS Standards

- 3.2.3.A- Make and communicate observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
- 3.2.3.B- Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- 3.5.3-5.I- Design solutions by safely using tools, materials, and skills.
- 3.5.3-5.M- Demonstrate essential skills of the engineering design process.
- 3.5.3-5.N- Identify why a product or system is not working properly.
- 3.5.3-5.O- Describe requirements of designing or making a product or system.

- 3.5.3-5.P -Evaluate the strengths and weaknesses of existing design solutions, including their own solutions.
- 3.5.3-5.Q- Practice successful design skills.
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- 3.5.3-5.T- Apply universal principles and elements of design.
- 3.5.3-5.U -Evaluate designs based on criteria, constraints, and standards.
- 3.5.3-5.BB- Illustrate how, when parts of a system are missing, it may not work as planned.
- 3.5.3-5.DD- Demonstrate how simple technologies are often combined to form more complex systems.

Acceptable Evidence:

Performance Tasks:

- Explore the six simple machines and how each makes work easier.
- Build and analyze a common example of a Rube Goldberg Machine, the Mousetrap game.
- Explore varying types of Rube Goldberg machines.
- Design a Rube Goldberg machine that has five steps and rings a bell.
- Present and demonstrate a Rube Goldberg machine to peers.

Real-World Challenge:

A Rube Goldberg machine is one that tackles a simple task in a roundabout or difficult manner. Varying simple machines are used to create a compound machine that moves an object from one point to another. The real-world challenge is-
“Can you design and create a Rube Goldberg machine that rings a bell in 5 steps?”.

Acceptable evidence of learning other than Performance Tasks:

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), journal entries/exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will learn about Rube Goldberg and his multi-step invention cartoons.
- Students will discuss various examples of Rube Goldberg machines.
- Students will construct and analyze a Rube Goldberg machine.
- Students will define examples of simple machines and identify simple machines within Mousetrap.
- Students will imagine, plan, and create Rube Goldberg machines that will ring a bell.
- Students will build Rube Goldberg machines that will ring a bell.
- Students will share their Rube Goldberg machines that ring a bell

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students’ strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.



QUEST

Course Level: Elementary

Grade: 2

Time/Credit: 40 minutes per week

Development Date: August 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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**Central Bucks School District
Teaching and Learning Principles**

1. QUEST is a process through which students discover how math, science, reading, writing, social studies, and the arts are a daily part of their lives.

Therefore, we will design lesson plans that require students to apply and integrate the content of our elementary curriculum to solve real world, unpredictable challenges.

2. We are preparing students to be complex thinkers, self-directed learners, effective communicators, responsible citizens, collaborative workers, and quality producers.

Therefore, we will design lesson plans that require students to use skills in critical and creative thinking, communication, and collaboration to explore questions about issues in their natural world and community.

3. Learning takes place when new information is linked with existing knowledge in meaningful ways.

Therefore, it is a priority to ensure students understand why they are learning the content. We will begin instruction with an anticipatory set that demonstrates relevancy to students' lives, scaffold instruction to build on existing knowledge, and close lessons with activities that reinforce the connection and relevancy of the material.

4. Learning involves connecting to the present, the past, and the possibilities of the future.

Therefore, we will make relevant connections to the real world and provide opportunities for students to understand how the present connects to the past and affects the future.

5. The learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience.

Therefore, we will help students activate prior knowledge, connect old and new information, and use what they have learned in authentic situations.

6. Process and product are equally important in the learning process.

Therefore, self-reflection and self-assessment will be modeled, and opportunities for self-evaluation and prompt, meaningful feedback will be provided. Our students will receive regular and specific feedback related to progress against standards and timely opportunities to use the feedback to re-do and improve.

7. Technology should be an integral part of the student's experience, enhancing learning and the ability to express ideas.

Therefore, we will model and encourage the use of technology as a tool for instruction, research, application, collaboration, and communication.

8. Research shows active learning is essential.

Therefore, we will design tasks that require students to research, analyze, investigate, solve problems, make decisions, and create products.

9. Learning is social. Our learning is closely associated with our connection with others.

Therefore, we will provide opportunities for students to build relationships with and among each other by facilitating discussions, building empathy, and fostering a climate of intrinsic motivation.

10. Relevance is essential to teaching and learning.

Therefore, learning will include real world exposure, cross-curricular connections, and high interest materials.

11. Learning is most effective when differences in learners' prior knowledge, interests, and strengths are accommodated.

Therefore, we will differentiate instruction and assessment to accommodate different learning styles and educational needs.

12. To maximize learning, students need multiple opportunities to practice and take risks.

Therefore, we will provide a supportive environment based on self-discovery and the respectful exchange of ideas.

13. Motivation influences learning.

Therefore, we will inspire students' curiosity with novel, rigorous, and relevant tasks that provide personal choice and control.

14. Formative assessment is vital for learning.

Therefore, we will create a variety of differentiated assessments that measure knowledge, application of skills, process and product, self-evaluation, and growth.

Central Bucks School District
Enduring Understandings

Students will understand that:

Critical Thinking

- Effective critical thinkers identify and ask significant questions that clarify various points of view and lead to better solutions.
- Effective critical thinkers effectively analyze and evaluate evidence, arguments, claims, and beliefs to make sensible decisions.
- Effective critical thinkers solve different kinds of unfamiliar problems in both conventional and innovative ways.
- Effective critical thinkers reflect critically on learning experiences and processes.
- Effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions.

Communication

- Effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts.
- Effective communicators understand that communication is an exchange between the sender and the receiver.
- Effective communicators adjust delivery skills to purpose, audience, and occasion.
- Effective communicators select appropriate media and technologies to enhance presentations.

Collaboration

- Effective collaborators exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.
- Effective collaborators assume shared responsibility for collaborative work, and value the individual contributions made by each team member.
- Effective collaborators are active, critical, and responsible listeners.
- Effective collaborators recognize that communication is essential to understanding themselves and others.
- Effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

Creative Thinking

- Effective creative thinkers elaborate, refine, analyze, and evaluate original ideas to improve and maximize creative efforts.
- Effective creative thinkers demonstrate originality and inventiveness in work and understand the real-world limits to adopting new ideas.
- Effective creative thinkers view failure as an opportunity to learn and understand that creativity and innovation are part of a long-term, cyclical process of small successes and frequent mistakes.
- Effective creative thinkers act on creative ideas to make a tangible and useful contribution.
- Effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

Research

- Effective researchers begin with essential guiding questions.
- Effective researchers understand that the research process is inherently circular and includes the planning, gathering, analyzing, organizing, synthesizing, and evaluating of information.
- Effective researchers select appropriate resources and evaluate information based on accuracy, validity, authority, and relevance.
- Effective researchers draw conclusions, create meaning, and construct new knowledge.
- Effective researchers use information and technology ethically and responsibly to enhance their understanding and present their findings.
- Effective researchers apply research skills to authentic, real-world issues and contexts.
- Effective researchers apply digital tools to gather, evaluate, and use information.

Science and Engineering

- Science is the search for understanding the natural world, and facts, principles, theories, and laws that have been verified by the scientific community and are used to explain and predict natural phenomena and events.
- Engineering is the application of science and mathematics to define real world problems and design solutions.
- Both effective scientists and engineers ask questions and define problems.
- Both effective scientists and engineers develop and use models.
- Both effective scientists and engineers plan and carry out investigations.
- Both effective scientists and engineers analyze and interpret data
- Both effective scientists and engineers use mathematics and computational thinking.
- Both effective scientists and engineers construct explanations and design solutions.
- Both effective scientists and engineers engage in argument from evidence.
- Both effective scientists and engineers obtain, evaluate, and communicate information

**Central Bucks School District
Essential Questions**

Critical Thinking

- What does it mean to think critically?
- Why is it important to think critically?
- How do effective critical thinkers approach a problem?
- How do effective critical thinkers use conventional and innovative ways to solve unfamiliar problems?
- Why do effective critical thinkers reflect on their learning experiences and processes?
- How do effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions?

Communication

- What is communication?
- Why is effective communication important?
- How do effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts?
- How do effective communicators adjust delivery skills to purpose, audience, and occasion?
- Why is it important to use appropriate media and technologies to enhance presentations?

Collaboration

- What does it mean to collaborate?
- What are the characteristics of an effective collaborator?
- How do effective collaborators listen?
- How do effective collaborators communicate?
- How do effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others?

Creative Thinking

- What does it mean to think creatively?
- Why is it important to think creatively?
- Why is it important to consider real world limits when developing new ideas?
- How can failure be used as an opportunity to learn?
- How do effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology?

Research

- What is the value of research?
- What can be discovered or created through research?
- What makes an effective researcher?
- How do effective researchers apply research skills to authentic, real-world issues and contexts?
- How do effective researchers apply digital tools to gather, evaluate, and use information?

Science and Engineering

- What is the difference between science and engineering?
- What skills do scientists use to explore and understand our world?
- What skills do engineers use to define real world problems and design solutions?

Central Bucks School District – Course of Study Overview

QUEST

Desired Results

QUEST Course Description:

QUEST is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real world challenges that allow students to apply 21st century skills to become informed citizens and life-long learners. Each unit of study is built around a real-world challenge that ties directly to classroom instruction and requires students to apply cross curricular skills. Further, the curriculum is heavily focused on teaching students how to use and incorporate technology in new ways.

Grade 2 QUEST Course Description:

Second grade QUEST students will be given opportunities to explore the concepts of the engineering design process and 21st century skills. Units of study connect directly to the Grade 1 and 2 curriculums in science, mathematics, social studies, reading, writing, health, and art. Further, the units continue to expose students to a variety of tools they can use to solve real-life problems such as: creation iPad apps, basic computer programming, and robotics.

Acceptable Evidence.

Assignments, Performance Tasks, Projects, Tests, etc.:

- Informal and Formal Critiques of 21st Century Skills, specifically creativity and collaboration
- Engineering products (solutions to real-world problems)
- Student Presentations

QUEST – Pacing Guide

Content	Days
Unit 1 -	
QUEST Introductory Lesson- Iggy Peck, Architect and Paper Bridges Lesson 1: Read the story/ Imagine and Plan Lesson 2: Create, Test, Improve, and Share Harnessing the Wind Lesson 1: Build Background Knowledge about Wind Power Lesson 2: Boat Building Challenge: Ask, Imagine, and Plan Lessons 3-5: Boat Building Challenge: Create, Test, and Improve Lesson 6: Introduction to Fab Maker Studio Lesson 7: The Boy Who Harnessed the Wind Lesson 8: Turbine Blade Building Challenge: Imagine and Plan Lessons 9-11: Turbine Building Challenge: Create, Test, and Improve Lesson 12: Turbine Building Challenge: Share/ Paper Bag Kites: Apply knowledge.	14 days
Unit 2 -	
Coding- LEGO Great Adventures Lesson 1: Sequencing: Code.org Course C/ Lesson 3- Programming with Angry Bird Lesson 2: Debugging: Code.org Course C/ Lesson 4- Debugging in Maze Lesson 3: Loops: Code.org Course C/ Lesson 8- Loops with Rey and BB-8 OR Kodable “Loopy Lessons” Lesson 4: Introduce real-world problem. Read the story How to Bake an Apple Pie and See the World . Explore with the components of the kit. Lesson 5: LEGO SPIKE- Boat Trip; Introduce Book Creator Adventure Story Lesson 6: LEGO SPIKE- Arctic Ride; Add to Book Creator Adventure Story Lesson 7: LEGO SPIKE- Cave Car; Add to Book Creator Adventure Story Lesson 8: LEGO SPIKE- Animal Alarm; Add to Book Creator Adventure Story Lesson 9: LEGO SPIKE- Underwater Quest; Add to Book Creator Adventure Story Lesson 10: LEGO SPIKE- Treehouse Camp; Add to Book Creator Adventure Story Lesson 11: LEGO SPIKE- The Great Desert Adventure Part 1 Lesson 12: LEGO SPIKE- The Great Desert Adventure Part 2 Lesson 13: LEGO SPIKE- Finish Book Creator Adventure Story and share	14-15 days
Unit 3 -	
Pollination Design Project Lesson 1: Introduce the Problem Lesson 2: Minecraft Introduction and Seedlings Lessons 3-4: Minecraft Beehive Exploration Lessons 5-7: Engineering Flowers and Pollination Parade Lessons 8-9: Minecraft Garden Lessons 10-11: Pollination Build	11 days
Unit 4-	
Digital Literacy- Lesson 1: Digital Citizenship- Digital Trails- Understand why it's important to think carefully about what information is shared online.	2 days

Lesson 2: AI Literacy - AI Sensors and Our Five Senses- Connect the idea of our senses to the sensors that help machines “see” and “hear.”	
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NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

Trade Books used within the curriculum:

Iggy Peck, Architect by Andrea Beaty

Kate, Who Tamed the Wind by Liz Garton Scanlon

Brilliant Boats by Tony Mitton and Ant Parker

The Boy Who Harnessed the Wind by William Kamkwamba and Bryan Mealer

How to Make an Apple Pie and See the World by Marjorie Priceman

A, Bee, See: Who Are Our Pollinators and Why Are They in Trouble by Kenneth Eade

Software used within the curriculum:

Book Creator app

Epic app

Code.org

Kodable app

LEGO Spike app

Minecraft

Fab Maker Studio

Central Bucks School District – QUEST – Grade 2

Unit 1 – Harnessing the Wind

Desired Results:

Essential Questions:

- How can we communicate effectively when collaborating with others?
- How do scientists learn about the natural world?
- Why is measurement so important to science?
- How can we use the wind?
- How is understanding wind speed useful?

Enduring Understandings:

Students will understand that...

- Effective communicators understand that communication is an exchange between the sender and receiver.
- Science includes the search for understanding the natural world and is used to explain and predict natural phenomena and events.
- Data is collected, organized, and displayed for analysis.
- Individuals can make informed and reasoned decisions for the public good.

Knowledge:

Students will know...

- Vocabulary: blade, harness, trial, wind, windmill, wind turbine
- Humans harness wind energy for a variety of purposes.
- Wind is the movement of air relative to the surface of the earth.
- Technology can be used to communicate findings.

Skills:

Students will be able to...

- Follow the scientific method to design an experiment.
- Design and construct a wind-powered boat and a working wind turbine with given materials.
- Communicate and collaborate with a team.
- Present experiment results to a group.

Standards:

Priority:

STEELS Standards

3.2.2.B- Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

3.4.K-2.A- Categorize ways people harvest, redistribute, and use natural resources.

3.4.K-2.B- Examine how people from different cultures and communities, including one's own, interact and express their beliefs about nature.

3.4.K-2.D- Plan and carry out an investigation to address an issue in the local environment and community.

3.4.K-2.G- Explain the tools and techniques that people use to help them do things.

3.4.K-2.H- Explain the needs and wants of individuals and societies.

3.5.K-2.K- Safely use tools to complete tasks.

3.5.K-2.L- Explore how technologies are developed to meet individual and societal needs and wants.

3.5.K-2.M- Demonstrate essential skills of the engineering design process.

- 3.5.K-2.N- Analyze how things work.
- 3.5.K-2.O- Illustrate that there are different solutions to a design and that none are perfect.
- 3.5.K-2.P- Discuss that all designs have different characteristics that can be described.
- 3.5.K-2.Q- Apply skills necessary for making in design.
- 3.5.K-2.R- Draw connections between technology and human experience.
- 3.5.K-2.S- Apply design concepts, principles, and processes through play and exploration.
- 3.5.K-2.T- Demonstrate that designs have requirements.
- 3.5.K-2.U- Explain that design is a response to wants and needs.
- 3.5.K-2.V- Explain that materials are selected for use because they possess desirable properties and characteristics.
- 3.5.K-2.W- Apply concepts and skills from technology and engineering activities that reinforce concepts and skills across multiple areas.
- 3.5.K-2.X- Develop a plan in order to complete a task.
- 3.5.K-2.DD- Collaborate effectively as a member of a team.

Supporting:

Social Studies

- 7.2.3.A- Identify the physical characteristics of places and regions.
- 7.3.3.A- Identify the human characteristics of places and regions.
- 6.1.3.A- Define scarcity and identify examples of resources, wants, and needs.

ELA Standards

- CC.1.5.2.A- Participate in collaborative conversations with peers and adults in small and larger groups.
- CC.1.5.2.B- Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

Acceptable Evidence:

Performance Tasks – Students will collaborate with others to create a wind-powered boat and a wind turbine that generates energy to do work.

Real-World Challenge-

The wind is the movement of air relative to the surface of the earth. The direction and strength of the wind are modified by the Earth's terrain, bodies of water, and vegetative cover. So, some locations consistently have strong winds from a particular direction, while other locations have erratic or little wind. For thousands of years, people have converted wind flow into energy to do work. Windmills have been used to convert the kinetic energy in the wind into mechanical energy for tasks such as pumping water or grinding grain. Modern wind turbines have generators that convert mechanical energy into electricity. The real-world challenge is- **“Can you collaborate to design and create various real-world objects that harness wind power?”**.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment- Teacher observations, anecdotal notes, student self-reflection (collaboration skills), exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will be able to build background knowledge about wind power.
- Students will be able to apply knowledge to design sails for a boat that will capture the wind to move across a body of water.

- Students will be able to communicate and collaborate with peers to agree on and execute a design plan. Students will use creativity and critical thinking to reflect upon and revise their design.
- Students will learn how to use the fabrication app Fab Maker Studio to design 2D and 3D objects. They will consider how this type of fabrication could be used in their design process.
- Students will be able to build background knowledge about wind power as it relates to wind turbines.
- Students will be able to apply knowledge from previous lessons to design blades for a wind turbine that will capture the wind to lift weight.
- Students will be able to apply knowledge from the unit to individually create a paper bag kite.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – QUEST – Grade 2

Unit 2 – Coding: LEGO Great Adventures

Desired Results:

Essential Questions:

- How does language evolve?
- How do coded commands instruct a computer?
- Is there only one way to write code?
- How can we direct a model to move in a certain way?
- How can the movements of an object be changed?
- Why do engineers make changes to their design?
- How can technology be used in a different way?

Enduring Understandings:

Students will understand that...

- Language evolves by adapting to technology and needs.
- Code is a language that helps people communicate with computers.
- Coded commands provide sequential directions for a task.
- Codes can be written in many ways depending on the technology and task.
- We can change the movements of an object by changing the code.
- Using feedback from the machine, engineers change or improve their design.
- Technology can be used to create and communicate ideas.

Knowledge:

Students will know...

- Vocabulary: alarm, the Arctic, backward, brainstorm, camping, cause, cave, challenge, change, Color Sensor, creature, dark, debug, desert, effect, forward, imagine, left, light, loop, moon, program, push, pyramid, react, right, robot, roof, sequence, snowmobile, submarine, treehouse, try, turtle, underwater, wonder.
- How to break down code into a specific sequence.
- Engineers utilize code to direct technology.
- Code is the language of computers.
- Code can be used to program a model to move.
- How to use technology to tell a story.
- Feedback can be used to change or improve a design.
- The appropriate vocabulary to communicate ideas in a collaborative group.

Skills:

Students will be able to...

- Translate real problems into programs.
- Clearly communicate algorithms which contain step by step programming commands.
- Follow visual multi-step directions to create models with LEGOs.
- Use technological systems and digital tools to program a model.
- Test the models' movements and power.
- Create a digital story with a sequence of events.
- Ask and answer questions within a collaborative group.
- Collaborate within a group to solve problems.

Standards:

Priority:

CSTA Standards

1A-AP-08- Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.

1A-AP-10- Develop programs with sequences and simple loops, to express ideas or address a problem.

1A-AP-11- Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.

1A-AP-12- Develop plans that describe a program's sequence of events, goals, and expected outcomes.

1A-AP-14- Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

Supporting:

ELA

CC.1.4.2.A- Write informative/ explanatory texts to examine a topic and convey ideas and information clearly.

CC.1.4.2.U- With guidance and support, use a variety of digital tools to produce and publish writing including in collaboration with peers.

CC.1.5.2.A- Participate in collaborative conversations with peers and adults in small and larger groups.

CC.1.5.2.B- Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

Acceptable Evidence:

Performance Tasks –

Within this unit students will work collaboratively with others to write a story by compiling a collection of adventure anecdotes. They will learn how to build and program LEGO models that will help a character go on a variety of adventures.

Real World Challenge:

Writing code is essential to computer programming. This unit will expose students to the idea of approaching computer tasks in a sequential order, debugging programs, and applying loops to a code. To begin students will be asked, **“Can you create code to manipulate different challenges and “write” a computer program?”** Once students can “write” a computer program they will use this skill to solve the following real-life challenge: There are many ways to bring a story to life for the reader. The purpose of this unit is to combine storytelling with robotics to do exactly that. Within this unit students will write a story by compiling a collection of adventure anecdotes. They will learn how to build and program LEGO models that will help a character go on a variety of adventures. **The real-world challenge is, “Can you create and code a 3-D model that will help a character go on an adventure?”**

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Observation Checklist

- Measure the students' proficiency for each outcome.
- Create a scale that matches your needs. For example:
 1. Needs additional support
 2. Can work independently
 3. Can teach others

Self-Assessment

- Have each student choose the LEGO brick that they feel best represents their performance.
 - o Yellow: I am working on meeting the outcome of the lesson.
 - o Blue: I am able to meet the outcome of the lesson.
 - o Green: I am able to meet the outcome of the lesson, and I can help a friend do it too.

Peer-Feedback

- In their small groups, have your students discuss their experiences working together.
- Encourage them to use statements like these:
 - I liked it when you...
 - I'd like to hear more about how you...

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will develop sequential algorithms where they identify and locate bugs in a program and translate movements into a series of commands.
- Students will modify an existing program to solve errors and predict where a program will fail.
- Students will add instructions to existing loops, gather repeated code into loops, and recognize patterns in code that need to be looped.
- Students will listen to a mentor text to inspire ideas for their own adventure stories.
- Students will learn about the LEGO SPIKE Essentials kit and the accompanying app on their iPad.
- Students will practice brainstorming to generate ideas, help develop a story, and solve a problem using engineering solutions and coding via the Lego SPIKE Essentials kit and app.
- Students will share solution strategies by contributing to a Book Creator project.
- Students will use directional vocabulary to describe a sequence and break a problem down into smaller parts.
- Students will describe a program's sequence of events, goals, and expected outcome.
- Students will explore objects that can be seen if light is available.
- Students will identify cause and effect. They will develop a program to solve a problem. They will practice helping a story character.
- Students will understand that an action can be repeated. They will develop programs that use simple loops (repetitions) to address a problem.
- Students will identify and fix errors in a program (test and debug). They will test to ensure the program works correctly. They will practice helping a story character. They will participate in collaborative conversations.
- Students will apply computational thinking skills to solve the given problem. They will identify the main characters and their problem in the story.
- Students will share their Book Creator projects with one another.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

Simplify by:

- Shortening the lesson to only include the first challenge
- Selecting one Inspiration Image to help students change their models

Increase the difficulty by:

- Adding different Color Sensor Blocks to the Programming Canvas
- Exploring new and different Coding Blocks in the program
- Creating unique programs to make the LEGO model move in different ways

Central Bucks School District – QUEST – Grade 2

Unit 3 – Pollination Design Project

Desired Results:

Essential Questions:

- How will research help in the real world?
- How do scientists learn about the natural world?
- Why is measurement so important to science?
- How can we protect pollinators?
- How can people aid in the process of pollination?

Enduring Understandings:

Students will understand that...

- Effective researchers apply research skills to authentic, real-world issues and contexts.
- Science includes the search for understanding the natural world and is used to explain and predict natural phenomena and events.
- Data is collected, organized, and displayed for analysis.
- Individuals can make informed and reasoned decisions for the public good.

Knowledge:

Students will know...

- Vocabulary: agricultural engineer, attract, hand pollinator, investigate, model, nectar, pollen, pollination, pollinator, stamen, technology, three-dimensional
- Pollination is the transfer of pollen grains to fertilize the seed-producing ovaries of flowers. It is an essential part of a healthy ecosystem.
- The habitats of many pollinators are threatened.
- Agricultural engineers have developed techniques in hand pollination.
- Technology can be used to communicate findings.

Skills:

Students will be able to...

- Build on prior knowledge by generating questions and seeking answers.
- Follow the scientific method to design an experiment to test hand pollinators.
- Collect data from hand pollinator experiment.
- Share hand pollinator results.
- Communicate and collaborate with a team.

Standards:

Priority:

STEELS Standards

3.1.2.B- Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

3.1.2.C- Make observations of plants and animals to compare the diversity of life in different habitats.

3.2.2.B- Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

- 3.4.K-2.D- Plan and carry out an investigation to address an issue in the local environment and community.
- 3.5.K-2.K- Safely use tools to complete tasks.
- 3.5.K-2.M- Demonstrate essential skills of the engineering design process.
- 3.5.K-2.N- Analyze how things work.
- 3.5.K-2.O- Illustrate that there are different solutions to a design and that none are perfect.
- 3.5.K-2.P- Discuss that all designs have different characteristics that can be described.
- 3.5.K-2.Q- Apply skills necessary for making in design.
- 3.5.K-2.R- Draw connections between technology and human experience.
- 3.5.K-2.S- Apply design concepts, principles, and processes through play and exploration.
- 3.5.K-2.T- Demonstrate that designs have requirements.
- 3.5.K-2.U- Explain that design is a response to wants and needs.
- 3.5.K-2.V- Explain that materials are selected for use because they possess desirable properties and characteristics.
- 3.5.K-2.W- Apply concepts and skills from technology and engineering activities that reinforce concepts and skills across multiple areas.
- 3.5.K-2.X- Develop a plan in order to complete a task.
- 3.5.K-2.DD- Collaborate effectively as a member of a team.

Supporting:

ELA Standards

- CC.1.5.2.A- Participate in collaborative conversations with peers and adults in small and larger groups.
- CC.1.5.2.B- Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

Acceptable Evidence:

Performance Tasks – Students will work collaboratively with others to create a pollinator garden.

Real-World Challenge-

Insects and other animals pollinate many kinds of plants. They play an important role in providing many of the foods we eat. Habitat loss for pollinators by human activity poses an immediate and frequently irreversible threat. What if the right insects aren't around to do the work? The real-world challenge is- **"How can people engineer an environment that will support pollination?"**.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment- Teacher observations, anecdotal notes, student self-reflection (collaboration skills), exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Read aloud *A, Bee, See: Who Are Our Pollinators and Why Are They in Trouble?* by Kenneth Eade; Discuss who pollinators are, why they are important, why they are in trouble, and how they can be protected. In a small group, brainstorm a list of possible solutions.
- Students will work in a rotation to plant seeds and create the "Build with Bees" world in Minecraft. Expectations will be delivered on the use of Minecraft.
- In Minecraft, students will journey to the hive and explore the information given about honey and pollination. They will learn about bee communication, the different jobs of bees, make bee bread, and ride a bee to collect nectar and make honey.

- Students will explore the relationship between flowers and their pollinators.
- Students will review the parts of a flower.
- Students will make 3-dimensional flowers that meet the requirements detailed in a description.
- Students will use a hand pollinator to develop an understanding of cross pollination between flowers.
- In Minecraft, students will explore the parts of a sustained garden, explore the demonstration garden, then gather the necessary inventory to design and build their own.
- Students will design, build & test their own pollination creation demonstrating an understanding of the key concepts from the unit.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – QUEST – Grade 2

Unit 4– Digital Literacy

Desired Results:

Essential Questions:

- What is a digital footprint, and how is it created?
- What kinds of information are safe to share online?
- Why should some information be kept private?
- How can the information we share online affect us now and in the future?
- Why is it important to think before posting or sharing online?
- Who might be able to see information that is shared on the internet?
- How can I make safe and responsible choices when sharing information online?
- How do our five senses help us learn about the world?
- How do machines gather information about the world around them?
- How are machine sensors similar to our human senses?
- Why do machines need people to help them learn and do jobs?
- How can AI and machines help people in everyday life?

Enduring Understandings:

Students will understand that...

- Everything we do online leaves a digital footprint. We can stay safe by thinking before we share and keeping our private information private.
- People use their senses to understand the world, and machines use sensors to gather information. Although AI can help people in many ways, machines need human guidance to learn and work effectively.

Knowledge:

Students will know...

- Vocabulary: digital footprint, permanent, private information, senses, sensors
- What a digital footprint is and how it is created through online activities, posts, messages, and shared information.
- The difference between private and public information.
- Why it is important to protect personal information online to stay safe.
- How strangers can learn information about someone through their digital footprint.
- The importance of thinking carefully before posting or sharing information online.
- The five human senses: sight, hearing, smell, touch, and taste.
- That people use their senses to gather information about the world around them.
- That machines use sensors to collect information, similar to how humans use their senses.
- That Artificial Intelligence (AI) is technology that can perform tasks using information from sensors and instructions provided by people.
- That machines and AI do not learn or think on their own and require human input, programming, and guidance.

Skills:

Students will be able to...

- Define the terms digital footprint, private information, and permanent.
- Explain that everything they do online contributes to a digital footprint.
- Identify examples of private information that should not be shared online, such as a full name, address, phone number, birthday, school name, username, or password.

- Distinguish between information that is generally safe to share and information that should remain private.
- Describe how people can learn about someone based on the information that person shares online.
- Explain why information shared online can be permanent and difficult to remove.
- Analyze digital footprint examples and determine whether information is safe or unsafe to share.
- Make responsible decisions about what to post, share, or communicate online.
- Apply the strategy of thinking before sharing information online.
- Explain the importance of asking a parent, caregiver, or trusted adult before sharing personal information online.
- Demonstrate an understanding of how digital footprints can affect personal privacy and online safety.
- Identify and name the five senses and explain how they help people learn about the world.
- Recognize common machine sensors such as cameras, microphones, smoke detectors, and touchscreens.
- Compare human senses and machine sensors, explaining how both gather information from the environment.
- Describe how AI systems use sensors to receive information and complete tasks.
- Explain that machines need human input and instructions in order to learn and perform jobs.
- Design and describe a simple AI robot, including the sensors it would use and how it could help people.

Standards:

Priority:

STEELS Standards

3.5.K-2.A Describe how technologies are created to meet people's needs and wants and improve daily life.

3.5.K-2.E Recognize that technologies collect, process, and communicate information.

3.5.K-2.G Explain that people create and control technologies to solve problems and accomplish tasks.

3.5.K-2.BB Compare the natural world and human-made world.

Acceptable Evidence:

- **Performance Tasks** – The students will follow the digital trails of two characters and will understand that digital footprints are often permanent, and they will learn to think carefully before sharing information online. The students will design and describe a simple AI robot that includes sensors that can help people solve problems.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, rubrics, exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will participate in a discussion about what information is safe and unsafe to share online.
- Students will work collaboratively to follow the digital footprints of two characters. They will take notes to determine if the characters are sharing safe or unsafe information online.
- Students will review the five senses.
- Students will examine examples of artificial objects that have sensors and compare them to the five human senses.
- The students will design and describe a simple AI robot using LEGO bricks that includes sensors that can help people solve problems.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.



QUEST

Course Level: Elementary

Grade: 1

Time/Credit: 40 minutes per week

Development Date: August 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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**Central Bucks School District
Teaching and Learning Principles**

1. QUEST is a process through which students discover how math, science, reading, writing, social studies, and the arts are a daily part of their lives.

Therefore, we will design lesson plans that require students to apply and integrate the content of our elementary curriculum to solve real world, unpredictable challenges.

2. We are preparing students to be complex thinkers, self-directed learners, effective communicators, responsible citizens, collaborative workers, and quality producers.

Therefore, we will design lesson plans that require students to use skills in critical and creative thinking, communication, and collaboration to explore questions about issues in their natural world and community.

3. Learning takes place when new information is linked with existing knowledge in meaningful ways.

Therefore, it is a priority to ensure students understand why they are learning the content. We will begin instruction with an anticipatory set that demonstrates relevancy to students' lives, scaffold instruction to build on existing knowledge, and close lessons with activities that reinforce the connection and relevancy of the material.

4. Learning involves connecting to the present, the past, and the possibilities of the future.

Therefore, we will make relevant connections to the real world and provide opportunities for students to understand how the present connects to the past and affects the future.

5. The learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience.

Therefore, we will help students activate prior knowledge, connect old and new information, and use what they have learned in authentic situations.

6. Process and product are equally important in the learning process.

Therefore, self-reflection and self-assessment will be modeled, and opportunities for self-evaluation and prompt, meaningful feedback will be provided. Our students will receive regular and specific feedback related to progress against standards and timely opportunities to use the feedback to re-do and improve.

7. Technology should be an integral part of the student's experience, enhancing learning and the ability to express ideas.

Therefore, we will model and encourage the use of technology as a tool for instruction, research, application, collaboration, and communication.

8. Research shows active learning is essential.

Therefore, we will design tasks that require students to research, analyze, investigate, solve problems, make decisions, and create products.

9. Learning is social. Our learning is closely associated with our connection with others.

Therefore, we will provide opportunities for students to build relationships with and among each other by facilitating discussions, building empathy, and fostering a climate of intrinsic motivation.

10. Relevance is essential to teaching and learning.

Therefore, learning will include real world exposure, cross-curricular connections, and high interest materials.

11. Learning is most effective when differences in learners' prior knowledge, interests, and strengths are accommodated.

Therefore, we will differentiate instruction and assessment to accommodate different learning styles and educational needs.

12. To maximize learning, students need multiple opportunities to practice and take risks.

Therefore, we will provide a supportive environment based on self-discovery and the respectful exchange of ideas.

13. Motivation influences learning.

Therefore, we will inspire students' curiosity with novel, rigorous, and relevant tasks that provide personal choice and control.

14. Formative assessment is vital for learning.

Therefore, we will create a variety of differentiated assessments that measure knowledge, application of skills, process and product, self-evaluation, and growth.

Central Bucks School District
Enduring Understandings

Students will understand that:

Critical Thinking

- Effective critical thinkers identify and ask significant questions that clarify various points of view and lead to better solutions.
- Effective critical thinkers effectively analyze and evaluate evidence, arguments, claims, and beliefs to make sensible decisions.
- Effective critical thinkers solve different kinds of unfamiliar problems in both conventional and innovative ways.
- Effective critical thinkers reflect critically on learning experiences and processes.
- Effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions.

Communication

- Effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts.
- Effective communicators understand that communication is an exchange between the sender and the receiver.
- Effective communicators adjust delivery skills to purpose, audience, and occasion.
- Effective communicators select appropriate media and technologies to enhance presentations.

Collaboration

- Effective collaborators exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.
- Effective collaborators assume shared responsibility for collaborative work, and value the individual contributions made by each team member.
- Effective collaborators are active, critical, and responsible listeners.
- Effective collaborators recognize that communication is essential to understanding themselves and others.
- Effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

Creative Thinking

- Effective creative thinkers elaborate, refine, analyze, and evaluate original ideas to improve and maximize creative efforts.
- Effective creative thinkers demonstrate originality and inventiveness in work and understand the real-world limits to adopting new ideas.
- Effective creative thinkers view failure as an opportunity to learn and understand that creativity and innovation are part of a long-term, cyclical process of small successes and frequent mistakes.
- Effective creative thinkers act on creative ideas to make a tangible and useful contribution.
- Effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

Research

- Effective researchers begin with essential guiding questions.
- Effective researchers understand that the research process is inherently circular and includes the planning, gathering, analyzing, organizing, synthesizing, and evaluating of information.
- Effective researchers select appropriate resources and evaluate information based on accuracy, validity, authority, and relevance.
- Effective researchers draw conclusions, create meaning, and construct new knowledge.
- Effective researchers use information and technology ethically and responsibly to enhance their understanding and present their findings.
- Effective researchers apply research skills to authentic, real-world issues and contexts.
- Effective researchers apply digital tools to gather, evaluate, and use information.

Science and Engineering

- Science is the search for understanding the natural world, and facts, principles, theories, and laws that have been verified by the scientific community and are used to explain and predict natural phenomena and events.
- Engineering is the application of science and mathematics to define real world problems and design solutions.
- Both effective scientists and engineers ask questions and define problems.
- Both effective scientists and engineers develop and use models.
- Both effective scientists and engineers plan and carry out investigations.
- Both effective scientists and engineers analyze and interpret data
- Both effective scientists and engineers use mathematics and computational thinking.
- Both effective scientists and engineers construct explanations and design solutions.
- Both effective scientists and engineers engage in argument from evidence.
- Both effective scientists and engineers obtain, evaluate, and communicate information

Central Bucks School District
Essential Questions

Critical Thinking

- What does it mean to think critically?
- Why is it important to think critically?
- How do effective critical thinkers approach a problem?
- How do effective critical thinkers use conventional and innovative ways to solve unfamiliar problems?
- Why do effective critical thinkers reflect on their learning experiences and processes?
- How do effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions?

Communication

- What is communication?
- Why is effective communication important?
- How do effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts?
- How do effective communicators adjust delivery skills to purpose, audience, and occasion?
- Why is it important to use appropriate media and technologies to enhance presentations?

Collaboration

- What does it mean to collaborate?
- What are the characteristics of an effective collaborator?
- How do effective collaborators listen?
- How do effective collaborators communicate?
- How do effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others?

Creative Thinking

- What does it mean to think creatively?
- Why is it important to think creatively?
- Why is it important to consider real world limits when developing new ideas?
- How can failure be used as an opportunity to learn?
- How do effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology?

Research

- What is the value of research?
- What can be discovered or created through research?
- What makes an effective researcher?
- How do effective researchers apply research skills to authentic, real-world issues and contexts?
- How do effective researchers apply digital tools to gather, evaluate, and use information?

Science and Engineering

- What is the difference between science and engineering?
- What skills do scientists use to explore and understand our world?
- What skills do engineers use to define real world problems and design solutions?

Central Bucks School District – Course of Study Overview

QUEST

Desired Results.

QUEST Course Description:

QUEST is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real world challenges that allow students to apply 21st century skills to become informed citizens and life-long learners. Each unit of study is built around a real-world challenge that ties directly to classroom instruction and requires students to apply cross-curricular skills. Further, the curriculum is heavily focused on teaching students how to use and incorporate technology in new ways.

Grade 1 QUEST Course Description:

First grade QUEST students will be given opportunities to explore the concepts of the engineering design process and 21st century skills. Units of study connect directly to the Kindergarten and Grade 1 curriculums in science, mathematics, social studies, reading, writing, and art. Further, the units introduce students to a variety of tools they can use to solve real-life problems such as: creation iPad apps, basic computer programing, and robotics.

Acceptable Evidence.

Assignments, Performance Tasks, Projects, Tests, etc.:

- Informal and Formal Critiques of 21st Century Skills, specifically collaboration
- Engineering products (solutions to real world problems)
- Student Presentations

QUEST First Grade – Pacing Guide

Content	Days
Unit 1-	
“Welcome to QUEST” Lesson 1- Introduction to engineering and the 4 Cs (collaboration, communication, creativity, and critical thinking skills) Lesson 2- Rosie Revere, Engineer - Read the story and identify the process of an engineer. Lesson 3- Rosie Revere, Engineer - Design, create, and test a prototype.	10 days
Once Upon a Design Lesson 1- Rescuing Rapunzel Introduction- Imagine and Plan Lesson 2- Rescuing Rapunzel - Create, Test, Improve, and Share Lesson 3- <i>Humpty Dumpty Stay on the Wall</i> Introduction- Create the Wall Lesson 4- <i>Humpty Dumpty Stay on the Wall</i> - Imagine and Plan Lesson 5- <i>Humpty Dumpty Stay on the Wall</i> - Create, Test, Improve, and Share Lesson 6- <i>Gingerbread Man</i> Introduction- Imagine and Plan Lesson 7- <i>Gingerbread Man</i> - Create, Test, Improve, and Share	
Unit 2-	
Book and Build Lesson 1 (2-3 days)- The Little Red Fort - Identify a story problem and generate solutions. Collaborate to imagine, plan, and create a model of a fort. Lesson 2 (2-3 days)- Have Fun Molly Lou Melon - Identify a story problem and generate solutions. Collaborate to imagine and plan a design for an invented toy. Lesson 3 (2-3 days)- Doll E 1.0 - Identify the story problem. Imagine and sketch an improved design of a simple toy. Collaborate to build their design, test, and make further improvements. Lesson 4 (2-3 days)- Mechanimals - Identify the problem and generate solutions that will help the farmer. Create an animal that moves.	8-12 days
Unit 3-	
Coding- LEGO Animal Amusement Park Lesson 1 - Code.org- Course B (Lessons 3 and 4) Lesson 2 - Code Spark app- Donut Detective and Tool Trouble Lesson 3- Introduce LEGO SPIKE- Expectations and exploration of kit materials. Lesson 4- LEGO SPIKE- The Fast Lane: Entering the Amusement Park Lesson 5- LEGO SPIKE- Classic Carousel: Create a New Spinning Ride Lesson 6- LEGO SPIKE- The Perfect Swing: Will the Swing Be a Perfect Fit? Lesson 7- LEGO SPIKE- Snack Stand: Let’s Get a Snack from the Snack Stand Lesson 8- LEGO SPIKE- Twirling Teacups: Try a New Spinning Ride Lesson 9- LEGO SPIKE- The Spinning Ferris Wheel: Help Your Friends Ride a Ferris Wheel Lesson 10 LEGO SPIKE- The Most Amazing Ride: Create your own amusement park ride. *Intervention and Enrichment is provided throughout each lesson.	10-12 days
Unit 4-	
Digital Literacy Lesson 1- Digital Citizenship- Pause and Think Online - Understand the importance of being safe, respectful, and responsible online.	2 days

Lesson 2- AI Literacy- All About Intelligence and Can Machines Be Smart? - Understand what it means to be intelligent. Identify and name the five human senses. Connect human learning to how machines can learn. Identify examples of AI in everyday life. Understand that machines do not have brains but can follow instructions. Recognize that AI relies on human input and programming.	
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NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required and Supplementary Texts

Trade books used within the curriculum:

Rosie Revere, Engineer by Andrea Beaty
Rescuing Rapunzel by Bethan Woollvin
The Little Red Fort by Brenda Maier
Have Fun, Molly Lou Melon by David Catrow
Doll E 1.0 by Shanda McCloskey
Mechanimals by Chris Tougas

Software used within the curriculum:

Code.org
Code Spark app
LEGO Spike coding app
Book Creator app

Central Bucks School District – QUEST – Grade 1

Unit 1 – Once Upon a Design

Desired Results:

Essential Questions:

- What is empathy and how do you practice it?
- How can collaborating with others enhance creativity?
- How can you use the individuality of all members of your group to ensure all designs are considered?
- How can you use common classroom materials to create solutions to problems?
- What is the engineering design process and how is it used to create?

Enduring Understandings:

Students will understand that...

- Empathy is the ability to sense other people's emotions and to imagine what other people are thinking or feeling.
- Collaboration can foster creativity and innovative thinking.
- There are different solutions to a design.
- Certain materials possess desirable properties and characteristics for use in creating solutions to problems.
- The engineering design process is a series of steps (Ask, Imagine, Plan, Create, Test, Improve, Share) used to create.

Knowledge:

Students will know...

- Vocabulary: collaboration, create, empathy, engineer, imagine, improve, plan, problem, share, solution, test
- The process of an engineer.
- How to apply the steps of the engineering design process to create solutions to problems.
- The essential components of design plan.

Skills:

Students will be able to...

- Identify a story's problem and innovate a prototype to solve the problem.
- Empathize with story characters in order to generate solutions to their problems.
- Communicate and collaborate with a team.
- Draw plans to use when creating.
- Utilize the engineering design process to collaboratively create, test, and improve their projects.

Standards:

Priority:

STEELS Standards

- 3.5.K-2.B- Describe qualities of everyday products.
- 3.5.K-2.K- Safely use tools to complete tasks.
- 3.5.K-2.M- Demonstrate essential skills of engineering design process.
- 3.5.K-2.N- Analyze how things work.
- 3.5.K-2.O- Illustrate that there are different solutions to a design and none are perfect.
- 3.5.K-2.P- Discuss that all designs have characteristics that can be described.

- 3.5.K-2.Q- Apply skills necessary for making a design.
- 3.5.K-2.S- Apply design concepts, principles, and processes through play and exploration.
- 3.5.K-2.T- Demonstrate that designs have requirements.
- 3.5.K-2.U- Explain that design is a response to wants and needs.
- 3.5.K-2.V- Explain that materials are selected for use because they possess desirable properties and characteristics.
- 3.5.K-2.W- Apply concepts and skills from technology and engineering activities that reinforce concepts and skills across multiple areas.
- 3.5.K-2.X- Develop a plan in order to complete a task.
- 3.5.K-2.DD- Collaborate effectively as a member of a team.

Supporting:

ELA Standards

- CC.1.3.1.A- Retell stories, including key details, and demonstrate understanding of their central message or lesson.
- CC.1.3.1.B- Ask and answer questions about key details in a text.
- CC.1.3.1.C- Describe characters, settings, and major events in a story, using key details.

Acceptable Evidence:

Performance Tasks –

Students will collaboratively create prototypes of inventions to help solve the problems of storybook characters.

Real-World Challenge-

Empathy is the first stage of the design thinking process. It is the ability to understand and feel the problems and realities of the people you are designing for. Empathy helps you create better solutions that meet the needs of your end users. The real-world challenge is- **“Our fairy tale friends are in trouble! Can you collaborate with others by using the engineering design process to design and create a solution that will help them?”**.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment- Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will identify the process of an engineer.
- Students will design, create, and improve on the copter so that it falls at a different speed than Rosie’s copter.
- Students will work collaboratively with peers to solve the problem.
- Students will describe and explain the events, including the problem, in the story **Rapunzel** by Bethan Woollvin.
- Students will brainstorm solutions to help rescue Rapunzel from the tower.
- Students will independently imagine an idea to create something which will solve the problem in the story **Rapunzel**.
- Students will collaborate with a partner to plan and draw a design to create something which will solve the problem in the story **Rapunzel**.
- Students will identify the problem and brainstorm solutions for the story “Humpty Dumpty Stay on the Wall!”
- Students will work in groups to build a Duplo Wall.
- Students will implement the engineering design process, applying prior knowledge to solve a problem.
- Students will differentiate between team roles and demonstrate the ability to work together.
- Students will plan how to keep Humpty safe on the wall.
- Students will apply what they learned in previous lessons to design, test, and adjust their safety seat for Humpty Dumpty.

- Students will describe and explain the events, including the problems, in the story **The Gingerbread Man**.
- Students will brainstorm solutions for one of the problems in the story **The Gingerbread Man**.
- Students will independently imagine an idea to create something which will solve one of the problems in the story **The Gingerbread Man**.
- Students will collaborate with a partner to plan and draw a design to create something which will solve one of the problems in the story **The Gingerbread Man**.
- Students will utilize the engineering design process to collaboratively create, test, and improve their projects.
- Students will share their completed projects by creating a video showing their solution and inserting the video into a collaborative Book Creator project.
- Students will practice working collaboratively with others by sharing ideas and making group decisions, by sharing materials and dividing responsibilities among team members.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – QUEST – Grade 1

Unit 2 – Book and Build

Desired Results:

Essential Questions:

- How can collaborating with others enhance creativity?
- How can you use the individuality of all members of your group to ensure all designs are considered?
- How can you use common classroom materials to create solutions to problems?
- What is the engineering design process and how is it used to create?

Enduring Understandings:

Students will understand that...

- Collaboration can foster creativity and innovative thinking.
- There are different solutions to a design.
- Certain materials possess desirable properties and characteristics for use in creating solutions to problems.
- The engineering design process is a series of steps (Ask, Imagine, Plan, Create, Test, Improve, Share) used to create.

Knowledge:

Students will know...

- Vocabulary: collaboration, communication, creativity, critical thinking,
- The process of an engineer.
- How to apply the steps of the engineering design process to create solutions to problems.
- The essential components of design plan.

Skills:

Students will be able to...

- Identify a story's problem and innovate a prototype to solve the problem.
- Empathize with story characters in order to generate solutions to their problems.
- Communicate and collaborate with a team.
- Draw plans to use when creating.
- Utilize the engineering design process to collaboratively create, test, and improve their projects.

Standards:

Priority:

STEELS Standards

- 3.5.K-2.B- Describe qualities of everyday products.
- 3.5.K-2.K- Safely use tools to complete tasks.
- 3.5.K-2.M- Demonstrate essential skills of engineering design process.
- 3.5.K-2.N- Analyze how things work.
- 3.5.K-2.O- Illustrate that there are different solutions to a design and none are perfect.
- 3.5.K-2.P- Discuss that all designs have characteristics that can be described.
- 3.5.K-2.Q- Apply skills necessary for making a design.
- 3.5.K-2.S- Apply design concepts, principles, and processes through play and exploration.
- 3.5.K-2.T- Demonstrate that designs have requirements.
- 3.5.K-2.U- Explain that design is a response to wants and needs.
- 3.5.K-2.V- Explain that materials are selected for use because they possess desirable properties and characteristics.

3.5.K-2.W- Apply concepts and skills from technology and engineering activities that reinforce concepts and skills across multiple areas.

3.5.K-2.X- Develop a plan in order to complete a task.

3.5.K-2.DD- Collaborate effectively as a member of a team.

Supporting:

ELA Standards

CC.1.3.1.A- Retell stories, including key details, and demonstrate understanding of their central message or lesson.

CC.1.3.1.B- Ask and answer questions about key details in a text.

CC.1.3.1.C- Describe characters, settings, and major events in a story, using key details.

Acceptable Evidence:

Performance Tasks – Students will utilize the 4Cs to design and create in response to a variety of problems posed in picture books.

Real-World Challenge- Communication, collaboration, critical thinking, and creativity are considered the four c's and are all skills that are needed to succeed in today's world. Not only are these skills important to have on their own, but by combining all these skills, you are empowered to solve your own problems, work together, and come up with solutions. The real-world challenge is- **"Can you use the 4Cs to design and create solutions to problems in picture books?"**.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment-Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Listen to the story **The Little Red Fort**.
- Students will identify the problem in the story **The Little Red Fort** and generate solutions.
- Students will imagine and sketch a design to create a model of a fort.
- Students will share their designs and create a group plan for their fort.
- Students will identify each group member's job during the creation stage of the engineering design process.
- Students will collaborate to create a model of a red fort.
- Listen to the story **Have Fun, Molly Lou Melon**.
- The students will identify the problem in the story **Have Fun, Molly Lou Melon** and generate solutions.
- Students will imagine a toy they can create with the materials given.
- Students will create a toy using the materials provided.
- Students will add an improvement to their toy design sketch so they may improve their creation at home.
- Listen to the story **Doll E 1.0**
- Students will identify the problem in the story **Doll E 1.0**.
- The class will discuss examples of toys that have been improved that students are familiar with. (Examples: Tinker Toys, Lite-Brite, video games, etc.)
- Students will imagine and sketch an improved design of a simple toy they use already (bubble wand.)
- Students will share imagined toy improvement ideas with their group and collaborate to sketch a group design.
- Students will collaborate to build their design, test it, and improve again.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – QUEST – Grade 1

Unit 3 – Coding: *Amazing Amusement Park*

Desired Results:

Essential Questions:

- How does language evolve?
- How do coded commands instruct a computer?
- Is there only one way to write code?
- How can we direct a model to move in a certain way?
- How can the movements of an object be changed?
- Why do engineers make changes to their design?
- How can technology be used in a different way?

Enduring Understandings:

Students will understand that...

- Technology can be used to create and communicate ideas.
- Language evolves by adapting to technology and needs. Code is a language that helps people communicate with computers.
- Coded commands provide sequential directions for a task.
- Codes can be written in many ways depending on the technology and task.
- We can change the movements of an object by changing the code.
- Using feedback from the machine, engineers change or improve their design.
- Technology can be used to create and communicate ideas.

Knowledge:

Students will know...

- Vocabulary: brainstorm, build, challenge, change, create, debugging, design, effective, improve, loops, need, program, prototype, refine, rotate, sequencing, serve, solution, test, tool, upgrade, want.
- Engineers utilize code to direct technology.
- Code is the language of computers.
- Code can be used to program a model to move.
- Technology can be used to tell a story.
- Feedback can be used to change or improve a design.
- The appropriate vocabulary to communicate ideas in a collaborative group.

Skills:

Students will be able to...

- Translate real problems into programs.
- Clearly communicate algorithms which contain step by step programming commands.
- Follow visual multi-step directions to create a model with LEGOs.
- Use technological systems and digital tools to program a model.
- Test the model's movement and power.
- Ask and answer questions within a collaborative group.
- Collaborate within a group to solve problems.

Standards:

Priority:

CSTA Standards

- 1A-AP-8- Model daily processes by creating and following algorithms to complete tasks.
- 1A-AP-10- Develop programs with sequences and simple loops, to express ideas or address a problem.
- 1A-AP-11- Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
- 1A-AP-12- Develop plans that describe a program's sequence of events, goals, and expected outcomes.
- 1A-AP-14- Debug errors in an algorithm or program that includes sequences and simple loops.

Acceptable Evidence:

Performance Tasks – Students will work collaboratively with others to use 2D instructions to construct a 3D model of an invented amusement park attraction. They will use software to program the amusement park attraction. Students will create an attraction that meets the needs and wants of a story character.

Real-World Challenge-

Writing code is essential to computer programming. This unit will expose students to the idea of approaching computer tasks in a sequential order, the first step in understanding coding. To begin, students will be asked, **“Can you create code to manipulate different challenges and “write” a computer program?”** Once students can “write” a computer program they will use this skill to solve the following real-life challenge:

In this Lego Spike Essentials activity, students will be challenged to work collaboratively with others to build and code a variety of amusement park attractions. They will then create and code an attraction that they invent: **“Can you create and code attractions for an amusement park to give your character a fun-filled day?”**

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Observation Checklist

- Measure the students' proficiency for each outcome.
- Create a scale that matches your needs. For example:
 1. Needs additional support
 2. Can work independently
 3. Can teach others

Self-Assessment

- Have each student choose the LEGO brick that they feel best represents their performance.
 - Yellow: I am working on meeting the outcome of the lesson.
 - Blue: I am able to meet the outcome of the lesson.
 - Green: I am able to meet the outcome of the lesson, and I can help a friend do it too.

Peer-Feedback

- In their small groups, have your students discuss their experiences working together.
- Encourage them to use statements like these:
 - I liked it when you...
 - I'd like to hear more about how you...

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will understand the beginning concepts of coding (sequencing, debugging, loops) by developing sequential algorithms.
- Students will be able to identify how to put code in the correct order (sequencing) and how to use code more efficiently (looping).
- Students will learn about the LEGO SPIKE Essentials kit and the accompanying app on their iPad.
- Students will practice brainstorming to generate ideas, help develop a story, and solve a problem using engineering solutions and coding via the LEGO SPIKE Essentials kit and app.
- Students will build a classic carousel following directions in the LEGO SPIKE app and then use the Design Process to improve the ride to make it more fun and exciting.
- Using correct sequential coding they will make the carousel move and then adjust the code to make it more fun.
- Students will gather information about the needs or wants of others.
- Students will adjust/change a solution to meet the needs or wants of others.
- Students will use correct sequential coding that allows the swings to meet the needs of all riders.
- Students will practice testing prototypes to ensure that they meet a need.
- Students will modify and remix a solution.
- Students will use correct sequential coding that allows the character to use an automated snack machine.
- Students will modify a solution while considering a specific goal or outcome.
- Students will refine and improve the prototype.
- Students will use correct sequential coding that will complete tasks, introduce an event (message block) that will run multiple programs at the same time.
- Students will modify an existing solution to make it work properly.
- Students will debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
- Students will apply their engineering design skills to solve a problem.
- Students will use correct sequential coding and debugging to create a ride that moves.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

Simplify by:

- Shortening the lesson to only include the first challenge
- Selecting one Inspiration Image to help students change their models

Increase the difficulty by:

- Adding different Color Sensor Blocks to the Programming Canvas
- Exploring new and different Coding Blocks in the program
- Creating unique programs to make the ride move in different ways

Central Bucks School District – QUEST – Grade 1

Unit 4– Digital Literacy

Desired Results:

Essential Questions:

- How can we stay safe when we are online?
- Why is it important to pause and think before we click, share, or post online?
- How can we be kind and respectful to others online?
- What should we do if something online makes us feel unsafe or uncomfortable?
- How can we make good choices when using technology?
- Why is it important to protect our personal information online?
- What can we do to be responsible digital citizens?
- What does it mean to be intelligent?
- How do our five senses help us learn about the world?
- Can machines learn and solve problems like people do?
- How are humans and AI alike, and how are they different?
- How does AI help people in everyday life?
- Why do machines need people to teach and program them?
- How do computers use information to make decisions?

Enduring Understandings:

Students will understand that...

- Being a good digital citizen means pausing and thinking before acting online so that we can stay safe, be responsible, and treat others with kindness and respect.
- People learn using their brains and senses. AI can do some smart tasks, but it only works because people teach it and give it instructions.

Knowledge:

Students will know...

- Vocabulary: artificial intelligence, intelligent, online, pause
- The importance of pausing and thinking before clicking, sharing, posting, or responding online.
- To recognize ways to stay safe online, including protecting personal information and avoiding messages from strangers.
- How to be kind and respectful when communicating with others online.
- That not everything they see online is true and that they should think carefully about online information.
- The importance of maintaining healthy technology habits and taking breaks from screens.
- How their actions online can affect themselves and others.
- The five senses (sight, hearing, smell, taste, and touch) and how they help humans learn about the world.
- That computers and AI can "learn" from data and instructions provided by people.
- Examples of artificial intelligence in their everyday lives.
- The similarities and differences between human intelligence and machine intelligence.
- That AI depends on human programming, guidance, and input.
- That machines can perform smart tasks but do not think exactly like people do.

Skills:**Students will be able to...**

- Explain why it is important to pause and think before taking action online.
- Identify ways to stay safe, responsible, and respectful when using technology.
- Demonstrate safe online behaviors, such as keeping usernames and passwords private and avoiding messages from strangers.
- Recognize that not all information found online is true and describe the importance of thinking critically about online content.
- Describe how to communicate kindly and respectfully with others online.
- Explain why balancing screen time with other activities is important.
- Identify trusted adults they can go to for help if something online makes them feel uncomfortable or unsafe.
- Explain what it means to be intelligent.
- Identify and name the five human senses: sight, hearing, smell, taste, and touch.
- Describe how their senses help them learn about the world around them.
- Recognize that machines do not have brains, feelings, or senses like people.
- Explain that AI can perform tasks that seem intelligent because it follows instructions and learns from data.
- Identify examples of AI they encounter in their everyday lives.
- Discuss similarities and differences between human intelligence and artificial intelligence.
- Contribute ideas to a class chart comparing what humans can do versus what AI can do.
- Demonstrate an understanding that AI depends on people to create, teach, and program it.

Standards:Priority:**STEELS Standards**

3.5.K-2.A Describe how technologies are created to meet people's needs and wants and improve daily life.

3.5.K-2.E Recognize that technologies collect, process, and communicate information.

3.5.K-2.G Explain that people create and control technologies to solve problems and accomplish tasks.

3.5.K-2.BB Compare the natural world and human-made world.

Acceptable Evidence:

- **Performance Tasks** – The students will learn a song that will teach them strategies for staying safe, respectful, and responsible online. The students will go on a 5-senses walk outside or around the school. Students can either take pictures with their iPads to show objects that they “see”, “hear”, “smell”, or “touch” or they can draw pictures using paper and pencil.

Acceptable evidence of learning other than Performance Tasks:**Formative Assessment**

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, rubrics, exit tickets.

Suggested Learning Experiences and Instruction**Learning Experiences:**

- Students will engage in a discussion to define the term “online”.
- Students will listen to a song called "Pause & Think Online" to learn how to be safe and responsible on the internet.
- Students will engage in a discussion to define the term “pause”.
- Students will model the actions of the Digital Citizens by singing and dancing along to the song.
- Students will turn-and-talk about the ways the Digital Citizens reminded them of how to stay safe and be respectful and responsible online.
- Students will draw a picture of one of the Digital Citizens to show how they will be like that character the next time they are online.
- Students will understand the meaning of the word “intelligent”.
- Students will name the five senses.
- Students will participate in a class discussion comparing human and machine intelligence.
- Students will discuss examples of AI devices.
- Students will create a chart comparing what humans can do vs. what AI can do.
- Students will go on a 5-senses walk outside or around the school. Students can either take pictures with their iPads to show objects that they “see”, “hear”, “smell”, or “touch” or they can draw pictures using paper and pencil.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students’ strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.



QUEST

Course Level: Elementary

Grade: Kindergarten

Time/Credit: 40 minutes per week

Development Date: August 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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**Central Bucks School District
Teaching and Learning Principles**

1. QUEST is a process through which students discover how math, science, reading, writing, social studies, and the arts are a daily part of their lives.

Therefore, we will design lesson plans that require students to apply and integrate the content of our elementary curriculum to solve real world, unpredictable challenges.

2. We are preparing students to be complex thinkers, self-directed learners, effective communicators, responsible citizens, collaborative workers, and quality producers.

Therefore, we will design lesson plans that require students to use skills in critical and creative thinking, communication, and collaboration to explore questions about issues in their natural world and community.

3. Learning takes place when new information is linked with existing knowledge in meaningful ways.

Therefore, it is a priority to ensure students understand why they are learning the content. We will begin instruction with an anticipatory set that demonstrates relevancy to students' lives, scaffold instruction to build on existing knowledge, and close lessons with activities that reinforce the connection and relevancy of the material.

4. Learning involves connecting to the present, the past, and the possibilities of the future.

Therefore, we will make relevant connections to the real world and provide opportunities for students to understand how the present connects to the past and affects the future.

5. The learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience.

Therefore, we will help students activate prior knowledge, connect old and new information, and use what they have learned in authentic situations.

6. Process and product are equally important in the learning process.

Therefore, self-reflection and self-assessment will be modeled, and opportunities for self-evaluation and prompt, meaningful feedback will be provided. Our students will receive regular and specific feedback related to progress against standards and timely opportunities to use the feedback to re-do and improve.

7. Technology should be an integral part of the student's experience, enhancing learning and the ability to express ideas.

Therefore, we will model and encourage the use of technology as a tool for instruction, research, application, collaboration, and communication.

8. Research shows active learning is essential.

Therefore, we will design tasks that require students to research, analyze, investigate, solve problems, make decisions, and create products.

9. Learning is social. Our learning is closely associated with our connection with others.

Therefore, we will provide opportunities for students to build relationships with and among each other by facilitating discussions, building empathy, and fostering a climate of intrinsic motivation.

10. Relevance is essential to teaching and learning.

Therefore, learning will include real world exposure, cross-curricular connections, and high interest materials.

11. Learning is most effective when differences in learners' prior knowledge, interests, and strengths are accommodated.

Therefore, we will differentiate instruction and assessment to accommodate different learning styles and educational needs.

12. To maximize learning, students need multiple opportunities to practice and take risks.

Therefore, we will provide a supportive environment based on self-discovery and the respectful exchange of ideas.

13. Motivation influences learning.

Therefore, we will inspire students' curiosity with novel, rigorous, and relevant tasks that provide personal choice and control.

14. Formative assessment is vital for learning.

Therefore, we will create a variety of differentiated assessments that measure knowledge, application of skills, process and product, self-evaluation, and growth.

Central Bucks School District
Enduring Understandings

Students will understand that:

Critical Thinking

- Effective critical thinkers identify and ask significant questions that clarify various points of view and lead to better solutions.
- Effective critical thinkers effectively analyze and evaluate evidence, arguments, claims, and beliefs to make sensible decisions.
- Effective critical thinkers solve different kinds of unfamiliar problems in both conventional and innovative ways.
- Effective critical thinkers reflect critically on learning experiences and processes.
- Effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions.

Communication

- Effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts.
- Effective communicators understand that communication is an exchange between the sender and the receiver.
- Effective communicators adjust delivery skills to purpose, audience, and occasion.
- Effective communicators select appropriate media and technologies to enhance presentations.

Collaboration

- Effective collaborators exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.
- Effective collaborators assume shared responsibility for collaborative work, and value the individual contributions made by each team member.
- Effective collaborators are active, critical, and responsible listeners.
- Effective collaborators recognize that communication is essential to understanding themselves and others.
- Effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

Creative Thinking

- Effective creative thinkers elaborate, refine, analyze, and evaluate original ideas to improve and maximize creative efforts.
- Effective creative thinkers demonstrate originality and inventiveness in work and understand the real-world limits to adopting new ideas.
- Effective creative thinkers view failure as an opportunity to learn and understand that creativity and innovation are part of a long-term, cyclical process of small successes and frequent mistakes.
- Effective creative thinkers act on creative ideas to make a tangible and useful contribution.

- Effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

Research

- Effective researchers begin with essential guiding questions.
- Effective researchers understand that the research process is inherently circular and includes the planning, gathering, analyzing, organizing, synthesizing, and evaluating of information.
- Effective researchers select appropriate resources and evaluate information based on accuracy, validity, authority, and relevance.
- Effective researchers draw conclusions, create meaning, and construct new knowledge.
- Effective researchers use information and technology ethically and responsibly to enhance their understanding and present their findings.
- Effective researchers apply research skills to authentic, real-world issues and contexts.
- Effective researchers apply digital tools to gather, evaluate, and use information.

Science and Engineering

- Science is the search for understanding the natural world, and facts, principles, theories, and laws that have been verified by the scientific community and are used to explain and predict natural phenomena and events.
- Engineering is the application of science and mathematics to define real world problems and design solutions.
- Both effective scientists and engineers ask questions and define problems.
- Both effective scientists and engineers develop and use models.
- Both effective scientists and engineers plan and carry out investigations.
- Both effective scientists and engineers analyze and interpret data
- Both effective scientists and engineers use mathematics and computational thinking.
- Both effective scientists and engineers construct explanations and design solutions.
- Both effective scientists and engineers engage in argument from evidence.
- Both effective scientists and engineers obtain, evaluate, and communicate information

**Central Bucks School District
Essential Questions**

Critical Thinking

- What does it mean to think critically?
- Why is it important to think critically?
- How do effective critical thinkers approach a problem?
- How do effective critical thinkers use conventional and innovative ways to solve unfamiliar problems?
- Why do effective critical thinkers reflect on their learning experiences and processes?
- How do effective critical thinkers use digital tools to plan and conduct research, manage projects, solve problems, and make informed decisions?

Communication

- What is communication?
- Why is effective communication important?
- How do effective communicators articulate thoughts and ideas using oral, written, and nonverbal communication skills in a variety of forms and contexts?
- How do effective communicators adjust delivery skills to purpose, audience, and occasion?
- Why is it important to use appropriate media and technologies to enhance presentations?

Collaboration

- What does it mean to collaborate?
- What are the characteristics of an effective collaborator?
- How do effective collaborators listen?
- How do effective collaborators communicate?
- How do effective collaborators use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others?

Creative Thinking

- What does it mean to think creatively?
- Why is it important to think creatively?
- Why is it important to consider real world limits when developing new ideas?
- How can failure be used as an opportunity to learn?
- How do effective creative thinkers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology?

Research

- What is the value of research?
- What can be discovered or created through research?
- What makes an effective researcher?
- How do effective researchers apply research skills to authentic, real-world issues and contexts?
- How do effective researchers apply digital tools to gather, evaluate, and use information?

Science and Engineering

- What is the difference between science and engineering?
- What skills do scientists use to explore and understand our world?
- What skills do engineers use to define real world problems and design solutions?

Central Bucks School District – Course of Study Overview

QUEST

Desired Results

QUEST Course Description:

QUEST is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real world challenges that allow students to apply 21st century skills to become informed citizens and life-long learners. Each unit of study is built around a real-world challenge that ties directly to classroom instruction and requires students to apply cross-curricular skills. Further, the curriculum is heavily focused on teaching students how to use and incorporate technology in new ways.

Kindergarten QUEST Course Description:

Kindergarten QUEST students will be given opportunities to explore the concepts of the engineering design process and 21st century skills. Units of study connect directly to the kindergarten curriculum in science, mathematics, social studies, reading, writing, and art. Emphasis will be placed on safely and responsibly using tools to complete tasks. Further, the units introduce students to a variety of technology they can use to solve real-life problems such as creation iPad apps, basic computer programming, and robotics.

Acceptable Evidence.

Assignments, Performance Tasks, Projects, Tests, etc.:

- Informal and Formal Critiques of 21st Century Skills, specifically collaboration
- Engineering products (solutions to real world problems)
- Student Presentations

QUEST Kindergarten – Pacing Guide

Content	Days
Unit 1 -	
“Welcome to QUEST” Lesson 1- Introduction to engineering and the 4 Cs (collaboration, communication, creativity, and critical thinking skills) Lesson 2- Practice safely and responsibly using tools to complete a task. Engineering with the Three Little Pigs Lesson 1- The Three Little Pigs Mega Block Build -Solve the characters’ problem by engineering using Mega Blocks. Lesson 2- The Three Little Pigs Structures Block Build - Solve the characters’ problem by engineering with Structures Blocks. Lesson 3- The Three Little Pigs Magna Tile Build - Solve the characters’ problem by engineering with Magna Tiles. Lesson 4 (2 days)- The Three Little Pigs Final Build and Puppet Show - Choose a favorite building material to engineer a solution to the characters’ problem. Collaborate with others to retell the story using puppets.	7 days
Unit 2 -	
Coding with Indi Robots Lesson 1- Unplugged Lesson - Coding with Magna Tiles Lesson 2- Meet Indi - Identify key parts of Indi and explain what they do. Demonstrate how Indi works. Lesson 3- Left or Right? - Move Indi left and right. Design a route around obstacles for Indi to follow. Lesson 4- Patterns - Identify patterns and correctly identify what comes next in a pattern. Complete a pattern to successfully guide Indi. Lesson 5 (2 days)- Coding with Kodable - Introduce sequencing and debugging using the Kodable app. Lesson 6 (2 days)- Coding with Code.org - Utilize coding skills to drag and drop, attach blocks of code, sequence, debug, and add loops. Lesson 7- Coding with Scratch Jr.- Friendly Playground - Program one sprite to greet another stationary sprite using movement and looks blocks. Initialize programs to begin with a Start on Green Flag and Go Home (Return to X). Lesson 8 (2 days)- Indi’s Day Out - Create a map and incorporate Indi’s color tiles to create routes for Indi to follow to visit different places in the community.	11 days
Unit 3 -	
Storybook STEM- The Three Billy Goats Gruff Lesson 1- Build a Bridge with Magna Tiles - Identify the characters, setting, and problem of the story. Use Magna Tiles to build a bridge to solve the characters’ problem. Lesson 2- Build a Bridge with Wood - Compare two different versions of the story. Build a wooden bridge to help the goats stay safe from the troll. Make a troll puppet. Lesson 3- Build a Bridge with Blocks - Listen to a third version of the story and make comparisons. Use Duplo Blocks to build a bridge. Compare materials. Lesson 4- Build a Custom Bridge - Listen to one more version of the story. Build a bridge to help the goats stay safe from the troll using materials of your choice.	4 days
Unit 4-	
LEGO EDU Science- Push and Pull	10 days

Lesson 1- LEGO Science EDU- Learn about the kit and free-build with the materials. Lesson 2- LEGO Science EDU- Dino Birthday Bash- Investigate the effects of pushes and pulls on the motion of an object. Lesson 3- LEGO Science EDU- Muddy Rhino- Design a solution to change the direction of a moving object with a push or a pull and then test if it works as intended. Lesson 4- LEGO Science EDU- Feeding Time- Conduct an investigation to compare the effects of different push strengths on the motion of an object. Lesson 5- LEGO Science EDU- Winning Shot- Make observations and analyze data to determine the effects of a push or a pull on a model. Lesson 6- LEGO Science EDU- Ducks in a Row- Determine if they need a push or a pull to solve a problem. Lesson 7- What Is a Magnet?- Understand that all magnetic objects are metal. Experiment with magnets to determine which objects are magnetic and which objects are not magnetic. Lesson 8- Estimating with Magnets- Estimate and test objects (paperclips, washers, coins) to see how many can be picked up by a magnet. Lesson 9 (2 days)- 5 Little Ducks Magnet Maze- Apply understanding of the forces of push and pull by using magnets to navigate a maze in order to help a mother duck find her baby ducks.	
Unit 5-	
Digital Literacy Lesson 1- Digital Citizenship: Caring for Our Devices- Understand what it means to be responsible for something and identify ways to take care of their device. Lesson 2- AI Literacy: Artificial vs. Natural- Recognize the difference between artificial and natural objects. Identify examples of artificial and natural items in their environment. Understand that artificial items are made by humans.	2 days

NOTE: Additional remediation in standards/content from the grade level where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their classmates.

Required Texts and Software

Trade books used within the curriculum:

One by Kathryn Otoshi

Three Little Pigs by Giuseppe Di Lernia

Three Billy Goats Gruff (multiple versions)

Five Little Ducks by Raffi

Me on the Map by Joan Sweeney

Software used within the curriculum:

Code.org

Kodable coding app

Scratch Jr. coding app

Central Bucks School District – QUEST – Kindergarten
Unit 1 – Welcome to QUEST: Engineering with the Three Little Pigs

Desired Results:

Essential Questions:

- What skills do engineers use to define real world problems and design solutions?
- How can collaborating with others enhance creativity?
- How can you use the individuality of all members of your group to ensure all designs are considered?
- How can you use common classroom materials to create solutions to problems?
- What is the engineering design process and how is it used to create?
- How can you safely and responsibly use appropriate tools to complete a task?

Enduring Understandings:

Students will understand that...

- Collaboration can foster creativity and innovative thinking.
- There are different solutions to a design.
- Certain materials possess desirable properties and characteristics for use in creating solutions to problems.
- The engineering design process is a series of steps (Ask, Imagine, Plan, Create, Test, Improve, Share) used to create
- There are ways to safely and responsibly use appropriate tools to complete a task.

Knowledge:

Students will know...

- Vocabulary: collaborate, create, engineer, imagine, problem, solution, tools
- The process of an engineer.
- How to apply the steps of the engineering design process to create solutions to problems.
- The essential components of a design plan.

Skills:

Students will be able to...

- Practice expected routines and procedures for the QUEST room.
- Explore and build with a variety of materials.
- Formulate an understanding of the term engineer.
- Safely use appropriate tools to complete tasks (crayons, scissors, tape).
- Collaborate with others by sharing ideas and materials.

Standards:

Priority:

STEELS Standards

3.5.K-2.K- Safely use tools to complete tasks.

3.5.K-2.O- Illustrate that there are different solutions to a design and none are perfect

3.5.K-2.S- Apply design concepts, principles, and processes through play and exploration

3.5.K-2.AA Demonstrate that creating can be done by anyone

3.5.K-2.DD- Collaborate effectively as a member of a team.

Acceptable Evidence:

Performance Tasks –

Students will collaboratively create prototypes of inventions to help solve the problems of storybook characters.

Real-World Challenge-

Empathy is the first stage of the design thinking process. It is the ability to understand and feel the problems and realities of the people you are designing for. Empathy helps you create better solutions that meet the needs of your end users. The real-world challenge is- “The three little pigs are in trouble! Can you collaborate with others by using the engineering design process to design and create a solution that will help them?”.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment- Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will be introduced to QUEST and understand what they will learn and do in this class.
- Students will listen to the story **The Three Little Pigs**.
- Students will solve the characters’ problem by engineering using Mega Blocks.
- Students will understand clean-up routines and learn the Clean-Up song.
- Students will be introduced to the “Tool of the Day”- crayons.
- Students will safely and responsibly use crayons to color a puppet.
- Students will solve the characters’ problem by engineering using Structures Blocks.
- Students will practice clean-up routines.
- Students will be introduced to the “Tool of the Day”- scissors.
- Students will safely and responsibly use scissors to cut out a puppet.
- Students will solve the characters’ problem by engineering using Magna Tiles.
- Students will be introduced to the “Tool of the Day”- masking tape.
- Students will use masking tape to assemble a puppet.
- Students will choose a favorite building material to engineer a solution to the characters’ problem.
- Students will collaborate with others to retell the story using the puppets.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students’ strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – QUEST – Kindergarten

Unit 2 – Coding with Indi

Desired Results:

Essential Questions:

- How does language evolve?
- How do coded commands instruct a computer?
- Is there only one way to write code?
- How can we direct a model to move in a certain way?
- How can the movements of an object be changed?
- Why do engineers make changes to their design?
- How can technology be used in a different way?

Enduring Understandings:

Students will understand that...

- Technology can be used to create and communicate ideas.
- Language evolves by adapting to technology and needs. Code is a language that helps people communicate with computers.
- Coded commands provide sequential directions for a task.
- Codes can be written in many ways depending on the technology and task.
- We can change the movements of an object by changing the code.
- Using feedback from the machine, engineers change or improve their design.

Knowledge:

Students will know...

- Vocabulary: code, color sensor, debugging, electric motor, LED light, loop, obstacle, pattern, repeat, robot, sequencing, speaker, sprite, turn
- Coding related terminology and problem solving through computer programming.

Skills:

Students will be able to...

- Utilize coding skills to drag and drop, attach blocks of code, sequence, debug, and add loops.
- Identify key parts of a robot and explain what they do.
- Demonstrate how a robot works.
- Complete a pattern to successfully guide a robot along a route and around obstacles.
- Collaborate with a team and use effective communication skills.
- Identify places in the community.
- Create a map and create routes for a robot to follow to visit different places in the community.

Standards:

Priority:

CSTA Standards

1A-CS-02- Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).

1A-CS-03- Describe basic hardware and software problems using accurate terminology.

1A-DA-06- Collect and present the same data in various visual formats.

1A-DA-07- Identify and describe patterns in data visualizations, such as charts or graphs, to make predictions.

1A-AP-08- Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.

1A-AP-09- Model the way programs store and manipulate data by using numbers or other symbols to represent information.

1A-AP-10- Develop programs with sequences and simple loops, to express ideas or address a problem.

1A-AP-11- Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.

1A-AP-12- Develop plans that describe a program's sequence of events, goals, and expected outcomes.

1A-AP-14- Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

1A-IC-17 - Work respectfully and responsibly with others online.

STEELS Standards

3.5.K-2.N Analyze how things work.

3.5.K-2.W Apply concepts and skills from technology and engineering activities that reinforce concepts and skills across multiple areas.

3.5.K-2.DD Collaborate effectively as a member of a team.

Supporting:

Social Studies Standards

7.2.K.A- Describe the characteristics of homes and businesses located in the community to gain an understanding of physical features.

Acceptable Evidence:

Performance Tasks –

Students will collaborate with a team and use effective communication skills to create a map and design routes for a robot to follow to visit different places in the community.

Real-World Challenge-

Writing code is essential for computer programming. This unit will expose students to the idea of approaching computer tasks in a sequential order, the first step in understanding coding. To begin, students will be asked, "Can you create code using color tiles and patterns to program a robot to move?"

Once students can "write" a computer program they will use this skill to solve the following real-life challenge: In this robotics activity, students will be challenged to work collaboratively with others to create a map of their community. They will then work together to code their robot to visit various locations around the community.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment- Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will play an "unplugged" coding game with a partner to learn about sequencing and programming.
- Students will identify key parts of the Indi robot and explain what they do.
- Students will use the terms: Electric motor, LED light, color sensor, speaker.
- Students will demonstrate how the Indi robot works.
- Students will move the Indi robot left and right.

- Students will design a route around obstacles for the Indi robot to follow.
- Students will identify patterns around them.
- Students will correctly identify what comes next in a pattern.
- Students will complete a pattern to successfully guide the Indi robot.
- Students will utilize coding skills to sequence and debug using the Kodable app.
- Students will utilize coding skills to drag and drop, attach blocks of code, sequence, debug, and add loops using the Code.org program.
- Students will understand the Scratch Jr. coding platform.
- Students will program one sprite to greet another stationary sprite using movement and looks blocks.
- Students will initialize their programs to begin with a Start on Green Flag and Go Home (Return to X).
- Students will collaborate with a team and use effective communication skills.
- Students will identify places in the community.
- Students will create a map and incorporate Indi's color tiles to create routes for Indi to follow to visit different places in the community.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – QUEST – Kindergarten

Unit 3 – Storybook STEM: The Three Billy Goats Gruff

Desired Results:

Essential Questions:

- What skills do engineers use to define real world problems and design solutions?
- How can collaborating with others enhance creativity?
- How can you use the individuality of all members of your group to ensure all designs are considered?
- How can you use common classroom materials to create solutions to problems?
- What is the engineering design process and how is it used to create?
- How can you safely and responsibly use appropriate tools to complete a task?

Enduring Understandings:

Students will understand that...

- Collaboration can foster creativity and innovative thinking.
- There are different solutions to a design.
- Certain materials possess desirable properties and characteristics for use in creating solutions to problems.
- The engineering design process is a series of steps (Ask, Imagine, Plan, Create, Test, Improve, Share) used to create.
- There are ways to safely and responsibly use appropriate tools to complete a task.

Knowledge:

Students will know...

- Vocabulary: collaborate, create, engineer, imagine, problem, solution, tools
- The process of an engineer.
- How to apply the steps of the engineering design process to create solutions to problems.
- The essential components of a design plan.

Skills:

Students will be able to...

- Practice expected routines and procedures for the QUEST room.
- Explore and build with a variety of materials.
- Formulate an understanding of the term engineer.
- Safely use appropriate tools to complete tasks (crayons, scissors, tape)
- Collaborate with others by sharing ideas and materials.

Standards:

Priority:

STEELS Standards

3.5.K-2.K- Safely use tools to complete tasks.

3.5.K-2.O- Illustrate that there are different solutions to a design and none are perfect

3.5.K-2.S- Apply design concepts, principles, and processes through play and exploration

3.5.K-2.AA Demonstrate that creating can be done by anyone

3.5.K-2.DD- Collaborate effectively as a member of a team.

Acceptable Evidence:

Performance Tasks –

Students will collaboratively create prototypes of inventions to help solve the problems of storybook characters.

Real-World Challenge-

Empathy is the first stage of the design thinking process. It is the ability to understand and feel the problems and realities of the people you are designing for. Empathy helps you create better solutions that meet the needs of your end users. The real-world challenge is- “The Three Billy Goats Gruff need your help to safely cross the river! Can you collaborate with others by using the engineering design process to design and create a solution that will help them?”.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment- Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will listen to the story **The Three Billy Goats Gruff**
- Students will identify the characters, setting and problem of the story.
- Students will help the characters solve their problem by engineering a bridge using Magna Tiles.
- Students will understand clean-up routines and practice the Clean-Up song.
- Students will safely and responsibly use tools to create a troll puppet.
- Students will help the characters solve their problem by engineering a bridge using Structures Blocks.
- Students will practice clean-up routines.
- Students will compare different versions of the story.
- Students will help the characters solve their problem by engineering a bridge using Mega Blocks.
- Students will compare the effectiveness of each building material.
- Students will choose a favorite building material to engineer a solution to the characters’ problem.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students’ strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – QUEST – Kindergarten

Unit 4– LEGO Science EDU Push and Pull

Desired Results:

Essential Questions:

- Can pushes and pulls have different strengths and directions?
- Can we change the speed and direction of an object by pushing or pulling it?
- What does a bigger push or pull do to an object?
- What are the similarities among magnetic and non-magnetic objects?
- How do magnets interact with each other and other objects?
- What does it mean to collaborate?

Enduring Understandings:

Students will understand that...

- Pushes and pulls can have different strengths and directions.
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
- A bigger push or pull makes things speed up or slow down more quickly.
- There are similarities among both magnetic objects and nonmagnetic objects.
- Magnets interact with all things made of iron and with other magnets to produce motion without touching them.
- Effective collaborators assume shared responsibility for collaborative work, and value the individual contributions made by each team member.

Knowledge:

Students will know...

- Vocabulary: attract, direction, magnet, metal, problem, pull, push, solution, strength
- How to follow directions to build a model.
- How to collaborate with others to accomplish a common goal.
- How to conduct an investigation and test objects.

Skills:

Students will be able to...

- Investigate the effects of pushes and pulls on the motion of an object.
- Design a solution to change the direction of a moving object with a push or a pull and then test if it works as intended.
- Conduct an investigation to compare the effects of different push strengths on the motion of an object.
- Define a simple problem and solve it by developing an object or tool.
- Define a problem that can be solved through the development of an improved object and test their solution.
- Understand that some metals are magnetic.
- Demonstrate effects of magnets on different objects.
- Experiment with magnets to understand magnetic properties of different materials.
- Describe qualities of different items (i.e. weight, magnetism, etc...)

Standards:

Priority:

STEELS Standards

- 3.2.K.A Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.
- 3.2.K.B Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
- 3.5.K-2.B Describe qualities of everyday products.
- 3.5.K-2.K Safely use tools and complete tasks.
- 3.5.K-2.N Analyze how things work.
- 3.5.K-2.O Illustrate that there are different solutions to a design and that none are perfect.
- 3.5.K-2.S Apply design concepts, principles, and processes through play and exploration.
- 3.5.K-2.T Demonstrate that designs have requirements.
- 3.5.K-2.U Explain that design is a response to wants and needs.
- 3.5.K-2.V Explain that materials are selected for use because they possess desirable properties and characteristics.
- 3.5.K-2.W Apply concepts and skills from technology and engineering activities that reinforce concepts and skills across multiple areas.
- 3.5.K-2.AA Demonstrate that creating can be done by anyone.
- 3.5.K-2.DD Collaborate effectively as a member of a team.

Acceptable Evidence:

Performance Tasks – Students will collaborate with a partner to apply their knowledge of magnetism and the forces of push and pull to navigate a magnetic “mother duck” through a maze to find her lost babies.

Real-World Challenge-

Teaching the motion of push and pull to kindergarten students helps them understand that forces are what make objects move. This foundational knowledge is crucial for their understanding of physics and motion. By learning about push and pull, students can apply their knowledge in real-world situations, such as moving furniture or playing with toys that require pushing or pulling.

In this real-world challenge, the students will apply their knowledge of the forces of push and pull and their understanding of magnetism to help a mother duck find her lost baby ducks.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, rubrics, exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will explore with the LEGO EDU Science kit materials and free-build with their partners.
- Students will investigate the effects of pushes and pulls on the motion of an object by helping a LEGO dinosaur bring presents to a birthday party.
- Students will design a solution to change the direction of a moving object with a push or a pull and then test if it works as intended by trying to get a muddy LEGO rhinoceros to take a bath.
- Students will conduct an investigation to compare the effects of different push strengths on the motion of an object by helping to feed some hungry LEGO animals.
- Students will define a simple problem and solve it by developing an object or tool to help some LEGO ducks safely cross the road.

- Students will define a problem that can be solved through the development of an improved object and test their solution by helping someone skateboard on a rocky road.
- Students will understand that all magnetic objects are metal.
- Students will experiment with magnets to determine which objects are magnetic and which objects are not magnetic.
- Students will appropriately use the “tool of the day”- glue sticks.
- Students will effectively collaborate with a partner to complete a task.
- Students will test objects (paperclips, washers, coins) to see how many can be picked up by a magnet.
- Students will write down their estimate and what actually happened.
- Students will use magnets to move an object through a maze.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students’ strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.

Central Bucks School District – QUEST – Kindergarten

Unit 5– Digital Literacy

Desired Results:

Essential Questions:

- How can we tell if something is natural or made by people?
- What things in our world come from nature?
- What things have people created or built?
- How do devices help people learn and work?
- How can we use devices safely and responsibly?

Enduring Understandings:

Students will understand that...

- Natural things occur in nature and are not made by people.
- Artificial things are created, built, or designed by humans.
- We can find both natural and artificial objects in our homes, schools, and communities.
- Technology can help us learn, create, and solve problems when used appropriately.
- Responsible device users follow rules, handle devices carefully, and ask a trusted adult for help when needed.
- We can make thoughtful choices about when and how to use technology.

Knowledge:

Students will know...

- Vocabulary: care, device, responsibility, artificial, natural
- Objects can be grouped into two categories: natural things and artificial (human-made) things.
- Natural objects come from nature and are not created by people (e.g., trees, rocks, flowers, animals).
- Artificial objects are made or designed by humans (e.g., toys, books, cars, computers, tablets).
- People create technology to help solve problems, communicate, learn, and complete tasks.
- Natural and artificial objects exist all around them in their homes, schools, and communities.
- Observing characteristics of objects can help them determine whether something is natural or human-made.
- Responsible device use is important for learning and safety.
- Technology should be used carefully and respectfully by following classroom and family rules.
- Trusted adults help children use technology safely and appropriately.

Skills:

Students will be able to...

- Understand what it means to be responsible for something.
- Identify ways to care for their device.
- Recognize the difference between artificial and natural objects.
- Identify examples of artificial and natural items in their environment.
- Understand that artificial items are made by humans.

Standards:

Priority:

STEELS Standards

3.5.K-2.B Describe qualities of everyday products.

- 3.5.K-2.K Safely use tools to complete tasks.
- 3.5.K-2.N Analyze how things work.
- 3.5.K-2.BB Compare the natural world and human-made world.

Acceptable Evidence:

Performance Tasks – The students will create a Device Care Tips picture chart to illustrate and share strategies for keeping devices safe, clean, and in good working condition. Students will categorize objects as either natural or artificial by sorting them into an interactive chart.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Teacher observation, anecdotal notes, student self-reflection (collaboration skills), design planning sheets, rubrics, exit tickets.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Students will engage in a class discussion about caring for people, pets, and cherished belongings, making connections to the importance of taking care of technology devices.
- Students will read and discuss a device-care limerick that reinforces key practices for using and handling technology responsibly.
- Students will create a Device Care Tips picture chart to illustrate and share strategies for keeping devices safe, clean, and in good working condition.
- Students will explore the difference between natural objects and artificial (human-made) objects, learning that artificial items are created by people.
- Students will participate in an interactive sorting activity in which they classify objects as either natural or artificial.
- Students will take part in a school or outdoor observation walk to identify examples of natural and artificial objects in their environment. Students will document their observations by either taking photographs with their iPads or creating drawings with paper and pencil.

Instructional Strategies:

Direct Instruction (.59), Class Discussion (.82), Cooperative vs. Individualistic Learning (.55), Problem Solving Teaching (.67)

Differentiation/Intervention/Enrichment Options:

- Assign specific roles and responsibilities during collaborative group work to draw upon students' strengths.
- Use alternative materials to allow for differentiation.

For Language Development:

- Utilize picture cards and other visual supports to reinforce vocabulary.
- Use translation features when presenting information digitally.



Family and Consumer Sciences

Curriculum Revisions Update:

Family and Consumer Sciences 7

Family and Consumer Sciences 8

Food for Life

Sept 3, 2026

Introductions



Elizabeth (Betsey) Coyne
FCS District Coordinator



Purpose of Presentation



Presentation Curriculum Revisions:

- Family and Consumer Sciences Grade 7
- Family and Consumer Sciences Grade 8
- Food for Life



10 Minutes



Agenda



Background



Curriculum Revisions



Questions



Background

FCS 7th & 8th

Curriculum was revised to align with the new Pennsylvania Family and Consumer Sciences Standards. With the addition of 6th Grade FCS through district realignment, curricula for grades 6, 7, and 8 were redesigned to ensure comprehensive coverage of all required standards across the middle school program.

Food for Life

Previously offered as a 9th-grade cooking course, Food for Life was revised for the transition of 9th grade to the high school. The course was redesigned for the block schedule format and expanded to be accessible to all students in grades 9-12.

*These revisions align curriculum with Pennsylvania Family and Consumer Sciences Standards while strengthening students' real-world life skills, independence, and career readiness.



Family and Consumer Sciences Grade 7

Key Curriculum Revisions:

- ✓ Aligned with new Pennsylvania FCS Standards
- ✓ Redesigned as part of a comprehensive Grades 6-8 curriculum progression
- ✓ Expanded focus on food literacy, nutrition, and kitchen safety
- ✓ Strengthened resource management through sustainability and machine sewing experiences
- ✓ Added instruction in responsible caregiving and child safety
- ✓ Increased emphasis on hands-on, real-world life skills that promote independence and responsible decision-making



Family and Consumer Sciences Grade 8

Key Curriculum Revisions:

- ✓ Aligned with updated Pennsylvania Family & Consumer Sciences and Personal Finance Standards.
- ✓ Added dedicated instruction in Personal Finance and Consumer Skills, including budgeting, income types, paycheck analysis, and consumer decision-making.
- ✓ Expanded Career Readiness through interviewing, professional communication, leadership, teamwork, and workplace technology skills.
- ✓ Strengthened Sewing and Textile Resource Management, emphasizing sewing machine operation, textile construction, repair skills, sustainability, and evaluating when to make, repair, or replace textile products.
- ✓ Continued emphasis on Food Science through food safety, culinary skill development, and hands-on cooking labs.
- ✓ Uses performance-based learning experiences that promote independence, responsible decision-making, and preparation for future careers and everyday life.



Scope and Sequence for Middle School FCS:

Grade 6	Grade 7	Grade 8
<i>Foundations → Skill Development → Real-World Application</i>		
Food Safety & Introductory Food Labs	Food Safety, Food Labs & Culinary Skills	Advanced Food Labs & Multi-Step Recipes
Personal Finance Foundations	Resource Management & Sustainability	Personal Finance & Consumer Skills
Needs vs. Wants & Budgeting	Sewing & Textile Basics	Sewing & Textile Resource Management
	Responsible Caregiving & Child Safety	Career Readiness & Workplace Skills



Food for Life – High School

Key Curriculum Revisions:

- ✓ Transitioned from a 9th-grade course to a high school elective open to students in grades 9-12.
- ✓ Redesigned from a traditional quarter course to a 0.5 credit block-format course.
- ✓ Emphasizes hands-on learning through food preparation labs and performance-based assessments.
- ✓ Develops practical skills in kitchen safety, food preparation, resource management, teamwork, and problem solving.
- ✓ Provides students with practical culinary skills that support independent living and future success.



Food for Life

Why Offer Food For Life?

- ✓ Designed as an introductory culinary course for students with little to no prior cooking experience.
- ✓ Culinary confidence and food preparation skills.
- ✓ Safe and responsible kitchen practices.
- ✓ Problem-solving and collaboration skills through hands-on labs.
- ✓ Resource management skills including planning, organization, and budgeting.
- ✓ Skills that support independent living.

Curriculum Revisions:

- ❖ Family and Consumer Sciences 7
- ❖ Family and Consumer Sciences 8
- ❖ Food for Life



Questions?



Family and Consumer Sciences Grade 7

Course Number: 6755

Course Level: Secondary

Grade: 7th Family and Consumer Sciences

Time/Credit: 1 quarter / 45 days

Development Date: 2025 – 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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Central Bucks School District
Teaching and Learning Principles

1. Students learn best when they work in a caring and respectful environment.
2. Learning is most effective when sufficient structure and scaffolding are provided.
3. Students thrive when they are challenged at an appropriate level.
4. Engaging students in learning includes allowing them to make choices based on their interests and creative abilities.
5. Providing opportunities for in-depth problem solving enhances students' critical thinking skills.
6. Active participation is essential for meaningful learning experiences.
7. Students benefit from opportunities to demonstrate and practice responsibility.
8. Connecting new learning to prior knowledge deepens understanding and retention.
9. Student collaboration enriches the learning process.
10. Relating the curriculum to students' lives fosters engagement and personal connection.
11. Effective learning occurs when individual differences are acknowledged and accommodated.
12. Students grow when they learn from their mistakes in a supportive environment.
13. Successful learning requires the ability to reflect, self-assess, and use feedback to self-adjust.
14. Family and Consumer Sciences empowers students with real-world skills and knowledge that prepare them for independent, responsible living and lifelong success.

Central Bucks School District
Family and Consumer Sciences Grade 7
Enduring Understandings

Students will understand that:

Food Science and Nutrition

- Applying safe food handling, preparation, and storage practices prevents foodborne illness and promotes health.
- Accurate measuring, proper knife skills, and correct tool use are essential for safe and successful food preparation.
- Analyzing nutrition facts, food labels, and energy needs enables individuals to make informed choices that support lifelong wellness.
- Food systems, from production to consumption, impact food safety, cost, and sustainability.
- Nutrients and calories fuel the body, and understanding their role helps maintain energy balance and overall health.

Resource Management

- Proper clothing care and laundry practices extend the life of garments.
- Using resources wisely, including upcycling and repairing items, supports sustainability and reduces waste.
- Design elements influence the appearance of textile projects.
- Applying sewing construction techniques allows individuals to create products that are practical, durable, and visually appealing.
- Operating a sewing machine safely and accurately is an important life skill for creating and repairing items.

Education and Early Childhood Development

- Understanding child safety and developmental needs is essential for responsible caregiving.
- Positive interactions and age-appropriate activities promote healthy growth and development in children.
- Preparedness and responsibility are key qualities of an effective babysitter or caregiver.

**Central Bucks School District
Family and Consumer Sciences Grade 7
Essential Questions**

Food Science and Nutrition

- How does safe food handling and preparation practices protect our health?
- Why is it important to measure accurately and use the correct tools when cooking?
- How can understanding nutrition facts and food labels help us make healthier choices?
- In what ways does the food supply chain impact our food choices, and how much food costs?

Resource Management

- How can proper clothing care extend the life of our garments?
- How does upcycling or repairing items benefit individuals and the environment?
- How do design elements affect the function and appearance of a textile project?
- Why is it important to know how to operate a sewing machine safely and effectively?

Education and Early Childhood Development

- How can understanding child development help someone become a better caregiver?
- What safety considerations are most important when caring for children?
- How can a babysitter or caregiver create a positive and supportive environment for a child?

Central Bucks School District – Course of Study Overview

Family and Consumer Sciences Grade 7

Desired Results

Course Description:

In 7th-grade Family and Consumer Sciences, students will develop essential life skills through hands-on learning in the areas of food science and nutrition, resource management, education and early child development. In the Food Science and Nutrition Unit, they'll learn how to safely prepare recipes, understand where food comes from, and make informed nutritional choices using food labels and current dietary guidelines for balanced eating. In our Resource Management Unit, students will master the basics of clothing care, sustainability, and machine sewing through creative projects. Finally, they'll explore Early Education and Child Development Unit, and what it means to be a responsible caregiver. This course empowers students to make smart, nutritional, and responsible choices at home and in their community.

Prerequisite: None

Committee Members:

Elizabeth Coyne
Yvonne Flath
Kim Hein
JoAnn Smith

Acceptable Evidence.

Completion of in-class learning tasks that may include, but are not limited to:

- Cooking Labs
- Projects and Presentations
- Performance-Based Assessments
- Class participation

Course Grading: No Final Exam

Family and Consumer Sciences 7th – Pacing Guide

Content	Days
Unit 1 – Food Science and Nutrition	22
Intro to Kitchen Safety	2
Kitchen Safety and Sanitation	2
Measuring and Knife Safety	2
Label Reading	1
Food Labs (Nutrition, Demos & Labs)	15
<i>Intervention/Enrichment occurs throughout the unit</i>	
Unit 2 – Resource Management	18
Intro to Resource Management	1
Laundry and Clothing Care	3
Sewing Machine Basics	3
Sustainability and Upcycling	2
Textile Project	9
<i>Intervention/Enrichment occurs throughout the unit</i>	
Unit 3 – Education and Early Childhood Development	4
Child Development & Positive Guidance	2
Safety & Learning Environments	2
<i>Intervention/Enrichment occurs throughout the unit</i>	

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students who acquire an understanding of the content faster than their class peers.

Required Texts and Software: None

Central Bucks School District – Course of Study – Family and Consumer Sciences Grade 7

Unit 1 – Food Science and Nutrition

Desired Results:

Students will develop the knowledge and skills to handle and prepare food safely, measure ingredients accurately, and use kitchen tools and appliances correctly to ensure both quality and safety in the kitchen. They will learn to identify food groups, understand nutrient functions, and make connections between food choices and overall health. By exploring the food supply chain, students will evaluate factors that influence food safety, availability, and sustainability. They will also use food labels to make informed dietary choices that support wellness.

Essential Questions:

- How do safe food handling and preparation practices protect our health?
- Why is it important to measure accurately and use the correct tools when cooking?
- How can understanding nutrition facts and food labels help us make healthier choices?
- In what ways does the food supply chain impact our food choices and the cost of food?

Enduring Understandings:

Students will understand that...

- applying safe food handling, preparation, and storage practices prevents foodborne illness and promotes health.
- accurate measuring, proper knife skills, and correct tool use are essential for safe and successful food preparation.
- analyzing nutrition facts, food labels, and energy needs enables individuals to make informed choices that support lifelong wellness.
- food systems, from production to consumption, impact food safety, cost, and sustainability.
- nutrients and calories fuel the body, and understanding their role helps maintain energy balance and overall health.

Knowledge:

Students will know...

Vocabulary:

Safety & Sanitation

- Sanitation – practices that keep food, surfaces, and equipment clean to prevent illness
- Cross-contamination – the transfer of harmful substances like chemicals, bacteria, or allergens from one surface or food to another
- Foodborne illness – sickness caused by consuming contaminated food
- Personal hygiene – habits like handwashing that prevent the spread of germs
- Danger zone – temperature range (40°F–140°F) where bacteria grow rapidly
- Cleaning – removing dirt and debris from surfaces
- Sanitizing – using chemicals or heat to kill bacteria on surfaces
- Bacteria – tiny living germs (organisms) that grow on food, cooking tools, and surfaces which can be good or bad

Clean, Separate, Cook, Chill

- Clean – washing hands, surfaces, and produce to remove germs
- Separate – keeping raw meat, poultry, and seafood away from ready-to-eat foods
- Cook – heating food to safe internal temperatures to kill bacteria
- Chill – refrigerating food promptly to slow bacterial growth

Measuring & Knife Safety

- Dry measuring cups – used for measuring solid ingredients like flour or sugar
- Liquid measuring cup – used for measuring liquids like milk or oil
- Measuring spoons – used for small amounts of ingredients
- Leveling – scraping off excess from a measuring tool for accuracy
- Chef's knife – a versatile kitchen knife used for chopping and slicing
- Claw grip – a safe hand position used when cutting food
- Cutting board – a surface used to protect counters from damage

Food Groups & Nutrition

- Food groups – categories of food: fruits, vegetables, grains, protein, dairy
- Nutrients – substances in food that help the body grow and stay healthy
- Portion size – the amount of food served or eaten at one time

Food Supply / Production

- Food supply chain – the path food takes from farm to table
- Sustainability – using resources in ways that protect the environment and future supply

Label Reading & Nutrient Analysis

- Calorie – a unit of energy provided by food
- Energy balance – the relationship between calories consumed and calories used
- Nutrition Facts Label – a label showing the nutrient content of packaged food
- Serving size – the recommended amount of food to eat at one time

Skills:**Students will be able to...**

- demonstrate proper handwashing and personal hygiene techniques before and during food preparation.
- identify and apply sanitation procedures to maintain a clean and safe kitchen environment.
- measure ingredients accurately using proper techniques (e.g., leveling, eye-level reading).
- identify and safely use basic kitchen knives and demonstrate proper cutting techniques.
- classify foods into appropriate food groups and identify daily serving requirements.
- analyze how food choices affect wellness.
- locate and read food labels to identify nutritional information.
- describe the steps food takes from production to consumption.

Standards:**Priority:**

11.1.6-8.B – Demonstrate food safety and sanitation procedures

11.1.6-8.E – Apply measurement and math skills in following recipe directions

11.1.6-8.F – Prepare a recipe using fundamental culinary skills and techniques

11.1.6-8.H – Examine the nutritional needs of individuals and families in relation to health and wellness

11.1.6-8.C – Analyze factors that influence nutrition and wellness practices across the life span

Supporting:

11.1.6-8.A – Evaluate factors that affect food safety from production through consumption

11.1.6-8.I – Analyze the energy and nutrient requirements for individuals at various stages of the life cycle

11.1.6-8.G – Demonstrate food science through principles of food biology and chemistry

11.1.6-8.D – Hypothesize the effectiveness of the use of meal management principles

Acceptable Evidence:

Performance Tasks:

- Demonstrate proper handwashing, surface cleaning, and food handling procedures before and during a cooking lab; complete a sanitation checklist and explain how actions prevent foodborne illness.
- Complete hands-on labs that demonstrate key culinary skills, including reading and following a recipe step-by-step, measuring ingredients accurately, practicing safe knife techniques, and using kitchen appliances correctly.
- Read and locate nutrition labels from food products; identify serving size, calories, added sugars, and key nutrients.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Exit tickets with reflections or quick checks on safety procedures, nutrition concepts, or culinary techniques.
- Canvas quizzes on vocabulary, sanitation steps, label reading, and food groups.
- Lab prep checklists completed before each lab to ensure readiness and safety compliance.
- Measuring practice using dry and liquid ingredients with correct tools and techniques.
- Knife safety simulation using playdough to practice grips and cutting motions.
- Teacher feedback in labs using rubrics to assess safety and technique.

Summative Assessment

- Kitchen safety quiz including topics such as sanitation, hygiene, cross-contamination, food and kitchen safety.
- Food labs where students prepare a recipe demonstrating measuring, kitchen safety, food preparation techniques, and clean-up procedures.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Practice proper handwashing, personal hygiene, and kitchen sanitation routines before and during food preparation.
- Demonstrate and apply the “Clean, Separate, Cook, Chill” principles through hands-on food handling activities.
- Measure dry and liquid ingredients accurately using the correct tools and leveling/eye-level techniques.

- Safely use knives by practicing the pinch/claw grip and other cutting techniques with fruits, vegetables, or practice materials.
- Classify a variety of foods into the correct food group.
- Have students review food packages to identify the key components of a food label.

Instructional Strategies:

- Model first, then do: demonstrate safety procedures, measuring techniques, and knife skills before students practice.
- Use lab routines: establish consistent expectations for setup, safety checks, cooking, and cleanup.
- Think-alouds: verbalize decision-making during recipe prep, label reading, or sanitation steps to model reasoning.
- Chunk lessons into mini-skills: break down complex tasks (e.g., knife safety or label analysis) into manageable steps.
- Assign group roles: use structured roles (e.g., head chef, safety monitor, cleanup lead) to promote collaboration and accountability.
- Use visual supports: provide diagrams, labeled tools, and step-by-step recipe visuals to reinforce vocabulary and procedures.
- Incorporate video demonstrations: use short clips to preview techniques or reinforce safety concepts
- Use exit tickets or quick check-ins: assess understanding of key concepts like food groups, sanitation, or measuring accuracy.
- Scaffold with guided notes: offer sentence starters or fill-in-the-blank formats to support reflection and content retention.
- Relate content to real life: connect food choices, safety practices, and nutrition to students' daily routines and family life.
- Provide tiered tasks: offer differentiated recipes or analysis activities based on readiness and skill level.
- Use peer feedback: have students observe and evaluate each other's technique using rubrics during labs.
- Integrate digital tools: use platforms like Canvas, Edpuzzle or Padlet for formative assessments and interactive activities.
- Offer small group or 1:1 check-ins: reteach or reinforce skills like measuring or knife safety with targeted support.

Differentiation/Intervention/Enrichment Options:

- Provide tiered recipes with varied complexity to match student readiness, such as simplified steps or no-heat options
- Use guided notes and sentence starters to support students during written reflections.
- Provide modified lab tasks with fewer ingredients or simplified steps for students needing additional support.
- Use video demonstrations and hands-on practice stations to reinforce safety and culinary techniques.
- Conduct small group or 1:1 check-ins to reteach key skills like measuring, knife safety, or sanitation procedures.

For Language Development:

- Provide visual recipes with labeled diagrams and step-by-step instructions to support vocabulary acquisition and comprehension.
- Use word banks, sentence starters, and guided notes during written reflections and nutrition analysis activities.
- Incorporate cooking demonstrations with think-alouds to model academic and procedural language.
- Offer bilingual materials or translated vocabulary lists for multilingual learners when available.

Central Bucks School District – Course of Study – Family and Consumer Sciences Grade 7

Unit 2 – Resource Management

Desired Results:

Students will develop essential life skills related to clothing care, sustainability, and textile construction. Through hands-on experiences, they will learn how to properly launder items made of fabric, decode care labels, and care for clothing to extend their lifespan. Students will explore the environmental impact of textile waste and apply creative problem-solving by upcycling materials into functional items. By learning to operate a sewing machine and apply design principles, students will gain confidence, independence, and an appreciation for resource management.

Essential Questions:

- How do proper laundry and clothing care practices help extend the life of garments?
- How can upcycling and sustainable choices reduce waste and support the environment?
- How do the elements of design influence the function and appearance of textile products?
- What skills are needed to safely and effectively operate a sewing machine?
- How can sewing and textile care promote independence and resourcefulness?

Enduring Understandings:

Students will understand that...

- proper laundry and clothing care practices help maintain textiles and promote sustainability.
- upcycling and responsible resource use support environmental stewardship and creative problem-solving.
- design elements such as color, texture, and shape influence both the function and aesthetics of textile products.
- hand/sewing machine skills foster independence, creativity, and practical resource management.
- textile care and sewing are essential life skills that support personal responsibility and self-sufficiency.
- hand/machine sewing skills are practical and transferable tools that can be used to repair, alter, and maintain textile items, extending their usefulness and reducing waste.

Knowledge:

Students will know...

Vocabulary:

Laundry & Clothing Care

- Detergent – a cleaning agent used to remove dirt and stains from clothing
- Fabric softener – a product used to soften clothes and reduce static cling
- Chlorine bleach – is a strong cleaning chemical that uses chlorine to whiten clothes, remove tough stains, and kill germs.
- Non-chlorine bleach – is a gentler type of bleach that does not use chlorine. This is color safe.
- Stain removal – the process of treating spots or discoloration on fabric
- Care label – a tag on clothing that provides instructions for washing and drying
- Laundering – the process of washing, drying, and caring for textiles
- Shrinkage – the reduction in size of fabric due to heat or moisture

Sustainability & Upcycling

- Sustainability – using resources in a way that protects the environment and future supply
- Upcycle – to creatively reuse or repurpose old materials into new, functional items
- Textile waste – discarded fabric and clothing that contributes to environmental pollution
- Repurpose – to adapt an item for a new use rather than discarding it

Sewing & Textile Construction

- Bobbin – a small spool that holds the lower thread in a sewing machine
- Presser foot – a part of the sewing machine that holds fabric in place while stitching
- Seam – the line where two pieces of fabric are stitched together
- Stitch – a loop of thread created by a needle in sewing
- Backstitch – a technique used to secure the beginning and end of a seam
- Needle Plate - is the flat metal plate under the needle on a sewing machine.
- Handwheel – the round knob on the side of the sewing machine that raises and lowers the needle.

Skills:

Students will be able to...

- identify and follow proper laundry procedures including sorting, washing, drying, and stain removal.
- read and decode clothing care labels to determine appropriate laundering methods.
- explain how upcycling supports sustainability and demonstrate how to repurpose textiles.
- apply elements of design such as color, texture, and shape to create functional textile products.
- operate a sewing machine safely and correctly, including threading, stitching, and troubleshooting.
- construct simple textile items using basic sewing techniques such as straight stitching and backstitching.
- demonstrate responsibility and independence through care and maintenance of personal clothing and textile projects.
- evaluate the environmental impact of textile waste and identify ways to reduce, reuse, and recycle materials.

Standards:

Priority:

- 11.2.6-8.A – Analyze sustainability practices and their effect on future renewable and non-renewable resources
- 11.2.6-8.C – Apply elements of design to create products and environments
- 11.2.6-8.E – Assess effects of design construction, care, use, and maintenance of textiles
- 11.2.6-8.F – Demonstrate laundering processes aligned with industry standards and regulations

Supporting:

- 11.2.6-8.B – Apply planning skills to manage individual and family resources such as clothing and time
- 11.1.6-8.A – Evaluate factors that affect safety from production through consumption (if discussing textile production and sustainability)

Acceptable Evidence:

Performance Tasks –

- Complete a laundry care simulation where students sort clothing, decode care labels, and select appropriate washing and drying methods; students explain their choices and demonstrate understanding of proper laundering practices.
- Create an upcycled textile item using repurposed materials; students document their design process, explain how their project supports sustainability, and reflect on the environmental impact of textile waste.
- Apply elements of design to a textile project by selecting colors, textures, and shapes that enhance both function and appearance; students present their design choices and explain how they meet a specific purpose.
- Demonstrate safe and effective sewing techniques by completing a guided project (e.g., fidget maze, pouch, lanyard, or handwarmer); students follow step-by-step instructions and troubleshoot basic machine issues.
- Reflect on the skills learned throughout the unit by completing a self-assessment and written response explaining how textile care and sewing contribute to independence, creativity, and responsible resource use.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Exit tickets on laundry procedures, sewing techniques, and sustainability concepts.
- Guided notes and vocabulary checks during instruction on textile care and design elements.
- Peer feedback during sewing practice using a checklist for machine setup and stitching accuracy.
- Sorting activity where students categorize clothing based on care labels and washing instructions.
- Observation during machine practice to assess threading, bobbin winding, and safe operation.

Summative Assessment

- Sewing project where students complete one textile item (e.g., fidget maze, pouch, lanyard or handwarmer) using a sewing machine; assessed on safety, technique, and design application.
- Upcycled textile project where students repurpose materials into a functional item; assessed on creativity, sustainability, and use of design elements.
- Laundry completion task where students demonstrate sorting, stain treatment, and care label interpretation; assessed through a rubric and reflection.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Explore laundry basics through a hands-on sorting activity using real or simulated clothing and care labels.
- Practice stain removal techniques using common household items and compare effectiveness.
- Complete a guided clothing care scavenger hunt using sample garments to identify care symbols and instructions.
- Participate in a sustainability discussion and brainstorm ways to reduce textile waste at home and in the community.
- Create an upcycled textile item using repurposed materials.
- Rotate through sewing machine practice stations to learn threading, bobbin winding, and basic stitching.
- Complete a mini sewing challenge to reinforce straight stitching and backstitching techniques.
- Reflect on the environmental impact of textile waste through a short writing or visual response.
- Collaborate in small groups to troubleshoot sewing machine issues and share tips for successful operation.

Instructional Strategies:

- Model first, then do: demonstrate laundry sorting, stain removal, and sewing machine setup before students practice independently.
- Use visual supports: provide diagrams of care labels, sewing machine parts, and design elements to reinforce vocabulary and procedures.
- Chunk tasks into mini-lessons: break down complex skills like threading a machine or planning an upcycled project into manageable steps.
- Assign group roles: use structured roles (e.g., machine operator, design planner, materials manager) to promote collaboration and accountability.
- Incorporate video demonstrations: use short clips to preview sewing techniques, laundry processes, or upcycling ideas.
- Use guided practice: scaffold hands-on activities with checklists, step-by-step instructions, and teacher feedback.

Differentiation/Intervention/Enrichment Options:

- Provide tiered sewing projects with varying complexity (e.g., simplified pouch vs. multi-step handwarmer) to meet diverse skill levels and build confidence.
- Use visual guides and labeled diagrams for sewing machine parts, laundry symbols, and design elements to support comprehension and language development.
- Offer small group or 1:1 support for students needing extra help with machine setup, threading, or troubleshooting.
- Allow advanced students to design their own upcycled textile item, incorporating multiple design elements and presenting their creative process.

For Language Development:

- Provide labeled diagrams of sewing machine parts, laundry symbols, and design elements to reinforce vocabulary and visual recognition.
- Use word banks and sentence starters during reflections, project planning, and peer feedback activities.
- Incorporate think-alouds during demonstrations to model academic and procedural language.
- Offer bilingual vocabulary lists or translated instructions when available to support multilingual learners.
- Use graphic organizers to help students plan upcycled projects, sort laundry tasks, or describe design choices.

Central Bucks School District – Course of Study – Family and Consumer Science Grade 7

Unit 3 – Education and Early Childhood Development

Desired Results:

Students will explore the foundational concepts of education and early child development, caregiving, and early learning. Through hands-on activities and scenario-based learning, they will identify developmental stages, apply positive guidance strategies, and evaluate safe environments for children. Students will also examine literacy-building techniques and reflect on the role of support systems in promoting healthy child development. This unit empowers students with essential skills for responsible caregiving in family and community settings.

Essential Questions:

- How do children grow and change during different stages of development, and why is it important for caregivers to understand these stages?
- What types of activities best support a child's learning and development at different ages?
- What makes the environment safe, healthy, and supportive for children?
- What are the most important health and safety considerations when caring for children?
- How can storytelling and reading help children develop literacy skills?

Enduring Understandings:

Students will understand that...

- the stages of child development help caregivers provide appropriate guidance and support.
- age-appropriate activities promote learning and healthy development in children.
- a safe, healthy, and nurturing environment is essential for children's growth and well-being.
- caregivers must be aware of health and safety hazards to protect children at different developmental stages.
- storytelling and reading are powerful tools for enhancing children's literacy and communication skills.

Knowledge:

Students will know...

Vocabulary:

- Developmental stages – the phases of growth children go through (infant, toddler, preschool, school-age)
- Milestones – key skills or behaviors children typically develop at certain ages
- Positive guidance – techniques used to encourage good behavior and teach self-control
- Redirection – guiding a child's attention from inappropriate behavior to a more appropriate activity
- Consistency – using the same expectations and consequences to help children feel secure
- Caregiver – a person responsible for the care and supervision of a child
- Babysitter – someone who temporarily cares for children, often in the absence of parents
- Safety hazard – anything that could potentially cause harm or injury to a child
- Age-appropriate – suitable for a child's developmental level and abilities
- Literacy – the ability to read and write; includes listening, speaking, and storytelling
- Routine – a regular schedule that helps children feel safe and know what to expect
- Emergency contact – a person to call in case of an emergency while babysitting
- First aid – basic medical help given before professional care is available
- Support system – people or services that help families and caregivers (e.g., pediatricians, childcare centers)

- Early childhood education – programs and practices that support learning in young children
- Childproofing – making a space safe for children by removing or securing hazards

Skills:

Students will be able to...

- identify and describe the stages of child development and appropriate guidance strategies for each stage.
- select and explain learning activities that support the developmental needs of children at various ages.
- evaluate environments to determine if they are safe, healthy, and supportive for children.
- recognize and respond to common health and safety hazards when caring for children.

Standards:

Priority:

11.4.6–8.A – Identify child guidance practices for each stage of child development

11.4.6–8.B – Identify learning activities that meet the developmental needs of learners

11.4.6–8.C – Evaluate various environments to determine if they provide the characteristics of a proper learning environment

11.4.6–8.D – Evaluate health and safety hazards relating to children at each stage of child development

Supporting:

11.4.6–8.E – Explain how storytelling, story reading, and writing enhance literacy development in children

Acceptable Evidence:

Performance Tasks –

- Create a mini-poster titled “Babysitter’s Guide to Child Development” where students select one developmental stage (infant, toddler, preschool, or school-age), list key milestones, and describe two positive guidance strategies appropriate for that stage.
- Participate in a safety scenario role-play where students work in small groups to act out a babysitting situation, identify and respond to a safety hazard, and explain how the environment could be improved to support child safety and learning.
- Evaluate a children's activity, toy, or book identifying its age-appropriateness, and how these activities aid in physical, social, emotional and intellectual development.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Exit ticket: After Day 1, students complete a short reflection identifying one developmental stage and a positive guidance strategy they learned.
- Safety check worksheet: During Day 2, students complete a checklist identifying potential hazards in a sample babysitting scenario and suggest improvements to the environment.
- Students rotate through stations acting out babysitting scenarios and apply positive guidance, identify safety hazards, and explain their decisions.
- Students review images of different rooms or environments and identify potential safety hazards.

Summative Assessment

- Performance task: Students create a “Babysitter’s Guide to Child Development” mini-poster, demonstrating understanding of developmental stages and guidance strategies.
- Read-aloud planning sheet: Students select a children’s book and complete a planning sheet that includes age-appropriateness, summary, and an interactive literacy activity.
- Students evaluate a toy or activity, identify its target age, describe which developmental areas it supports, and note any safety concerns.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Explore developmental stages through a gallery walk or station activity where students examine age-specific milestones and match them to appropriate guidance strategies.
- Analyze babysitting scenarios in small groups to identify safety hazards and propose improvements to create a safer, more supportive environment for children.
- Participate in a read-aloud demonstration where the teacher models storytelling techniques, followed by students planning their own literacy activity using a children’s book.

Instructional Strategies:

- Chunk lessons into mini-skills: break down complex tasks like identifying developmental stages or planning literacy activities into manageable steps.
- Assign group roles: use structured roles (e.g., safety checker, storyteller, resource researcher) to promote collaboration and accountability during group tasks.
- Use visual supports: provide diagrams of developmental stages, safety hazards, and literacy strategies to reinforce vocabulary and concepts.
- Integrate digital tools: use platforms like Canvas, Edpuzzle or Padlet for formative assessments and interactive activities.
- Offer small group or 1:1 check-ins: reteach or reinforce skills with targeted support.

Differentiation/Intervention/Enrichment Options:

- Allow students to choose from tiered performance tasks (e.g., simplified poster vs. full scenario role-play) based on readiness and comfort level.
- Conduct small group or 1:1 check-ins to reteach key concepts such as developmental stages, safety hazards, or literacy strategies.
- Integrate real-world connections by inviting students to reflect on personal experiences with siblings, babysitting, or helping younger children.
- Challenge advanced learners to design a full babysitting plan that includes developmental activities, safety precautions, and emergency contacts.

For Language Development:

- Incorporate think-alouds during demonstrations to model academic and caregiving language (e.g., “I’m choosing this book because it’s age-appropriate for toddlers…”).
- Offer bilingual vocabulary lists or translated instructions when available to support multilingual learners.
- Use graphic organizers to help students plan read-aloud activities, identify safety hazards, or describe developmental milestones.
- Encourage oral language practice through partner discussions, role-plays, and group presentations.



Family and Consumer Sciences 8th Grade

Course Number: 6850

Course Level: All

Grade: 8th Grade

Time/Credit: 45 Days/1 Quarter

Development Date: 2025 - 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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**Central Bucks School District
Teaching and Learning Principles**

1. Students learn best when they work in a caring and respectful environment.
2. Learning is most effective when sufficient structure and scaffolding are provided.
3. Students thrive when they are challenged at an appropriate level.
4. Engaging students in learning includes allowing them to make choices based on their interests and creative abilities.
5. Providing opportunities for in-depth problem solving enhances students' critical thinking skills.
6. Active participation is essential for meaningful learning experiences.
7. Students benefit from opportunities to demonstrate and practice responsibility.
8. Connecting new learning to prior knowledge deepens understanding and retention.
9. Student collaboration enriches the learning process.
10. Relating the curriculum to students' lives fosters engagement and personal connection.
11. Effective learning occurs when individual differences are acknowledged and accommodated.
12. Students grow when they learn from their mistakes in a supportive environment.
13. Successful learning requires the ability to reflect, self-assess, and use feedback to self-adjust.
14. Family and Consumer Sciences empowers students with real-world skills and knowledge that prepare them for independent, responsible living and lifelong success.

Central Bucks School District
Enduring Understandings

Students will understand that:

Food Science and Nutrition

- proper food handling, sanitation, and knife skills are essential for preventing illness and ensuring safe food preparation.
- accurate measuring and culinary techniques support consistency and successful cooking recipe outcomes.
- nutritional needs vary across the lifespan, and understanding calories, nutrients, and energy balance helps individuals make informed dietary choices.
- reading and analyzing food labels empower consumers to evaluate products and make health-conscious decisions.
- nutrient analysis supports wellness by helping individuals assess how food choices impact their health and energy levels.

Career, Community, and Family Connections

- professional communication, appropriate dress, and interview skills are essential for success in the workplace.
- leadership, teamwork, and effective use of technology contribute to effective collaboration and career readiness.
- understanding job roles and workplace expectations helps students prepare for future employment and community engagement.

Personal Finance and Consumer Skills

- budgeting and financial planning are essential life skills that help individuals and families manage resources, meet goals, and prepare for unexpected expenses.
- different types of income, such as hourly wage, salary, commission, and tips, offer varying financial advantages and influence career decisions, financial well-being, and lifestyle choices.
- career choices and educational pathways directly impact earning potential, financial stability, and long-term planning.
- family needs and life transitions shape how individuals create budgets, make purchases, and plan for financial stability.

Sewing and Textile Resource Management

- it is important to compare cost, time, durability, and sustainability when deciding whether to make or alter a textile item.
- it is important to accurately read, interpret, and follow technical directions and procedures to safely and successfully complete textile and sewing tasks.
- there are connections between textile construction skills and real-world careers in design, manufacturing, and human services.
- strong communication is essential to support collaborative problem-solving during sewing tasks.

Central Bucks School District Essential Questions

Food Science and Nutrition

- How do food safety and sanitation practices protect our health during food preparation?
- Why is accurate measuring essential for successful cooking?
- How do proper knife skills and responsible equipment handling help ensure safety in the kitchen?
- How do nutritional needs change across the lifespan, and how can we meet them through food choices?
- What role do calories and nutrients play in providing energy and supporting wellness?
- How can reading and analyzing food labels help us make informed dietary decisions?
- How does nutrient analysis support healthy eating habits and personal wellness goals?

Career, Community, and Family Connections

- What skills and behaviors contribute to success in job interviews and the workplace?
- How can communication, leadership, and teamwork improve our relationships and career readiness?
- Why is it important to use technology responsibly and professionally in a work environment?

Personal Finance and Consumer Skills

- How can creating and managing a family budget help individuals meet short-term and long-term financial goals?
- What are the financial advantages and disadvantages of different types of income such as hourly wage, salary, commission, and tips?
- How do career choices and education levels influence income potential and financial stability?
- How can understanding and comparing income types support informed financial and career decisions?
- How do changing family needs and responsibilities impact financial decisions and budgeting?

Sewing and Textile Resource Management

- How do different construction techniques affect the durability and long-term value of textile items?
- Why is accurately reading, interpreting, and following technical directions and procedures critical to safe and successful textile and sewing tasks?
- When is it smarter to make, replace or repair, and why?
- In what ways are sewing and textile construction skills transferable to a variety of career paths?

Central Bucks School District – Course of Study Overview

Family and Consumer Sciences Grade 8

Desired Results

Course Description:

In 8th Grade Family and Consumer Sciences students gain real-world skills across four connected areas: food science, career readiness, personal finance, and sewing and textile resource management. Students strengthen their culinary skills by preparing multi-step recipes and exploring nutrition, energy needs, and food safety practices. In the sewing and textiles unit they learn to operate a sewing machine, apply basic construction techniques, and evaluate the durability of textile products. Students build workplace readiness by practicing interviewing, communication, leadership, and teamwork, and deepen financial literacy by creating budgets, and comparing income types. Across all units students make meaningful connections to family life, independence, and everyday decision-making, empowering them with practical skills to navigate adolescence, family life, and future career pathways.

Prerequisite: None

Committee Members:

Elizabeth Coyne
Yvonne Flath
Kim Hein
Suzanne Rodowicz
JoAnn Smith

Acceptable Evidence.

Completion of in-class learning tasks that may include, but are not limited to:

- Cooking Labs
- Projects and Presentations
- Performance-Based Assessments
- Class participation

Course Grading: No Final Exam

Family and Consumer Sciences Grade 8 – Pacing Guide

Content	Days
Unit 1 – Food Science	22
Introduction to Kitchen Safety	1
Sanitation & Food Safety Principles	2
Measuring Techniques	2
Knife Safety and Cutting Skills	2
Nutrition and Wellness	2
Food Labs	13
<i>Intervention/Enrichment occurs throughout the unit</i>	
Unit 2 – Career, Community and Family Connections	7
Introduction to Careers & Professionalism	1
Interviewing & Communication Skills	2
Dressing for Success	1
Leadership & Teamwork	1
Technology in the Workplace	1
<i>Intervention/Enrichment occurs throughout the unit</i>	
Unit 3 – Personal Finance and Consumer Skills	7
Introduction to Personal Finance	1
Types of Income	1
Understanding Your Paycheck	2
Budgeting Basics	1
Budgeting Project	1
Consumer Rights and Responsibilities	1
<i>Intervention/Enrichment occurs throughout the unit</i>	
Unit 4 – Sewing and Textile Resource Management	7
Machine operation and safety review	1
Machine Sewing	1
Hand Sewing	1
Sewing Textile Project	4
<i>Intervention/Enrichment occurs throughout the unit</i>	

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software: None

Central Bucks School District – Course of Study – Family and Consumer Sciences Grade 8

Unit 1 – Food Science

Desired Results:

This unit builds skills in food safety, sanitation, and culinary techniques to promote safe and successful food preparation. Students learn proper handwashing, kitchen hygiene, accurate measuring, knife safety, and responsible equipment use through hands-on cooking labs. Emphasis is placed on following multi-step recipes while working cooperatively and maintaining a safe kitchen environment. This unit also explores nutrition by helping students understand how calories, nutrients, and energy contribute to growth, health, and wellness. Students develop consumer awareness by reading and analyzing Nutrition Facts labels to make informed food choices. Through practical application and reflection, students gain lifelong skills that support healthy eating habits and personal wellness.

Essential Questions:

- How do food safety and sanitation practices protect our health during food preparation?
- Why is accurate measuring essential for successful cooking?
- How do proper knife skills and responsible equipment handling help ensure safety in the kitchen?
- How do nutritional needs change across the lifespan, and how can we meet them through food choices?
- What role do calories and nutrients play in providing energy and supporting wellness?
- How can reading and analyzing food labels help us make informed dietary decisions?
- How does nutrient analysis support healthy eating habits and personal wellness goals?

Enduring Understandings:

Students will understand that...

- proper food handling, sanitation, and knife skills are essential for preventing illness and ensuring safe food preparation.
- accurate measuring and culinary techniques support consistency and successful cooking recipe outcomes.
- nutritional needs vary across the lifespan, and understanding calories, nutrients, and energy balance helps individuals make informed dietary choices.
- reading and analyzing food labels empower consumers to evaluate products and make health-conscious decisions.
- nutrient analysis supports wellness by helping individuals assess how food choices impact their health and energy levels.

Knowledge:

Students will know...

Vocabulary:

Safety & Sanitation

- Sanitation – practices that keep food, surfaces, and equipment clean to prevent illness.

- Cross-Contamination – the transfer of harmful bacteria from one surface or food to another.
- Pathogens – harmful microorganisms, such as bacteria, viruses, or parasites, that can contaminate food and cause foodborne illness if ingested.
- Foodborne Illness – sickness caused by consuming contaminated food.
- Personal Hygiene – habits such as proper hand washing, tying back hair, wearing clean clothing, and maintaining personal grooming and cleanliness that help prevent the spread of germs and keep food safe.
- Danger Zone – temperature range (40°F–140°F) where bacteria grow rapidly.
- Clean – washing hands, surfaces, and produce to remove germs.
- Separate – keeping raw meat, poultry, and seafood away from ready-to-eat foods.
- Cook – heating food to safe internal temperatures to kill bacteria.
- Chill – refrigerating or freezing food promptly to slow bacterial growth.
- Thaw – to change frozen food back to its unfrozen state using safe methods that prevent bacterial growth.
- Internal Temperature – the temperature inside food that ensures it's safely cooked.

Measuring & Knife Skills

- Dry Measuring Cups – used for measuring solid ingredients like flour or sugar.
- Liquid Measuring Cup – used for measuring liquids like milk or oil.
- Measuring Spoons – used for small amounts of ingredients.
- Leveling – scraping off excess from a measuring tool for accuracy.
- Chef's Knife – a versatile kitchen knife used for chopping and slicing.
- Pinch and Claw Grip – a safe hand position used when cutting food.
- Cutting Board – a surface used to protect counters and knives and prevent cross-contamination.

Nutrition Across the Lifespan

- Nutritional Needs – the specific nutrients required at different life stages.
- Nutrient – a substance found in food that the body needs for energy, growth, repair, and overall health.
- Life Stages – phases of human development (infant, child, teen, adult, senior).
- Portion Size – the amount of food served or eaten at one time.

Food Production / Supply Chain

- Production – growing, raising, or manufacturing food.
- Processing – changing food from its natural state for safety or convenience.
- Distribution – transporting food to stores or consumers.

Label Reading & Nutrient Analysis

- Nutrition Facts Label – a label showing the nutrient content of packaged food.
- Serving Size – the recommended amount of food to eat at one time.
- % Daily Value (%DV) – shows how much a nutrient in a serving contributes to a recommended daily diet.
- Calorie – a unit of energy provided by food.
- Energy Balance – the relationship between calories consumed and calories used.
- Metabolism – the process by which the body converts food into energy.
- Ingredients list – a list of all items used to make the food, in order of quantity.
- Added sugars – sugars added during processing, not naturally occurring.
- Nutrient Analysis – evaluating the nutritional content of food to assess healthfulness.

Skills:**Students will be able to...**

- demonstrate proper handwashing and personal hygiene techniques before, during, and after food preparation.
- identify and apply sanitation procedures to maintain a clean and safe kitchen environment.
- explain and apply the principles of Clean, Separate, Cook, and Chill to prevent foodborne illness.
- measure dry and liquid ingredients accurately using appropriate tools and techniques.
- identify and safely use kitchen knives, demonstrating proper cutting techniques such as the pinch and claw grip.
- follow multi-step recipes using culinary techniques and kitchen equipment.
- interpret and compare Nutrition Facts labels to evaluate % daily value, calories, added sugars, and key nutrients.
- work cooperatively in lab groups using communication strategies to solve problems and manage tasks.

Standards:Priority:

11.1.6–8.B – Demonstrate food safety and sanitation procedures.

11.1.6–8.E – Apply measurement and math skills in following recipe directions.

11.1.6–8.F – Prepare a recipe using fundamental culinary skills and techniques.

11.1.6–8.H – Examine the nutritional needs of individuals and families in relation to health and wellness across the life span.

11.1.6–8.C – Analyze factors that influence nutrition and wellness practices across the life span.

11.1.6–8.I – Analyze the energy and nutrient requirements for individuals at various stages of the life cycle.

11.3.6–8.C – Justify the significance of interpersonal communication skills in the practical method of decision-making (team lab communication & roles).

Supporting:

11.1.6–8.A – Evaluate factors that affect food safety from production through consumption.

11.1.6–8.G – Demonstrate food science through principles of food biology and chemistry.

11.1.6–8.D – Hypothesize the effectiveness of the use of meal management principles.

11.1.6–8.J – Investigate career choices within food services, sciences, and nutrition industries.

Acceptable Evidence:**Performance Tasks –**

- Demonstrate proper handwashing, surface cleaning, and food handling procedures before, during and after a cooking lab; complete a sanitation checklist and explain how actions prevent foodborne illness.
- Complete hands-on labs in which students prepare a multi-step recipe using proper measuring and knife techniques and will be assessed with a rubric based on accuracy, safety and sanitation, and cooperative teamwork.
- Compare Nutrition Facts labels from two similar food products; identify serving size, calories, added sugars, and key nutrients, then justify which option is more nutritious.

- Create a visual or written reflection showing how Clean, Separate, Cook, and Chill principles are applied in the kitchen; identify potential safety risks and explain how each principle prevents foodborne illness..

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Exit tickets with reflections or quick checks on safety procedures, nutrition concepts, or culinary techniques.
- Sanitation checklist completed before each lab to ensure readiness and safety compliance.
- Measuring practice using dry and liquid ingredients with correct tools and techniques.
- Label analysis warm-up using sample Nutrition Facts labels and guided questions.
- Food group sorting activity, where students categorize foods into the correct food groups.
- Teacher feedback during labs using rubrics to assess safety, measuring, and knife technique.
- Canvas quizzes on vocabulary, sanitation steps, label reading, and nutrition concepts.

Summative Assessment

- Complete hands-on labs in which students prepare a multi-step recipe using proper measuring and knife techniques and will be assessed with a rubric based on accuracy, safety and sanitation, and cooperative teamwork.
- Label comparison activity where students evaluate two food products and justify which is the more nutritious option based on % daily value, serving size, calories, and nutrients.
- Written or visual reflection on how Clean, Separate, Cook, and Chill principles are applied in the kitchen to prevent foodborne illness

Suggested Learning Experiences and Instruction

Learning Experiences:

- Practice proper handwashing, personal hygiene, and kitchen sanitation routines before, during and after food preparation.
- Demonstrate and apply the “Clean, Separate, Cook, Chill” principles through hands-on food safety activities.
- Measure dry and liquid ingredients accurately using the correct tools and techniques (e.g., leveling, eye-level reading).
- Practice knife safety using the pinch and claw grip and safe cutting motions.
- Complete cooking labs that require multi-step preparation, accurate measuring, teamwork and knife skills.
- Compare and evaluate Nutrition Facts labels to determine which food options are more nutritious.
- Create a visual or written reflection showing how food safety principles are applied in real-life kitchen settings.

Instructional Strategies:

- Model first, then do: demonstrate safety procedures, measuring techniques, and knife skills before students practice independently.
- Use lab routines: establish consistent expectations for proper hygiene, lab setup, safety checks, cooking, and cleanup.
- Chunk lessons into mini-skills: break down complex tasks (e.g., knife safety, label analysis, nutrient planning) into manageable steps.
- Use visual supports: provide diagrams, labeled tools, and step-by-step recipe visuals to reinforce vocabulary and procedures.
- Incorporate video demonstrations: use short clips to preview techniques or reinforce safety and sanitation concepts.
- Assign group roles: use structured roles (e.g., head chef, safety monitor, cleanup lead) to promote collaboration and accountability.
- Scaffold with guided notes: offer sentence starters or fill-in-the-blank formats to support reflection and content retention.
- Use exit tickets or quick check-ins: assess understanding of key concepts like food groups, sanitation, or measuring accuracy.
- Relate content to real life: connect food choices, safety practices, and nutrition to students' daily routines and family life.
- Use peer feedback: have students observe and evaluate each other's technique using rubrics during labs.

Differentiation/Intervention/Enrichment Options:

- Use guided notes and sentence starters to support students during written reflections and nutrition analysis.
- Offer modified lab tasks with fewer ingredients or simplified steps for students needing additional support.
- Incorporate video demonstrations and hands-on practice stations to reinforce safety and culinary techniques.
- Use visual recipes with labeled diagrams and step-by-step instructions to support vocabulary acquisition and comprehension.
- Integrate real-world connections by encouraging students to reflect on personal food choices and family cooking routines.
- Use graphic organizers to help students plan meal ideas, analyze food labels, or describe food safety principles.

For Language Development:

- Provide visual recipes with labeled diagrams and step-by-step instructions to reinforce vocabulary and procedural understanding.
- Use word banks, sentence starters, and guided notes during written reflections, nutrition analysis, and lab planning.
- Incorporate cooking demonstrations with think-alouds to model academic and procedural language (e.g., "I'm using the pinch and claw grip to keep my fingers safe while chopping").
- Offer bilingual vocabulary lists or translated instructions when available to support multilingual learners.

Central Bucks School District – Course of Study – Family and Consumer Sciences Grade 8

Unit 2 – Career, Community and Family Connections

Desired Results:

Students will explore foundational career readiness skills, including professional communication, interviewing, and appropriate workplace attire. They will assess the importance of leadership, teamwork, and responsible technology use in both family and workplace settings. Through hands-on activities and role-play, students will build confidence in presenting themselves professionally and collaborating effectively.

Essential Questions:

- What skills and behaviors contribute to success in job interviews and the workplace?
- How can communication, leadership, and teamwork improve our relationships and career readiness?
- Why is it important to use technology responsibly and professionally in a work environment?

Enduring Understandings:

Students will understand that...

- professional communication, appropriate dress, and interview skills are essential for success in the workplace.
- leadership, teamwork, and effective use of technology contribute to effective collaboration and career readiness.
- understanding job roles and workplace expectations helps students prepare for future employment and community engagement.

Knowledge:

Students will know...

Vocabulary:

- Interview – a formal meeting to assess a candidate for a job
- Professional Attire – clothing appropriate for a workplace or formal setting
- Non-verbal Communication – gestures, posture, and facial expressions that convey meaning
- Teamwork – cooperative effort by a group to achieve a common goal
- Leadership – guiding or directing others in a positive and productive way
- Digital Etiquette – appropriate and respectful behavior when using technology
- Resume – a document summarizing a person's education, experience, and skills
- Soft Skills – personal attributes that enable someone to interact effectively with others

Skills:

Students will be able to...

- identify appropriate attire for various professional and workplace settings
- demonstrate effective verbal and non-verbal communication skills during interviews and group interactions
- participate in role-play scenarios to practice job interviewing techniques and workplace etiquette
- collaborate with peers using leadership and teamwork strategies to complete tasks

- assess how technology is used professionally and explain its impact on communication and productivity
- reflect on personal strengths, interests, and values as they relate to future career choices
- evaluate how leadership and teamwork contribute to success in family, school, and workplace environments

Standards:

Priority:

11.6.6–8.B – Assess the use of teamwork and leadership skills in accomplishing the work of families and communities.
 11.6.6–8.C – Assess the use of technology and its effect on the quality of life.

Supporting:

11.3.6–8.C – Justify the significance of interpersonal communication skills in the practical reasoning method of decision-making.

Acceptable Evidence:

Performance Tasks –

- Participate in a mock interview where students respond to common interview questions using appropriate verbal and non-verbal communication; assessed using a checklist for professionalism, clarity, and confidence.
- Complete a professional attire activity where students select or design an outfit suitable for a specific job or workplace setting; explain their choices in writing or presentation.
- Collaborate in a group challenge (e.g., planning a classroom event or solving a workplace scenario) using assigned roles to demonstrate leadership and teamwork; reflect on group dynamics and contributions.
- Analyze a workplace technology scenario (e.g., email etiquette, virtual meetings, digital organization tools) and present best practices for using technology professionally.
- Complete a career reflection worksheet where students identify personal strengths, interests, and values, then match them to potential career paths in Family and Consumer Sciences or related fields.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Exit ticket: students reflect on one communication skill they practiced and how it applies to interviews or teamwork.
- Group feedback form: students evaluate their own and peers' contributions during a teamwork activity.
- Attire sorting activity: students categorize clothing items as appropriate or inappropriate for different job settings.
- Digital Etiquette Quiz: students identify best practices for professional technology use.
- Interview prep worksheet: students draft responses to common interview questions using sentence starters.
- Leadership role reflection: students write a short response about their role in a group task and how they demonstrated leadership.

Summative Assessment

- Mock interview performance: students participate in a simulated job interview and are assessed using a checklist for communication, professionalism, and preparedness.
- Professional attire: students select or design an outfit for a specific career and explain their choices in writing or orally
- Teamwork challenge: students complete a collaborative task with assigned roles and submit a group reflection on leadership and teamwork
- Technology scenario analysis: students evaluate a workplace technology situation and present best practices for professional use

Suggested Learning Experiences and Instruction

Learning Experiences:

- Explore professional attire through a gallery walk or sorting activity where students match clothing items to workplace settings.
- Participate in mock interviews using prepared questions and feedback checklists to practice verbal and non-verbal communication.
- Complete a resume or personal profile worksheet highlighting strengths, interests, and career goals.
- Engage in a group challenge (e.g., planning a classroom event or solving a workplace scenario) to practice leadership and teamwork.
- Analyze digital communication scenarios (e.g., email etiquette, virtual meetings) and discuss best practices for professional technology use.
- Reflect on personal values and how they influence career choices through journaling or small group discussion.
- Participate in a role-play activity where students act out workplace situations requiring teamwork, communication, and problem-solving.
- Complete a self-assessment on soft skills (e.g., communication, collaboration, adaptability) and set personal improvement goals.

Instructional Strategies:

- Use role-play: simulate job interviews, workplace scenarios, and group challenges to build confidence and real-world readiness.
- Chunk lessons into mini-skills: break down complex tasks like resume writing, interview responses, or leadership roles into manageable steps.
- Use visual supports: provide examples of professional attire, digital etiquette, and career pathways to reinforce vocabulary and expectations.
- Assign group roles: use structured roles (e.g., team leader, timekeeper, presenter) during collaborative tasks to promote accountability and leadership.
- Incorporate video demonstrations: show clips of interviews, workplace communication, and technology use to model professional behavior.

Differentiation/Intervention/Enrichment Options:

- Provide modified group tasks with clearly defined roles and expectations for students needing additional structure.
- Challenge advanced learners to design a career portfolio including resume, attire plan, and digital communication strategy.

- Integrate real-world connections by inviting students to reflect on personal experiences with teamwork, technology, or family roles.
- Use graphic organizers to help students plan interview responses, career reflections, or group collaboration strategies.

For Language Development:

- Offer bilingual materials or translated vocabulary lists to support multilingual learners.
- Incorporate peer modeling and feedback to reinforce soft skills like professionalism, collaboration, and adaptability.
- Use word banks, sentence starters and guided notes during lessons.

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Unit 3 – Personal Finance and Consumer Skills

Desired Results:

In this unit, students develop essential personal finance skills by exploring how budgeting and financial planning support family needs, short-term goals, and long-term financial stability. Students examine different types of income, including hourly wage, salary, commission, and tips, and analyze the financial advantages and disadvantages of each. They investigate how career choices, education, and training impact earning potential and overall financial well-being. Through hands-on budgeting activities, students learn to manage income, track fixed and variable expenses, and plan for savings. Students also interpret pay statements to understand gross pay, deductions, and net pay. By connecting income, budgeting, and career planning, students build the skills needed to make informed financial decisions throughout their lives.

Essential Questions:

- How can creating and managing a family budget help individuals meet short-term and long-term financial goals? (Aligns with PA FCS 11.5.6–8.B and Personal Finance 17.3.6–8.D)
- What are the financial advantages and disadvantages of different types of income such as hourly wage, salary, commission, and tips? (Aligns with PA FCS 11.5.6–8.D and Personal Finance 17.2.6–8.A)
- How do career choices and education levels influence income potential and financial stability? (Aligns with PA FCS 11.5.6–8.E and Personal Finance 17.2.6–8.C)
- How can understanding and comparing income types support informed financial and career decisions? (Aligns with Personal Finance 17.2.6–8.A and 17.2.6–8.H)
- How do changing family needs and responsibilities impact financial decisions and budgeting?

Enduring Understandings:

Students will understand that...

- budgeting and financial planning are essential life skills that help individuals and families manage resources, meet goals, and prepare for unexpected expenses.
- different types of income, such as hourly wage, salary, commission, and tips, offer varying financial advantages and influence career decisions, financial well-being, and lifestyle choices.
- career choices and educational pathways directly impact earning potential, financial stability, and long-term planning.
- family needs and life transitions shape how individuals create budgets, make purchases, and plan for financial stability.

Knowledge:

Students will know...

Vocabulary:

Budgeting & Financial Planning

- Budget – A plan for managing income and expenses over a period of time
- Expense – Money spent on goods and services
- Income – Money received, especially on a regular basis, for work or through investments
- Fixed Expense – Costs that do not change from month to month (e.g., rent, car payment)
- Variable Expense – Costs that change depending on usage or choices (e.g., groceries, entertainment)
- Savings – Money set aside for future use
- Financial Goal – A target or objective related to managing money, such as saving for a purchase or paying off debt
- Debit– Money deducted (or leaving) from your bank account when you make a purchase or payment
- Credit – Money added to your account (Not a credit card)
- Credit Card – Payment tool that allows you to borrow money from a financial company to make purchases. The borrowed amount must be repaid in full or over time with interest.

Types of Income

- Hourly Wage – Rate of payment an employee earns for each hour of work
- Salary – Fixed regular payment, typically paid monthly or biweekly, regardless of hours worked
- Commission – Earnings based on a percentage of sales made
- Tips – Extra money given for services, often in addition to base pay
- Gross Pay – Total earnings before deductions
- Net Pay – Earnings after deductions such as taxes and benefits

Career & Income Connections

- Career – A long-term professional journey based on interests, education, and experience.
- Education & Training – Learning experiences that prepare individuals for specific careers and increase earning potential.
- Pay Statement (Stub) – A document showing earnings, deductions, and net pay.
- Payroll Deductions – Amounts withheld from gross pay for taxes, insurance, retirement, etc.

Skills:

Students will be able to...

- create and manage a basic family budget that includes income, fixed and variable expenses, and savings goals.
- compare different types of income (hourly wage, salary, commission, tips) and evaluate their financial advantages and disadvantages.
- interpret a pay statement to identify gross pay, net pay, and payroll deductions.
- investigate career/job options and analyze how education and training impact earning potential.
- apply decision-making strategies to make informed financial and career/job choices.
- reflect on how financial planning supports personal and family well-being.

Standards:Priority:**PA FCS Standards:**

- 11.5.6–8.B – Develop short-term and long-term financial goals for a family budget.
- 11.5.6–8.D – Compare/evaluate the financial advantages and disadvantages of various incomes.
- 11.5.6–8.E – Investigate career choices within financial service industries.

PA Personal Finance Standards:

- 17.2.6–8.A – Compare compensation methods, including hourly wage, salary, commission, tips, and piecework.
- 17.2.6–8.C – Analyze connections between the amount individuals might earn in various careers and the education or training that is required.
- 17.2.6–8.H – Interpret a pay statement and explain the relationship between gross pay, net pay, and payroll deductions.
- 17.3.6–8.D – Explain the components of a personal budget and how budgeting can help people achieve their financial goals.

Supporting:**PA FCS Standards:**

- 11.5.6–12.C – Analyze components of a family financial planning process that reflect the distinction between wants, needs, values, goals, and economic resources.

PA Personal Finance Standards:

- 17.1.6–8.A – Compare short-, intermediate-, and long-term financial goals.
- 17.1.6–8.B – Explain why the opportunity cost of a decision might differ from one person or situation to another.
- 17.1.6–8.F – Identify personal information needed to establish a financial account.
- 17.1.6–8.H – Describe strategies people can use to protect their personally identifiable information.
- 17.3.6–8.C – Compare ways people organize and track their spending and income.

Acceptable Evidence:**Performance Tasks –**

- Complete a family budget project that includes income types, fixed and variable expenses, and savings goals; present how the budget supports financial planning.
- Compare hourly wage, salary, commission, and tips using sample careers/jobs; calculate weekly earnings and reflect on which income type fits different lifestyles.
- Research a career/job and present its income potential, required education or training, and how it aligns with personal financial goals.
- Analyze a sample pay statement (stub) to identify gross pay, deductions, and net pay; explain how understanding pay statements supports financial literacy.

Acceptable evidence of learning other than Performance Tasks:**Formative Assessment**

- Exit ticket: Students reflect on one budgeting strategy they learned and how it could help a family manage money.

- Quick check worksheet: Students identify and categorize types of income (hourly wage, salary, commission, tips).
- Budget planning warm-up: Students list common fixed and variable expenses for a family.
- Career match activity: Students match careers to income types and required education levels.
- Pay statement/stub analysis: Students label parts of a sample pay statement and define gross vs. net pay.
- Group discussion: Students share which income type they think is most stable and why.
- Budget vocabulary sort: Students organize key terms into categories (income, expenses, savings, etc.).

Summative Assessment

- Family Budget Project: Students create and present a detailed family budget including income types, expenses, and savings goals.
- Income Comparison Report: Students calculate and compare earnings from different income types and reflect on lifestyle implications.
- Career/Job Exploration: Students research a career/job, report on income potential and education requirements, and explain how it fits their financial goals.
- Pay Statement Reflection: Students analyze a sample pay statement/stub and write a short reflection on the importance of understanding deductions and net pay.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Explore types of income through a matching activity where students connect careers to hourly wage, salary, commission, and tips.
- Participate in a budgeting simulation where students allocate income to expenses and savings using a mock family scenario.
- Analyze sample pay statement/stubs to identify gross pay, deductions, and net pay; discuss how payroll deductions affect take-home income.
- Research a career/job of interest and create a visual or written reflection showing income potential, required education, and lifestyle impact.
- Use graphic organizers to plan a family budget, categorize expenses, and reflect on financial goals.
- Compare income types using math-based scenarios to calculate weekly earnings and evaluate financial stability.
- Reflect on personal/family financial goals and how budgeting and career choices can support those goals.
- Collaborate in small groups to create a budget for a fictional family, present their choices, and justify how they meet financial needs.

Instructional Strategies:

- Use graphic organizers: Provide tools to help students categorize expenses, compare income types, and plan financial goals.
- Integrate math practice: Include calculations for gross/net pay, budgeting totals, and income comparisons to reinforce financial numeracy.
- Facilitate peer discussion: Encourage students to share budgeting strategies, career interests, and financial goals in small groups.

- Scaffold with guided notes: Offer sentence starters and fill-in-the-blank formats to support reflection and content retention.
- Use exit tickets and quick checks: Assess understanding of key concepts like budgeting, income types, and consumer rights through short written responses.
- Relate content to student lives: Connect budgeting and career planning to students' personal goals, family responsibilities, and future aspirations.

Differentiation/Intervention/Enrichment Options:

- Use small group instruction or peer modeling to support students during complex tasks like calculating net pay or analyzing career data.
- Allow students to choose between written, visual, or oral formats to present their budget project or career exploration.
- Challenge advanced learners to create a financial plan for a future goal (e.g., saving for college or a car) using multiple income types and budgeting strategies.
- Integrate real-world connections by encouraging students to reflect on family financial decisions or interview someone about their career and income.
- Provide tiered tasks such as comparing basic vs. advanced budgeting methods or analyzing multiple career paths with varying income levels.

For Language Development:

- Incorporate sentence starters and word banks during written reflections, budget planning, and career reflections.
- Model academic and financial language through think-alouds (e.g., "I'm allocating \$100 to savings because it's a fixed goal in my budget").
- Offer guided notes with fill-in-the-blank formats to support understanding of budgeting steps and income comparisons.
- Use graphic organizers to help students sort vocabulary, plan budgets, and compare career options.

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Unit 4 – Sewing and Textile Resource Management

Desired Results:

In this unit, students build foundational hand and machine sewing skills while examining how textile construction techniques influence durability and quality. Students practice reading and following technical directions to safely and successfully operate sewing machines and complete textile tasks. Through hands-on projects, students evaluate when it is more effective to make, repair, or replace a textile item based on cost, time, and sustainability. The unit emphasizes precision, craftsmanship, and collaboration while students share equipment and troubleshoot sewing challenges. By connecting sewing skills to real-world careers, sustainability, and independent living, students gain practical skills that support both personal responsibility and future career pathways.

Essential Questions:

- How do different construction techniques affect the durability and long-term value of textile items?
- Why is accurately reading, interpreting, and following technical directions and procedures critical to safe and successful textile and sewing tasks?
- When is it smarter to make, replace, or repair a textile and why?
- In what ways are sewing and textile construction skills transferable to a variety of career paths?

Enduring Understandings:

Students will understand that...

- it is important to compare cost, time, durability, and sustainability when deciding whether to make or alter a textile item.
- It is important to accurately read, interpret, and follow technical directions and procedures to safely and successfully complete textile and sewing tasks.
- there are connections between textile construction skills and real-world careers in design, manufacturing, and human services.
- strong communication is essential to support collaborative problem-solving during sewing tasks.

Knowledge:

Students will know...

Vocabulary:

Sewing Machine Operation & Precision

- Seam allowance – the space between the stitching line and the fabric edge; helps ensure strong, accurate seams
- Presser foot – the part of the machine that holds the fabric flat so stitches form correctly
- Feed dogs– small metal teeth under the needle plate that move the fabric forward as you sew
- Bobbin – a small spool that holds the lower thread used to form stitches

- Tension – the tightness or looseness of the sewing threads; balanced tension creates smooth, even stitches
- Stitch length – how long each stitch is; affects strength and appearance of the seam
- Reverse/backstitch – stitching backward at the beginning and end of a seam to lock stitches in place
- Handwheel – the round knob on the side of the sewing machine that raises and lowers the needle
- Needle Plate – is the flat metal plate under the needle on a sewing machine
- Seam Gauge – six inch ruler features a sliding marker used to measure precise seam allowance

Construction Techniques & Product Quality

- Seam finish – treatments like zig-zag, pinking, or turning under the edge to prevent fraying
- Fastener – a device that opens or closes an item, such as a zipper, snap, or button
- Pressing – using an iron during construction to set seams and improve accuracy and appearance
- Pivot and Turn – changing the stitching direction at the corner by leaving the needle down in the fabric before rotating the fabric
- Pattern - paper template pieces that are traced onto fabric for cutting accuracy.

Skills:

Students will be able to...

- operate a sewing machine safely
- follow the step-by-step threading procedure.
- demonstrate hand/machine sewing techniques that allow for repairing a textile item.
- sew a straight seam, backstitch and pivot and turn using a sewing machine.
- repair an item to extend its life instead of replacing it.
- choose materials and techniques that help an item last longer.
- explain ways in which sewing can reduce waste (repair, reuse, making long-lasting items).
- explain how textile tasks (repairing, washing, caring for items) shift as individuals become more independent.
- demonstrate communication skills when sharing equipment and troubleshooting.

Standards:

Priority:

- 11.2.6–8.E – Assess the effects of design, construction, care, use, and maintenance of textiles on individuals and families.
- 11.2.6–8.F – Evaluate factors that influence clothing selection, care, and maintenance.

Supporting:

- 11.2.6–8.G – Investigate career choices within textiles, apparel, and consumer products.
- 11.6.6–8.B – Assess the use of teamwork and leadership skills in accomplishing tasks.
- 11.2.6–8.A – Analyze the relationship between resources and sustainability.

Acceptable Evidence:

Performance Tasks –

- Operate a sewing machine safely and correctly by threading the machine, sewing a straight seam, and securing stitches with backstitching.

- Complete a simple sewing project by following step-by-step directions, cutting fabric using a pattern, sewing accurate seams, pressing as needed, and adding a basic closure if required.
- Evaluate the quality of their finished project by checking for straight seams, consistent seam allowances, secure stitching, and overall craftsmanship.
- Complete a short make-vs-buy reflection explaining whether sewing the item or purchasing it would be the better choice based on cost, time, and quality.
- Work cooperatively during the sewing process by sharing materials, communicating respectfully with peers, and helping troubleshoot simple problems.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Sewing machine practice checks (threading, seam allowance, backstitching, pivot and turn).
- Exit tickets reflecting on daily progress, challenges, or next steps.
- Teacher observation during sewing work time (safe use, accuracy, teamwork).
- Check-ins on project steps (cutting fabric, pressing seams, attaching closure).
- Peer or self-evaluation of craftsmanship using a simple checklist.
- Mini reflections on sustainability, teamwork, or quality indicators.

Summative Assessment

- Demonstrate hand/machine sewing techniques to complete a sewing project.
- Machine operation demonstration showing threading, sewing a straight seam, and securing stitches.
- Completed sewing project demonstrating accurate seams, safe machine use, pressing, and craftsmanship.
- Make-vs-buy written reflection explaining cost, time, and quality considerations.
- Final project rubric assessing accuracy, technique, safety, and overall quality.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Practicing sewing machine threading and sewing straight seams.
- Completing short sewing technique samples.
- Cutting fabric using a teacher-provided pattern or template.
- Following step-by-step directions to complete a simple sewing project.
- Pressing fabric during construction to improve accuracy and appearance.
- Completing a brief make-vs-buy reflection based on material cost, time, and product quality.
- Working with peers to share tools, help troubleshoot machine issues, and support safe work habits.

Instructional Strategies:

- Modeling machine threading, stitching, and pressing techniques before guided student practice.
- Breaking construction steps into small, manageable parts (“I do → We do → You do”).
- Using visual demonstrations, diagrams, or projected steps to support each phase of the project.
- Providing check-in points during sewing work time to monitor accuracy and safety.

- Offering technique stations for targeted practice.
- Encouraging partner or small-group collaboration to support problem-solving and peer assistance.
- Using exit tickets or quick verbal check-ins to monitor student progress and understanding.

Differentiation/Intervention/Enrichment Options:

- Providing pre-cut fabric pieces or simplified patterns for students who need additional support.
- Using seam guides, colored tape, or slower machine settings to assist with accuracy.
- Offering optional challenge steps (pockets, boxed corners, zipper addition) for advanced learners.
- Giving students choices of simpler or slightly more complex projects that fit the 7-day timeline.
- Allowing extended time or additional teacher check-ins for students needing more help with machine operation.
- Pairing students strategically for peer support (ex. troubleshooting or threading assistance).
- Providing visual instructions or step-by-step checklists for students who benefit from structured organization.

For Language Development:

- Providing vocabulary lists with visuals for sewing terms (seam allowance, backstitch, pivot and turn, etc.).
- Using sentence starters for reflections (ex. "One quality improvement I made was..." or "I chose to make/buy because...").
- Offering bilingual vocabulary supports or translated terms when available.
- Demonstrating techniques while verbalizing each step using clear, consistent language.
- Allowing students to explain steps verbally, with a partner, or using labeled diagrams.
- Using graphic organizers to support sequencing (ex. "Steps of My Project" chart).
- Checking for understanding through simple gestures, visuals, or modeling rather than written responses alone.



Food for Life

Course Number: 6263

Course Level: Academic

Grade: 9-12

Time/Credit: 9-week course/.5 credit

Development Date: 2025 - 2026

School Board Approval:

Central Bucks School District
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Doylestown, PA 18901

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**Central Bucks School District
Teaching and Learning Principles
Family and Consumer Sciences**

Family and Consumer Sciences Department Learning Principles

1. Students learn best when they work in a caring and respectful environment.
2. Learning is most effective when sufficient structure and scaffolding are provided.
3. Students thrive when they are challenged at an appropriate level.
4. Engaging students in learning includes allowing them to make choices based on their interests and creative abilities.
5. Providing opportunities for in-depth problem solving enhances students' critical thinking skills.
6. Active participation is essential for meaningful learning experiences.
7. Students benefit from opportunities to demonstrate and practice responsibility.
8. Connecting new learning to prior knowledge deepens understanding and retention.
9. Student collaboration enriches the learning process.
10. Relating the curriculum to students' lives fosters engagement and personal connection.
11. Effective learning occurs when individual differences are acknowledged and accommodated.
12. Students grow when they learn from their mistakes in a supportive environment.
13. Successful learning requires the ability to reflect, self-assess, and use feedback to self-adjust.
14. Family and Consumer Sciences empowers students with real-world skills and knowledge that prepare them for independent, responsible living and lifelong success.

Central Bucks School District
Food For Life
Enduring Understandings

Students will understand that...

- safe and sanitary food preparation and storage practices are essential to personal and public health.
- understanding and applying food safety techniques protects individuals and communities from foodborne illness.
- nutritional choices directly influence physical, mental, and emotional well-being across the lifespan.
- balanced dietary decisions support lifelong health and help prevent chronic disease.
- reading and interpreting food labels empowers individuals to make informed and health-conscious food choices.
- accurate measuring and preparation techniques are critical to achieving desired culinary outcomes.
- cooking methods and ingredient choices affect the nutritional value, safety, and appeal of food.
- scientific principles guide how food is processed, prepared, and preserved.
- effective resource management, including time, money, and ingredients, enhances meal quality and sustainability.
- meal planning and budgeting are essential life skills that support individual and family well-being.

Central Bucks School District
Food for Life
Essential Questions

- How do safe food handling and sanitation practices protect individual and public health?
- What are the consequences of poor food safety practices in the kitchen?
- How do our food choices impact our health and well-being over time?
- What role does nutrition play in preventing disease and promoting wellness?
- How can understanding and analyzing food labels help us make informed, healthy, and cost-effective food choices?
- How do measuring and preparation techniques influence the outcome of a recipe?
- In what ways do cooking methods affect the nutritional value of food?
- How does science influence the way we prepare and preserve food?
- How can we plan and prepare meals that are nutritious, affordable, and sustainable?
- What strategies help individuals and families manage time, money, and food resources effectively?
- How do our available resources shape the meals we prepare and eat?

Central Bucks School District – Course of Study Overview

Food for Life

Desired Results

Course Description:

Discover your inner chef in this dynamic, hands-on introduction to the world of cooking. Whether you're a beginner or looking to build confidence in the kitchen, this course offers the perfect blend of creativity, technique, and real-world application. Students will learn proper safety and sanitation practices, develop knife and measuring techniques, and apply a variety of cooking methods. Emphasis is placed on planning and preparing everyday meals, while also fostering teamwork, time management, and problem-solving. The course culminates in a creative cooking challenge that allows students to showcase their skills and personal growth in the kitchen.

Prerequisite: None

Committee Members: MJ Bartchak, Dana Cole, Elizabeth Coyne, Mackenzie Delaney, Beth Howard, Christy Micucci

Acceptable Evidence.

Completion of in-class learning tasks that may include, but are not limited to:

- Cooking Labs
- Projects and Presentations
- Performance-Based Assessments
- Class participation

Course Grading: No Final Exam

Food for Life – Pacing Guide

Content	Days
Unit 1 – Kitchen Safety and Sanitation	8
Introduction	1
Kitchen Safety	2
Clean, Separate, Cook, and Chill	1
Measuring	2
Reading a Recipe	1
Tool Identification	1
Intervention/Enrichment occurs throughout the unit	
Unit 2 – Snacks and Appetizers	8
Foundational Culinary Techniques (baking, sautéing, blending, and knife skills)	2
Labs	6
Intervention/Enrichment occurs throughout the unit	
Unit 3 – Breakfast	10
Breakfast Nutrition	1
Focus on Mixing Methods	1
Leavening Agents	1
Labs	7
Intervention/Enrichment occurs throughout the unit	
Unit 4 – Lunch/Dinner	10
Cooking Methods (sautéing, baking, frying, and simmering)	1
Meal Planning	1
Dietary Modifications	1
Labs	7
Intervention/Enrichment occurs throughout the unit	
Unit 5 – Dessert	9
Mixing and Baking Techniques	1
Ingredient Functions	1
Plating and Presentation	1
Labs	6
Intervention/Enrichment occurs throughout the unit	

Required Texts and Software

None

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students who acquire an understanding of the content faster than their class peers.

Central Bucks School District – Course of Study – Food for Life

Unit 1 – Kitchen Safety & Sanitation

Desired Results:

In this unit, students will build a strong foundation in kitchen safety, sanitation, and basic cooking principles. Students will learn how to identify and safely use kitchen tools and equipment, follow proper hygiene practices, and understand the importance of accurate measuring and recipe reading. Emphasis is placed on teamwork, responsibility, and creating a safe and efficient cooking environment. These skills will prepare students for success in future culinary labs and real-world food preparation.

Essential Questions:

- What practices ensure a safe and sanitary kitchen environment?
- How do the principles of clean, separate, cook, and chill help prevent foodborne illness and ensure safe food preparation?
- How do measuring techniques impact the outcome of a recipe?
- Why is cooperation and communication essential during kitchen labs?
- How does understanding food labels support healthier food choices?
- What foundational skills are necessary for successful cooking experiences?

Enduring Understandings:

Students will understand that...

- accurate measuring techniques influence the quality and consistency of food products.
- safe and sanitary food handling is essential for preventing foodborne illness and promoting health.
- effective teamwork and communication contribute to a successful and safe kitchen experience.
- reading and interpreting food labels helps individuals make informed and health-conscious decisions.
- foundational cooking skills and safety knowledge are critical for success in the kitchen and everyday life.

Knowledge

Students will know:

Vocabulary

Kitchen Safety & Sanitation

- Cross-contamination – Transfer of harmful bacteria between foods or surfaces.
- Temperature Danger Zone – Range (40°F–140°F) where bacteria grows rapidly.
- Sanitize – Reducing pathogens on surfaces to safe levels.
- Personal Hygiene – Practices that maintain cleanliness and prevent contamination.
- Clean – Washing hands, surfaces, and tools to remove dirt and germs.
- Separate – Keeping raw meats and ready-to-eat foods apart to prevent contamination.
- Cook – Heating food to safe internal temperatures to kill harmful bacteria.

- Chill – Refrigerating foods promptly to slow bacterial growth.
- Fire Hazard – A condition that increases the risk of fire in the kitchen.
- First Aid – Basic treatment for minor injuries like cuts or burns.

Tools & Equipment

- Knife – A tool used for cutting, chopping, and slicing.
- Cutting board – A surface used to protect counters and safely cut food.
- Measuring Cups and spoons – Tools used to measure dry and liquid ingredients.
- Spatula – A tool used for flipping or mixing food.
- Oven Mitt – A protective glove used to handle hot cookware.
- Whisk – A tool used to beat or stir ingredients.
- Timer – A device used to track cooking or baking time.
- Apron – A garment worn to protect clothing while cooking.

Measuring Techniques

- Dry Measuring Cups – Used to measure dry ingredients such as flour and sugar.
- Liquid Measuring Cup – Used to measure liquids such as water, milk, or oil.
- Measuring Spoons – Used to measure small amounts of dry or liquid ingredients.
- Level – Flattening the top of a measured ingredient for accuracy.
- Tare – Resetting a scale to zero before measuring ingredients.
- Conversion – Changing measurements between units (e.g., cups to ounces).

Skills:

Students will be able to...

- demonstrate proper handwashing and sanitation procedures.
- measure dry and liquid ingredients accurately using appropriate tools.
- read and follow a simple recipe with attention to sequencing and timing.
- apply food safety principles, including clean, separate, cook, and chill.
- maintain a safe and organized kitchen workspace during labs.
- collaborate with peers to complete kitchen tasks efficiently and respectfully.
- respond appropriately to minor kitchen accidents using basic first aid knowledge.
- explain the importance of personal hygiene and sanitation in food preparation.
- convert basic measurements and recognize common equivalents in recipes.

Standards:

Priority:

11.1.9-12.A – Predict factors that affect food safety and security from production through consumption.

11.1.9-12.C – Model the ability to acquire, handle, and use foods to meet nutrition and wellness needs of individuals and families across the life span.

11.1.9-12.E – Apply principles of measurement, portion control, conversions, food cost analysis and control, menu terminology, and menu pricing to menu planning.

11.1.9-12.F – Apply the fundamentals of time, temperature, and cooking techniques to preparing, cooking, cooling, reheating, and holding a variety of foods.

11.3.9-12.C – Evaluate the effectiveness of using interpersonal communication skills to resolve conflict.

Acceptable Evidence:**Performance Tasks –**

- Demonstrate proper handwashing technique and explain its importance in preventing foodborne illness.
- Identify and safely use basic kitchen tools and equipment during a guided cooking activity.
- Measure dry and liquid ingredients accurately using appropriate tools and techniques.
- Set up and maintain a dishwashing station, including proper sanitizing procedures and drying methods.
- Complete a kitchen safety walk-through, identifying hazards and explaining how to correct them.
- Follow a simple recipe from start to finish, demonstrating mise en place, measuring, and safe equipment use.
- Collaborate with peers to clean and organize a kitchen station, applying principles of sanitation and teamwork.
- Respond appropriately to a simulated kitchen accident (e.g., minor burn or cut) using basic first aid procedures.
- Explain the principles of clean, separate, cook, and chill and apply them during a food handling demonstration.
- Complete a tool identification activity, matching kitchen tools to their names and functions during a hands-on lab.

Acceptable evidence of learning other than Performance Tasks:**Formative Assessment**

- Complete a kitchen safety checklist identifying potential hazards and explaining how to correct them.
- Perform a handwashing demonstration assessed with a rubric for technique and timing.
- Match kitchen tools to their names and functions using a visual identification activity.
- Measure dry and liquid ingredients in a station-based activity with teacher observation and feedback.
- Complete a sanitation sequencing activity where students organize steps for cleaning and sanitizing a kitchen station.
- Submit a labeled diagram of a properly set-up dishwashing station, including wash, rinse, and sanitize zones.
- Participate in a group clean-up challenge focused on teamwork, sanitation, and organization.
- Take a short quiz on kitchen safety symbols, temperature danger zone, and cross-contamination.
- Fill out an exit ticket reflecting on one safety practice learned and how it applies to future cooking labs.
- Complete a recipe reading activity by identifying important parts of a recipe, including the yield, list of ingredients, and step-by-step instructions.

Summative Assessment

- Complete a kitchen safety and sanitation lab where students demonstrate proper handwashing, equipment use, and station setup.
- Participate in a guided cooking lab using a simple recipe, assessed on measuring accuracy, tool use, and safe food handling.
- Submit a kitchen tools and equipment identification project, including labeled visuals and explanations of each tool's function.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Sequence the steps for cleaning and sanitizing a kitchen station using sequencing cards or digital tools to understand safe food handling practices.
- Break down a simple recipe into sequential steps, identify required tools, and organize mise en place to promote efficient food preparation and handling.
- Set up and clean a kitchen station in teams, applying food safety and sanitation protocols throughout the preparation process.
- Reflect on safety and sanitation practices after each lab through exit tickets that reinforce responsible food handling behaviors.
- Set up and clean a kitchen station in cooperative teams to practice respectful communication, role delegation, and conflict resolution.
- Engage in team-based kitchen challenges to build collaborative problem-solving and interpersonal effectiveness in high-paced kitchen settings.

Instructional Strategies:

- Use live demonstrations or video modeling to show proper handwashing, tool use, and sanitation procedures, pausing to highlight key vocabulary and safety steps.
- Incorporate guided practice sessions where students follow along with the teacher to reinforce measuring techniques, recipe reading, and kitchen setup.
- Group students strategically for cooperative learning during kitchen labs and clean-up activities to promote peer modeling and collaboration.

Differentiation/Intervention/Enrichment Options:

- Provide visual aids, labeled diagrams, and picture-based instructions to support students who benefit from visual learning.
- Pair or group students to intentionally promote peer modeling, collaboration, and support during kitchen tasks.

- Offer scaffolded materials such as simplified safety checklists, modified recipes, and step-by-step guides for students needing additional support.
- Offer enrichment tasks such as leading a safety demonstration, designing a sanitation infographic, or creating a kitchen safety PSA video for students ready for deeper engagement.

For Language Development:

- Use labeled diagrams and visual aids to reinforce vocabulary related to kitchen tools, safety procedures, and sanitation practices.
- Encourage students to narrate their cooking or cleaning process aloud using target vocabulary and sequencing language (e.g., first, next, then).
- Offer translated materials or bilingual support when needed to ensure comprehension of safety instructions and lab procedures.
- Use sentence frames and word banks during reflections or exit tickets to support structured language use.

Central Bucks School District – Course of Study – Food for Life

Unit 2 – Snacks and Appetizers

Desired Results:

In Unit 2, students will develop foundational culinary skills through the preparation of a variety of snacks and appetizers. They will apply techniques such as baking, sautéing, blending, and knife work while exploring the impact of ingredient choices and cooking methods on nutrition, flavor, and presentation. Emphasis is placed on food safety, serving size, and resource management, empowering students to make informed decisions in the kitchen. Through hands-on practice and collaborative learning, students will gain confidence in executing recipes, modifying them for dietary needs, and presenting food in an appealing and professional manner.

Essential Questions:

- How do specific cooking techniques (e.g., baking, sautéing, blending) influence the taste, texture, and nutritional value of snacks and appetizers?
- What role does ingredient selection play in creating a nutritionally balanced snack option?
- How can we use basic culinary skills to prepare snacks that are affordable, appealing, and nutrient-dense?
- How do time, tools, and available ingredients influence the snack recipes we choose to prepare?

Enduring Understandings:

Students will understand that...

- cooking techniques such as baking, blending, and sautéing directly impact the flavor, texture, and nutritional quality of snack foods.
- ingredient choices and preparation methods can transform traditional snacks into healthier alternatives.
- foundational culinary skills empower students to create snacks that are both cost-effective and satisfying.
- resource availability, including time, equipment, and ingredients, shapes the way we plan and prepare food.

Knowledge:

Students will know...

Vocabulary:

General Techniques

- **Mise en place** – The practice of preparing and organizing ingredients before cooking.
- **Yield** – The amount a recipe produces.
- **Seasoning** – Enhancing flavor using salt, herbs, spices, etc.

- Presentation – Arranging food attractively for serving.

Cooking Methods

- Bake – Cooking food using dry heat in an oven.
- Sauté – Cooking food quickly in a small amount of fat.
- Simmer – Cooking food gently just below boiling.
- Blend/Purée – Mixing ingredients until smooth using a blender or food processor.
- Caramelize – Browning sugar or foods to develop flavor and color.
- Proof – Allowing yeast dough to rise before baking.
- Boil – Cooking food in rapidly bubbling water or liquid.

Ingredient Prep

- Dice – Cutting food into small, uniform cubes.
- Mince – Finely chopping food, especially garlic or herbs.
- Chop – Cutting food into irregular pieces.
- Knead – Working dough to develop gluten.
- Toss – Mixing ingredients gently, often in a bowl.

Food Safety & Handling

- Cross-contamination – Transfer of harmful bacteria between foods or surfaces.
- Temperature Danger Zone – Range (40°F–140°F) where bacteria grows rapidly.
- Sanitize – Reducing pathogens on surfaces to safe levels.
- Hold – Keeping food at a safe temperature before serving.

Lab-Specific Vocabulary

- Fondue – A melted mixture used for dipping, typically cheese or chocolate.
- Dip – A thick mixture served with chips, bread, or vegetables.
- Pretzel Bath – A baking soda solution used to boil pretzels before baking.
- Emulsion – A mixture of two liquids that normally don't combine (e.g., oil and vinegar).

Skills:

Students will be able to:

- identify and apply appropriate cooking techniques such as baking, sautéing, simmering, and blending.
- prepare and portion recipes using proper measuring tools and techniques.
- demonstrate knife skills including chopping, dicing, and mincing for recipe preparation.
- apply food safety principles when handling, preparing, and storing ingredients.
- follow multi-step recipes with attention to timing, temperature, and ingredient sequencing.
- use small appliances and kitchen tools safely and effectively.
- present snacks and appetizers with attention to visual appeal.
- explain the purpose of techniques such as caramelizing, proofing, and emulsifying in snack preparation.
- collaborate with peers to complete kitchen labs efficiently and safely.

Standards

Priority:

11.1.9-12.F – Apply the fundamentals of time, temperature, and cooking techniques to preparing, cooking, cooling, reheating, and holding a variety of foods.

11.1.9-12.E – Apply principles of measurement, portion control, conversions, food cost analysis and control, menu terminology, and menu pricing to menu planning.

11.1.9-12.H – Evaluate nutrition principles, food plans, preparation techniques, and specialized dietary plans.

11.1.9-12.C – Model the ability to acquire, handle, and use foods to meet nutrition and wellness needs of individuals and families across the life span.

11.2.9-12. B Examine strategies for managing individual and family resources such as food

11.3.9-12. C Evaluate the effectiveness of using interpersonal communication skills to resolve conflict.

Supporting:

11.1.9-12.A – Predict factors that affect food safety and security from production through consumption.

11.1.9-12.D – Evaluate the application of nutrition and meal-planning principles in the selection, planning, preparation, and serving of meals that meet the specific nutritional needs of individuals across their life span.

11.1.9-12.I – Analyze the breakdown of foods, the absorption of nutrients, and their conversion to energy by the body.

11.2.9-12.B – Examine strategies for managing individual and family resources such as food.

11.3.9-12.C – Evaluate the effectiveness of using interpersonal communication skills to resolve conflict.

Acceptable Evidence

Performance Tasks-

- Apply dry heat cooking techniques such as baking to produce snack items with proper texture and doneness.
- Demonstrate blending and pureeing techniques to create smooth, well-seasoned mixtures.
- Prepare and shape yeast dough, including kneading, proofing, and boiling, to achieve the desired structure and appearance.
- Apply knife skills such as chopping, dicing, and mincing to prepare ingredients safely and uniformly.
- Measure ingredients accurately using appropriate tools for dry, liquid, and weight-based measurements.
- Apply principles of caramelization and emulsification to enhance flavor and texture.
- Evaluate food safety practices, including temperature control, sanitation, and cross-contamination prevention during snack preparation.
- Modify snack recipes to meet specific dietary needs or resource constraints.
- Present snack items with attention to portion control, plating, and visual appeal.
- Collaborate effectively in a kitchen setting to complete multi-step food preparation tasks.
- Reflect on how cooking techniques influence the nutritional value and sensory qualities of snack foods.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Knife skills check to assess safety, uniformity, and technique.
- Cooking technique exit tickets identifying methods used and their impact on the final product.
- An ingredient function quiz focusing on the role of key ingredients in snack preparation.
- Recipe math practice converting measurements, scaling portions, and calculating cost
- Peer feedback on plating using a simple rubric to evaluate presentation and portioning

Summative Assessment

- Culinary lab demonstrating mise en place, technique execution, and final product quality.
- Recipe modification project with revised recipe, cost analysis, and nutritional comparison.
- Technique and safety quiz covering cooking methods, food safety, and ingredient functions.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Practice knife skills by preparing a variety of vegetables and herbs used in snack recipes, focusing on safety, uniformity, and efficiency.
- Explore the science of caramelization and emulsification through guided demonstrations and taste comparisons of different cooking methods.
- Conduct a nutrition analysis of a popular snack item and compare it to a homemade version, discussing ingredient choices and preparation techniques.
- Work in small groups to plan and execute a snack recipe using a designated cooking method, then present the final product with a focus on plating and portion control.
- Participate in a recipe modification challenge where students adjust a snack recipe to meet specific dietary needs or resource constraints, followed by a class discussion on the impact of those changes.

Instructional Strategies:

- Use pre-printed notes and/or recipes to support guided instruction and reduce cognitive load.
- Provide lists and picture lists of kitchen tools to reinforce vocabulary and visual recognition.
- Group students strategically for cooperative learning during labs and planning activities.
- Incorporate demonstrations of culinary techniques before student practice.
- Use exit tickets and reflective journaling to reinforce learning and encourage metacognition.

Differentiation/Intervention/Enrichment Options:

- Offer preferential seating to support focus and access to instruction.
- Pair or group students intentionally to support peer modeling and collaboration.
- Provide differentiated materials such as modified labs, visual aids, and scaffolded worksheets.

- Allow extended time on assignments and assessments to support processing and performance.
- Offer second-chance learning opportunities for skill mastery and confidence building.
- Use modified or adapted assessments, including simplified language or alternative formats.

For Language Development:

- Provide translated materials or bilingual support when needed.
- Use visual aids and labeled diagrams to reinforce culinary vocabulary.

Central Bucks School District – Course of Study – Food for Life

Unit 3 – Breakfast

Desired Results

Students will develop the skills to prepare a variety of breakfast foods safely and effectively, using appropriate mixing and cooking techniques to achieve desired results. They will interpret and modify recipes to meet dietary needs, practice visual plating, and apply principles of food safety, time management, and equipment use. By reflecting on how breakfast supports overall health and how resources influence preparation, students will be able to make informed, efficient, and creative choices in the kitchen.

Essential Questions:

- How do different cooking and baking techniques affect the texture and quality of breakfast foods?
- In what ways can breakfast recipes be modified to meet nutritional needs and dietary preferences?
- How do time, tools, and available ingredients influence the breakfast meals we prepare?
- What role does breakfast play in supporting overall health and wellness?

Enduring Understandings

Students will understand that...

- cooking and baking techniques directly impact the texture, flavor, and appearance of breakfast foods.
- ingredient choices and preparation methods can be adjusted to improve the nutritional value of breakfast meals.
- resource availability including time, equipment, and ingredients, shape the way breakfast is planned and prepared.
- a balanced breakfast contributes to physical, mental, and emotional well-being.

Knowledge:

Students will know...

Vocabulary:

General Techniques

- Mise en place – The practice of preparing and organizing ingredients before cooking.
- Yield – The amount a recipe produces.
- Plating – Arranging food attractively for serving.
- Leavening – The process of making baked goods rise using agents like baking powder or baking soda.

Cooking Methods

- Scramble – Cooking beaten eggs by stirring gently over heat.
- Sauté – Cooking food quickly in a small amount of fat.
- Bake – Cooking food using dry heat in an oven.
- Griddle – Cooking on a flat heated surface, often used for pancakes and waffles.

- Pan Bake – Baking in a skillet or oven-safe pan, often used for Dutch pancakes.

Mixing Methods

- Cream – Beating fat and sugar together until light and fluffy.
- Fold – Gently combining ingredients to avoid deflating air.
- Stir – Mixing ingredients with a spoon or spatula.
- Whisk – Beating ingredients to incorporate air or blend smoothly.
- Blend – Combining ingredients until smooth, often using a blender or mixer.

Ingredient Prep

- Dice – Cutting food into small, uniform cubes.
- Chop – Cutting food into irregular pieces.
- Zest – Removing the outer peel of citrus fruits for flavor.
- Sift – Passing dry ingredients through a sieve to remove lumps and aerate.

Food Safety & Handling

- Cross-contamination – Transfer of harmful bacteria between foods or surfaces.
- Temperature Danger Zone – Range (40°F–140°F) where bacteria grows rapidly.
- Sanitize – Reducing pathogens on surfaces to safe levels.
- Hold – Keeping food at a safe temperature before serving.

Skills

Students will be able to:

- prepare a variety of breakfast foods using appropriate cooking techniques such as baking, sautéing, and griddle work.
- demonstrate proper mixing methods including creaming, folding, stirring, and whisking.
- identify and use leavening agents correctly in quick bread recipes.
- follow multi-step recipes with attention to timing, temperature, and ingredient sequencing.
- use kitchen tools and equipment safely and effectively during breakfast preparation.
- apply food safety principles when handling, cooking, and storing breakfast ingredients.
- collaborate with peers to complete breakfast labs efficiently and safely.
- reflect on how cooking techniques influence the texture, flavor, and nutritional quality of breakfast foods.

Standards

Priority:

11.1.9-12.F – Apply the fundamentals of time, temperature, and cooking techniques to preparing, cooking, cooling, reheating, and holding a variety of foods.

11.1.9-12.E – Apply principles of measurement, portion control, conversions, food cost analysis and control, menu terminology, and menu pricing to menu planning.

11.1.9-12.H – Evaluate nutrition principles, food plans, preparation techniques, and specialized dietary plans.

11.1.9-12.C – Model the ability to acquire, handle, and use foods to meet nutrition and wellness needs of individuals and families across the life span.

Supporting:

- 11.1.9-12.A – Predict factors that affect food safety and security from production through consumption.
- 11.1.9-12.B – Evaluate the role of government agencies in safeguarding our food supply.
- 11.1.9-12.D – Evaluate the application of nutrition and meal-planning principles in the selection, planning, preparation, and serving of meals that meet the specific nutritional needs of individuals across their life span.
- 11.1.9-12.I – Analyze the breakdown of foods, the absorption of nutrients, and their conversion to energy by the body.
- 11.2.9-12.B – Examine strategies for managing individual and family resources such as food.
- 11.3.9-12.C – Evaluate the effectiveness of using interpersonal communication skills to resolve conflict.

Acceptable Evidence

Performance Tasks -

- Apply baking techniques such as measuring, creaming, folding, to produce consistent breakfast baked goods.
- Prepare egg-based dishes using appropriate methods such as scrambling and sautéing while maintaining food safety standards.
- Evaluate the impact of leavening agents on the texture and rise of quick breads and muffins.
- Modify breakfast recipes to meet specific dietary needs or nutritional goals.
- Present breakfast items with attention to plating and visual appeal.
- Collaborate with peers to complete a breakfast lab efficiently, demonstrating time management and kitchen safety.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Complete a mixing method identification activity where students match terms like creaming, folding, and whisking to their definitions and applications.
- Perform a kitchen safety walk-through where students identify potential hazards and explain how to correct them before beginning a breakfast lab.
- Submit a recipe analysis worksheet where students break down a breakfast recipe into steps, identify cooking methods used, and note nutritional highlights.
- Participate in a peer feedback session after a breakfast lab, using a rubric to evaluate the recipe outcome and teamwork.

Summative Assessment

- Complete a breakfast lab using appropriate mixing and cooking techniques, demonstrating mise en place, time management, and safe food handling.
- Complete a practical kitchen safety and equipment identification assessment during a lab setup or cleanup.
- Take a technique and vocabulary quiz covering breakfast-related culinary terms, mixing methods, and cooking processes.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Practice mixing methods such as creaming, folding, whisking, and stirring by preparing a variety of recipes.
- Modify a traditional breakfast recipe to meet specific dietary needs or nutritional goals.
- Plan and prepare a breakfast dish using limited tools or time constraints, focusing on adaptability, efficiency, and resourcefulness.

Instructional Strategies:

- Teachers share live demos or video modeling to show proper mixing methods and cooking techniques, pausing to highlight key vocabulary and decision-making steps.
- Incorporate guided practice sessions where students follow along with the teacher to reinforce technique, accuracy, and timing.
- Encourage students to reflect on how breakfast choices impact health and wellness.
- Use formative assessments like matching activities, recipe breakdowns, and technique identification to reinforce vocabulary and procedural knowledge.

Differentiation/Intervention/Enrichment Options:

- Provide visual aids, step-by-step recipe cards, and video demonstrations for students who benefit from visual instruction.
- Assign peer partners or small group roles to encourage collaboration and scaffold learning for students who need help with time management or kitchen safety.
- Use graphic organizers to help students break down recipes into mixing methods, cooking techniques, and nutritional components.
- Incorporate assistive technology such as text-to-speech tools or digital timers for students with learning or attention challenges.
- Provide extra practice opportunities for key techniques like whisking, folding, or sautéing during open lab time or skill-building stations.
- Use formative assessments to identify students needing intervention and provide targeted feedback or reteaching sessions before summative tasks.

For Language Development:

- Encourage students to narrate their cooking process aloud or record short video walkthroughs using target vocabulary and sequencing language.
- Use graphic organizers to help students categorize vocabulary by technique, equipment, ingredient prep, and safety terms.
- Provide opportunities for students to read and annotate recipes, identifying verbs, measurements, and home language.

Central Bucks School District – Course of Study – Food for Life

Unit 4 – Lunch/Dinner

Desired Results

Students will explore the preparation of balanced lunch and dinner meals using a variety of cooking techniques such as sautéing, baking, frying, and simmering. Through hands-on cooking labs, students will develop essential culinary skills, including knife handling, food safety practices, and effective meal planning. Emphasis is placed on preparing meals that are nutritionally balanced, cost-conscious, and satisfying, while fostering collaboration, confidence, and creativity in the kitchen.

Essential Questions:

- How do different cooking methods (e.g., sautéing, baking, frying) influence the nutritional value and flavor of meals?
- How can we prepare satisfying meals that meet dietary needs and resource constraints?
- What strategies help us plan and execute balanced meals using available ingredients and tools?

Enduring Understandings:

Students will understand that...

- dietary choices affect health.
- choices about time, money, and the use of other available resources affect meals.
- cooking techniques and ingredient choices directly affect the healthfulness, taste, and appeal of meals.
- planning and preparing lunch and dinner requires balancing nutrition, time, cost, and available resources.
- cultural and personal preferences influence meal choices and preparation styles.

Knowledge:

Students will know...

Vocabulary

General Techniques

- Mise En Place – The practice of organizing and preparing ingredients before cooking.
- Yield – The amount a recipe produces.
- Seasoning – Enhancing flavor using salt, herbs, spices, etc.
- Presentation – Arranging food attractively for serving.

Cooking Methods

- Boil – Cooking food in rapidly bubbling water or liquid.
- Sauté – Cooking food quickly in a small amount of fat.
- Fry – Cooking food in hot oil, either shallow or deep.

- Bake – Cooking food using dry heat in an oven.
- Simmer – Cooking food gently just below boiling.
- Roast – Cooking food using dry heat, typically in an oven.
- Steam – Cooking food using vapor from boiling water.
- Pan-fry – Cooking food in a small amount of oil in a skillet.

Ingredient Prep

- Dice – Cutting food into small, uniform cubes.
- Mince – Finely chopping food, especially garlic or herbs.
- Chop – Cutting food into irregular pieces.
- Shred – Pulling or cutting food into thin strips.
- Knead – Working dough to develop gluten.
- Roll – Flattening dough with a rolling pin.
- Filling – Stuffing dough, vegetables, or meat with a mixture.
- Crimp – Sealing the edges of dough by pinching or folding.
- Julienne – Cut into matchstick-size strips.

Food Safety & Handling

- Cross-contamination – Transfer of harmful bacteria between foods or surfaces.
- Temperature Danger Zone – Range (40°F–140°F) where bacteria grow rapidly.
- Sanitize – Reducing pathogens on surfaces to safe levels.
- Hold – Keeping food at a safe temperature before serving.
- Internal Temperature – The temperature inside food is used to determine doneness.

Lab-Specific Vocabulary

- Alfredo Sauce – A creamy pasta sauce made with butter, cream, and cheese.
- Lentils – Small legumes used as a plant-based protein.
- Empanada – A pastry filled with savory ingredients and baked or fried.
- Dough – A mixture of flour and liquid used to make baked goods.
- Crust – The outer layer of baked dough, especially in pizza or empanadas.
- Breading – Coating food with flour, egg, and crumbs before frying.
- Stir-fry – A cooking method involving quick sautéing of ingredients over high heat, typically in a wok.
- Taco seasoning – A blend of spices used to flavor taco fillings.
- Slurry – Mixing cornstarch and water to thicken the sauce.
- Dredging – Coating food lightly with a dry ingredient.

Skills:

Students will be able to...

- prepare a variety of lunch and dinner recipes using techniques such as sautéing, baking, frying, and simmering.
- demonstrate knife skills and ingredient prep for complex recipes.
- apply food safety principles during multi-step meal preparation.
- plan and execute balanced meals considering time, budget, and nutritional goals.
- modify recipes to accommodate dietary restrictions or resource limitations.

- collaborate effectively in kitchen labs to complete recipes safely and efficiently.

Standards

Priority:

- 11.1.9-12.F – Apply fundamentals of time, temperature, and cooking techniques.
- 11.1.9-12.E – Apply principles of measurement, portion control, conversions, and food cost analysis.
- 11.1.9-12.H – Evaluate nutrition principles and specialized dietary plans.
- 11.1.9-12.C – Model the ability to acquire, handle, and use foods to meet nutrition and wellness needs.
- 11.2.9-12.B – Examine strategies for managing individual and family resources.
- 11.3.9-12.C – Evaluate the effectiveness of using interpersonal communication skills to resolve conflict.

Supporting:

- 11.1.9-12.D – Evaluate nutrition and meal-planning principles.
- 11.1.9-12.I – Analyze nutrient absorption and energy conversion.

Acceptable Evidence:

Performance Tasks –

- Kitchen labs that demonstrate proper cooking techniques and food safety.
- Recipe modification projects with nutritional and cost analysis.
- Collaborative meal planning and execution.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Knife skills check using vegetables for stir fry or taco toppings; assessed on safety, uniformity, and efficiency.
- Cooking technique exit tickets identifying methods used in each lab and their impact on flavor, texture, and nutrition.
- Recipe math practice converting measurements, scaling portions, and calculating cost per serving.
- Peer feedback on plating using a rubric to evaluate portion control, presentation, and visual appeal.

Summative Assessment

- Culinary lab performance preparing a complete lunch or dinner meal with assessment of mise en place, technique, safety, and final product.
- Recipe modification project with revised recipe, cost analysis, and nutritional comparison for dietary needs.
- Technique and safety quiz covering cooking methods, food safety principles, and unit vocabulary.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Prepare meals using different cooking methods and compare outcomes.
- Conduct a cost and nutrition analysis of homemade vs. store-bought meals.
- Modify a recipe to meet specific dietary needs (e.g., vegetarian, gluten-free).
- Collaboratively plan and prepare a themed lunch or dinner lab.

Instructional Strategies:

- Use demonstrations and video modeling to introduce techniques.
- Provide scaffolded recipe cards and visual aids.
- Facilitate peer feedback sessions on plating and teamwork.

Differentiation/Intervention/Enrichment Options:

- Preferential seating and peer pairing for support.
- Differentiated materials and extended time options.
- Second-chance learning opportunities during lunch and learn.

Language Development:

- Translated materials and labeled diagrams.
- Graphic organizers for vocabulary and recipe breakdowns.

Central Bucks School District – Course of Study – Food for Life

Unit 5 – Dessert

Desired Results

Students will explore the art and science of dessert preparation through hands-on labs and creative challenges. They will learn and apply essential mixing and baking techniques, develop an understanding of ingredient functions, and practice safe food handling. Emphasis is placed on presentation, portion size, and the ability to modify recipes to meet dietary needs. Students will gain confidence in executing a variety of desserts while reflecting on how technique and creativity influence the final product.

Essential Questions:

- How do mixing and baking techniques influence the texture, flavor, and appearance of desserts?
- In what ways can desserts be modified to meet nutritional needs or dietary restrictions?
- How do ingredient choices and proportions affect the outcome of a dessert?
- What role does presentation play in the appeal and enjoyment of desserts?
- How can we balance taste and nutrition when preparing sweet treats?

Enduring Understandings:

Students will understand that...

- precise mixing and baking techniques are essential to achieving desired textures and flavors in desserts.
- ingredient selection and measurement directly impact the structure, taste, and nutritional value of baked goods.
- desserts can be adapted to meet dietary needs without sacrificing quality or enjoyment.
- presentation enhances the sensory experience and appeal of desserts.
- creating desserts involves both scientific principles and creative expression.

Knowledge:

Students will know...

Vocabulary

General Techniques

- Mise en place – The practice of organizing and preparing ingredients before cooking.
- Yield – The amount a recipe produces.
- Plating – Arranging food attractively for serving.
- Presentation – Enhancing the visual appeal of a dish.

Cooking Methods

- Bake – Cooking food using dry heat in an oven.
- Broil – Cooking food with direct heat from above.
- Chill – Cooling food in the refrigerator to set or firm.
- Whip – Beating ingredients to incorporate air and increase volume.
- Fold – Gently combining ingredients to avoid deflating air.
- Temper – Gradually combining hot and cold ingredients to prevent curdling.

Ingredient Prep

- Cream – Beating fat and sugar together until light and fluffy.
- Sift – Passing dry ingredients through a sieve to remove lumps and aerate.
- Zest – Removing the outer peel of citrus fruits for flavor.
- Chop – Cutting food into irregular pieces.
- Dice – Cutting food into small, uniform cubes.

Food Safety & Handling

- Cross-contamination – Transfer of harmful bacteria between foods or surfaces.
- Temperature danger zone – Range (40°F–140°F) where bacteria grows rapidly.
- Sanitize – Reducing pathogens on surfaces to safe levels.
- Hold – Keeping food at a safe temperature before serving.

Lab-Specific Vocabulary

- Lava cake – A small chocolate cake with a gooey, molten center.
- Shortcake – A sweet biscuit or cake base served with fruit and whipped cream.
- Cookie – A small baked treat made from dough, often sweet and crisp or chewy.
- Ganache – A smooth mixture of chocolate and cream used for filling or topping.
- Glaze – A glossy coating applied to baked goods for shine and flavor.
- Crumb – The interior texture of baked goods.
- Leavening – The process of making baked goods rise using agents like baking soda or baking powder.
- Piping – Squeezing frosting or batter through a bag to decorate or shape.

Skills:

Students will be able to...

- prepare a variety of desserts using appropriate mixing and baking techniques.
- demonstrate proper use of tools such as mixers, sifters, and piping bags.
- apply plating techniques to present desserts attractively.
- identify and use leavening agents correctly in baked goods.
- follow multi-step recipes with attention to timing, temperature, and ingredient sequencing.
- use kitchen equipment safely and effectively during dessert preparation.
- apply food safety principles when handling, cooking, and storing dessert ingredients.
- collaborate with peers to complete dessert labs efficiently and safely.

Standards

Priority:

11.1.9-12.F – Apply the fundamentals of time, temperature, and cooking techniques to preparing, cooking, cooling, reheating, and holding a variety of foods.

11.1.9-12.E – Apply principles of measurement, portion control, conversions, food cost analysis and control, menu terminology, and menu pricing to menu planning.

11.1.9-12.H – Evaluate nutrition principles, food plans, preparation techniques, and specialized dietary plans.

11.1.9-12.C – Model the ability to acquire, handle, and use foods to meet nutrition and wellness needs of individuals and families across the life span.

11.2.9-12.B – Examine strategies for managing individual and family resources such as food.

11.3.9-12.C – Evaluate the effectiveness of using interpersonal communication skills to resolve conflict.

Supporting:

11.1.9-12.D – Evaluate the application of nutrition and meal-planning principles in the selection, planning, preparation, and serving of meals that meet the specific nutritional needs of individuals across their life span.

11.1.9-12.I – Analyze the breakdown of foods, the absorption of nutrients, and their conversion to energy by the body.

Acceptable Evidence:

Performance Tasks –

- Apply mixing techniques such as creaming, folding, and portioning to produce consistent dessert items like cookies or shortcakes.
- Demonstrate proper use of mixing tools and equipment (e.g., electric mixer, sifter, piping bag) during dessert preparation.
- Prepare a molten-centered lava cake using correct timing and temperature control to achieve the desired texture.
- Modify a dessert recipe to meet a specific dietary need.
- Present plated desserts with attention to portion control, garnish, and visual appeal.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Mixing method identification activity where students match terms like creaming, folding, and whipping to their definitions and applications.
- Recipe breakdown worksheet where students analyze a dessert recipe, identifying steps, cooking methods, and ingredient functions.
- Kitchen safety walk-through where students identify potential hazards and explain how to correct them before beginning a dessert lab.
- Texture comparison lab where students prepare two versions of a cookie or cake using different mixing methods and record observations.

Summative Assessment

- Complete a dessert lab demonstrating proper mixing methods, baking techniques, and food safety practices.
- Participate in a dessert showcase where students present a plated dessert with attention to portion control, garnish, and visual appeal.
- Submit a recipe modification project that includes a revised dessert recipe, cost analysis, and nutritional comparison.
- Create a dessert menu for a specific dietary need or occasion, including rationale for recipe selection and presentation strategy.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Practice mixing methods such as creaming, folding, and whipping by preparing cookie doughs, cake batters, and whipped toppings.
- Compare the effects of different leavening agents (e.g., baking soda vs. baking powder) by baking.
- Conduct a sensory evaluation of desserts, focusing on texture, flavor, aroma, and presentation, and use descriptive vocabulary to communicate findings.
- Modify a traditional dessert recipe to be more nutritionally dense.

Instructional Strategies:

- Use live demonstrations or video modeling to show proper mixing methods, baking techniques, and plating styles.
- Incorporate guided practice sessions where students follow along with the teacher to reinforce technique accuracy and timing.
- Provide pre-printed recipes and visual step-by-step guides to reduce cognitive load and support procedural understanding.
- Facilitate think-pair-share discussions using essential questions to encourage reflection on dessert preparation and nutritional choices.
- Group students strategically for cooperative learning during labs and planning activities to promote peer modeling and collaboration.

Differentiation/Intervention/Enrichment Options:

- Provide visual aids, step-by-step recipe cards, and video demonstrations for students who benefit from visual instruction.
- Offer scaffolded recipes with varying levels of complexity to accommodate different skill levels.
- Assign peer partners or small group roles to encourage collaboration and support time management and kitchen safety.
- Use graphic organizers to help students break down recipes into techniques, ingredients, and timing.
- Provide modified or adapted assessments, including simplified language or alternative formats.

- Offer second-chance learning opportunities for students to reattempt techniques or labs for mastery.

Language Development:

- Translated materials and labeled diagrams.
- Graphic organizers for vocabulary and recipe breakdowns.



Course of Study Revisions and Adoption

**Personal Finance 1 Update
and Requesting Approval of
Compass 6, 7, and 8 and
Integrated Tech 6**

September 2026



Introductions



Hannah Woodring

Business, Integrated Tech &
Compass Coordinator



Matt Palmer

Secondary Staff Developer



Goal of Presentation



Share revised Course of Study for:

- **Personal Finance 1**

Seek approval for Courses of Study for:

- **Compass 6, 7, and 8**
- **Integrated Tech 6**



10 min



Agenda



Background



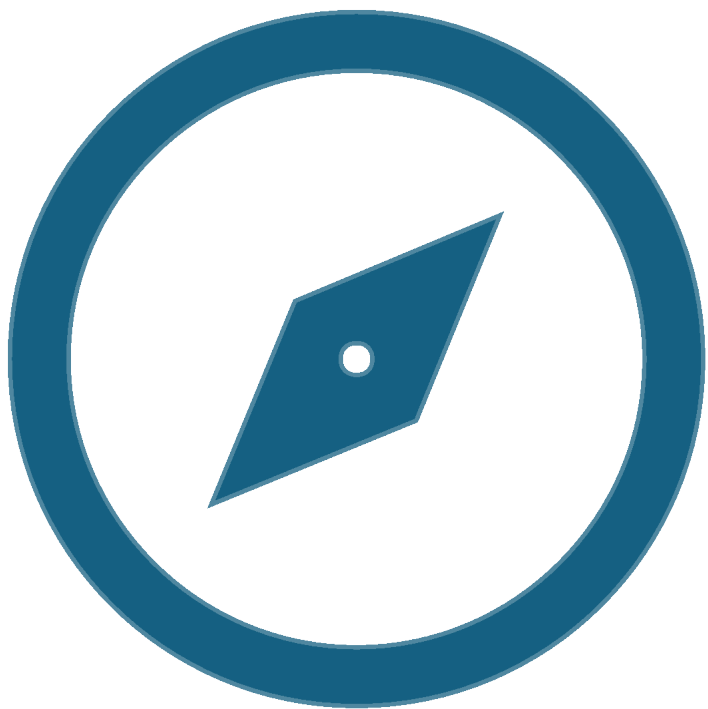
Course Overview



Budget

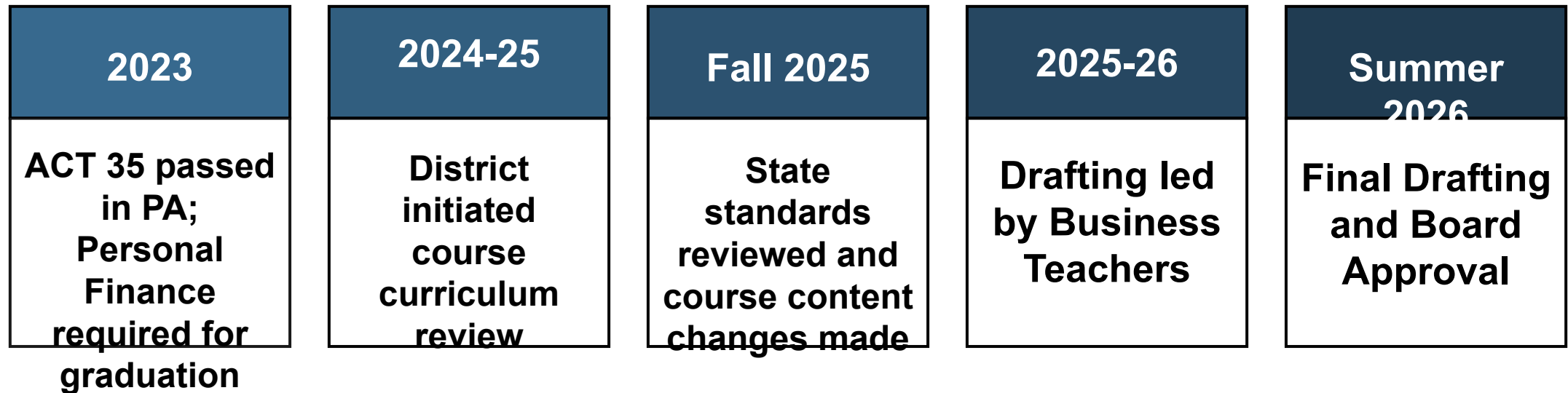


Next Steps



Personal Finance 1

Background



Overview

Content included in original course	New content added
• Financial Decision making • Personal Money Management • Checking & Savings Accounts • Income & Benefits • Taxes • Expenses • Budgeting • Investing • Credit & Loans	• Consumer Protection • Behavioral Biases • Risk and Insurance • Wills & Power of Attorney

Budget

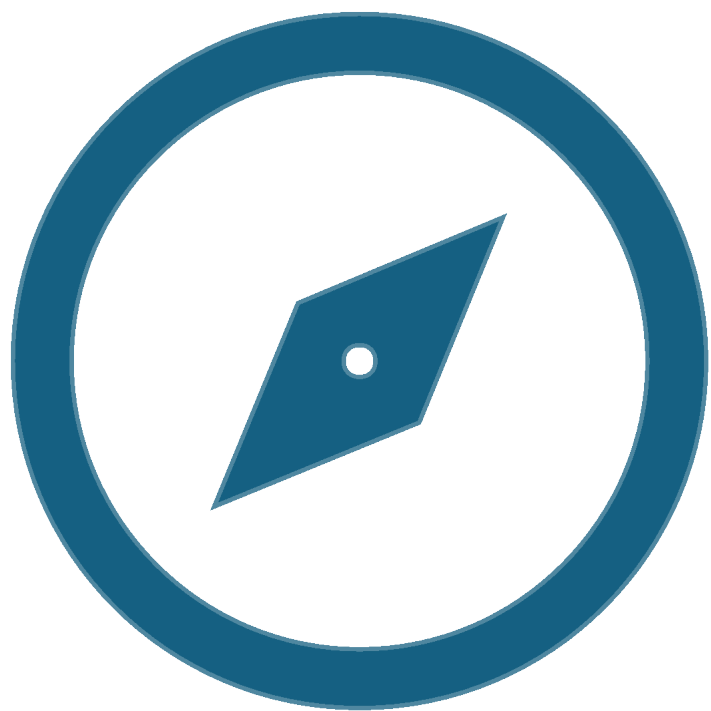
The course will use existing CBSD resources:

- Canvas
- MS Office

In addition to a free web based resource:

- NGPF

No additional costs.



Compass 6, 7, & 8



Background – Compass 6, 7, 8

2023-24	2024-25	Fall 2025	2025-26	Summer 2026
Anticipation of Grade-Level Realignment	District identified need for curriculum-based skill development in all students	Teacher and Administration input on areas of need	Drafting led by Cross Curriculum Team	Final Drafting and Board Approval

Overview



5 Units:

- Academic Skills
- Personal Skills
- Social Skills
- Career Readiness and Preparation (Smart Futures)
- Digital Citizenship

Overview



Compass Kickstarts: Common Formative Assessments

- Microsoft/Windows
- Study Skills
- Outlook
- Internet
- Etiquette/Citizenship
- Mental Health
- Apps

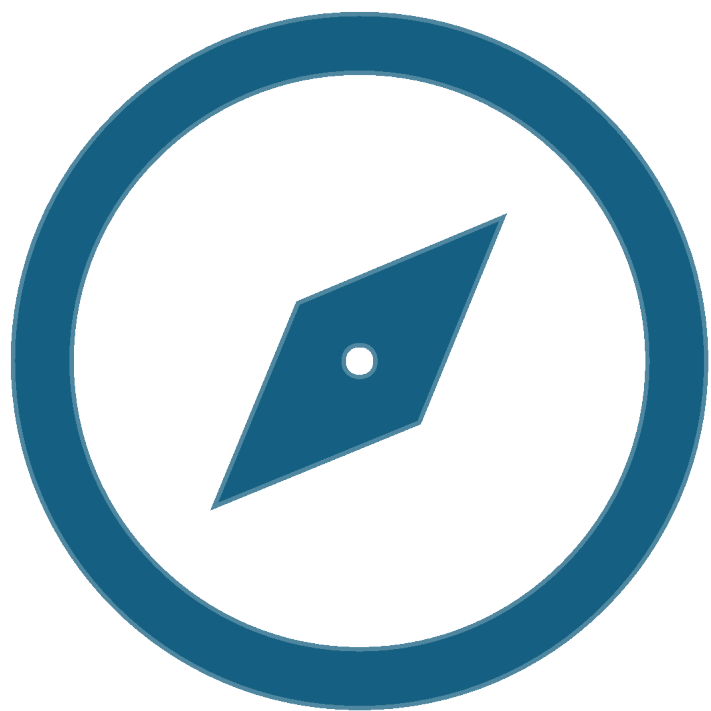
Budget



The course will use existing CBSD resources:

- Canvas
- MS Office
- Minecraft EDU

No additional costs.



Integrated Tech

6

Background

2023-24	2024-25	Fall 2025	2025-26	Summer 2026
Anticipation of Grade-Level Realignment	MS Specials Schedule Established with IT6	Scope & Sequence for IT 6 / 7 / 8 Revised	Drafting led by Integrated Technology Teachers	Final Drafting and Board Approval

Overview

Main Units

- Unit 1: Introduction to Integrated Technology 6
- Unit 2: Career Exploration
 - Marketing
 - Accounting
 - Management
- Unit 3: Coding

Overview - Standards

ISTE Standards for Students

- Empowered Learner
- Creative Communicator
- Computational Thinker

Career & Technical Education (CTE) – Career Awareness

21st Century Skills Framework

- Critical Thinking
- Collaboration
- Creativity
- Communication

Supporting Standards

- PA Core ELA (Speaking, Listening, Informational Text)
- PA Core Math (Basic operations, problem-solving, money concepts)

Overview

Common Summative Assessment

- Professional Portfolio

Budget

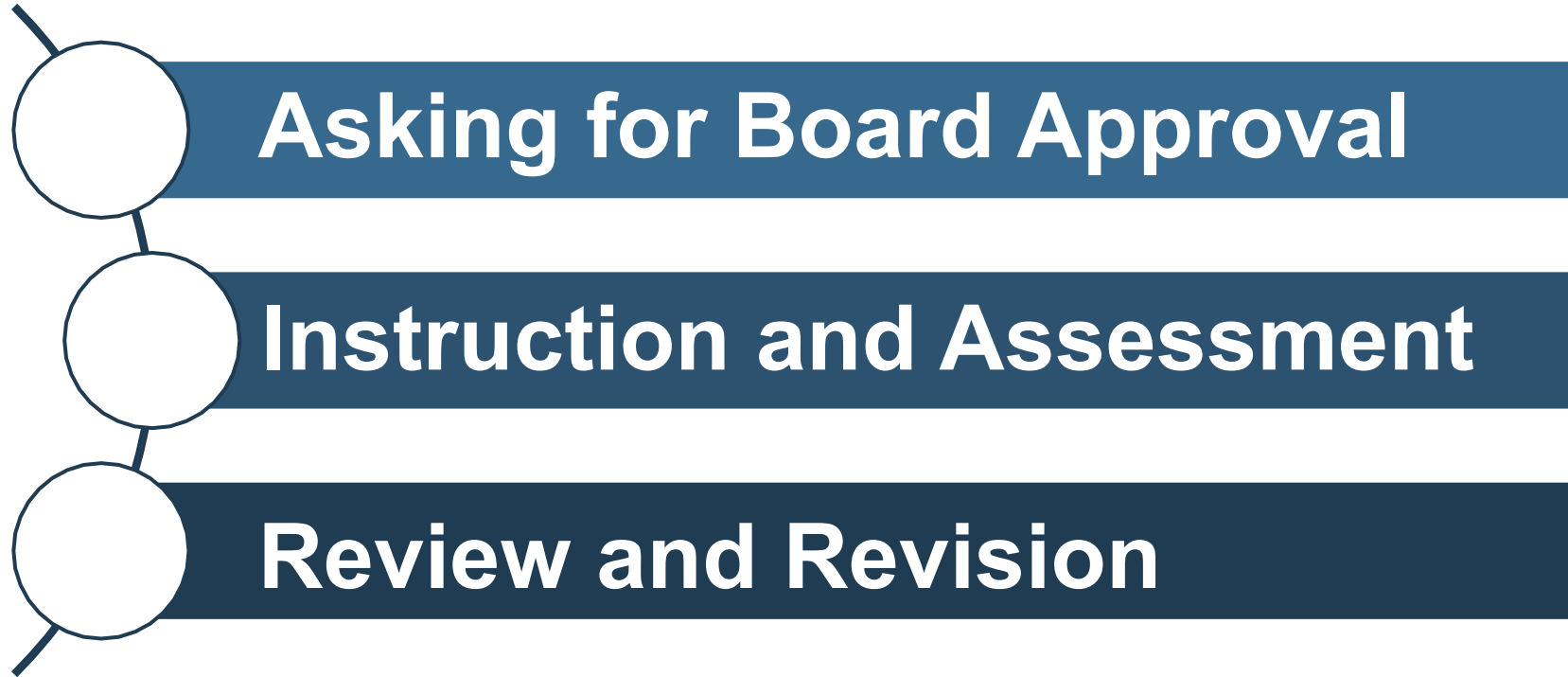
The course will utilize existing CBSD accessible resources:

- Canvas
- MS Office (including Sway)
- Canva
- Floorplan creator

No additional costs.



Next Steps





Personal Finance 1

Course Number: 5062 / 5062 S

Course Level: Academic / Elective

Grade: 10-12

Time/Credit: 0.5 - 9 weeks; 0.5 A/B – 18 weeks

Development Date: Revised June 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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Central Bucks School District
Teaching and Learning Principles

- **Active, Inquiry-Based Financial Learning**
 - Students actively engage in financial inquiry by exploring authentic questions and scenarios, promoting discovery, critical thinking, and innovation aligned with the district's inquiry-based learning focus.
- **Big Ideas and Essential Questions**
 - Instruction is organized around core financial concepts and essential questions that frame learning and promote application, consistent with active engagement and project-based learning models.
- **Hands-On, Real-World Application**
 - Learning experiences emphasize simulations, projects, and case studies that require students to apply financial knowledge to real-life decision-making and problem-solving.
- **Explicit Instruction in Financial Literacy and Reading Skills**
 - Teachers provide direct instruction in financial vocabulary, comprehension of informational texts, contracts, data representations, and real-world documents, supporting district literacy expectations across content areas.
- **Technology and Information Literacy Integration**
 - Students use digital tools and financial technology responsibly, learning to evaluate sources, manage information ethically, and apply language arts skills within personal finance contexts.
- **Multi-Tiered System of Supports (MTSS)**
 - Instruction reflects a collective responsibility for student success by incorporating diagnostic assessments, targeted interventions, and enrichment opportunities to meet diverse learning needs.
- **Safe and Supportive Learning Environment**
 - The classroom fosters a respectful environment where students feel safe discussing financial topics, taking intellectual risks, and learning from mistakes—essential for authentic financial learning.
- **Reflective Practice and Self-Assessment**
 - Students regularly reflect on financial decisions, learning progress, and personal goals to deepen understanding and build metacognitive skills.
- **Career and Life Connection**
 - Financial instruction is explicitly connected to career exploration, helping students understand earnings, benefits, taxes, and financial planning within real-world career pathways.
- **Cross-Disciplinary Skill Development**
 - Personal finance instruction integrates mathematics, literacy, technology, and critical thinking skills to support comprehensive, transferable learning.
- **Preparation for Responsible, Informed Citizenship**
 - The course equips students with the financial knowledge and decision-making skills necessary to participate responsibly and ethically in their communities and the broader economy

Central Bucks School District
Enduring Understandings

Unit 1 – Personal Finance Fundamentals

- Students will understand that effective financial decision-making requires distinguishing between needs and wants, assessing trade-offs, and recognizing how scarcity and demand influence personal and consumer choices.
- Students will understand that financial choices are not always rational and are often influenced by behavioral biases—such as overconfidence, loss aversion, anchoring, herd mentality, present bias, experiential bias, and mental accounting—which can impact both short-term decisions and long-term financial outcomes.
- Students will understand that responsible personal money management depends on setting clear financial goals, using structured decision-making processes, and selecting appropriate financial accounts and services to manage income, spending, saving, and risk.
- Students will understand that informed consumers benefit from understanding the role of financial service providers and consumer protection laws, enabling them to evaluate financial products, safeguard their resources, and advocate for themselves in the marketplace.

Unit 2 – Income

- Students will understand that income comes from a variety of sources and types—including earned income, benefits, and retirement income—and that each has different characteristics, risks, and implications for financial stability.
- Students will understand that occupational choice and earning potential are influenced by education, skills, experience, and external factors such as economic conditions, technology, and labor market trends.
- Students will understand that total compensation includes more than wages or salary, as employee benefits and payroll deductions significantly affect take-home pay and long-term financial well-being.
- Students will understand that planning for income across the lifespan—including employment income and retirement income—is essential for meeting financial goals and adapting to changing personal and economic circumstances.

Unit 3 – Spending

- Students will understand that informed spending decisions require evaluating needs and wants, comparing alternatives, considering taxes and total cost of ownership, and using tools to obtain the best value.
- Students will understand that effective money management depends on accurate record keeping, timely bill paying, and the strategic use of payment methods, each of which impacts financial stability and creditworthiness.
- Students will understand that budgeting is a flexible process that helps individuals manage fixed and variable expenses, plan for major purchases such as vehicles and housing, and adjust spending to meet financial goals.
- Students will understand that spending choices—including charitable giving—reflect personal values and priorities and can balance immediate satisfaction with long-term financial well-being and social responsibility.

Unit 4 – Savings and Investing

- Students will understand that building net worth depends on purposeful saving and investing decisions that align with personal financial goals and adapt over time.
- Students will understand that different savings and investment vehicles—including retirement accounts—carry varying levels of risk, return, liquidity, and restrictions that affect how and when funds can be used.
- Students will understand that investing involves balancing risk and reward through strategies such as diversification, the use of benchmark indices, and appropriate trading methods to support long-term financial growth.
- Students will understand that behavioral biases can influence saving and investing decisions, and that recognizing and managing these biases is essential for making consistent, informed, and goal-oriented financial choices.

Unit 5 – Risk and Insurance

- Students will understand that individuals face financial risks related to income, property, health, and liability, and that insurance is a key strategy for managing and reducing the financial impact of these risks.
- Students will understand that insurance products involve tradeoffs among coverage, premiums, deductibles, and other out-of-pocket costs that affect both short-term affordability and long-term financial security.
- Students will understand that understanding insurance terms, coverage options, and the claims process enables consumers to make informed decisions and effectively protect themselves when unexpected events occur.
- Students will understand that awareness of financial fraud and risk-management practices is essential for safeguarding personal resources and maintaining financial stability.

Unit 6 – Credit

- Students will understand that credit allows individuals to access goods, services, and opportunities before full payment is available, but it involves responsibilities, costs, and long-term financial implications.
- Students will understand that creditworthiness is determined by information in credit reports and reflected in credit scores, which influence access to credit, borrowing costs, and financial opportunities.
- Students will understand that different forms of credit and loan types—along with alternative financial service providers—carry varying terms, risks, and costs that affect debt management and financial stability.
- Students will understand that responsible use of credit includes understanding credit laws, managing debt effectively, and making informed borrowing decisions to support long-term financial goals.

Central Bucks School District
Essential Questions

Unit 1: Personal Finance Fundamentals

- How do needs, wants, and scarcity influence the financial choices individuals make?
- What factors affect consumer demand, and how do elasticity and personal preferences shape spending behavior?
- How do behavioral biases influence financial decisions, and how can individuals minimize their impact?
- Why is a structured decision-making process important when managing personal finances?
- How do financial institutions, accounts, and consumer protections support responsible financial decision-making?

Unit 2: Income

- What are the different types and sources of income, and how do they contribute to financial stability?
- How do career choices, education, and labor market conditions affect earning potential?
- What role do employee benefits and payroll deductions play in total compensation?
- How do external factors—such as the economy and technology—impact employment opportunities and income security?
- Why is planning for income across the lifespan, including retirement income, essential?

Unit 3: Spending

- What factors should be considered to make informed and responsible spending decisions?
- How do taxes, payment methods, and fees influence the true cost of purchases?
- Why are budgeting, record keeping, and bill paying critical for financial stability?
- How do major purchases like housing and transportation affect long-term financial planning?
- How can spending choices—including charitable giving—reflect personal values and priorities?

Unit 4: Saving and Investing

- How do saving and investing contribute to building net worth and achieving financial goals?
- What factors should individuals consider when choosing among savings and investment vehicles?
- How do risk, diversification, and benchmark indices influence investment performance?
- How do retirement accounts support long-term financial security?
- How can recognizing and overcoming behavioral biases improve saving and investing outcomes?

Unit 5: Risk and Insurance

- What types of financial risks do individuals face related to income, health, property, and liability?
- How does insurance help manage financial risk, and what tradeoffs exist among coverage, cost, and out-of-pocket expenses?
- How do insurance terms and the claims process affect consumer protection and financial recovery?
- Why is understanding fraud and risk management essential for financial security?
- How can individuals evaluate insurance options to align with their needs and financial goals?

Unit 6: Credit

- How does credit expand financial opportunities, and what responsibilities come with its use?
- What factors influence credit reports and credit scores, and why do they matter?
- How do the costs of credit—such as interest and fees—impact long-term financial health?
- How do different forms of credit and loan types affect borrowing decisions and debt management?
- How do credit laws and consumer protections help individuals use credit responsibly?

Central Bucks School District – Course of Study

Course Overview

Desired Results

Course Description:

This practical course allows students the opportunity to evaluate how current decisions impact our long-range financial success. Topics covered include strategies for money management, how to properly budget and save money, preparing income taxes and the necessary skills needed to invest successfully. Students learn about identity theft, employee benefits, credit card debt, funding a college education, their first car, and home ownership all while maintaining a quality credit standing. This course provides 10th – 12th grade students with a solid foundation for making well informed, personal financial decisions leading them towards the goal of financial independence.

Prerequisite: N/A

Committee Members: Robert Moran, Rachel Oestreich, Connor Simpson, Hannah Woodring

Acceptable Evidence.

Teachers of this course will abide by the expectations set forth from the Teaching and Learning Team for summative and formative assessment practices as well as composition of the gradebook.

Common Summative Assessment 1: 7 Steps to Financial Purchase Activity (unit 1)

Common Summative Assessment 2: Calculating Income Word Problem Quiz (unit 2)

Common Summative Assessment 3: Salary Based Budget Activity Excel Spreadsheet (unit 3)

Common Summative Assessment 4: Money Management Research Activity (unit 4)

Common Summative Assessment 5: Insurance terms and basic concepts Quiz (unit 5)

Common Summative Assessment 6: Credit Research and Poster Activity (unit 6)

Course Grading:

10% formative; 90% summative

Grades are based on a point system and final grades are assessed based on the District grading scale

Pacing Guide

Content	Days
Course Introduction, Syllabus Review	1
Unit 1 – Personal Finance Fundamentals	
Consumer Behavior	1
Financial Decision Making Process; <i>7 Steps to Financial Purchasing CSA</i>	2
Personal Money Management	2
Checking Accounts	1
Financial Goals); <i>Standard of Living CFA</i>	1
Consumer Protection	1
Enrichment and Remediation	1
Unit 2 - Income	
Types and Sources of Income	1
Retirement Income	1
Earned Income and Occupation; <i>Net Pay Calculation Worksheet WS CFA</i>	2
Employee Benefits); <i>Benefits Package Activity CFA; Income Summative Quiz CSA</i>	2
Payroll Deductions; <i>Fine Print Pay Stub Activity CFA</i>	1
Enrichment and Remediation	1
Unit 3 - Spending	
Informed Spending Factors	0.5
Taxes on Purchases	0.25
Tools for Lower Prices	0.5
Record Keeping	0.25
Types of Expenses; <i>Types of Expenses Practice CFA</i>	0.5
Payment Methods	1
Bill Paying	0.5
Costs of Car Ownership	1
Costs of Home Ownership	1
Budgeting Approaches; <i>Class Budget Activity CSA</i>	2
Enrichment and Remediation	0.5
Unit 4 – Saving and Investing	
Net Worth	0.5
Savings Plans; <i>Money Management Research Activity CSA</i>	1.5
Investing	2
Trading Methods and Restrictions	0.5
Benchmark Indices	0.5
Investment Portfolio Diversification	0.5
Retirement Accounts; <i>Compare Types of Retirement Accounts CFA</i>	1
Overcoming Common Behavior Biases); <i>Risk Tolerance Quiz and Worksheet CFA</i>	1
Enrichment and Remediation	0.5
Unit 5 – Risk and Insurance	
Basic Terms	0.5
Out of Pocket Costs	0.5
Filing Claims	0.5

Financial Risk: Income	0.5
Financial Risk: Property	0.5
Financial Risk: Health; <i>Compare Types of Health Insurance CFA</i>	0.5
Financial Risk: Liability; <i>Insurance Project CSA</i>	0.5
Financial Fraud	0.5
Enrichment and Remediation	0.5
Unit 6 - Credit	
Obtaining Credit	0.5
Cost of Credit	0.5
Debt Management; <i>Calculate Debt Avalanche v. Debt Snowball CFA</i>	1
Main Forms of Credit; <i>Run the Numbers: Credit Card Analysis CFA</i>	0.5
Common Loan Types; <i>Credit Project CSA</i>	2
Credit Laws	0.5
Enrichment and Remediation	0.5

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

- Microsoft Office (including Word, PowerPoint, Excel)
- Canvas
- Canva
- Next Gen Personal Finance (website)
- How the Market Works (website)
- Managing Personal Finances Textbook

Unit 1 – Personal Finance Fundamentals

Desired Results:

Essential Questions:

- How do needs, wants, and scarcity influence the financial choices individuals make?
- What factors affect consumer demand, and how do elasticity and personal preferences shape spending behavior?
- How do behavioral biases influence financial decisions, and how can individuals minimize their impact?
- Why is a structured decision-making process important when managing personal finances?
- How do financial institutions, accounts, and consumer protections support responsible financial decision-making?

Enduring Understandings:

Students will understand that...

- Effective financial decision-making requires distinguishing between needs and wants, assessing trade-offs, and recognizing how scarcity and demand influence personal and consumer choices.
- Financial choices are not always rational and are often influenced by behavioral biases—such as overconfidence, loss aversion, anchoring, herd mentality, present bias, experiential bias, and mental accounting—which can impact both short-term decisions and long-term financial outcomes.
- Responsible personal money management depends on setting clear financial goals, using structured decision-making processes, and selecting appropriate financial accounts and services to manage income, spending, saving, and risk.
- Informed consumers benefit from understanding the role of financial service providers and consumer protection laws, enabling them to evaluate financial products, safeguard their resources, and advocate for themselves in the marketplace.

Knowledge:

Students will know...

- Vocabulary:
- Consumer Behavior
- Needs vs. Wants
- Budget
- Opportunity Cost
- Elastic or Inelastic Demand
- Behavior Biases (overconfidence, anchoring, herd mentality, loss aversion, present bias)
- Financial Decision Making Process
- Financial Goals
- Emergency Fund
- Consumer Protection
- Will
- Power of Attorney

Skills:

- Students will be able to identify and articulate personal long-term financial goals and explain their importance in financial planning.
- Students will be able to apply the decision-making process to financial choices, including evaluating opportunity costs for different options.

- Students will be able to recognize common behavioral biases in financial decision-making and analyze how these biases can impact personal financial outcomes.
- Students will be able to compare different financial service providers and account types, and select appropriate options based on individual needs and goals.
- Students will be able to demonstrate effective methods for maintaining accurate personal financial records, including income, expenses, and account information.
- Students will be able to explain the purpose and components of long-term planning tools such as wills, powers of attorney, and beneficiary designations.
- Students will be able to identify key consumer protection laws and agencies, and describe how they safeguard individuals in financial transactions.

Standards:

Priority:

- 17.1.9-12.B Apply a systematic decision-making process, including opportunity costs, to setting and achieving financial goals
- 17.1.9-12.G Communicate the process of opening financial accounts and the factors to consider when selecting financial institutions and professionals
- 17.1.9-12.I Develop a system for documenting and organizing personal financial records, both paper and electronic

Supporting:

- 17.1.9-12.A Determine the financial impact of various long-term goals (e.g. lifestyle, family, education)
- 17.1.9-12.C Analyze the impact of various factors on a person's financial mindset and decisions
- 17.1.9-12.D Evaluate strategies for dealing with behavioral biases (e.g., loss aversion, experiential bias, mental accounting) and other obstacles to managing personal finance
- 17.1.9-12.E Assess the value of sharing financial goals and information with others
- 17.1.9-12.F Compare various financial service providers (e.g. banks, credit unions, check cashers, brokerage firms) and the types of accounts and services each provides
- 17.1.9-12.H Evaluate the use of financial technology to access financial services and make financial decisions
- 17.1.9-12.J Explain the financial implications of wills, powers of attorney, and naming beneficiaries for various accounts
- 17.1.9-12.K Explain the role of various state and federal financial regulators and consumer protection agencies
- 17.1.9-12.L Describe the issues addressed by various laws and regulations that impact or safeguard a person's finances

Acceptable Evidence:

Acceptable evidence of learning:

Formative Assessment

- Standard of Living Activity

Summative Assessment

- 7 Steps of Financial Decision making Activity

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Unit 2 – Income

Desired Results:

Essential Questions:

- What are the different types and sources of income, and how do they contribute to financial stability?
- How do career choices, education, and labor market conditions affect earning potential?
- What role do employee benefits and payroll deductions play in total compensation?
- How do external factors—such as the economy and technology—impact employment opportunities and income security?
- Why is planning for income across the lifespan, including retirement income, essential?

Enduring Understandings:

Students will understand that...

- Income comes from a variety of sources and types—including earned income, benefits, and retirement income—and that each has different characteristics, risks, and implications for financial stability.
- Occupational choice and earning potential are influenced by education, skills, experience, and external factors such as economic conditions, technology, and labor market trends.
- Total compensation includes more than wages or salary, as employee benefits and payroll deductions significantly affect take-home pay and long-term financial well-being.
- Planning for income across the lifespan—including employment income and retirement income—is essential for meeting financial goals and adapting to changing personal and economic circumstances.

Knowledge:

Students will know...

- Vocabulary:
- Sources of Income (Earned, Portfolio, Passive and Unearned)
- Salary
- Wages
- Bonus
- Commission
- Tips
- Employee
- Independent Contractor
- Business Owner
- Retirement Income
- Social Security
- Defined Contribution Plan (401K, 403B)
- IRA
- Benefits
- Total Compensation
- Payroll Deductions
- Mandatory vs. Voluntary Deductions

Skills:

- Students will be able to define and differentiate between earned, unearned, passive, and active income.
- Students will be able to provide examples of each type of income in real-life scenarios.
- Students will be able to identify common sources of income such as employment, rentals, investments, and government programs.

- Students will be able to explain how different sources of income contribute to financial stability.
- Students will be able to describe various retirement income options, including individual investments, employer-sponsored plans, and government programs.
- Students will be able to compare the benefits and limitations of different retirement income sources.
- Students will be able to analyze how education and training impact earning potential.
- Students will be able to research career paths and the education required to achieve targeted income levels.
- Students will be able to identify common employee benefits such as health insurance, retirement plans, and education reimbursement programs.
- Students will be able to explain how employee benefits affect overall compensation and financial planning.
- Students will be able to interpret a sample pay stub to identify taxes and payroll deductions.
- Students will be able to explain the purpose of federal, state, and local taxes and how they impact net income.

Standards:

Priority:

- 17.2.9-12.A Explain various types of income (e.g. earned, unearned, passive, active) and their sources (e.g. work, rentals, investments, government programs)
- 17.2.9-12.F Explain the impact of employee benefits (e.g. health insurance, retirement savings plans, education reimbursement programs) on an individual's finances
- 17.2.9-12. H Calculate the impact of taxes and payroll deductions on income

Supporting:

- 17.2.9-12.B Describe sources of retirement income and how they relate to individual investment choices, employer-sponsored retirement plans and government programs.
- 17.2.9-12.C Use data to support an individual's decision to obtain or forgo post-secondary education based on the associated costs and anticipated future income.
- 17.2.9-12.D Research options to pay for education and training, ways to reduce the total cost, and steps needed to obtain financial aid.
- 17.2.9-12.E Evaluate the impacts of technology, labor markets, and economic conditions and trends on a person's employment potential.
- 17.2.9-12.G Analyze the financial impact of a person's decision to own a business, work as an independent contractor, or be employed.
- 17.2.9-12.I Complete various federal, state, and local tax forms.

Acceptable Evidence:

Acceptable evidence of learning:

Formative Assessment

- Net Pay Calculation Activity
- Employee Benefits Package Activity
- Fine Print Payscale Activity

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar

- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Title of Course Here

Unit 3 – Spending

Desired Results:

Essential Questions:

- What factors should be considered to make informed and responsible spending decisions?
- How do taxes, payment methods, and fees influence the true cost of purchases?
- Why are budgeting, record keeping, and bill paying critical for financial stability?
- How do major purchases like housing and transportation affect long-term financial planning?
- How can spending choices—including charitable giving—reflect personal values and priorities?

Enduring Understandings:

Students will understand that...

- informed spending decisions require evaluating needs and wants, comparing alternatives, considering taxes and total cost of ownership, and using tools to obtain the best value.
- effective money management depends on accurate record keeping, timely bill paying, and the strategic use of payment methods, each of which impacts financial stability and creditworthiness.
- budgeting is a flexible process that helps individuals manage fixed and variable expenses, plan for major purchases such as vehicles and housing, and adjust spending to meet financial goals.
- spending choices—including charitable giving—reflect personal values and priorities and can balance immediate satisfaction with long-term financial well-being and social responsibility.

Knowledge:

Students will know...

- Vocabulary:
- Informed Spending
- Reliability of Information
- Peer Influence and Marketing
- Sales Tax
- Excise Tax
- Expenses (fixed, variable, discretionary, unexpected)
- Emergency Fund
- Payment Methods
- Buy Now Pay Later (BNPL)
- Total Cost of Ownership
- Depreciation
- Mortgage
- Lease

Skills:

- Students will identify and evaluate factors that influence spending decisions, including product features, price, durability, environmental and societal impact, and reliability of information.
- Students will demonstrate strategies to reduce costs on purchases, such as using online tools, shopping at discount retailers, negotiating prices, and considering secondhand items.
- Students will create and maintain accurate financial records to track income, expenses, and savings.
- Students will compare and apply different budgeting approaches (e.g., 50-30-20 rule, zero-based budgeting) and use various methods (e.g., envelope system, spreadsheets, online tools) to manage personal finances.
- Students will differentiate between fixed and variable expenses and explain their impact on a personal budget.

- Students will identify and evaluate various payment methods (cash, debit, credit, electronic payments) and their advantages and disadvantages.
- Students will describe bill payment options and guidelines to ensure timely and accurate payments.
- Students will compare renting and buying housing options, including upfront and ongoing costs, and explain mortgage and lease terms.
- Students will analyze the differences between purchasing and leasing a vehicle, considering total cost of ownership.
- Students will identify and explain common taxes (sales, excise, property) and their impact on personal finances.

Standards:

Priority:

- 17.3.9-12.A Develop a process for making informed spending decisions, including factors to consider (e.g. product features, price, durability, environmental or societal impact, reliability of information)
- 17.3.9-12.E Create a personal budget to allocate current or future income, including estimates for fixed and variable expenses
- 17.3.9-12.J Analyze a housing decision, including comparing and renting and buying, upfront and ongoing costs, and the process of obtaining a mortgage or a lease
- 17.3.9-12.K Justify the purchase or lease of a vehicle and the alternatives considered (e.g. new versus used, total cost of ownership or use)

Supporting:

- 17.3.9-12.B Compare ways people can lower the price they pay for goods and services (e.g. online tools, discount retailers, negotiating, secondhand items)
- 17.3.9-12.C Develop a personal approach to keeping track of income and spending
- 17.3.9-12.D Evaluate various budgeting approaches (e.g. 50-30-20, zero-based) and methods (e.g. envelope system, spreadsheets, online tools)
- 17.3.9-12.F Identify methods for adjusting a budget for unexpected expenses or loss of income
- 17.3.9-12.G Compare the effects of using various payment methods when making purchases
- 17.3.9-12.H Compare various approaches to paying bills, including making automated payments and ensuring bills are paid on time
- 17.3.9-12.I Describe the impact of technology on payment methods and how it influences spending
- 17.3.9-12.L Analyze the impact of paying sales, excise, and property taxes on financial decisions
- 17.3.9-12.M Justify a decision to participate in or forgo a fundraising effort based on the organization and cause

Acceptable Evidence:

Acceptable evidence of learning:

Formative Assessment

- Organizing Budget Expenses Activity

Summative Assessment

- Salary Based Budgeting Activity (Excel Document)

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

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- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Title of Course Here
Unit 4 – Saving and Investing

Desired Results:

Essential Questions:

- How do saving and investing contribute to building net worth and achieving financial goals?
- What factors should individuals consider when choosing among savings and investment vehicles?
- How do risk, diversification, and benchmark indices influence investment performance?
- How do retirement accounts support long-term financial security?
- How can recognizing and overcoming behavioral biases improve saving and investing outcomes?

Enduring Understandings:

Students will understand that...

- building net worth depends on purposeful saving and investing decisions that align with personal financial goals and adapt over time.
- different savings and investment vehicles—including retirement accounts—carry varying levels of risk, return, liquidity, and restrictions that affect how and when funds can be used.
- investing involves balancing risk and reward through strategies such as diversification, the use of benchmark indices, and appropriate trading methods to support long-term financial growth.
- behavioral biases can influence saving and investing decisions, and that recognizing and managing these biases is essential for making consistent, informed, and goal-oriented financial choices.

Knowledge:

Students will know...

- Vocabulary:
- Net Worth
- Asset
- Liability
- Liquidity
- Safety
- Yield
- Simple Interest
- Compound Interest
- Annual Percentage Yield (APY)
- Automated Savings
- Investing
- Inflation
- Diversification
- Time Horizon
- Stocks
- Bonds
- Mutual Funds
- Exchange Traded Funds (ETFs)

Skills:

- Students will identify and evaluate factors that influence spending decisions, including product features, price, durability, environmental and societal impact, and reliability of information.
- Students will demonstrate strategies to reduce costs on purchases, such as using online tools, shopping at discount retailers, negotiating prices, and considering secondhand items.

- Students will create and maintain accurate financial records to track income, expenses, and savings.
- Students will compare and apply different budgeting approaches (e.g., 50-30-20 rule, zero-based budgeting) and use various methods (e.g., envelope system, spreadsheets, online tools) to manage personal finances.
- Students will differentiate between fixed and variable expenses and explain their impact on a personal budget.
- Students will identify and evaluate various payment methods (cash, debit, credit, electronic payments) and their advantages and disadvantages.
- Students will describe bill payment options and guidelines to ensure timely and accurate payments.
- Students will compare renting and buying housing options, including upfront and ongoing costs, and explain mortgage and lease terms.
- Students will analyze the differences between purchasing and leasing a vehicle, considering total cost of ownership.
- Students will identify and explain common taxes (sales, excise, property) and their impact on personal finances.

Standards:

Priority:

- 17.4.9-12.B Develop a savings plan for accomplishing personal short- and long-term financial goals
- 17.4.9-12.F Describe factors to consider when selecting sources of investment advice and trading methods (e.g. online trading platforms, financial advisors, robo advisors)

Supporting:

- 17.4.9-12.A Calculate a person's net worth given their assets and liabilities
- 17.4.9-12.C Compare the features of various savings vehicles (e.g. savings accounts, certificates of deposit, money market accounts) and the interest rates offered by several institutions
- 17.4.9-12.D Explain factors that contribute to rates of return for various investments, including risk inflation and taxes
- 17.4.9-12.E Explain the similarities and differences between stocks, bonds, mutual funds, and exchange-traded funds and the factors that influence price fluctuations for each
- 17.4.9-12.G Explain how popular benchmark indices are used
- 17.4.9-12.H Recommend an investment portfolio diversified to meet specific goals, including purpose, starting age, time horizon, and tolerance for risk
- 17.4.9-12.I Compare retirement-specific investment options, including employer-sponsored plans, Roth and traditional individual retirement accounts, and accounts available to people who are self-employed
- 17.4.9-12.J Analyze personal attitudes towards risk and how these might impact future investment decisions and outcomes
- 17.4.9-12.K Describe methods to avoid or counteract the potentially negative impacts of behavioral biases (e.g. loss aversion, herding, choice overload) on investment decisions

Acceptable Evidence:

Acceptable evidence of learning:

Formative Assessment

- Compare Retirement Accounts Activity
- Risk Tolerance Quiz

Summative Assessment

- Savings Jigsaw Activity

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking

- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Unit 5 – Risk and Insurance

Desired Results:

Essential Questions:

- What types of financial risks do individuals face related to income, health, property, and liability?
- How does insurance help manage financial risk, and what tradeoffs exist among coverage, cost, and out-of-pocket expenses?
- How do insurance terms and the claims process affect consumer protection and financial recovery?
- Why is understanding fraud and risk management essential for financial security?
- How can individuals evaluate insurance options to align with their needs and financial goals?

Enduring Understandings:

Students will understand that...

- individuals face financial risks related to income, property, health, and liability, and that insurance is a key strategy for managing and reducing the financial impact of these risks.
- insurance products involve tradeoffs among coverage, premiums, deductibles, and other out-of-pocket costs that affect both short-term affordability and long-term financial security.
- understanding insurance terms, coverage options, and the claims process enables consumers to make informed decisions and effectively protect themselves when unexpected events occur.
- awareness of financial fraud and risk-management practices is essential for safeguarding personal resources and maintaining financial stability.

Knowledge:

Students will know...

- Vocabulary:
- Risk
- Insurance
- Insurer
- Proof of Insurance
- Premium
- Deductible
- Copayment
- Coinsurance
- Claim
- Risk (Income, Property, Liability)
- Insurance Types (Disability, Life, Unemployment, Health)
- Financial Fraud

Skills:

- Students will identify and explain different types of financial risk, including loss of personal property, income reduction, and liability.
- Students will analyze scenarios to determine potential financial risks and propose strategies to minimize them.
- Students will describe the purpose and benefits of various types of insurance (automotive, homeowners, renters, health, life, disability).
- Students will compare and contrast different insurance types to determine which best fits specific personal or family needs.
- Students will interpret insurance policy components, including out-of-pocket costs, minimum coverage requirements, and proof of insurance.

- Students will demonstrate the process of filing an insurance claim and explain common challenges.
- Students will differentiate between public insurance programs, such as Medicare, Medicaid, and unemployment insurance.
- Students will evaluate eligibility requirements and benefits of public insurance programs.
- Students will define financial fraud and identify common examples (identity theft, phishing, etc.).
- Students will develop strategies to protect personal information and prevent financial fraud.

Standards:

Priority:

- 17.5.9-12.A Evaluate a person's potential for financial risk (e.g. loss of personal property, reduction in income, liability)
- 17.5.9-12.B Critique approaches to avoiding, reducing, retaining, and transferring risk given a particular scenario
- 17.5.9-12.H Analyze trends in financial fraud and strategies to avoid becoming a victim

Supporting:

- 17.5.9-12.C Formulate insurance recommendations based on individual needs, situations, and preferences, including but not limited to automotive, homeowners, renters, health, life and disability, as justified
- 17.5.9-12.D Use information from various sources to compare insurance providers, plans and prices
- 17.5.9-12.E Formulate a process of comparing insurance products, determining out-of-pocket costs, and filing claims
- 17.5.9-12.F Describe circumstances in which a person may be required to show proof of insurance or obtain a minimum amount of coverage
- 17.5.9-12.G Evaluate the impact of public insurance programs for individuals facing financial hardship (e.g. Medicare, Medicaid, and unemployment)
- 17.5.9-12.I Research the agencies individuals can contact and steps they can take to address financial fraud and scams, including identity theft

Acceptable Evidence:

Acceptable evidence of learning:

Formative Assessment

- Compare Types of Health Insurance Activity

Summative Assessment

- Insurance Project

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers, etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Title of Course Here
Unit 6 – Credit

Desired Results:

Essential Questions:

- How does credit expand financial opportunities, and what responsibilities come with its use?
- What factors influence credit reports and credit scores, and why do they matter?
- How do the costs of credit—such as interest and fees—impact long-term financial health?
- How do different forms of credit and loan types affect borrowing decisions and debt management?
- How do credit laws and consumer protections help individuals use credit responsibly?

Enduring Understandings:

Students will understand that...

- Credit allows individuals to access goods, services, and opportunities before full payment is available, but it involves responsibilities, costs, and long-term financial implications.
- Creditworthiness is determined by information in credit reports and reflected in credit scores, which influence access to credit, borrowing costs, and financial opportunities.
- Different forms of credit and loan types—along with alternative financial service providers—carry varying terms, risks, and costs that affect debt management and financial stability.
- Responsible use of credit includes understanding credit laws, managing debt effectively, and making informed borrowing decisions to support long-term financial goals.

Knowledge:

Students will know...

- Vocabulary:
- Credit
- Debt
- Character
- Capacity
- Collateral
- Credit Report
- Credit Score
- Credit History
- Hard Inquiry
- Minimum Payment
- Credit (Revolving, Installment, Secured, Unsecured)
- Mortgage Loan
- Down Payment
- Truth in Lending Act

Skills:

- Students will be able to explain the factors lenders consider when granting credit (character, capacity, capital, collateral) and describe how each impacts creditworthiness.
- Students will be able to interpret a credit report and explain the components of a credit score, including how scores are calculated and why they matter.
- Students will be able to differentiate among various forms of credit, including: Secured vs. unsecured loans; Installment vs. revolving credit; Service credit
- Students will be able to analyze different types of loans, such as college loans and mortgages, and compare their terms and long-term financial impact.

- Students will be able to calculate the cost of credit, including minimum payments, interest, fees, and the role of alternative financial service providers.
- Students will be able to develop strategies for effective debt management, including budgeting, prioritizing payments, and avoiding excessive debt.
- Students will be able to summarize key credit laws and consumer protections, explaining how they safeguard borrowers and regulate lenders.

Standards:

Priority:

- 17.6.9-12.A Evaluate pathways to obtaining credit and what lenders look for in a borrower (e.g. character, capacity, capital, collateral)
- 17.6.9-12.B Describe how credit reports and scores are determined, used and improved

Supporting:

- 17.6.9-12.C Compare various forms of credit and how each is used (e.g. secured and unsecured loans, installment and revolving credit, service credit)
- 17.6.9-12.D Analyze the use of loans to finance higher education and home purchases, how they are obtained, and options for paying them back.
- 17.6.9-12.E Calculate the total cost of credit given a variety of situations (e.g. making minimum payments, paying fees, using alternative financial service providers)
- 17.6.9-12.F Describe the consequences of failing to repay debts and sources of debt management assistance
- 17.6.9-12.G – Evaluate various rights and laws related to credit and their impact on consumers

Acceptable Evidence:

Acceptable evidence of learning:

Formative Assessment

- Debt Avalanche vs. Debt Snowball Activity
- Compare Credit Cards Activity

Summative Assessment

- Credit Project

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation

- Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
- Choice Boards
- Scaffolding
- Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers, etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

CENTRAL BUCKS SCHOOL DISTRICT

Course of Study

Recommendation for Adoption

Course: Compass

Date: 09-03-2026

Student Level: Middle School

Grade Level: Grade 6, 7, 8

Characterization of Course of Study:

Compass is a course designed to equip middle school students with essential academic strategies that foster success both in school and beyond. Through engaging activities, students build essential competencies across three interconnected units. Academic skill building includes study strategies, strengthening executive functioning skills and emphasizing personal responsibility with a focus on Digital Citizenship. Social skill building covers collaboration, communication and problem solving. Personal skill building allows students to explore their own mindset and motivation as they prepare for future academic and career endeavors, including compiling career readiness artifacts in alignment with Pennsylvania middle school requirements.

Reasons for Proposed Adoption:

There are specific skills with the Academic, Personal and Social realms that have been identified as essential to the future success of all of our middle school students. A course specifically designed to provide students with tools that enhance these skills and that foster and cultivate the development of new skills will benefit students not only within the school environment but also in their future in whatever environment they may encounter.

Principal Approval Date: _____

Curriculum Committee Approval Date: _____

School Board Approval Date: _____



Compass 6

Course Number: 9600

Course Level: Academic / Elective

Grade: 6

Time/Credit: 22 Periods /.25 Credit

Development Date: August 2025 - June 2026

School Board Approval: TBD

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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Central Bucks School District
Teaching and Learning Principles

1. Student-Centered & Active Learning

Students are active participants in their learning through reflection, discussion, and inquiry around real-life social, personal, and academic challenges. The seminar emphasizes student voice, choice, and ownership as students set goals and apply strategies to their daily lives.

2. Holistic Development

The seminar supports the development of the whole child by building social skills, emotional awareness, resilience, and academic habits. Students learn to understand themselves, work effectively with others, and make responsible decisions.

3. Comprehensive Literacy & Inquiry

Students develop literacy and inquiry skills by reading, discussing, and reflecting on topics related to learning strategies, digital citizenship, and personal growth. Instruction strengthens students' ability to ask questions, evaluate information, and communicate thoughtfully and ethically.

4. Supportive & Safe Learning Environment

The seminar classroom is a safe, inclusive space where students feel respected, supported, and encouraged to take personal and academic risks. Strong relationships, clear norms, and respectful dialogue promote emotional well-being and confidence.

5. Evidence-Based Instruction & MTSS

Seminar instruction uses evidence-based practices to support all learners and aligns with the district's MTSS framework. Lessons provide universal skill development while allowing for targeted support and enrichment based on student needs.

6. Future-Ready Focus

The seminar prepares students with essential life skills such as self-management, collaboration, critical thinking, and responsible digital behavior. Students engage in age-appropriate conversations about ethical technology use, building habits needed for future academic and personal success.

Central Bucks School District

Enduring Understandings

Students will understand that:

Social Skills

- Students will understand that effective collaboration requires listening, sharing responsibility, and respecting diverse perspectives in order to achieve common goals.
- Students will understand that clear and respectful communication strengthens relationships and helps prevent conflict in academic and social settings.
- Students will understand that problem-solving involves identifying challenges, considering multiple solutions, and reflecting on outcomes to improve future decisions.
- Students will understand that personal accountability plays a key role in building trust and credibility with peers and adults.

Academic Skills

- Students will understand that strong time-management skills help balance academic responsibilities, extracurricular activities, and personal well-being.
- Students will understand that planning ahead and setting realistic goals leads to greater academic success and reduced stress.
- Students will understand that memory and study strategies can be practiced and improved through intentional habits and reflection.
- Students will understand that organization and preparation contribute to confidence and effectiveness in school and everyday life.

Personal Skills

- Students will understand that professionalism includes responsibility, respect, preparedness, and appropriate behavior in learning communities.
- Students will understand that resilience allows individuals to learn from mistakes, adapt to challenges, and persist through difficulties.
- Students will understand that a growth mindset supports learning by viewing effort, feedback, and challenges as opportunities for improvement.
- Students will understand that motivation influences both effort and achievement, and can come from internal goals or external factors.
- Students will understand that intrinsic motivation fosters deeper engagement and long-term learning compared to motivation based solely on rewards or consequences.

- Students will understand that self-awareness helps individuals recognize their strengths, areas for growth, and learning preferences.
- Students will understand that developing personal, academic, and social skills builds a foundation for success in middle school, high school, and life beyond school.

Smart Futures

- Students will understand that exploring their interests, strengths, and skills helps them make informed choices about future careers and pathways.
- Students will understand that the academic, social, and personal skills they develop now are essential for success in future education, careers, and life.
- Students will understand that careers and workplaces are constantly changing, and being adaptable and open to learning prepares them for future opportunities.

Digital Citizenship

- Students will understand that exploring their interests, strengths, and skills helps them make informed choices about future careers and pathways.
- Students will understand that the academic, social, and personal skills they develop now are essential for success in future education, careers, and life.
- Students will understand that careers and workplaces are constantly changing, and being adaptable and open to learning prepares them for future opportunities.

Central Bucks School District

Essential Questions

Academic Skills

- How does the way I manage my time affect my stress level, learning, and success in school?
- What strategies help me remember and understand information instead of just memorizing it?
- How can setting goals and planning ahead help me stay organized and meet deadlines?
- What habits do successful students use when they struggle with difficult work?

Personal Skills

- What does it mean to act professionally in school now, and how does that prepare me for the future?
- How can mistakes help me learn and grow instead of making me give up?
- How does my mindset affect my motivation, effort, and confidence?
- What strategies help me stay motivated when something feels difficult or boring?

Social Skills

- What makes teamwork effective, and what role do I play when working in a group?
- How do strong communication skills help solve problems and build healthy relationships?
- How can I respectfully disagree or handle conflict without damaging relationships?
- Why is listening just as important as speaking when working with others?

Smart Futures

- How do my interests, strengths, and skills help shape my future career possibilities?
- Why is it important to explore different careers before high school and beyond?
- How can the skills I learn now help me succeed in future jobs that may not even exist yet?

Digital Citizenship

- What does it mean to be a responsible and respectful digital citizen?
- How can tools like AI to support learning, and when can they become a problem?
- How do I make ethical choices when using technology, social media, and artificial intelligence?

Central Bucks School District – Course of Study Compass 6

Course Overview

Desired Results

Course Description: Compass is a course designed to equip middle school students with essential academic strategies that foster success both in school and beyond. Through engaging activities, students build essential competencies across three interconnected units. Academic skill building includes study strategies, strengthening executive functioning skills and emphasizing personal responsibility with a focus on Digital Citizenship. Social skill building covers collaboration, communication and problem solving. Personal skill building allows students to explore their own mindset and motivation as they prepare for future academic and career endeavors, including compiling career readiness artifacts in alignment with Pennsylvania middle school requirements.

Prerequisite: N/A

Committee Members: Christie Besack, Jesse Breeden, Adam Controy, Casey Dannin, Haley Donohoe, Michael Greenbaum, Melissa Hallman, Rachel Moyer, Hillary Norris

Acceptable Evidence.

Teachers of this course will abide by the expectations set forth from the Teaching and Learning Team for summative and formative assessment practices as well as composition of the gradebook.

Common Assessments:

Time Tracker Scavenger Hunt (Academic Skills Unit)
Memory Recall Activity (Academic Skills Unit)
Planning: Utilizing a Calendar (Academic Skills Unit)
Professionalism in Digital Communications (Personal Skills Unit)
Resiliency in Practice (Personal Skills Unit)
Mindset and Motivation: Intrinsic vs. Extrinsic Motivation (Personal Skills Unit)
The Drawing Barrier (Social Skills Unit)
Stranded! (Social Skills Unit)
Punny Punchlines (Social Skills Unit)
Stack Attack (Social Skills Unit)
Breakout Edu (Social Skills Unit)
Assess Your Interests (Smart Futures)
Identify Your Work Values (Smart Futures)
Make Goals Happen (Smart Futures)
Discover Your Learning Styles (Smart Futures)
What are Online Harms (Digital Citizenship)
De-escalating Online Harm (Digital Citizenship)
Making Things Right Repairing Harms (Digital Citizenship)
Web of Responsibility (Digital Citizenship)
Understanding My Digital Footprint (Digital Citizenship)
Your Curated Self (Digital Citizenship)

Final Exam / Project: No

Course Grading:

10% formative (Compass Kickstart Activities)

90% summative (Unit Activities)

Pacing Guide

COURSE CONTENT	Days	
Compass Kickstarts		
Each class period includes a 5–10-minute Compass Kickstart. The kickstarts embed essential skills into each lesson such as study skills, technology, and executive functioning. Two note taking strategies (Cornell and Outline) will be embedded into Compass Kickstarts. Teachers will introduce these strategies at the beginning and halfway mark of the course. Students will use the strategy each day to compile notes on their daily Compass Kickstart. *Compass Kickstarts may be omitted in designated lessons due to activity time.	Every Day*	
Introduction		
Course Introduction		1
Unit 1 – Academic Skills		
Time Management	1	
Memory – Recall	1	
Planning	1	
Unit 2 – Personal Skills		
Professionalism Digital Communications	1	
Resiliency	1	
Mindset and Motivation	1	
Unit 3 – Social Skills		
Drawing Barrier (Communication)	1	
Survival Pack (Problem Solving)	1	
Punny Punchlines (Problem Solving, Communication)	1	
Stack Attack (Communication and Collaboration)	1	
Breakout Edu Escape Room (Problem Solving, Communication)	1	
Unit 4 – Smart Futures		
Assess Your Interests	1	
Identify Your Work Values	1	
Make Goals Happen	1	
Discover Your Learning Styles	1	
Unit 5 – Digital Citizenship		
What are Online Harms?	1	
De-Escalating Online Harm	1	
Making Things Right Repairing Harms	1	
Web of Responsibility	1	
Understanding My Digital Footprint	1	
Your Curated Self	1	
Course Wrap-up and Reflection	0.5	

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

- Microsoft Office and Windows
- Canvas
- Edge
- Outlook
- Canva
- Adobe Express
- Microsoft Apps (Sticky Notes, Whiteboard, Clock)

Central Bucks School District – Course of Study – Compass 6

Unit 1 – “Academic Skills”

Desired Results:

Essential Questions:

- How does the way I manage my time affect my stress level, learning, and success in school?
- What strategies help me remember and understand information instead of just memorizing it?
- How can setting goals and planning ahead help me stay organized and meet deadlines?
- What habits do successful students use when they struggle with difficult work?

Enduring Understandings:

- Students will understand that strong time-management skills help balance academic responsibilities, extracurricular activities, and personal well-being.
- Students will understand that planning ahead and setting realistic goals leads to greater academic success and reduced stress.
- Students will understand that memory and study strategies can be practiced and improved through intentional habits and reflection.
- Students will understand that organization and preparation contribute to confidence and effectiveness in school and everyday life.

Knowledge:

Students will know...

- Vocabulary:
 - Time Management
 - Memory
 - Recall
 - Planning
 - Optimum Work Environment
 - Ambient Sound
 - Bookmarking
 - Cornell Note Taking Strategy
 - Outline Note Taking Strategy

Skills:

Students will be able to...

- Plan and execute a task list scavenger hunt to maximize efficiency and time management skills
- Memorize a specific item using 3 different strategies and reflect on the effectiveness of each
- Create a study plan given different calendar events and items typical of a middle school students
- Utilize different note taking strategies and determine the best subject areas to apply these strategies within the academic environment

Standards:

Supporting:

Standard - 15.3.8.I

Distinguish between relevant and non-relevant information for note taking, questioning, or decision making.

Standard - 15.3.8.J

Identify barriers to active listening (e.g., environmental, peer, time, and cultural distractions).

Acceptable Evidence:

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Compass Kickstart Activities:

- Notetaking Abbreviations
- Workplace Environment (e.g. ambient sound, baroque music)
- Canvas communication (e.g. comments)

Summative Assessment

- Time Tracker Scavenger Hunt
- Memory – Recall Activity
- Study Plan Calendar Activity

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools that are individually tailored to each student.

- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 6

Unit 2 – “Personal Skills”

Desired Results:

Essential Questions:

- What does it mean to act professionally in school now, and how does that prepare me for the future?
- How can mistakes help me learn and grow instead of making me give up?
- How does my mindset affect my motivation, effort, and confidence?
- What strategies help me stay motivated when something feels difficult or boring?

Enduring Understandings:

- Students will understand that professionalism includes responsibility, respect, preparedness, and appropriate behavior in learning communities.
- Students will understand that resilience allows individuals to learn from mistakes, adapt to challenges, and persist through difficulties.
- Students will understand that a growth mindset supports learning by viewing effort, feedback, and challenges as opportunities for improvement.
- Students will understand that motivation influences both effort and achievement, and can come from internal goals or external factors.
- Students will understand that intrinsic motivation fosters deeper engagement and long-term learning compared to motivation based solely on rewards or consequences.
- Students will understand that self-awareness helps individuals recognize their strengths, areas for growth, and learning preferences.
- Students will understand that developing personal, academic, and social skills builds a foundation for success in middle school, high school, and life beyond school.

Knowledge:

Students will know...

- Vocabulary:
 - Professionalism
 - Resiliency
 - Mindset
 - Intrinsic Motivation
 - Extrinsic Motivation
 - Self-Advocacy
 - Box Breathing

Skills:

Students will be able to...

- Distinguish between casual texting language and professional email communication
- Students will be able to work through the main steps of resiliency and apply them to different typical middle school scenarios
- Students will be able to create a self-motivation toolkit for a task that they identify as something they do not like

Standards:

Priority:

Standard - 13.2.6-8.A

Apply critical thinking to solve real-life problems.

Standard – 13.2.6-8.B

Develop formal communication that demonstrates professional etiquette and observes social protocols when communicating verbally, nonverbally, and in writing.

Acceptable Evidence:

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Compass Kickstart Activities:

- Outlook and professional digital communication
- Etiquette and Citizenship (workspace, self-advocacy)
- Mental Health (box breathing, journaling, clock app, adobe express coloring mode)

Summative Assessment

- Professional Communication (texting vs. emailing)
- Resiliency Activity
- Mindset and Motivation Activity (self-motivation toolkit)

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools that are individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 6

Unit 3 – “Social Skills”

Desired Results:

Essential Questions:

- What makes teamwork effective, and what role do I play when working in a group?
- How do strong communication skills help solve problems and build healthy relationships?
- How can I respectfully disagree or handle conflict without damaging relationships?
- Why is listening just as important as speaking when working with others?

Enduring Understandings:

- Students will understand that effective collaboration requires listening, sharing responsibility, and respecting diverse perspectives in order to achieve common goals.
- Students will understand that clear and respectful communication strengthens relationships and helps prevent conflict in academic and social settings.
- Students will understand that problem-solving involves identifying challenges, considering multiple solutions, and reflecting on outcomes to improve future decisions.
- Students will understand that personal accountability plays a key role in building trust and credibility with peers and adults.

Knowledge:

Students will know...

- Vocabulary:
 - Collaboration
 - Interpersonal Relationships
 - Self-Awareness
 - Etiquette
 - Respect
 - Perspective
 - Empathy
 - Conflict Resolution
 - Boundaries
 - Cues
 - Norms
 - Self-Regulation

Skills:

Students will be able to...

- demonstrate active listening and clear communication by asking clarifying questions, paraphrasing, and expressing ideas respectfully.
- adapt verbal and non-verbal behaviors (tone, body language, facial expressions, and personal space) to fit diverse academic and social situations.
- practice positive etiquette when collaborating with peers both in person and in online environments.
- collaborate effectively in team settings by fulfilling assigned roles, sharing responsibility, and valuing diverse peer perspectives.
- resolve conflicts constructively by identifying root issues, expressing respectful disagreement, and negotiating mutually agreeable solutions.

- apply self-regulation and personal accountability by recognizing personal triggers, managing emotional responses, and reflecting on individual actions to build trust.

Standards:

Priority:

Standard - 15.3.8.X

Demonstrate effective techniques for good communication.

Supporting:

Standard - 15.3.8.K

Determine the situational appropriateness of verbal and non-verbal behaviors.

Standard - 15.3.8.M

Demonstrate proper etiquette when networking either face-to-face or online.

Acceptable Evidence:

Formative Assessment

Compass Kickstart Activities

- Sharing in Microsoft
- Outlook Reactions
- Maintaining Physical Workspace
- Maintaining Digital Workspace
- Self-Advocacy in a Respectful Manner

Summative Assessment

- Drawing Barrier Activity
- Survival Pack Activity
- Punny Punchlines Activity
- Stack Attack Activity
- Breakout Edu Activity

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards

- Scaffolding
- Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools that are individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers, etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 6

Unit 4 – “Smart Futures”

Desired Results:

Essential Questions:

- How do my personal interests, abilities, and work values help me identify fulfilling career paths?
- How does understanding my primary learning style help me succeed in school and prepare for the workplace?
- How can setting S.M.A.R.T. goals and managing my time effectively help me achieve my academic and future career aspirations?

Enduring Understandings:

- Aligning personal interests, abilities, and core work values is essential for making informed career choices and achieving long-term job satisfaction.
- Recognizing your unique learning style allows you to apply targeted study strategies to improve academic performance and adapt to workplace tasks.
- Setting structured S.M.A.R.T. goals, managing time, and reflecting on progress build self-management habits necessary for reaching personal and professional milestones.

Knowledge:

Students will know...

- Vocabulary:
 - Learning Styles (Visual, Auditory, Kinesthetic)
 - Study Strategies
 - Personal Interests (Holland Codes)
 - Abilities & Aptitudes
 - Work Values
 - Workplace Preferences / Environment
 - S.M.A.R.T. Goals (Specific, Measurable, Achievable, Relevant, Time-bound)
 - Time & Project Management

Skills:

Students will be able to...

- Identify personal learning styles and apply corresponding study and learning strategies to improve academic success and task completion.
- Assess personal interests and abilities using self-inventory tools to discover matching career clusters and occupations.
- Evaluate core workplace values by prioritizing job conditions and analyzing how value alignment influences career choice and satisfaction.
- Research and compare potential careers that align with individual strengths, interests, and work values using digital exploration resources.
- Construct actionable S.M.A.R.T. goals with clear timelines and steps to guide personal, academic, and future career growth.
- Apply time management and self-reflection techniques to track goal progress, evaluate setbacks, and adjust action plans.

Standards:

Priority:

Standard – 13.3.6-8.C

Practice feedback and personal reflection to evaluate success towards setting and completing goals.

Standard – 13.4.6-8.B

Relate careers to personal interests, abilities, and aptitudes.

Standard – 13.4.6-8.C

Evaluate a variety of methods to research careers that align with personal interests, values, strengths, and career goals.

Supporting:

Standard – 13.2.6-8.E

Demonstrate effective time and project management strategies.

Standard – 13.3.6 – 8.B

Explain how decisions regarding education, skill building, and work impact other major life decisions.

Standard – 13.4.6-8.D

Evaluate a variety of methods to research careers that align with personal interests, values, strengths, and career goals.

Acceptable Evidence:

Smart Futures Performance Tasks –

Assess Your Interests

Identify Your Work Values

Make Goals Happen

Discover Your Learning Styles

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities

- Career Exploration Options

For Language Development:

- Using Microsoft translation tools that are individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 6

Unit 5 – “Digital Citizenship”

Desired Results:

Essential Questions:

- What does it mean to be a responsible and respectful digital citizen?
- How can tools like AI support learning, and when can they become a problem?
- How do I make ethical choices when using technology, social media, and artificial intelligence?

Enduring Understandings:

- Students will understand that exploring their interests, strengths, and skills helps them make informed choices about future careers and pathways.
- Students will understand that the academic, social, and personal skills they develop now are essential for success in future education, careers, and life.
- Students will understand that careers and workplaces are constantly changing and being adaptable and open to learning prepares them for future opportunities.

Knowledge:

Students will know...

- Vocabulary:
 - Netiquette
 - AI
 - Digital Footprint
 - Privacy
 - Phishing
 - Biometrics
 - Cyberbullying
 - Exclusion
 - Credible

Skills:

Students will be able to...

- Explain the basic structure of how AI works and functions
- Understand how AI is trained and use this information to prompt for more effective results
- Outline best practices for maintaining their active digital footprint in a professional manner
- List damaging online behaviors and strategies for avoiding digital drama

Standards:

Priority:

Standard - 15.4.8.A

Analyze the influence of emerging technologies on daily life.

Supporting:

Standard - 15.4.8.B

Interpret and apply appropriate social, legal, ethical, and safe behaviors of digital citizenship.

Standard - 15.4.8.L

Evaluate the accuracy and bias of online sources of information; appropriately cite online resources.

Standard - 15.3.8.T

Discuss the rules of digital citizenship.

Standard 13.2.6-8.D

Demonstrate proficient use of technologies by using various types of technology.

Acceptable Evidence:

Acceptable evidence of learning other than Performance Tasks:

Summative Assessment

Common Sense Media Activities

- What are Online Harms?
- De-escalating Online Harm
- Making Things Right Repairing Harms
- Web of Responsibility
- Understanding My Digital Footprint
- Your Curated Self

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools that are individually tailored to each student.

- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency



Compass 7

Course Number: 9700

Course Level: Academic / Elective

Grade: 7

Time/Credit: 0.5 / 45 instructional days

Development Date: August 2025 - June 2026

School Board Approval: TBD

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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Central Bucks School District
Teaching and Learning Principles

1. Student-Centered & Active Learning

Students are active participants in their learning through reflection, discussion, and inquiry around real-life social, personal, and academic challenges. The seminar emphasizes student voice, choice, and ownership as students set goals and apply strategies to their daily lives.

2. Holistic Development

The seminar supports the development of the whole child by building social skills, emotional awareness, resilience, and academic habits. Students learn to understand themselves, work effectively with others, and make responsible decisions.

3. Comprehensive Literacy & Inquiry

Students develop literacy and inquiry skills by reading, discussing, and reflecting on topics related to learning strategies, digital citizenship, and personal growth. Instruction strengthens students' ability to ask questions, evaluate information, and communicate thoughtfully and ethically.

4. Supportive & Safe Learning Environment

The seminar classroom is a safe, inclusive space where students feel respected, supported, and encouraged to take personal and academic risks. Strong relationships, clear norms, and respectful dialogue promote emotional well-being and confidence.

5. Evidence-Based Instruction & MTSS

Seminar instruction uses evidence-based practices to support all learners and aligns with the district's MTSS framework. Lessons provide universal skill development while allowing for targeted support and enrichment based on student needs.

6. Future-Ready Focus

The seminar prepares students with essential life skills such as self-management, collaboration, critical thinking, and responsible digital behavior. Students engage in age-appropriate conversations about ethical technology use, building habits needed for future academic and personal success.

Central Bucks School District

Enduring Understandings

Students will understand that:

Social Skills

- Students will understand that effective collaboration requires listening, sharing responsibility, and respecting diverse perspectives in order to achieve common goals.
- Students will understand that clear and respectful communication strengthens relationships and helps prevent conflict in academic and social settings.
- Students will understand that problem-solving involves identifying challenges, considering multiple solutions, and reflecting on outcomes to improve future decisions.
- Students will understand that personal accountability plays a key role in building trust and credibility with peers and adults.

Academic Skills

- Students will understand that strong time-management skills help balance academic responsibilities, extracurricular activities, and personal well-being.
- Students will understand that planning ahead and setting realistic goals leads to greater academic success and reduced stress.
- Students will understand that memory and study strategies can be practiced and improved through intentional habits and reflection.
- Students will understand that organization and preparation contribute to confidence and effectiveness in school and everyday life.

Personal Skills

- Students will understand that professionalism includes responsibility, respect, preparedness, and appropriate behavior in learning communities.
- Students will understand that resilience allows individuals to learn from mistakes, adapt to challenges, and persist through difficulties.
- Students will understand that a growth mindset supports learning by viewing effort, feedback, and challenges as opportunities for improvement.
- Students will understand that motivation influences both effort and achievement, and can come from internal goals or external factors.
- Students will understand that intrinsic motivation fosters deeper engagement and long-term learning compared to motivation based solely on rewards or consequences.

- Students will understand that self-awareness helps individuals recognize their strengths, areas for growth, and learning preferences.
- Students will understand that developing personal, academic, and social skills builds a foundation for success in middle school, high school, and life beyond school.

Smart Futures

- Students will understand that exploring their interests, strengths, and skills helps them make informed choices about future careers and pathways.
- Students will understand that the academic, social, and personal skills they develop now are essential for success in future education, careers, and life.
- Students will understand that careers and workplaces are constantly changing, and being adaptable and open to learning prepares them for future opportunities.

Digital Citizenship

- Students will understand that exploring their interests, strengths, and skills helps them make informed choices about future careers and pathways.
- Students will understand that the academic, social, and personal skills they develop now are essential for success in future education, careers, and life.
- Students will understand that careers and workplaces are constantly changing, and being adaptable and open to learning prepares them for future opportunities.

Central Bucks School District

Essential Questions

Academic Skills

- How does the way I manage my time affect my stress level, learning, and success in school?
- What strategies help me remember and understand information instead of just memorizing it?
- How can setting goals and planning ahead help me stay organized and meet deadlines?
- What habits do successful students use when they struggle with difficult work?

Personal Skills

- What does it mean to act professionally in school now, and how does that prepare me for the future?
- How can mistakes help me learn and grow instead of making me give up?
- How does my mindset affect my motivation, effort, and confidence?
- What strategies help me stay motivated when something feels difficult or boring?

Social Skills

- What makes teamwork effective, and what role do I play when working in a group?
- How do strong communication skills help solve problems and build healthy relationships?
- How can I respectfully disagree or handle conflict without damaging relationships?
- Why is listening just as important as speaking when working with others?

Smart Futures

- How do my interests, strengths, and skills help shape my future career possibilities?
- Why is it important to explore different careers before high school and beyond?
- How can the skills I learn now help me succeed in future jobs that may not even exist yet?

Digital Citizenship

- What does it mean to be a responsible and respectful digital citizen?
- How can tools like AI support learning, and when can they become a problem?
- How do I make ethical choices when using technology, social media, and artificial intelligence?

Central Bucks School District – Course of Study Compass 7

Course Overview

Desired Results

Course Description: Compass is a course designed to equip middle school students with essential academic strategies that foster success both in school and beyond. Through engaging activities, students build essential competencies across three interconnected units. Academic skill building includes study strategies, strengthening executive functioning skills and emphasizing personal responsibility with a focus on Digital Citizenship. Social skill building covers collaboration, communication and problem solving. Personal skill building allows students to explore their own mindset and motivation as they prepare for future academic and career endeavors, including compiling career readiness artifacts in alignment with Pennsylvania middle school requirements.

Prerequisite: N/A

Committee Members: Christie Besack, Jesse Breeden, Adam Controy, Casey Dannin, Haley Donohoe, Michael Greenbaum, Melissa Hallman, Rachel Moyer, Hillary Norris

Acceptable Evidence.

Teachers of this course will abide by the expectations set forth from the Teaching and Learning Team for summative and formative assessment practices as well as composition of the gradebook.

Common Assessments:

Time Tracker Scavenger Hunt (Academic Skills Unit)
Memory Recall Activity (Academic Skills Unit)
Planning: Utilizing a Calendar (Academic Skills Unit)
Professionalism in Digital Communications (Personal Skills Unit)
Resiliency in Practice (Personal Skills Unit)
Mindset and Motivation: Intrinsic vs. Extrinsic Motivation (Personal Skills Unit)
The Drawing Barrier (Social Skills Unit)
Stranded! (Social Skills Unit)
Punny Punchlines (Social Skills Unit)
Stack Attack (Social Skills Unit)
Kent (Social Skills Unit)
Class Relay Race (Social Skills Unit)
Risk (Social Skills Unit)
Breakout Edu (Social Skills Unit)
Minecraft Edu (Social Skills Unit)
Promote Your Brand (Smart Futures)
Analyze Career Information (Smart Futures)
Investigate Career Clusters Happen (Smart Futures)
Study Successful Entrepreneurs (Smart Futures)
Keep Up With Technology (Smart Futures)
What are Online Harms (Digital Citizenship)

De-escalating Online Harm (Digital Citizenship)
Making Things Right Repairing Harms (Digital Citizenship)
Web of Responsibility (Digital Citizenship)
Understanding My Digital Footprint (Digital Citizenship)
Your Curated Self (Digital Citizenship)
Care to Share (Digital Citizenship)
Permission to Post (Digital Citizenship)
The Assumptions We Make (Digital Citizenship)
What is AI? (Digital Citizenship)
How is AI Trained? (Digital Citizenship)

Final Exam / Project: No

Course Grading:

10% formative (Compass Kickstart Activities)
90% summative (Unit Activities)

Pacing Guide

COURSE CONTENT	Days
Compass Kickstarts	
Each class period includes a 5–10-minute Compass Kickstart. The kickstarts embed essential skills into each lesson such as study skills, technology, and executive functioning.	Every Day*
Five note taking strategies (Cornell, Outline, Mind Mapping, Boxing / Chunking and Charting) will be embedded into Compass Kickstarts. Teachers will introduce these strategies throughout the course. Students will use the strategy each day to compile notes on their daily Compass Kickstart.	
*Compass Kickstarts may be omitted in designated lessons due to activity time.	
Introduction	
Course Introduction	1
Unit 1 – Academic Skills	
Time Management	1
Memory – Recall	1
Planning	1
Unit 2 – Personal Skills	
Professionalism Digital Communications	1
Resiliency	1
Mindset and Motivation	1
Unit 3 – Social Skills	
Drawing Barrier (Communication)	1
Survival Pack (Problem Solving)	1
Kent (Communication and Collaboration)	1
Class Relay Race (Collaboration)	1
Punny Punchlines (Problem Solving, Communication)	1
Stack Attack (Communication and Collaboration)	1
Risk (Communication, Collaboration & Problem Solving)	4
BreakoutEdu (Communication, Collaboration & Problem Solving)	1
Minecraft Edu	
Home Sweet Hmmm (Digital Citizenship)	2
Good Game (Digital Citizenship)	2
AI: Dig Deeper (AI)	5
Build Challenge: Accessibility Park (Communication, Problem Solving)	1
Unit 4 – Smart Futures	
Promote Your Brand	1
Analyze Career Information	1
Investigate Career Clusters	1
Study Successful Entrepreneurs	1
Keep Up With Technology	1
Unit 5 – Digital Citizenship	
What are Online Harms?	1
De-Escalating Online Harm	1

Making Things Right Repairing Harms	1
Web of Responsibility	1
Understanding My Digital Footprint	1
Your Curated Self	1
Care to Share	1
Permission to Post	1
The Assumptions We Make	1
What is AI?	1
How is AI Trained?	1
Course Wrap-up and Reflection	1

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

- Microsoft Office and Windows
- Canvas
- Edge
- Outlook
- Canva
- Adobe Express
- Microsoft Apps (Sticky Notes, Whiteboard, Clock)

Central Bucks School District – Course of Study – Compass 7

Unit 1 – “Academic Skills”

Desired Results:

Essential Questions:

- How does the way I manage my time affect my stress level, learning, and success in school?
- What strategies help me remember and understand information instead of just memorizing it?
- How can setting goals and planning ahead help me stay organized and meet deadlines?
- What habits do successful students use when they struggle with difficult work?

Enduring Understandings:

- Students will understand that strong time-management skills help balance academic responsibilities, extracurricular activities, and personal well-being.
- Students will understand that planning ahead and setting realistic goals leads to greater academic success and reduced stress.
- Students will understand that memory and study strategies can be practiced and improved through intentional habits and reflection.
- Students will understand that organization and preparation contribute to confidence and effectiveness in school and everyday life.

Knowledge:

Students will know...

- Vocabulary:
 - Time Management
 - Memory
 - Recall
 - Planning
 - Optimum Work Environment
 - Ambient Sound
 - Bookmarking
 - Cornell Note Taking Strategy
 - Outline Note Taking Strategy

Skills:

Students will be able to...

- Plan and execute a task list scavenger hunt to maximize efficiency and time management skills
- Memorize a specific item using 3 different strategies and reflect on the effectiveness of each
- Create a study plan given different calendar events and items typical of a middle school students
- Utilize different note taking strategies and determine the best subject areas to apply these strategies within the academic environment

Standards:

Supporting:

Standard - 15.3.8.I

Distinguish between relevant and non-relevant information for note taking, questioning, or decision making.

Standard - 15.3.8.J

Identify barriers to active listening (e.g., environmental, peer, time, and cultural distractions).

Acceptable Evidence:

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Compass Kickstart Activities:

- Notetaking Abbreviations
- Workplace Environment (e.g. ambient sound, baroque music)
- Canvas communication (e.g. comments)

Summative Assessment

- Time Tracker Scavenger Hunt
- Memory – Recall Activity
- Study Plan Calendar Activity

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools that are individually tailored to each student.

- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 7

Unit 2 – “Personal Skills”

Desired Results:

Essential Questions:

- What does it mean to act professionally in school now, and how does that prepare me for the future?
- How can mistakes help me learn and grow instead of making me give up?
- How does my mindset affect my motivation, effort, and confidence?
- What strategies help me stay motivated when something feels difficult or boring?

Enduring Understandings:

- Students will understand that professionalism includes responsibility, respect, preparedness, and appropriate behavior in learning communities.
- Students will understand that resilience allows individuals to learn from mistakes, adapt to challenges, and persist through difficulties.
- Students will understand that a growth mindset supports learning by viewing effort, feedback, and challenges as opportunities for improvement.
- Students will understand that motivation influences both effort and achievement, and can come from internal goals or external factors.
- Students will understand that intrinsic motivation fosters deeper engagement and long-term learning compared to motivation based solely on rewards or consequences.
- Students will understand that self-awareness helps individuals recognize their strengths, areas for growth, and learning preferences.
- Students will understand that developing personal, academic, and social skills builds a foundation for success in middle school, high school, and life beyond school.

Knowledge:

Students will know...

- Vocabulary:
 - Professionalism
 - Resiliency
 - Mindset
 - Intrinsic Motivation
 - Extrinsic Motivation
 - Self Advocacy
 - Box Breathing

Skills:

Students will be able to...

- Distinguish between casual texting language and professional email communication
- Students will be able to work through the main steps of resiliency and apply them to different typical middle school scenarios
- Students will be able to create a self motivation toolkit for a task that they identify as something they do not like

Standards:

Priority:

Standard - 13.2.6-8.A

Apply critical thinking to solve real-life problems.

Standard – 13.2.6-8.B

Develop formal communication that demonstrates professional etiquette and observes social protocols when communicating verbally, nonverbally, and in writing.

Acceptable Evidence:

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Compass Kickstart Activities:

- Outlook and professional digital communication
- Etiquette and Citizenship (workspace, self advocacy)
- Mental Health (box breathing, journaling, clock app, adobe express coloring mode)

Summative Assessment

- Professional Communication (texting vs. emailing)
- Resiliency Activity
- Mindset and Motivation Activity (self motivation toolkit)

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools that are individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 7

Unit 3 – “Social Skills”

Desired Results:

Essential Questions:

- What makes teamwork effective, and what role do I play when working in a group?
- How do strong communication skills help solve problems and build healthy relationships?
- How can I respectfully disagree or handle conflict without damaging relationships?
- Why is listening just as important as speaking when working with others?

Enduring Understandings:

- Students will understand that effective collaboration requires listening, sharing responsibility, and respecting diverse perspectives in order to achieve common goals.
- Students will understand that clear and respectful communication strengthens relationships and helps prevent conflict in academic and social settings.
- Students will understand that problem-solving involves identifying challenges, considering multiple solutions, and reflecting on outcomes to improve future decisions.
- Students will understand that personal accountability plays a key role in building trust and credibility with peers and adults.

Knowledge:

Students will know...

- Vocabulary:
 - Collaboration
 - Interpersonal Relationships
 - Self-Awareness
 - Etiquette
 - Respect
 - Perspective
 - Empathy
 - Conflict Resolution
 - Boundaries
 - Cues
 - Norms
 - Self-Regulation

Skills:

Students will be able to...

- demonstrate active listening and clear communication by asking clarifying questions, paraphrasing, and expressing ideas respectfully.
- adapt verbal and non-verbal behaviors (tone, body language, facial expressions, and personal space) to fit diverse academic and social situations.
- practice positive etiquette when collaborating with peers both in person and in online environments.
- collaborate effectively in team settings by fulfilling assigned roles, sharing responsibility, and valuing diverse peer perspectives.
- resolve conflicts constructively by identifying root issues, expressing respectful disagreement, and negotiating mutually agreeable solutions.

- apply self-regulation and personal accountability by recognizing personal triggers, managing emotional responses, and reflecting on individual actions to build trust.

Standards:

Priority:

Standard - 15.3.8.X

Demonstrate effective techniques for good communication.

Supporting:

Standard - 15.3.8.K

Determine the situational appropriateness of verbal and non-verbal behaviors.

Standard - 15.3.8.M

Demonstrate proper etiquette when networking either face-to-face or online.

Acceptable Evidence:

Formative Assessment

Compass Kickstart Activities

- Sharing in Microsoft
- Outlook Reactions
- Maintaining Physical Workspace
- Maintaining Digital Workspace
- Self Advocacy in a Respectful Manner

Summative Assessment

- Drawing Barrier Activity
- Survival Pack Activity
- Punny Punchlines Activity
- Stack Attack Activity
- Kent Activity
- Class Relay Race Activity
- Risk Activity
- Minecraft Edu Activity

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools that are individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers, etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 7

Unit 4 – “Smart Futures”

Desired Results:

Essential Questions:

- How do successful entrepreneurs use their mindset, work ethic, and branding to overcome challenges and create opportunities?
- How can using reliable digital career research tools help me make informed decisions about future career paths?
- How does understanding and showcasing my personal strengths help me build a positive brand as a future job candidate?

Enduring Understandings:

- Students will understand that adopting an entrepreneurial mindset, demonstrating a strong work ethic, and applying core branding principles are key drivers of career success across traditional and self-employment pathways.
- Students will understand that utilizing valid career research tools and labor market data allows them to analyze job requirements, availability, and future opportunities effectively.
- Students will understand that identifying personal strengths and communicating them clearly builds a positive personal brand and sets them apart as strong job candidates.

Knowledge:

Students will know...

- Vocabulary:
 - Entrepreneurship
 - Entrepreneurial Mindset
 - Work Ethic
 - Labor Market
 - Job Availability
 - Career Research Tools
 - Personal Brand
 - Self-Marketing

Skills:

Students will be able to...

- Analyze the characteristics, mindset, and work ethic of successful entrepreneurs to evaluate how these traits influence career opportunities and problem-solving in any profession.
- Compare and contrast entrepreneurship with traditional employment by examining the risks and rewards of both.
- Research and evaluate diverse career options across local, national, and global job markets using digital tools Smart Futures Career Super-Search.
- Analyze specific job postings and requirements to determine career fit, necessary qualifications, and post-secondary preparation pathways.
- Identify personal strengths and accomplishments through self-reflection to establish evidence for an authentic personal brand.
- Communicate and market personal strengths effectively for workplace scenarios and interviews while maintaining a positive digital and in-person footprint.

Standards:

Priority:

Standard – 13.1.6-8.B

Compare and contrast entrepreneurship and other self-employment opportunities to other employment types; evaluate how entrepreneurial character traits influence career opportunities in any type of job play a role in entrepreneurial branding.

Standard – 13.1.6-8.C

Compare and contrast multiple careers using a variety of career research resources.

Standard – 13.4.6-8.A

Identify ways to market yourself as a job candidate.

Supporting:

Standard – 13.1.6-8.D

Use multiple resources or tools to research the job availability in a local, national, and global job market.

Standard – 13.2.6-8.F

Explain how entrepreneurial Mindset characteristics and skills can help one be successful in their career.

Standard – 13.3.6 – 8.B

Explain how decisions regarding education, skill building, and work impact other major life decisions.

Standard – 13.3.6-8.D

Demonstrate a positive work ethic.

Acceptable Evidence:

Smart Futures Performance Tasks –

Promote Your Brand

Analyze Career Information

Investigate Career Clusters

Study Successful Entrepreneurs

Keep Up With Technology

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials

- Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools that are individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers, etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 7

Unit 5 – “Digital Citizenship”

Desired Results:

Essential Questions:

- What does it mean to be a responsible and respectful digital citizen?
- How can tools like AI support learning, and when can they become a problem?
- How do I make ethical choices when using technology, social media, and artificial intelligence?

Enduring Understandings:

- Students will understand that exploring their interests, strengths, and skills helps them make informed choices about future careers and pathways.
- Students will understand that the academic, social, and personal skills they develop now are essential for success in future education, careers, and life.
- Students will understand that careers and workplaces are constantly changing, and being adaptable and open to learning prepares them for future opportunities.

Knowledge:

Students will know...

- Vocabulary:
 - Netiquette
 - AI
 - Digital Footprint
 - Privacy
 - Phishing
 - Biometrics
 - Cyberbullying
 - Exclusion
 - Credible

Skills:

Students will be able to...

- Explain the basic structure of how AI works and functions
- Understand how AI is trained and use this information to prompt for more effective results
- Outline best practices for maintaining their active digital footprint in a professional manner
- List damaging online behaviors and strategies for avoiding digital drama

Standards:

Priority:

Standard - 15.4.8.A

Analyze the influence of emerging technologies on daily life.

Supporting:

Standard - 15.4.8.B

Interpret and apply appropriate social, legal, ethical, and safe behaviors of digital citizenship.

Standard - 15.4.8.L

Evaluate the accuracy and bias of online sources of information; appropriately cite online resources.

Standard - 15.3.8.T

Discuss the rules of digital citizenship.

Standard 13.2.6-8.D

Demonstrate proficient use of technologies by using various types of technology.

Acceptable Evidence:

Acceptable evidence of learning other than Performance Tasks:

Summative Assessment

Common Sense Media Activities

- What are Online Harms?
- De-escalating Online Harm
- Making Things Right Repairing Harms
- Web of Responsibility
- Understanding My Digital Footprint
- Your Curated Self
- Care to Share
- Permission to Post
- The Assumptions We Make
- What is AI?
- How is AI Trained?

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

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 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities

- Career Exploration Options

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- Modify assessments to focus on content knowledge rather than English Language proficiency



Compass 8

Course Number: 9800

Course Level: Academic / Elective

Grade: 8

Time/Credit: 0.5 / 45 instructional days

Development Date: August 2025 - June 2026

School Board Approval: TBD

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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Central Bucks School District
Teaching and Learning Principles

1. Student-Centered & Active Learning

Students are active participants in their learning through reflection, discussion, and inquiry around real-life social, personal, and academic challenges. The seminar emphasizes student voice, choice, and ownership as students set goals and apply strategies to their daily lives.

2. Holistic Development

The seminar supports the development of the whole child by building social skills, emotional awareness, resilience, and academic habits. Students learn to understand themselves, work effectively with others, and make responsible decisions.

3. Comprehensive Literacy & Inquiry

Students develop literacy and inquiry skills by reading, discussing, and reflecting on topics related to learning strategies, digital citizenship, and personal growth. Instruction strengthens students' ability to ask questions, evaluate information, and communicate thoughtfully and ethically.

4. Supportive & Safe Learning Environment

The seminar classroom is a safe, inclusive space where students feel respected, supported, and encouraged to take personal and academic risks. Strong relationships, clear norms, and respectful dialogue promote emotional well-being and confidence.

5. Evidence-Based Instruction & MTSS

Seminar instruction uses evidence-based practices to support all learners and aligns with the district's MTSS framework. Lessons provide universal skill development while allowing for targeted support and enrichment based on student needs.

6. Future-Ready Focus

The seminar prepares students with essential life skills such as self-management, collaboration, critical thinking, and responsible digital behavior. Students engage in age-appropriate conversations about ethical technology use, building habits needed for future academic and personal success.

Central Bucks School District

Enduring Understandings

Students will understand that:

Social Skills

- Students will understand that effective collaboration requires listening, sharing responsibility, and respecting diverse perspectives in order to achieve common goals.
- Students will understand that clear and respectful communication strengthens relationships and helps prevent conflict in academic and social settings.
- Students will understand that problem-solving involves identifying challenges, considering multiple solutions, and reflecting on outcomes to improve future decisions.
- Students will understand that personal accountability plays a key role in building trust and credibility with peers and adults.

Academic Skills

- Students will understand that strong time-management skills help balance academic responsibilities, extracurricular activities, and personal well-being.
- Students will understand that planning ahead and setting realistic goals leads to greater academic success and reduced stress.
- Students will understand that memory and study strategies can be practiced and improved through intentional habits and reflection.
- Students will understand that organization and preparation contribute to confidence and effectiveness in school and everyday life.

Personal Skills

- Students will understand that professionalism includes responsibility, respect, preparedness, and appropriate behavior in learning communities.
- Students will understand that resilience allows individuals to learn from mistakes, adapt to challenges, and persist through difficulties.
- Students will understand that a growth mindset supports learning by viewing effort, feedback, and challenges as opportunities for improvement.
- Students will understand that motivation influences both effort and achievement, and can come from internal goals or external factors.
- Students will understand that intrinsic motivation fosters deeper engagement and long-term learning compared to motivation based solely on rewards or consequences.

- Students will understand that self-awareness helps individuals recognize their strengths, areas for growth, and learning preferences.
- Students will understand that developing personal, academic, and social skills builds a foundation for success in middle school, high school, and life beyond school.

Smart Futures

- Students will understand that exploring their interests, strengths, and skills helps them make informed choices about future careers and pathways.
- Students will understand that the academic, social, and personal skills they develop now are essential for success in future education, careers, and life.
- Students will understand that careers and workplaces are constantly changing, and being adaptable and open to learning prepares them for future opportunities.

Digital Citizenship

- Students will understand that exploring their interests, strengths, and skills helps them make informed choices about future careers and pathways.
- Students will understand that the academic, social, and personal skills they develop now are essential for success in future education, careers, and life.
- Students will understand that careers and workplaces are constantly changing, and being adaptable and open to learning prepares them for future opportunities.

Central Bucks School District

Essential Questions

Academic Skills

- How does the way I manage my time affect my stress level, learning, and success in school?
- What strategies help me remember and understand information instead of just memorizing it?
- How can setting goals and planning ahead help me stay organized and meet deadlines?
- What habits do successful students use when they struggle with difficult work?

Personal Skills

- What does it mean to act professionally in school now, and how does that prepare me for the future?
- How can mistakes help me learn and grow instead of making me give up?
- How does my mindset affect my motivation, effort, and confidence?
- What strategies help me stay motivated when something feels difficult or boring?

Social Skills

- What makes teamwork effective, and what role do I play when working in a group?
- How do strong communication skills help solve problems and build healthy relationships?
- How can I respectfully disagree or handle conflict without damaging relationships?
- Why is listening just as important as speaking when working with others?

Smart Futures

- How do my interests, strengths, and skills help shape my future career possibilities?
- Why is it important to explore different careers before high school and beyond?
- How can the skills I learn now help me succeed in future jobs that may not even exist yet?

Digital Citizenship

- What does it mean to be a responsible and respectful digital citizen?
- How can tools like AI support learning, and when can they become a problem?
- How do I make ethical choices when using technology, social media, and artificial intelligence?

Central Bucks School District – Course of Study Compass 8

Course Overview

Desired Results

Course Description: Compass is a course designed to equip middle school students with essential academic strategies that foster success both in school and beyond. Through engaging activities, students build essential competencies across three interconnected units. Academic skill building includes study strategies, strengthening executive functioning skills and emphasizing personal responsibility with a focus on Digital Citizenship. Social skill building covers collaboration, communication and problem solving. Personal skill building allows students to explore their own mindset and motivation as they prepare for future academic and career endeavors, including compiling career readiness artifacts in alignment with Pennsylvania middle school requirements.

Prerequisite: N/A

Committee Members: Christie Besack, Jesse Breeden, Adam Controy, Casey Dannin, Haley Donohoe, Michael Greenbaum, Melissa Hallman, Rachel Moyer, Hillary Norris

Acceptable Evidence.

Teachers of this course will abide by the expectations set forth from the Teaching and Learning Team for summative and formative assessment practices as well as composition of the gradebook.

Common Assessments:

Time Tracker Scavenger Hunt (Academic Skills Unit)
Memory Recall Activity (Academic Skills Unit)
Planning: Utilizing a Calendar (Academic Skills Unit)
Professionalism in Digital Communications (Personal Skills Unit)
Resiliency in Practice (Personal Skills Unit)
Mindset and Motivation: Intrinsic vs. Extrinsic Motivation (Personal Skills Unit)
The Drawing Barrier (Social Skills Unit)
Stranded! (Social Skills Unit)
Punny Punchlines (Social Skills Unit)
Stack Attack (Social Skills Unit)
Class Relay Race (Social Skills Unit)
Kent (Social Skills Unit)
Minecraft Edu (Social Skills Unit)
Adapt to Workspace Changes (Smart Futures)
Gauge Your Skills and Abilities (Smart Futures)
Understand Work and Play (Smart Futures)
Resolve Workplace Conflicts (Smart Futures)
Explore Your Local CTC (Smart Futures)
What are Online Harms (Digital Citizenship)
De-escalating Online Harm (Digital Citizenship)
Making Things Right Repairing Harms (Digital Citizenship)

Web of Responsibility (Digital Citizenship)
Understanding My Digital Footprint (Digital Citizenship)
Your Curated Self (Digital Citizenship)
Care to Share (Digital Citizenship)
Permission to Post (Digital Citizenship)
The Assumptions We Make (Digital Citizenship)
Life in Public (Digital Citizenship)
What We See, What We Assume (Digital Citizenship)
Viral Posts & Online Responsibilities (Digital Citizenship)
What is AI?
How is AI Trained?
AI Chatbots: Who's Behind the Screen
AI Chatbots and Friendship

Final Exam / Project: No

Course Grading:

10% formative (Compass Kickstart Activities)
90% summative (Unit Activities)

Pacing Guide

COURSE CONTENT	Days	
Compass Kickstarts		
Each class period includes a 5–10-minute Compass Kickstart. The kickstarts embed essential skills into each lesson such as study skills, technology, and executive functioning. Two note taking strategies (Cornell and Outline) will be embedded into Compass Kickstarts. Teachers will introduce these strategies at the beginning and halfway mark of the course. Students will use the strategy each day to compile notes on their daily Compass Kickstart. *Compass Kickstarts may be omitted in designated lessons due to activity time.	Every Day*	
Introduction		
Course Introduction		1
Unit 1 – Academic Skills		
Time Management	1	
Memory – Recall	1	
Planning	1	
Unit 2 – Personal Skills		
Professionalism Digital Communications	1	
Resiliency	1	
Mindset and Motivation	1	
Unit 3 – Social Skills		
Drawing Barrier (Communication)	1	
Survival Pack (Problem Solving)	1	
Punny Punchlines (Problem Solving, Communication)	1	
Stack Attack (Communication and Collaboration)	1	
Kent (Communication and Collaboration)	1	
Class Relay Race (Collaboration)	1	
Minecraft Edu		
Home Sweet Hmmm (Digital Citizenship)	2	
Good Game (Digital Citizenship)	2	
AI: Dig Deeper (AI)	5	
Build Challenge: Accessibility Park (Communication, Problem Solving)	1	
Unit 4 – Smart Futures		
Adapt to Workplace Changes	1	
Gauge Your Skills and Abilities	1	
Understand Work and Pay	1	
Resolve Workplace Conflicts	1	
Explore Your Local CTC	1	
Unit 5 – Digital Citizenship		
What are Online Harms?	1	
De-Escalating Online Harm	1	
Making Things Right Repairing Harms	1	
Web of Responsibility	1	
Understanding My Digital Footprint	1	

Your Curated Self	1
Care to Share	1
Permission to Post	1
The Assumptions We Make	1
Life in Public	1
What We See, What We Assume	1
Viral Posts & Online Reputations	1
What is AI?	1
How is AI Trained?	1
AI Chatbots: Who's Behind The Screen	1
AI Chatbots and Friendship	1
Course Wrap-up and Reflection	1

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

- Microsoft Office and Windows
- Canvas
- Edge
- Outlook
- Canva
- Adobe Express
- Microsoft Apps (Sticky Notes, Whiteboard, Clock)

Central Bucks School District – Course of Study – Compass 8

Unit 1 – “Academic Skills”

Desired Results:

Essential Questions:

- How does the way I manage my time affect my stress level, learning, and success in school?
- What strategies help me remember and understand information instead of just memorizing it?
- How can setting goals and planning ahead help me stay organized and meet deadlines?
- What habits do successful students use when they struggle with difficult work?

Enduring Understandings:

- Students will understand that strong time-management skills help balance academic responsibilities, extracurricular activities, and personal well-being.
- Students will understand that planning ahead and setting realistic goals leads to greater academic success and reduced stress.
- Students will understand that memory and study strategies can be practiced and improved through intentional habits and reflection.
- Students will understand that organization and preparation contribute to confidence and effectiveness in school and everyday life.

Knowledge:

Students will know...

- Vocabulary:
 - Time Management
 - Memory
 - Recall
 - Planning
 - Optimum Work Environment
 - Ambient Sound
 - Bookmarking
 - Cornell Note Taking Strategy
 - Outline Note Taking Strategy

Skills:

Students will be able to...

- Plan and execute a task list scavenger hunt to maximize efficiency and time management skills
- Memorize a specific item using 3 different strategies and reflect on the effectiveness of each
- Create a study plan given different calendar events and items typical of a middle school students
- Utilize different note taking strategies and determine the best subject areas to apply these strategies within the academic environment

Standards:

Supporting:

Standard - 15.3.8.I

Distinguish between relevant and non-relevant information for note taking, questioning, or decision making.

Standard - 15.3.8.J

Identify barriers to active listening (e.g., environmental, peer, time, and cultural distractions).

Acceptable Evidence:

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Compass Kickstart Activities:

- Notetaking Abbreviations
- Workplace Environment (e.g. ambient sound, baroque music)
- Canvas communication (e.g. comments)

Summative Assessment

- Time Tracker Scavenger Hunt
- Memory – Recall Activity
- Study Plan Calendar Activity

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools individually tailored to each student.

- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 8

Unit 2 – “Personal Skills”

Desired Results:

Essential Questions:

- What does it mean to act professionally in school now, and how does that prepare me for the future?
- How can mistakes help me learn and grow instead of making me give up?
- How does my mindset affect my motivation, effort, and confidence?
- What strategies help me stay motivated when something feels difficult or boring?

Enduring Understandings:

- Students will understand that professionalism includes responsibility, respect, preparedness, and appropriate behavior in learning communities.
- Students will understand that resilience allows individuals to learn from mistakes, adapt to challenges, and persist through difficulties.
- Students will understand that a growth mindset supports learning by viewing effort, feedback, and challenges as opportunities for improvement.
- Students will understand that motivation influences both effort and achievement, and can come from internal goals or external factors.
- Students will understand that intrinsic motivation fosters deeper engagement and long-term learning compared to motivation based solely on rewards or consequences.
- Students will understand that self-awareness helps individuals recognize their strengths, areas for growth, and learning preferences.
- Students will understand that developing personal, academic, and social skills builds a foundation for success in middle school, high school, and life beyond school.

Knowledge:

Students will know...

- Vocabulary:
 - Professionalism
 - Resiliency
 - Mindset
 - Intrinsic Motivation
 - Extrinsic Motivation
 - Self Advocacy
 - Box Breathing

Skills:

Students will be able to...

- Distinguish between casual texting language and professional email communication
- Students will be able to work through the main steps of resiliency and apply them to different typical middle school scenarios
- Students will be able to create a self motivation toolkit for a task that they identify as something they do not like

Standards:

Priority:

Standard - 13.2.6-8.A

Apply critical thinking to solve real-life problems.

Standard – 13.2.6-8.B

Develop formal communication that demonstrates professional etiquette and observes social protocols when communicating verbally, nonverbally, and in writing.

Acceptable Evidence:

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

Compass Kickstart Activities:

- Outlook and professional digital communication
- Etiquette and Citizenship (workspace, self advocacy)
- Mental Health (box breathing, journaling, clock app, adobe express coloring mode)

Summative Assessment

- Professional Communication (texting vs. emailing)
- Resiliency Activity
- Mindset and Motivation Activity (self motivation toolkit)

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 8

Unit 3 – “Social Skills”

Desired Results:

Essential Questions:

- What makes teamwork effective, and what role do I play when working in a group?
- How do strong communication skills help solve problems and build healthy relationships?
- How can I respectfully disagree or handle conflict without damaging relationships?
- Why is listening just as important as speaking when working with others?

Enduring Understandings:

- Students will understand that effective collaboration requires listening, sharing responsibility, and respecting diverse perspectives in order to achieve common goals.
- Students will understand that clear and respectful communication strengthens relationships and helps prevent conflict in academic and social settings.
- Students will understand that problem-solving involves identifying challenges, considering multiple solutions, and reflecting on outcomes to improve future decisions.
- Students will understand that personal accountability plays a key role in building trust and credibility with peers and adults.

Knowledge:

Students will know...

- Vocabulary:
 - Collaboration
 - Interpersonal Relationships
 - Self-Awareness
 - Etiquette
 - Respect
 - Perspective
 - Empathy
 - Conflict Resolution
 - Boundaries
 - Cues
 - Norms
 - Self-Regulation

Skills:

Students will be able to...

- demonstrate active listening and clear communication by asking clarifying questions, paraphrasing, and expressing ideas respectfully.
- adapt verbal and non-verbal behaviors (tone, body language, facial expressions, and personal space) to fit diverse academic and social situations.
- practice positive etiquette when collaborating with peers both in person and in online environments.
- collaborate effectively in team settings by fulfilling assigned roles, sharing responsibility, and valuing diverse peer perspectives.
- resolve conflicts constructively by identifying root issues, expressing respectful disagreement, and negotiating mutually agreeable solutions.

- apply self-regulation and personal accountability by recognizing personal triggers, managing emotional responses, and reflecting on individual actions to build trust.

Standards:

Priority:

Standard - 15.3.8.X

Demonstrate effective techniques for good communication.

Supporting:

Standard - 15.3.8.K

Determine the situational appropriateness of verbal and non-verbal behaviors.

Standard - 15.3.8.M

Demonstrate proper etiquette when networking either face-to-face or online.

Acceptable Evidence:

Formative Assessment

Compass Kickstart Activities

- Sharing in Microsoft
- Outlook Reactions
- Maintaining Physical Workspace
- Maintaining Digital Workspace
- Self Advocacy in a Respectful Manner

Summative Assessment

- Drawing Barrier Activity
- Survival Pack Activity
- Punny Punchlines Activity
- Stack Attack Activity
- Kent Activity
- Class Relay Race Activity
- Minecraft Edu

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation

- Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
- Choice Boards
- Scaffolding
- Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers, etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 8

Unit 4 – “Smart Futures”

Desired Results:

Essential Questions:

- How do my knowledge, skills, and abilities influence my readiness for high school pathways and future careers?
- Why is adaptability essential when navigating a rapidly changing workplace shaped by technology and labor laws?
- How does understanding compensation, workplace conflict resolution, and Career and Technical Center (CTC) opportunities help me make informed transition decisions?

Enduring Understandings:

- Students will understand that assessing their knowledge, skills, and abilities connects school learning to future career requirements and high school readiness.
- Students will understand that ongoing changes including technological advancements and labor regulations continuously reshape workplace expectations, requiring personal adaptability and lifelong learning.
- Students will understand that navigating compensation structures, resolving workplace conflicts constructively, and exploring technical education options (CTC) are vital components of practical career preparation.

Knowledge:

Students will know...

- Vocabulary:
 - Knowledge, Skills, and Abilities
 - Workplace Automation & Emerging Technology
 - Labor Laws, Wages, & Compensation
 - Conflict Resolution Strategies
 - Career and Technical Center (CTC) Programs & Pathways
 - High School Transition Planning

Skills:

Students will be able to...

- Assess personal knowledge, skills, and abilities using self-reporting tools to evaluate career readiness and match them with suitable occupational fields.
- Analyze the impact of technology and labor regulations on the evolving modern workplace and identify how these factors influence career longevity and adaptability.
- Examine work compensation fundamentals, including wages, deductions, benefits, and labor law protections affecting worker safety and earnings.
- Apply constructive conflict resolution strategies to address workplace and interpersonal disagreements while maintaining professional relationships.
- Investigate local Career and Technical Center (CTC) offerings and evaluate how specialized training programs align with individual career goals.
- Formulate a high school transition and career plan integrating personal skill assessments, technical education interests, and academic pathways.

Standards:

Priority:

Standard – 13.1.6-8.A

Analyze the relationship of school subjects, extracurricular activities, and community experiences to career preparation.

Standard – 13.1.6-8.F

Understand what labor laws are and how they impact worker wages and safety.

Standard – 13.2.6-8.A

Apply critical thinking to solve real-life problems.

Standard – 13.4.6-8.B

Relate careers to personal interests, abilities, and aptitudes.

Supporting:

Standard – 13.1.6-8.E

Identify, participate in, and evaluate school and community-based opportunities for career awareness/preparation experiences.

Standard – 13.2.6-8.C

Practice effective group interactions, acknowledging people's different backgrounds, experiences, beliefs, and ideas.

Standard – 13.3.6-8.A

Identify factors that may inform decisions for career changes, such as loss of employment, lifestyle changes, workplace conflicts, work value changes, and job market changes.

Standard – 13.3.6 – 8.B

Explain how decisions regarding education, skill building, and work impact other major life decisions.

Standard – 13.4.6-8.C

Evaluate a variety of methods to research careers that align with personal interests, values, strengths, and career goals.

Standard – 13.4.6-8.D

Build a career plan to describe planned action steps (electives, coursework, career interests, training opportunities).

Acceptable Evidence:

Smart Futures Performance Tasks –

Adapt to Workplace Changes

Gauge Your Skills and Abilities

Understand Work and Pay

Resolve Workplace Conflicts

Explore Your Local CTC

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)

- Choice Boards
- Scaffolding
- Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials
 - Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools that are individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

Central Bucks School District – Course of Study – Compass 8

Unit 5 – “Digital Citizenship”

Desired Results:

Essential Questions:

- What does it mean to be a responsible and respectful digital citizen?
- How can tools like AI support learning, and when can they become a problem?
- How do I make ethical choices when using technology, social media, and artificial intelligence?

Enduring Understandings:

- Students will understand that exploring their interests, strengths, and skills helps them make informed choices about future careers and pathways.
- Students will understand that the academic, social, and personal skills they develop now are essential for success in future education, careers, and life.
- Students will understand that careers and workplaces are constantly changing, and being adaptable and open to learning prepares them for future opportunities.

Knowledge:

Students will know...

- Vocabulary:
 - Netiquette
 - AI
 - Digital Footprint
 - Privacy
 - Phishing
 - Biometrics
 - Cyberbullying
 - Exclusion
 - Credible

Skills:

Students will be able to...

- Explain the basic structure of how AI works and functions
- Understand how AI is trained and use this information to prompt for more effective results
- Outline best practices for maintaining their active digital footprint in a professional manner
- List damaging online behaviors and strategies for avoiding digital drama

Standards:

Priority:

Standard - 15.4.8.A

Analyze the influence of emerging technologies on daily life.

Supporting:

Standard - 15.4.8.B

Interpret and apply appropriate social, legal, ethical, and safe behaviors of digital citizenship.

Standard - 15.4.8.L

Evaluate the accuracy and bias of online sources of information; appropriately cite online resources.

Standard - 15.3.8.T

Discuss the rules of digital citizenship.

Standard 13.2.6-8.D

Demonstrate proficient use of technologies by using various types of technology.

Acceptable Evidence:

Acceptable evidence of learning other than Performance Tasks:

Summative Assessment

Common Sense Media Activities

- What are Online Harms?
- De-escalating Online Harm
- Making Things Right Repairing Harms
- Web of Responsibility
- Understanding My Digital Footprint
- Your Curated Self
- Care to Share
- Permission to Post
- The Assumptions We Make
- Life in Public
- What We See, What We Assume
- Viral Posts & Online Reputations
- What is AI?
- How is AI Trained?
- AI Chatbots: Who's Behind The Screen
- AI Chatbots and Friendship

Suggested Learning Experiences and Instruction

Learning Experiences:

- Discussion and Critical Thinking
- Experiential and Project – Based Learning
- Life Skills and Future Readiness
- Interactive and Creative Engagement

Instructional Strategies:

- Socratic Seminar
- Think-Pair-Share
- Text Annotation
- Sentence frames and starters
- Active listening and documentation
- Structured Reflection

Differentiation/Intervention/Enrichment Options:

- Differentiation
 - Flexible Small Group Sessions (Flexible Grouping, targeted support, seminar approach)
 - Choice Boards
 - Scaffolding
 - Multiple modalities (visual, auditory and kinesthetic)
- Intervention
 - Small Group Instruction
 - Tiered Assignments and Materials

- Executive Functioning Coaching
 - I & E
- Enrichment
 - Project-Based Learning
 - Extra-curricular clubs and activities
 - Career Exploration Options

For Language Development:

- Using Microsoft translation tools that are individually tailored to each student.
- Utilize visual supports (e.g. color coding, graphs, diagrams, closed captioning, graphic organizers,etc) when available and appropriate
- Foster collaborative peer support (e.g. increased student talk time, think-pair-share, strategic grouping, etc)
- Incorporate the use of structured language scaffolding (e.g. sentence starters, chunking information, pre-teaching vocabulary)
- Modify assessments to focus on content knowledge rather than English Language proficiency

CENTRAL BUCKS SCHOOL DISTRICT
Integrated Technology Course of Study
Recommendation for Adoption

Course: Integrated Technology 6

Date: 09-03-2026

Student Level: Middle School

Grade Level: Grade 6

Characterization of Course of Study:

Integrated Technology 6 is a foundational middle school course designed to help students develop essential digital literacy, technology, and career readiness skills. Through hands-on experiences with Microsoft 365, digital collaboration tools, and introductory coding platforms, students learn how to organize files, communicate professionally, practice safe and responsible digital citizenship, and protect themselves from online threats. Students also explore real-world careers in marketing, accounting, management, and technology by engaging in project-based learning activities that incorporate budgeting, branding, teamwork, problem-solving, and creativity. Through portfolio development, career exploration, mock interviews, and coding challenges, students build confidence as innovative thinkers, effective communicators, and responsible digital citizens while gaining the foundational technology skills needed for success in school, future careers, and an increasingly digital world.

Reasons for Proposed Adoption:

By integrating technology, business concepts, and career readiness within a single course, Integrated Technology 6 provides a meaningful and engaging foundation that supports future coursework, workforce development, and lifelong learning.

Principal Approval Date: _____

Curriculum Committee Approval Date: _____

School Board Approval Date: _____



Integrated Technology 6

Course Number:

Course Level: Academic 6th grade

Grade: 6th grade

Time/Credit: 22 Periods /.25 Credit

Development Date: 2025 - 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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Central Bucks School District
Teaching and Learning Principles

1. Empower Learner: Students take an active role in choosing tools to demonstrate competency in their learning goals. Therefore, we will design units where students are exposed to a variety of technology applications but then have the opportunity to choose which applications they believe best meet their needs and interests for engaging in particular learning components /projects.
2. Digital Citizen: Students recognize the responsibility of learning and working in a digital world of life is a safe, legal, ethical way. Therefore, we will provide students the opportunity to learn 21st century skills while implementing appropriate use of the technologies.
3. Knowledge Constructor: Students select a variety of resources using digital tools to construct knowledge, create products, and experience learning in meaningful ways. Therefore, we will model and encourage the use of digital tools as a means for instruction, research, application, collaboration, communication, and creation of meaningful and relevant products.
4. Innovative Designer: Students use a variety of technologies within a design process to create new, useful, or imaginative products. Therefore, we will plan projects and assessments that require our students to use diverse technology applications with a focus on usefulness of skills for their academic and future professional lives. Students will be encouraged and allowed to involve new and imaginative products in this process.
5. Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that use technologies to develop and test solutions. Therefore, we will develop projects and assessments that require students to utilize a variety of technology applications to address problems and/or challenges where they will need to strategize (e.g. test presentation formats; assess their and their peers' products) in order to produce a high-quality product.
6. Creative Communicator: Students communicate clearly and express themselves creatively for a variety of purposes using platforms, tools, styles, formats, and digital media appropriate to their goals. Therefore, tasks proposed will require students to collaboratively work through problems while collaborating using a variety of resources.
7. Global Collaborator: Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally. Therefore, we will embed opportunities to collaborate, assume roles, facilitate discussion both in-person and through technology platforms. These opportunities will allow students the opportunity to practice social and digital relationships, share and respect the ideas/contributions of others, and enrich their learning and products through incorporation of diverse thinkers.

Central Bucks School District
Enduring Understandings

Students will understand that:

- computer skills are critical for success in the 21st century.
- organizing files helps us stay efficient and productive.
- backing up files protects our hard work and increases workflow.
- basic technology tools help us explore how businesses operate and how careers connect to business functions.
- organizations require employees with specialized skills in marketing, accounting, and management to operate successfully.
- career exploration helps them discover how their interests and strengths connect to real world opportunities.
- different careers require different skills, education, and personal qualities.
- productivity software (documents, presentations, and spreadsheets) is useful for creating school and business projects.
- problem solving and critical thinking skills help individuals address real world business challenges.

Central Bucks School District
Essential Questions

- What are the key elements of composing a professional email?
- What are the different career paths available and what skills are needed for them?
- How can we set goals and plan for our future careers?
- How can we utilize Microsoft and multimedia programs for a variety of purposes and projects?
- What is coding and why do we use it?
- How can coding be used to solve problems and express ideas?
- How does debugging our code help us learn from our mistakes?

Central Bucks School District – Integrated Technology 6 Course of Study

Course Overview

Desired Results

Course Description:

In this course, students will build foundational technology skills by learning effective file management and using Office 365 tools for productivity and collaboration. Students will explore careers in marketing, accounting, and management, developing communication, organization, and critical thinking skills. Through portfolio creation and mock interviews, students will connect their personal strengths to real-world career paths and gain confidence in their ability to succeed in a digital and professional environment.

Prerequisite: none

Committee Members: **Michael Greenbaum, Melissa Hallman, Patrick Mullin, Dylan Oppen, Joseph Schoenly, Natalie Spatafora, Hannah Woodring**

Acceptable Evidence.

Teachers of this course will abide by the expectations set forth from the Teaching and Learning Team for summative and formative assessment practices as well as composition of the gradebook.

Common Summative Assessment 1: Make Your Portfolio- students will use Sway to create

Course Grading: 90% Summative, 10% Formative

Pacing Guide

Content	
Unit 1	
Intro to Integrated Tech	
Introductions	1
File Management	1
Professional Emails	1
Scams	1
Unit 2	
Career Exploration (Creating a School Store)	
Marketing as a career	4
Accounting as a career	4
Management as a career	4
Resume/Portfolio and Mock Interview	3
Intervention and Enrichment (Floor Plan)	1
Unit 3	
Coding	
Introductions to coding	1
Coding day 1	1
Coding day 2	1
Coding day 3	1
Coding day 4	1

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

<https://arcade.makecode.com>

M365

Canva

WeVideo

Floorplan

Central Bucks School District – Course of Study – Integrated Technology 6

Unit 1 – “Introduction to Integrated Technology”

Desired Results:

Essential Questions

- How can technology help us stay organized, communicate effectively, and work efficiently?
- What are the characteristics of professional digital communication?
- How can we recognize and avoid phishing emails, scams, and other online threats?
- Why is digital citizenship important in school, careers, and everyday life?

Enduring Understandings

Students will understand that...

- technology is a tool that supports organization, communication, productivity, and learning.
- professional digital communication helps people collaborate effectively and build positive relationships.
- cybersecurity awareness is essential for protecting personal information and digital accounts.
- responsible digital citizenship involves making safe, ethical, and informed decisions online.
- organized file management systems make digital work easier to access, maintain, and share.
- professional emails require clear purpose, appropriate tone, and proper formatting.
- phishing emails and online scams use deceptive tactics to obtain personal information.
- good digital habits help individuals remain safe, productive, and responsible technology users.

Knowledge

Students will know...

- the purpose of Integrated Technology and its connection to school, careers, and daily life
- how to organize, save, rename, and manage digital files and folders
- components of a professional email, including subject lines, greetings, body text, and signatures
- appropriate email etiquette and communication practices
- common characteristics of phishing emails, scams, spam, and suspicious online messages
- basic cybersecurity practices for protecting accounts and personal information
- expectations for responsible digital citizenship and technology use

Vocabulary

- Integrated Technology
- Digital Citizenship
- File Management
- Folder
- Directory
- Cloud Storage
- Organization
- Productivity
- Email

- Subject Line
- Salutation
- Signature
- Attachment
- Professional Communication
- Cybersecurity
- Phishing
- Scam
- Spam
- Password Security
- Personal Information

Skills

Students will be able to...

- create and maintain an organized digital file and folder structure
- save, rename, move, and retrieve files efficiently
- compose professional emails using appropriate formatting and tone
- attach, organize, and share digital documents appropriately
- identify common warning signs of phishing emails and scams
- apply safe online practices to protect personal information
- demonstrate responsible digital citizenship in classroom technology activities
- communicate effectively using digital tools

Standards:

Priority

BCIT

Standard - 15.3.8.S - Apply appropriate electronic communication based on message requirements.

Standard - 15.3.8.T - Discuss the rules of digital citizenship.

Supporting

BCIT

Standard - 15.3.8.O - Discuss types of communication skills (e.g., internal, external) in organizations.

Standard - 15.4.8.B - Interpret and apply appropriate social, legal, ethical, and safe behaviors of digital citizenship.

CTE

13.2.6-8.B Develop formal communication that demonstrates professional etiquette and observes social protocols when communicating verbally, nonverbally, and in writing. (Professional Emails)

13.2.6-8.A Apply critical thinking to solve real-life problems (Scams)

ISTE

1.1.d Students understand fundamental concepts of how technology works, demonstrate the ability to choose and use current technologies effectively, and are adept at thoughtfully exploring emerging technologies.

1.6.a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.

1.6.c Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models, or simulations.

PA Core Standards

MP.5 – Use appropriate tools strategically (file management)

CC.1.4.6.X – Write routinely over extended and shorter time frames for a range of tasks, purposes, and audiences (professional email)

MP.3 – Construct viable arguments and critique the reasoning of others (phishing scams)

Acceptable Evidence:

Acceptable evidence of learning:

Performance Tasks

Digital Readiness Portfolio

Students will create a portfolio that includes:

- A well-organized file and folder structure
- A professionally written email responding to a realistic scenario
- An analysis of sample phishing emails identifying warning signs
- A digital citizenship or online safety product (poster, infographic, slideshow, or video)

Presentation

- Explain organizational strategies used for file management
- Demonstrate proper email etiquette
- Describe methods for recognizing and responding to phishing attempts and scams

Acceptable Evidence of Learning Other Than Performance Tasks

Formative Assessment

- Exit tickets
- Class discussions
- Reflection journals
- Email writing practice activities
- File management exercises
- Phishing identification activities
- Teacher observation and feedback

Summative Assessment

- Digital Readiness Portfolio

Suggested Learning Experiences and Instruction

Learning Experiences:

- Explore school technology systems and digital tools
- Practice organizing files and folders using cloud storage platforms

- Analyze examples of professional and informal emails
- Participate in phishing and scam detection activities
- Complete digital citizenship and online safety lessons
- Reflect on personal technology habits and digital responsibilities
- Collaborate with peers on cybersecurity awareness projects

Instructional Strategies:

- Project-based learning
- Direct instruction and modeling
- Cooperative learning groups
- Think-Pair-Share
- Scenario-based learning
- Technology simulations
- Guided discussion and inquiry
- Interactive demonstrations

Differentiation / Intervention / Enrichment Options:

- Step-by-step templates for file organization and email writing
- Visual guides and checklists for identifying phishing attempts
- Small-group reteaching and guided practice
- Choice-based projects (poster, slideshow, infographic, video)
- Peer mentoring opportunities
- Extension activities focused on cybersecurity careers and emerging technologies
- Modified assignments and supports as needed

For Language Development:

- Explicit instruction of digital literacy and technology vocabulary
- Visual supports including screenshots, diagrams, icons, and examples
- Sentence starters for professional emails and classroom discussions
- Graphic organizers for analyzing phishing emails and scams
- Opportunities for oral practice and collaborative learning
- Bilingual glossaries or translation tools when available

Sample Sentence Starters

- "I am writing to inquire about..."
- "Thank you for your time and assistance."
- "This file organization system helps me because..."
- "One clue that this message may be a phishing attempt is..."
- "To keep my information secure, I should..."
- "A responsible digital citizen would..."

Central Bucks School District – Course of Study – Integrated Technology 6
Unit 2 – “Career Exploration”

Desired Results:

Essential Questions:

- How do businesses use technology to solve problems and meet customer needs?
- How do skills like management, marketing, and accounting prepare us for future careers?
- How can teamwork, creativity, and critical thinking help us succeed in the workplace?
- What careers use technology and business skills in everyday life?

Enduring Understandings:

Students will understand that...

- technology is a powerful tool used across all careers and industries.
- businesses rely on marketing, accounting, and coding to operate successfully.
- strong communication, collaboration, and problem-solving skills are essential for future jobs.
- exploring careers helps students make informed choices about their interests and strengths.
- business decisions are based on data, budgeting, and customer needs.
- digital tools and simple programming are used to create, market, and manage products.
- career paths are diverse and often combine multiple skill sets.
- ethical and responsible use of technology is important in business.

Knowledge:

Students will know...

- The basic roles of marketing, accounting, and management in a business
- How businesses earn, track, and spend money
- How technology supports communication and productivity
- Various career options related to technology and business
- How collaboration and professionalism are used in the workplace

Vocabulary

- Marketing
- Accounting
- Budget
- Profit
- Expense
- Revenue
- Coding
- Algorithm
- Consumer
- Product
- Career Path
- Collaboration
- Digital Tools

Skills:

Students will be able to...

- create a simple budget for a product or business idea
- design a basic marketing campaign using digital tools
- write and modify simple code (e.g., block-based coding)
- analyze basic financial decisions and outcomes
- work collaboratively in teams to solve problems
- present ideas clearly using technology

Standards:

Priority

BCIT

Standard - 15.1.8.A - Identify knowledge, skills, and attitudes needed for careers in accounting.

Standard - 15.2.8.A - Examine various occupation options based on career assessments results, personal characteristics, talents, skills, abilities, and aptitudes as related to career pathways, clusters, or occupations.

Standard - 15.9.8.A - Explore various marketing careers and analyze their role in the business world.

Supporting

BCIT

Standard - 15.4.8.G - Create an advanced digital project using appropriate software/application for an authentic task.

CTE

13.1.6-8.A Analyze the relationship of school subjects, extracurricular activities, and community experiences to career preparation.

13.1.6-8.C Compare and contrast multiple careers using a variety of career research resources.

13.1.6-8.E Identify, participate in, and evaluate school- and community-based opportunities for career awareness/preparation experiences.

ISTE

1.1.d Students understand fundamental concepts of how technology works, demonstrate the ability to choose and use current technologies effectively, and are adept at thoughtfully exploring emerging technologies.

1.7.c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

PA Core Standards

13.1.6-8.E Identify, participate in, and evaluate school- and community-based opportunities for career awareness/preparation experiences.

Acceptable Evidence:

Performance Tasks –

Create a mini business project that includes:

- A simple product or service idea
- A basic budget (income and expenses)
- A marketing advertisement (poster, slide, or video)

Group presentation explaining their business and career connections

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Exit tickets
- Class discussions
- Journals or reflection prompts
- Coding practice activities
- Budget worksheets
- Teacher observation and feedback

Summative Assessment

- Final business project rubric
- End-of-unit reflection
- Vocabulary or concept quiz
- Self and peer evaluations

Suggested Learning Experiences and Instruction

Learning Experiences:

- Career exploration videos and guest speakers
- Hands-on coding activities (e.g., Scratch)
- Budgeting simulations and games
- Design and marketing challenges
- Small-group problem-solving activities
- Reflection on personal interests and strengths

Instructional Strategies:

- Project-based learning
- Direct instruction with modeling
- Cooperative learning groups
- Think-pair-share
- Technology-based simulations
- Discussion and guided inquiry

Differentiation/Intervention/Enrichment Options:

- Step-by-step guided templates for budgeting and coding
- Extension challenges (advanced coding or marketing design)
- Choice-based projects (poster, video, slideshow)
- Small-group reteaching
- Peer mentoring
- Modified expectations as needed

For Language Development:

- Explicit teaching of academic and business vocabulary
- Visual supports (charts, icons, diagrams)
- Sentence starters for discussions and presentations
- Opportunities for oral practice and collaboration
- Bilingual glossaries or translation tools when available

Central Bucks School District – Course of Study – Integrated Technology 6
Unit 3 – “Coding”

Desired Results:

Essential Questions:

- How does writing code solve real-world problems?
- What steps do I take to plan, test, and improve a program?
- In what ways does coding connect to science and engineering practices?

Enduring Understandings:

Students will understand that...

- algorithms are step-by-step instructions that solve problems or complete tasks.
- debugging is essential for refining programs to behave as intended.
- coding is a creative and iterative process intertwined with engineering practices.

Knowledge:

Students will know...

- the concept of algorithms, sequence, selection, and iteration.
- basic coding constructs: variables, events, conditionals.
- the relationship between inputs, outputs, and program state.
- how STEELS integrates with CSTA standards. For example, computational thinking, systems thinking

Vocabulary:

- Algorithm
- Sequential Execution
- Conditional/Selection
- Iteration/Loop
- Variable
- Event-Driven Programming
- Debugging

Skills:

Students will be able to...

- design and implement algorithms to solve authentic problems.
- write code using block-based or text-based environments (like Scratch or MakeCode).
- test and debug programs, identifying and correcting errors.
- communicate logical sequences and code behavior using computational thinking.
- explain how coding employs engineering practices such as planning, testing, and refinement.

Standards:

Priority

BCIT

Standard - 15.4.8.H - Explain the differences between a scripting language and a coding language.

Standard - 15.4.8.J - Explain the basic differences between encoding and decoding.

Supporting

BCIT

Standard - 15.4.8.D - Create projects using emerging input technologies.

Standard - 15.4.8.I - Solve a problem with an algorithm.

CTE

13.2.6-8.D - Demonstrate proficient use of technologies by using various types of technology.

ISTE-

1.1.d Students understand fundamental concepts of how technology works, demonstrate the ability to choose and use current technologies effectively, and are adept at thoughtfully exploring emerging technologies.

1.7.c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

PA Core Standards

MP.1 Make sense of problems and persevere in solving them

MP.5 Use appropriate tools strategically

MP.6 Attention to precision

Acceptable Evidence:

Performance Tasks –

- Coding Challenge Project
Students design and create a working program (e.g., game, animation, or simulation) that:
 - Uses sequence, conditionals, and loops
 - Solves a defined problem or meets a set of constraints
 - Is tested and debugged through multiple iterations
 - Includes a short written or recorded explanation of how the algorithm works
- Algorithm Design Task
Students create a flowchart or pseudocode plan before coding, demonstrating logical thinking and planning.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Teacher observation during coding activities
- Think-alouds while debugging
- Check-in questions during mini-lessons
- Practice challenges with immediate feedback
- Quick quizzes on vocabulary and concepts
- Code reviews (teacher or peer)

Summative Assessment

- Final coding project evaluated using a rubric assessing:
 - Use of required coding structures
 - Functionality and accuracy of the program
 - Problem-solving and debugging process
 - Explanation of algorithm and design choices

- Unit assessment covering:
 - Coding vocabulary
 - Core concepts (algorithms, loops, conditionals)
 - Interpretation of simple code examples

Suggested Learning Experiences and Instruction

Learning Experiences:

- Unplugged coding activities (logic puzzles, human algorithms)
- Guided coding tutorials using a block-based or beginner text-based platform
- Small-group coding challenges
- Debug-the-code exercises
- Collaborative problem-solving tasks
- Independent project work with checkpoints
- Reflection activities connecting coding to real-world technology

Instructional Strategies:

- Direct instruction with modeling (I do)
- Guided practice (We do)
- Independent/collaborative coding (You do)
- Use of exemplars and non-examples
- Questioning and discussion to promote computational thinking
- Engineering design cycle (plan → build → test → improve)
- Use of visual supports (flowcharts, anchor charts)

Differentiation/Intervention/Enrichment Options:

Differentiation

- Choice of project themes or difficulty levels
- Scaffolded starter code for struggling students
- Chunked instructions and checklists
- Flexible grouping (pairs, small groups, individual)

Intervention

- One-on-one or small-group reteaching
- Simplified coding tasks focusing on one concept at a time
- Guided debugging with teacher modeling
- Additional practice with visuals and step-by-step support

Enrichment

- Optional advanced challenges (nested loops, variables, extensions)
- Student-designed modifications to existing projects
- Introduction to real-world coding applications (games, simulations, sensors)
- Leadership roles as peer mentors or “code coaches”

For Language Development:

- Explicit instruction in coding vocabulary with visuals
- Sentence frames for explaining code (e.g., “This loop repeats because...”)
- Pair-programming to encourage academic language
- Opportunities for oral explanations before written responses
- Visual instructions, icons, and color-coding in code blocks
- Use of diagrams and flowcharts to support comprehension

ART Course of Studies Updates

Fall 2026



Art COS Teams

“New” Sculpture Team

Samantha Schollenberger
Art Teacher ~ South

Rebecca Panitch
Art Teacher ~ South

Gabby Miller
Art Teacher ~ West

Deb Thomas
Art District
Coordinator

“New” Ceramics 4 Team

Tina Warren
Art Teacher ~ South

Allison Theis
Art Teacher ~ East

Alison Thompson
Art Teacher ~ West

Rebecca Panitch
Art Teacher ~ South

Revisions Grade 3 and 4

Elementary Art Team

Cara Alderfer

Erin Casey

Marc West

Amy Palmer

Kate Sayer

Allison Farrell

Olivia Servidio

Nicole Doubet

Kelli Patrick

Kyle Cincirpini

Colleen Zachmann

Maeve Potash



Presenter- CBSD ART K-12 Coordinator



Deb Thomas
Art K-12 District
Coordinator





Goal of Presentation



Share updates to the Art Course of Studies

- 1. Revisions to Grades 3 & 4**
- 2. “NEW & Revised” Sculpture (“Old” Grade 9 - 3D art)**
- 3. “NEW” Ceramics 4**



15 min

Agenda-

...for each Course of study



Background & Rationale



Course/Curriculum Overview



Budget



Next Steps

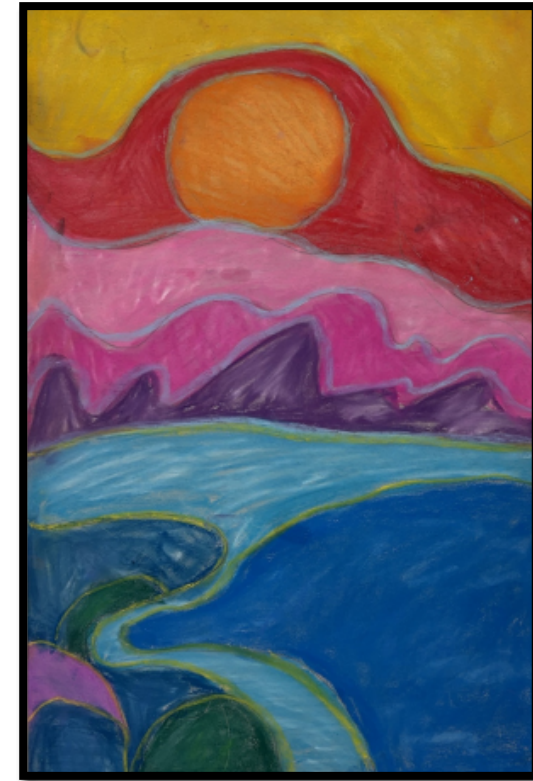


Background & Rationale

All CBSD Art Curriculum considers:

1. *All COS will be converted from the 4 strands of DBAE to Common Units of study with standards embedded*
 - Discipline-Based Art Education: (Production, Criticism, Aesthetics, History)
 - Crosswalk to National Visual Arts Standards (Creating, Presenting, Responding, Connecting)
2. Pacing guides that reflect the Creative Process Continuum
3. Updated Technology, Terminology, Suggested Artists, and Vocabulary
4. Updated Learning Principles

Revisions Grades 3 & 4





Gades 3 & 4: Rationale

Reasons for Proposed Adoption:

- Embeds the artistic processes of creating, presenting, responding, and connecting
- Supports student access, engagement, and growth through meaningful artmaking
- Provides a consistent, developmentally appropriate art curriculum
- Supports creative expression, foundational art skills, standards alignment, and equitable learning for all students



Grades 3 & 4 Overview

Grade 3 Art: Characterization of Course of Study:

Students explore art concepts through six engaging units: **building classroom community, color theory, shape and value, sculpture, line and pattern, and art history.**

They develop creative expression, technical skills, and cultural awareness while working with both two- and three-dimensional media.

Emphasis is placed on developing personal aesthetic, self-expression, and understanding diverse artistic traditions.

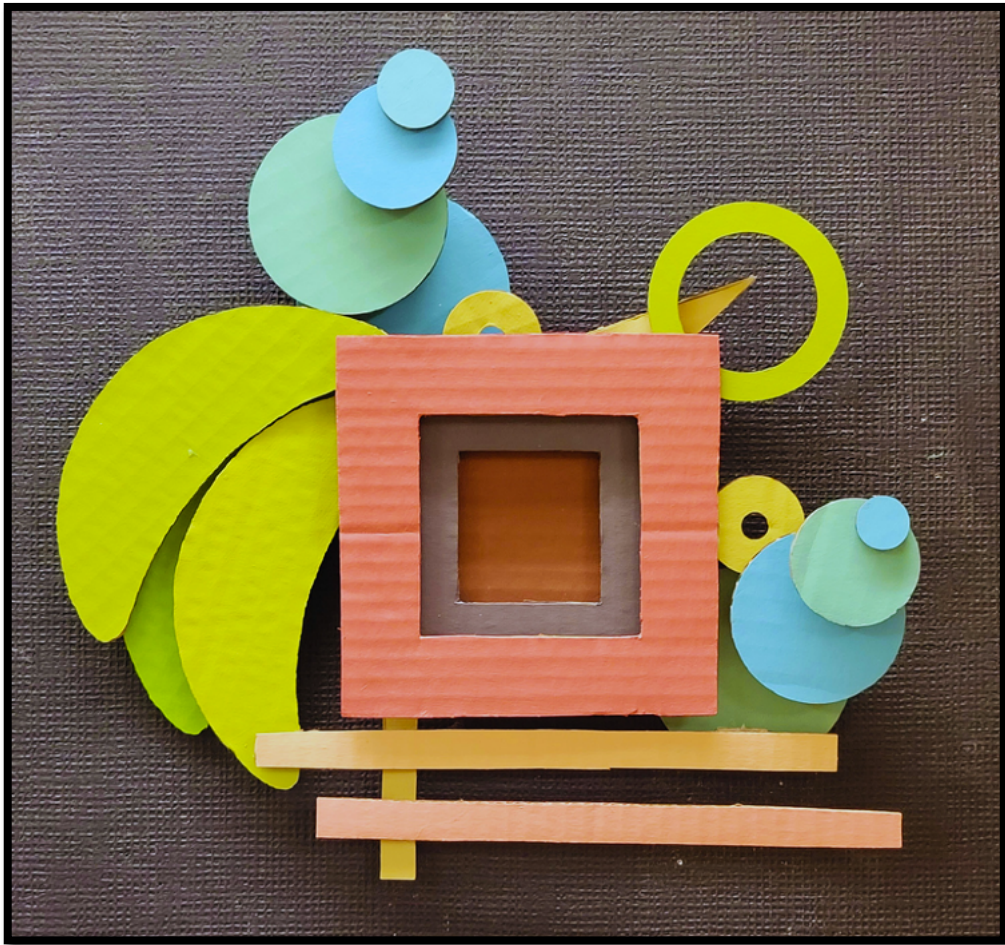
Grade 4 Art: Characterization of Course of Study:

Students develop creative thinking and artistic skills through hands-on exploration of **color theory, spatial design, sculpture, and art history.**

Projects emphasize self-expression, collaboration, and cultural awareness, including studies of Renaissance, Middle Ages, and Pennsylvanian Folk Art.

The course fosters confidence, craftsmanship, and community through both individual and group artworks.

“New” Sculpture





Sculpture: Rationale

Reasons for Proposed Adoption:

- Builds on the ***former 9th grade 3D art course***, now made more robust
- Provides students with a foundational three-dimensional art experience
- Expands creative problem solving, material exploration, craftsmanship, and visual communication
- Introduces functional, sculptural, abstract, and installation-based approaches
- Supports CBSD curriculum goals while aligning with PA and National Visual Arts Standards and the creative process



Sculpture Overview

Characterization of Course of Study:

This 9-week course, meeting daily for 83 minutes, immerses students in the world of three-dimensional art by exploring foundational concepts and skills across sculpture, crafts, and industrial design. Students will engage with a wide array of media, techniques, and creative approaches, while also studying the evolution and current trends of 3D design in art history. Through hands-on, exploratory projects, students will work with materials such as metal, clay, wax, wood, wire, glass, plastic, papier-mâché, plaster, fabrics, fibers, and found objects. Each unit will incorporate aspects of art history, criticism, and aesthetics to deepen understanding and appreciation of three-dimensional art.

- *This course requires no prerequisites and has no fee.*

Course Units

- **Unit One:** Intro to 3D Art
- **Unit Two:** Functional
- **Unit Three:** Sculptural
- **Unit Four:** Abstraction
- **Unit Five:** Installation

“New” Ceramics 4





Ceramics 4: Rationale

Reasons for Proposed Adoption:

- Provides advanced students with a rigorous continuation of the ceramic's pathway
- Supports independent studio practice, advanced craftsmanship, portfolio development, and personal artistic voice
- Aligns with CBSD curriculum goals and both PA and National Visual Arts Standards while embracing the creative continuum



Ceramics 4: Overview

Characterization of Course of Study:

Ceramics 4 offers advanced students in grades 11-12 the opportunity to refine their ceramic techniques and strengthen their artistic voice through complex, self-directed projects. Building on skills from Ceramics 1-3, students will engage in advanced wheel-throwing, sculptural design, and experimental forms.

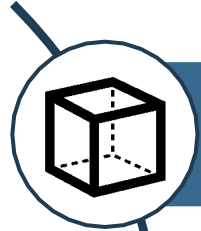
Students will develop a unique portfolio of functional and non-functional works that explore contemporary and historical influences. An emphasis is placed on pushing boundaries in surface treatments, glaze layering, and mixed media. Through critiques, students will articulate their creative processes, explore aesthetic decision-making, and respond to feedback.

- Prerequisite: Ceramics 3, B or better, or teacher recommendation.

UNITS of Study	Unit 1- Conceptual & Imagination	Unit 2 – Figurative	Unit 3 Form/ Function	Unit 4 – Identity	Unit 5 – Portraiture	Unit 6 – Non- Representational
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Next Steps



Teach



Reflections and PLC time



Revise

Budget

- No immediate impact to district budget for Ceramics 4 or Grades 3 & 4
- Sculpture: amount allocated in Art K-12 budget to supplement building budget as needed for this rollout



Grade 3 ART

Course Number: 3AR Art - 03

Course Level: Academic

Grade: 3rd

Time: 1 day per 5 day cycle

Development Date:
2025 - 2026

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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**Central Bucks School District
Teaching and Learning Principles**

K – 12 Art Program Learning Principles

1. All learners are capable of complex and high-quality work if the right learning conditions are established.
2. Students of art learn when modeling of products and processes are demonstrated that address appropriate learning criteria.
3. Students learn when they are focused on the objectives and actively engaged in the learning experience.
4. Students of art learn when a connection is made to prior learning and personal interests.
5. Students learn when they are provided with a safe environment where they can experiment and take creative risks.
6. Learning is most effective when differences in learners' prior knowledge, interests, and strengths are accommodated.
7. Learners succeed when they believe the task is attainable with reasonable effort.
8. Students learn when they see and demonstrate links between new learning, possibilities for future learning, and its multi-disciplinary applications.
9. Greater learning depends upon repeated performance to increase fluency and accuracy.
10. Students learn when they reflect upon and summarize the learning experience.
11. Successful learning requires the ability to reflect, self-assess and use feedback to self-adjust.
12. Various visual arts processes can foster creative thinking, providing students with an essential real-world skill.
13. Students can use the creative process to solve problems and generate new concepts for learning.
14. Students of art can use appropriate technology to enhance creative growth and creative process.

Enduring Understandings

Students will understand that:

Creating (NCAS Create) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- Artists use the elements and principles of design (line, color, shape, pattern, value, and form) to organize their artwork and communicate ideas.
- Creative expression grows through experimentation, practice, and reflection.
- Artists make choices about materials, tools, and techniques to achieve specific visual effects or express feelings.

Connecting (NCAS Connect) — PA Visual Arts: 9.2 Historical & Cultural Contexts (Visual Arts)

- Art can tell stories, express emotions, and represent personal or cultural identity.
- Artists observe and interpret the world around them to inspire their artwork.
- Art from various times and cultures shows how people express their values, beliefs, and experiences.
- Artists connect ideas from other subjects and experiences to create meaningful art.

Responding (NCAS Respond) — PA Visual Arts: 9.3 Critical Response (Visual Arts)

- Collaboration and respectful discussion help artists grow and learn from one another.
- Reflection and critique help artists improve their work and deepen understanding of art's purpose.

Presenting (NCAS Present) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- Artmaking is a process that includes planning, experimenting, revising, and sharing.

Central Bucks School District - Grade 3 Art

Essential Questions

Creating (NCAS Create) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- How do artists use the elements of art and principles of design to express ideas or feelings?
- How does trying new things help me grow as an artist?
- Why do artists choose certain materials or techniques for their artwork?

Connecting (NCAS Connect) — PA Visual Arts: 9.2 Historical & Cultural Contexts (Visual Arts)

- How can art show who we are or how we feel?
- How does looking closely at the world help me create art?
- What can art from other cultures and time periods teach us?
- How can I use what I know from other subjects or life experiences in my artwork?

Responding (NCAS Respond) — PA Visual Arts: 9.3 Critical Response (Visual Arts)

- What can I learn from talking about art with others?
- How does giving and receiving feedback make my art better?

Presenting (NCAS Present) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- What steps do artists take to bring their ideas to life?

Central Bucks School District –

Course of Study Overview

Grade 3 Visual Arts

Desired Results

Course Description:

Students explore art concepts through six engaging units: building classroom community, color theory, shape and value, sculpture, line and pattern, and art history. They develop creative expression, technical skills, and cultural awareness while working with both two- and three-dimensional media. Emphasis is placed on developing personal aesthetic, self-expression, and understanding diverse artistic traditions.

Prerequisite: N/A

Committee Members: **Elementary Art Team**

Acceptable Evidence.

1. Completed Art Projects

- Final artworks demonstrating use of color, shape, line, pattern, and 3D form.
- Sculptures showing hand-building techniques.

2. Sketchbook Entries

- Planning sketches, color studies, and practice exercises.
- Reflections on technique and process.

3. Student Reflections

- Written or verbal reflections on artistic choices, materials, and outcomes.
- Comparisons between 2D and 3D work.

4. Peer Feedback

- Participation in critique sessions.
- Constructive comments on classmates' work.

5. Vocabulary Use

- Correct use of art vocabulary in discussions or written work.

6. Artist Connections

- Responses to studied artists (e.g., Henry Moore, Alma Thomas).
- Art inspired by historical or cultural references.

7. Collaborative Work

- Group projects or classroom community-building activities.

Course Grading: CBSD Art Department Common Language Rubric

Central Bucks School District

Grade 3 ART - Pacing Guide

UNITS of Study	Unit 1- Social & Emotional Learning	Unit 2 – Color	Unit 3 Value, Shape & Forms	Unit 4 - 3-D Form & Sculpture	Unit 5– Line & Pattern	Unit 6 – Art History & Cultures
DAYS	2	7	7	7	7	5

NOTE:

1. All units of study align with the PA Visual Arts Standards and National Standards. Each unit will employ the creative process, with specific, daily, and ongoing formative feedback.
2. This creative cycle is a progression that will repeat until a point of completion is determined:
 1. Inspire & Research
 2. Plan, Sketch and Practice
 3. Envision, Create & Revise
 4. Share, Reflect and Assess

Units of study may need to be combined & overlapped to account for studio space, equipment/materials, and the teacher’s professional judgment based on differentiated student needs.

Unit 1 - Social and Emotional Learning	
Inspire & Research	2
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	
Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC)	
Unit 2 – Color	
Inspire & Research	7
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	
Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC)	
Unit 3 - Value, Shape & Forms	
Inspire & Research	7
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	

Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC)	
Unit 4 --3D Form & Sculpture	
Inspire & Research	7
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	
Formative Assessment Throughout Learning Cycle	
Inspire & Research	
Unit 5 -Line & Pattern	
Inspire & Research	7
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	
Formative Assessment Throughout Learning Cycle	
Unit 6 -Art History & Cultures (threaded throughout)	
Inspire & Research	5
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	
Formative Assessment Throughout Learning Cycle	
Inspire & Research	

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their classmates.

Central Bucks School District – Grade 3 Art

Unit 1 – Social Emotional Learning

Desired Results

Unit 1 focuses on building a positive classroom community through shared creative experiences. Students will learn art room routines, expectations, and the importance of mutual respect. They will also explore how mistakes are part of the creative process and how to express emotions and ideas visually while collaborating with others

Essential Questions

- How can art help us express our feelings and ideas?
- How can a mistake become something beautiful?
- How do we work together respectfully in the art room?
- What does it mean to have a growth mindset as an artist?

Enduring Understandings

- Artists express ideas, emotions, and identities through their artwork.
- Mistakes can lead to new creative discoveries.
- Collaboration builds community and strengthens creative problem-solving.
- A positive mindset helps artists persevere through challenges.

Knowledge:

Students will know:

- Classroom routines, materials, and procedures.
- That artists use color, line, and shape to communicate emotions.
- Art helps people connect, reflect, and share their stories.

Vocabulary: collaboration, community, expression, creativity, growth mindset.

Suggested Artists & Cultural Connections

- Jim Dine – Uses expressive hearts to symbolize love, connection, and emotion.
- Barney Saltzberg (Beautiful Oops!) – Encourages creativity, resilience, and turning mistakes into opportunities.
- Keith Haring – Creates bold, colorful figures that express movement, friendship, and community, accessible visual language for all students.
- Romero Britto – Uses bright colors and patterns to convey happiness, positivity, and unity; promotes optimism and inclusion.
- Faith Ringgold – Combines storytelling and quilting traditions to explore identity, family, and cultural heritage.
- Indigenous Australian Dot Painting Traditions – Symbolic and communal art practice connecting individuals to place, story, and community.

Skills:

Students will be able to:

- Collaborate on a group artwork that builds classroom communities.
- Express emotions or ideas visually through art elements.
- Reflect on personal and collective artistic growth.

- Demonstrate art room routines and responsible use of materials.

Standards

Pennsylvania Visual Arts Standards

Priority Standards

- 9.1.3.A – Recognize and use the elements and principles of design to create and respond to works of art.
- 9.1.3.B – Recognize, know, use, and demonstrate a variety of appropriate art materials, tools, and techniques.
- 9.4.3.A – Identify how the arts have influenced personal and community life.

Supporting Standards

- 9.2.3.C – Identify and describe works of art that reflect community and cultural traditions.
- 9.3.3.A – Identify critical processes used in the examination of works of art.

National Core Arts Standards

Priority Standards

- VA:Cr1.1.3a – Elaborate on an imaginative idea.
- VA:Cr2.1.3a – Create personally satisfying artwork using a variety of artistic processes and materials.
- VA:Cr3.1.3a – Discuss and reflect with peers about choices made in creating artwork.
- VA:Cn10.1.3a – Develop a work of art based on observations of surroundings.

Supporting Standards

- VA:Cr2.2.3a – Demonstrate an understanding of the safe and proficient use of materials, tools, and equipment.
- VA:Re7.1.3a – Speculate about processes an artist uses to create a work of art.
- VA:Re8.1.3a – Interpret art by analyzing use of media to create subject matter, characteristics of form, and mood.
- VA:Cn11.1.3a – Recognize that responses to art change depending on knowledge of the time and place in which it was made.

Acceptable Evidence

Formative Assessments (*Ongoing checks for understanding and participation*)

- Observation of student engagement, collaboration, and respectful interactions during artmaking and discussions.
- Teacher-led check-ins and questioning during group and individual work to gauge understanding of routines, expectations, and SEL themes.
- Sketchbooks or brainstorming drawings showing how students plan or revise their ideas.
- Exit reflections or quick oral responses: “What did you learn about working together today?” or “How did you turn a mistake into something new?”
- Peer and group discussions on how teamwork, creativity, or growth mindset show up in their work.

Summative Assessments (*End-of-unit demonstrations of learning*)

- Collaborative Artwork: Completion of a community mural, puzzle, or collage demonstrating teamwork, creativity, and understanding of art room routines.
- “Beautiful Oops” Project: Individual artwork transforming a “mistake” into a finished piece showing perseverance and creative thinking.
- Reflection (Written or Verbal): Student explanation of how they contributed to the class community and how art helps express emotions or ideas.
- Evaluation using CBSD Art Department’s Common Language Rubric for participation, creativity, craftsmanship, and collaboration.

Suggested Learning Experiences and Instruction

- 1. Art Room Orientation and Community Norms**
 - Discuss art room rules, safety, and materials.
 - Brainstorm: “What makes a great art community?”
 - Create a collaborative class art pledge poster.
- 2. Beautiful Oops! Activity**
 - Read *Beautiful Oops!* and discuss the growth mindset.
 - Students turn an “oops” (a tear, spill, or scribble) into a finished piece.
 - Share examples of how mistakes led to creativity.
- 3. Community Collaboration Project**
 - Create a shared artwork, such as a Jim Dine-inspired heart mural, puzzle mural, or community tree.
 - Each student designs one piece that reflects their identity or how they contribute to the group.
- 4. Reflection and Celebration**
 - Students share their collaborative work and reflect on the process.
 - Display final art in the classroom or hallway to celebrate unity.

Learning Experiences

Suggested Learning Experiences

- Participate in community-building art activities such as a class mural or puzzle project.
- Create a small artwork that expresses personal identity or emotions.
- Practice basic art elements (line, shape, color, texture) through fun, hands-on exercises.
- Work in groups to design a shared art piece that shows teamwork and connection.
- Reflect and share ideas in short class discussions or “I notice/I wonder” critiques.
- Keep a simple art journal with sketches and short reflections about feelings and growth.
- Learn about artists who explore identity and community (e.g., Kehinde Wiley, Frida Kahlo, Bisa Butler, Ai Weiwei, Jim Dine).
- Help design a small class display that shows everyone’s contributions.
- Practice classroom routines, mindfulness, and respect for materials and peers.
- Reflect at the end of the unit on how art helps build empathy and community.

Instructional Strategies

- Modeling and Think-Alouds: Demonstrate classroom routines, material use, and how to turn a mistake into a creative opportunity.
- Guided Practice: Co-create with students during collaborative activities to model teamwork and problem-solving.

- Visual Supports: Use anchor charts, visuals of artists' work, and process photos to clarify routines and expectations.
- Questioning and Reflection: Encourage discussion with prompts like "How did this artwork make you feel?" or "What did you notice about working with others?"
- Collaborative Learning: Partner and small-group work to strengthen social and communication skills.
- Art Critique Conversations: Structured "See–Think–Wonder" format to guide respectful observation and discussion.

Differentiation / Intervention / Enrichment Options

For Diverse Learners

- Provide step-by-step visual guides and process checklists for clarity.
- Offer tactile or adaptive tools for students needing motor skill support.
- Allow flexible roles in collaborative work (e.g., designer, color mixer, cutter, assembler).
- Provide additional time or simplified directions for students needing support with sequencing or decision-making.
- Encourage verbal expression or pointing responses when writing may be difficult.

For Enrichment

- Encourage students to design an additional element or border for the class mural that symbolizes unity.
- Invite advanced learners to research one of the featured artists and share how that artist's work connects to the theme of community.
- Integrate digital art or photography extensions, where students document the class collaboration process.

For Language Development (MLLs and Emerging Communicators)

- Visual Vocabulary Cards: Display and use illustrated word cards for key terms (community, collaboration, expression, creativity, growth mindset).
- Sentence Frames for Discussion:
 - "I showed collaboration by ____."
 - "My artwork expresses ____."
 - "When I made a mistake, I ____."
- Model and Repeat: Consistently use academic and emotional vocabulary in context.
- Multimodal Expression: Allow students to communicate ideas through drawing, gestures, or translated key phrases.
- Partner Talk: Pair multilingual learners with supportive peers during reflections or critiques.
- Anchor Charts: Use images and color cues to reinforce meaning and structure classroom expectations.

Central Bucks School District – Grade 3 Art

Unit 2 – Color

Desired Results

In this unit, students explore how artists use color to express feelings, create mood, and organize their artwork. Through hands-on activities, they learn to identify and categorize warm, cool, and neutral colors, experiment with opaque and translucent materials, and apply these concepts in expressive paintings and collages. By studying artists such as Wayne Thiebaud, Romero Britto, Ted Harrison, Alma Thomas, and Jean-Michel Basquiat, students discover how color choices can communicate energy, emotion, and meaning in visual art.

Essential Questions:

- How does color affect the way we feel about an artwork?
- What makes a color warm, cool, or neutral?
- How can artists use color to express mood or meaning?
- Why might an artist choose certain colors in their work?

Enduring Understandings:

- Color has temperatures and can create different moods or emotions.
- Artists use warm, cool, and neutral colors to create visual balance and harmony.
- Understanding color properties helps artists make intentional creative choices.
- Experimenting with color builds confidence and expressive skill.

Knowledge:

Students will know:

- Warm, cool, and neutral colors and their emotional impact.
- The difference between opaque and translucent materials.
- How artists use color to show mood, temperature, and balance.
- That color can organize a composition and guide the viewer's eye.

Vocabulary: Warm colors, Cool colors, Neutral colors, Color temperature, Opaque, Translucent, Hue, Tint, Shade, Contrast, Mood

Suggested Artists / Cultures

- Wayne Thiebaud – playful use of color and shadow in everyday subjects

- Romero Britto – bold color and pattern to express joy
- Ted Harrison – simplified landscapes with distinct warm/cool contrasts
- Alma Thomas – rhythmic color patterns inspired by nature
- Jean-Michel Basquiat – expressive, layered use of color and texture
- Australian Aboriginal Artists – use of color and pattern to convey story and landscape
- Mexican Folk Art – vibrant color palettes reflecting cultural celebration
- Jasper Johns- everyday symbols like flags and numbers to create bold, thought-provoking art

Skills:

Students will be able to:

- Identify and categorize warm, cool, and neutral colors.
- Mix and apply colors to create expressive artwork.
- Use color vocabulary to describe and discuss their work and others'.
- Experiment with different media to explore transparency and layering.
- Make intentional color choices to communicate mood or meaning.

Standards

Priority PA Visual Arts Standards

- 9.1.3.A: Recognize and use elements and principles to create works of art.
- 9.1.3.B: Recognize and use a variety of art materials, techniques, and processes.

Supporting PA Visual Arts Standards

- 9.2.3.L: Identify and describe the use of art to express community, cultural, or historical context.
- 9.3.3.A: Recognize critical processes used to interpret works of art.

Priority National Core Arts Standards

- VA:Cr1.2.3a: Apply knowledge of available resources, tools, and technologies to investigate personal ideas.
- VA:Cr2.1.3a: Create personally satisfying artwork using a variety of artistic processes and materials.

Supporting National Core Arts Standards

- VA:Re7.1.3a: Speculate about processes artists use to create artwork.

Acceptable Evidence:

Formative Assessments (Ongoing checks for understanding and participation)

- Observation of correct identification and categorization of warm, cool, and neutral colors
- Active participation in color-mixing demonstrations
- Use of vocabulary in discussion: hue, value, temperature, opaque, translucent
- Reflection on how color communicates feeling or meaning (informal or in-progress)

Summative Assessments (End-of-unit demonstrations of learning)

- Color wheel or color temperature chart
- Painting or collage emphasizing warm or cool color schemes

- Artwork using both opaque and translucent media to show contrast
- Short written or verbal reflection explaining color choices and their emotional impact

Suggested Learning Experiences and Instruction

Suggested Learning Experiences –

- Review and discuss primary, secondary, and neutral colors.
- Identify warm and cool color families through visual examples.
- Mix and paint color swatches showing warm, cool, and neutral palettes.
- Explore transparency using watercolor and opacity using tempera or collage.
- Create an expressive painting inspired by feelings using warm or cool colors.
- Compare and discuss how artists like Jasper, Johns, Wayne Thiebaud, Romero Britto, Ted Harrison, Alma Thomas, and Jean-Michel Basquiat use color.
- Reflect on how color choice affects mood and meaning in artwork.
- Display class work in a “Color Gallery” showing different emotional themes.

Instructional Strategies

- Teacher modeling of color-mixing and painting techniques.
- Guided practice identifying color families in artwork.
- Collaborative color wheel or chart activity.
- Visual thinking routines (“I see – I think – I wonder”) for artist examples.
- Peer discussion and mini critiques on expressive use of color.

Differentiation / Intervention / Enrichment Options

Differentiation (Support for All Learners):

- Provide color templates, swatch cards, or pre-labeled color wheels to guide students in identifying warm, cool, and neutral colors.
- Offer step-by-step visual demonstrations for mixing and applying paint, including clear examples of opaque vs. translucent techniques.
- Break tasks into smaller steps for students who benefit from scaffolding (e.g., first mix primary colors, then create secondary colors, then experiment with temperature).
- Use peer support or buddy systems, pairing students to model techniques and encourage collaboration.

Intervention (Targeted Support for Struggling Learners):

- Use limited color palettes to reduce cognitive load and focus on warm/cool recognition.
- Provide guided color-mixing exercises with teacher or aide support.
- Offer pre-cut shapes or guided collage elements for students needing fine motor support.
- Check in frequently with students, asking them to verbalize their color choices to reinforce understanding.

Enrichment (Extension for Advanced Learners):

- Challenge students to combine warm and cool colors within a single composition to create dynamic contrasts or mood shifts.
- Encourage exploration of layering, tinting, shading, and transparency to achieve more complex effects.
- Invite students to research a featured artist or culture and create a work inspired by their use of color.

- Have students experiment with mixed media (watercolor + collage, tempera + pastel) to explore how color interacts across surfaces.

For Language Development (MLLs and Emerging Communicators):

- Pre-teach color-related vocabulary with visuals, color swatches, and real-life examples.
- Use sentence starters and frames to support verbal and written expression:
 - “This color feels _____ because _____.”
 - “I used warm colors to show _____.”
 - “I mixed these colors to create _____.”
- Encourage partner talk and small-group discussion to practice using new vocabulary in context.
- Label art materials and classroom areas in multiple languages, when possible, to reinforce word recognition.
- Use visual cues and anchor charts to model language while demonstrating techniques.

Central Bucks School District – Grade 3 Art

Unit 3 – Value, Shape, Form

Desired Results:

In this unit, students explore geometric and organic shapes and learn how to create the illusion of depth and dimension through value, blending, and shading. Students practice controlling light and dark tones to convey form, highlight details, and create shadows. By studying artists, students learn how shape and value communicate mood, structure, and meaning in art.

Essential Questions

- How can we use shapes to create a balanced and interesting composition?
- How does value help make a drawing look three-dimensional?
- What techniques can artists use to show light, shadow, and depth?
- How do artists choose shapes and value to convey meaning or emotion?

Enduring Understandings

The students will know that...

- Geometric shapes have defined rules and attributes, while organic shapes are found in nature.
- Value (lightness or darkness) can create the illusion of three-dimensional form on a two-dimensional surface.
- Artists use blending, shading, and hatching to depict light, shadow, and depth.
- Thoughtful use of shape and value enhances artistic expression and composition.

Knowledge:

Students will know:

- The difference between geometric and organic shapes (square, triangle, circle, rectangle, rhombus, oval).
- How to identify highlights, shadows, and midtones in objects and images.
- Techniques for creating a range of values, including blending, shading, and hatching.

Vocabulary: Geometric shape, Organic shape, Value, Light / Dark / Midtone, Highlight, Shadow, Blending, Shading, Hatching, Form, Contrast

Suggested Artists and Cultures

- Wayne Thiebaud – Use of value and shape in still-life compositions.
- Henri Matisse – Bold shapes, expressive use of form and color.
- Jeff Koons – Large-scale sculptures emphasizing shape and reflective surfaces.
- Ancient Greek Vase Painting – Study of geometric patterns and forms.
- Japanese Ink Wash Painting (Sumi-e) – Use of shading and contrast to depict natural forms.

Skills:

Students will be able to:

- Draw geometric and organic shapes accurately, respecting their attributes.
- Apply value techniques to create depth and three-dimensionality.
- Experiment with light, shadow, and contrast in their artwork.
- Discuss how shape and value influence the viewer's perception and mood.

Standards:

PA Visual Arts Standards

Priority PA Visual Arts Standards

- 9.1.3.A: Recognize and use elements and principles of design to create works of art.
- 9.1.3.B: Recognize, know, use, and demonstrate a variety of appropriate art materials, tools, and techniques.

Supporting PA Visual Arts Standards

- 9.2.3.L: Identify and describe the use of art to express community, cultural, or historical context.
- 9.3.3.A: Recognize critical processes used to interpret works of art.

National Core Arts Standards

Priority National Core Arts Standards

- VA:Cr1.2.3a: Apply knowledge of available resources, tools, and techniques to investigate ideas.
- VA:Cr2.1.3a: Create personally satisfying artwork using blending and shading techniques.

Supporting National Core Arts Standards

- VA:Cr2.2.3a: Demonstrate safe and proficient use of art materials.
- VA:Re7.1.3a: Speculate about processes artists use to create a work of art.
- VA:Cn10.1.3a: Develop a work of art based on observations of form and shape in the environment.

Acceptable Evidence:

Formative Assessments

- Teacher observation during shape and shading exercises.
- Sketchbook practice showing blending, shading, and hatching experiments.
- Quick peer-sharing or “I notice/I wonder” reflections on value techniques.

Summative Assessments

- Completed artwork demonstrating accurate use of geometric and organic shapes, with highlights and shadows.
- Value scales or blending charts showing control of light to dark.
- Reflection explaining how shape and value choices communicate form and meaning.

Suggested Learning Experiences and Instruction

Suggested Learning Experiences

- Practice drawing geometric and organic shapes, labeling attributes.
- Create value scales using pencils or paint to practice blending and shading.
- Apply value techniques to simple still-life objects to show highlights and shadows.
- Study artists (Wayne Thiebaud, Henri Matisse, Jeff Koons) to see use of shape and value in compositions.
- Collaborative exercises where students combine shapes into a group composition.

- Use a gallery walk or peer critique to discuss use of form, value, and shading.
- Experiment with different media (pencil, charcoal, watercolor) to explore contrast and texture.

Instructional Strategies

- Demonstrate blending and shading techniques step by step.
- Use think-alouds to model observation of light and shadow in real objects.
- Partners or small-groups work to reinforce skill practice and peer learning.
- Anchor charts showing step-by-step shading techniques and geometric vs. organic shapes.
- Encourage verbal reflection using vocabulary frames ("I used shading to show...")

Differentiation / Intervention / Enrichment Options

Differentiation:

- Provide templates or stencils for geometric shapes.
- Use step-by-step visual guides for blending and shading.
- Pair students for guided practice and peer modeling.

Intervention:

- Focus on one shape or one value technique at a time.
- Provide pre-drawn shapes to shade for practice.
- Use limited media to simplify blending techniques.

Enrichment:

- Combine multiple shapes into a complex composition with advanced shading.
- Explore reflective or metallic surfaces to experiment with highlights.
- Incorporate three-dimensional modeling using clay to reinforce understanding of form and value.

For Language Development:

- Pre-teach vocabulary with visual examples and real objects.
- Sentence starters: "I shaded this shape to show _____," "The highlight shows _____," "This shape is geometric because _____."
- Encourage students to explain choices orally or with labeled sketches.

Central Bucks School District – Grade 3 Art

Unit 4 – 3D Form & Sculpture

Desired Results:

In this unit, students explore three-dimensional form through hand-building techniques in clay. They learn about diverse types of sculpture, including functional and abstract works, and gain experience with techniques such as scratch-and-attach, glazing, and firing. By comparing two-dimensional and three-dimensional art, students develop a deeper understanding of form, space, and artistic expression. Artists provide inspiration for exploring organic shapes, abstraction, and the transition from 2-D to 3-D form.

Essential Questions:

- How do artists use three-dimensional form to express ideas or emotions?
- What makes a sculpture functional or non-functional?
- How do hand-building techniques help artists create and manipulate form?
- In what ways is working in 3-D space different from creating 2-D artwork?

Enduring Understandings

Students will understand that...

- Sculptures occupy and define space differently than 2-D artwork.
- Artists use form, texture, and volume to communicate meaning and emotion.
- Functional sculpture serves a purpose, while non-functional sculpture emphasizes form and concept.
- Hand-building techniques allow artists to construct and manipulate clay to create three-dimensional artwork.

Knowledge:

Students will know:

- The difference between 2-D and 3-D art.
- Types of sculpture: functional, abstract, and representational.
- Basic hand-building techniques: pinch, coil, slab, scratch-and-attach.
- The kiln firing and glazing process and how it affects clay.

Vocabulary:

- 3-D / Three-dimensional
- Form
- Volume
- Texture
- Functional sculpture
- Abstract sculpture
- Pinch, Coil, Slab
- Scratch-and-attach
- Kiln
- Firing
- Glaze

Suggested Artists and Cultures

- Henry Moore – Abstract sculptor emphasizing organic forms and mass.
- Frank Stella – Explores 2-D to 3-D forms and structure in visual art.
- Louise Nevelson – Assemblage sculptures using found objects.
- Ancient Greek Sculpture – Classical understanding of form, proportion, and representation.
- Native American Clay Traditions – Functional pottery and sculptural forms reflecting cultural heritage.

Skills:

Students will be able to:

- Construct a three-dimensional clay sculpture using hand-building techniques.
- Apply scratch-and-attach methods to combine clay elements securely.
- Use glaze to enhance surface texture and visual interest.
- Compare and reflect on the differences between 2-D and 3-D artwork.
- Discuss and critique sculptures using proper vocabulary.

Standards:

PA Visual Arts Standards

Priority PA Visual Arts Standards

- 9.1.3.A: Recognize and use elements and principles of design to create 3-D works.
 - 9.1.3.B: Demonstrate appropriate use of materials, tools, and techniques for sculpture.
- Supporting PA Visual Arts Standards
- 9.2.3.C: Identify works of art that reflect cultural traditions and artistic expression.
 - 9.3.3.A: Apply critical processes to examine 3-D artwork.

National Visual Arts Standards

Priority National Core Arts Standards

- VA:Cr1.1.3a: Elaborate on ideas to create 3-D forms.
 - VA:Cr2.1.3a: Create personally satisfying sculpture using hand-building techniques.
- Supporting National Core Arts Standards
- VA:Cr2.2.3a: Demonstrate safe and proficient use of clay tools and materials.
 - VA:Re7.1.3a: Discuss how artists develop form in sculpture.
 - VA:Cn10.1.3a: Develop 3-D artwork based on observation and design principles.

Acceptable Evidence:

Formative Assessments

- Teacher observation of clay handling, scratch-and-attach technique, and kiln preparation.
- Sketches and planning of 3-D designs in sketchbooks.
- Short reflections comparing 2-D and 3-D art experiences.

Summative Assessments

- Completed clay sculpture demonstrating form, volume, and surface detail.
- Application of glazing and firing techniques to finish work.
- Written or verbal reflection on the differences between functional and non-functional sculpture.
- Peer and self-assessment using CBSD Art Department Rubric.

Suggested Learning Experiences and Instruction

Suggested Learning Experiences –

- Demonstrate and practice hand-building techniques: pinch, coil, slab, and scratch-and-attach.
- Explore the difference between 2-D and 3-D forms with drawing exercises and sculptural studies.
- Create a small functional sculpture (e.g., vessel or container) using proper hand-building and joining techniques.
- Create a non-functional abstract sculpture emphasizing organic form or design inspired by Henry Moore.
- Apply glaze and discuss its effect on surface and texture.
- Reflect and share work in small groups or class critique, comparing use of space, form, and texture.
- Study 3-D artists to understand different approaches to form and function.

Instructional Strategies:

- Teacher demonstration and step-by-step modeling of hand-building and joining techniques.
- Visual examples of 3-D artwork to discuss form and structure.
- Think-alouds during glazing and sculpting to show decision-making process.
- Peer and group critiques to practice art vocabulary and constructive feedback.
- Scaffolded support for assembling complex forms and planning multiple components.

Differentiation / Intervention / Enrichment Options

Differentiation:

- Provide templates or simple clay forms for students who need guidance.
- Use visual and verbal modeling of steps for hand-building and glazing.
- Offer adaptive tools for students with fine motor challenges.

Intervention:

- Focus on one technique at a time (e.g., pinch or coil) before combining.
- Provide pre-scored or pre-slabbed clay for students needing support with joining.
- Offer additional guided demonstrations for glazing and kiln use.

Enrichment:

- Encourage creating multi-part sculptures or combining 2-D and 3-D elements.
- Challenge students to experiment with abstract forms inspired by artists like Henry Moore or Frank Stella.
- Explore mixed-media sculptural work using clay combined with found materials.

For Language Development:

- Pre-teach key vocabulary with labeled visuals and clay demonstrations.
- Sentence frames: “I used ____ technique to create ____,” “This sculpture is functional because ____,” “This sculpture shows ____ form.”
- Encourage partner talk to describe process and artistic choices.
- Use visual cues to reinforce concepts like form, volume, and texture.

Central Bucks School District – Grade 3 Art

Unit 5 – Line & Pattern

Desired Results:

In this unit, students explore the expressive potential of line and the use of repetition to create patterns. Students learn how line weight, direction, and contour can define shape, movement, and positive space in artwork. Through hands-on exercises and study of artists, students create patterned compositions that demonstrate intentional use of line and repetition.

Essential Questions

- How does line affect movement, space, and pattern in artwork?
- What is the difference between contour line and expressive line?
- How can repetition of line, shape, or color create rhythm or pattern?
- How do artists use lines and patterns to communicate meaning or emotion?

Enduring Understandings

The students will know that

- Lines can vary in weight, direction, and movement to create visual interest.
- Repetition of line, shape, and color creates pattern and rhythm.
- Contour lines define edges and help communicate form and space.
- Artists make deliberate choices in line and pattern to guide the viewer's eye and convey meaning.

Knowledge:

Students will know:

- Types of lines: horizontal, vertical, diagonal, thick, thin.
- Contour line as a tool for outlining shapes.
- How repetition of line, shape, and color creates pattern.
- Line can be used as the main or positive space in a composition.

Vocabulary:

- Line
- Line weight
- Horizontal
- Vertical
- Diagonal
- Contour line
- Pattern
- Repetition
- Movement
- Positive space

Suggested Artists and Cultures:

- Piet Mondrian – Geometric lines and balanced compositions.
- Henri Matisse – Expressive line and cut-out shapes.
- Yayoi Kusama – Repetition and polka-dot patterns.

- Wassily Kandinsky – Lines creating rhythm and abstract movement.
- Gustav Klimt – Decorative line patterns in painting.
- Islamic Geometric Art – Repetition of line and shape in intricate designs.
- African Textile Patterns – Use of repeated lines and motifs to create rhythm and meaning.

Skills:

Students will be able to:

- Draw and vary line weight, direction, and style to create visual interest.
- Use contour line to define shapes.
- Create patterns through repetition of line, shape, and/or color.
- Discuss how line choices affect movement and space in their artwork.
- Reflect on how line and pattern convey rhythm, mood, or focus.

Standards:

PA Visual Arts Standards

Priority PA Visual Arts Standards

- 9.1.3.A: Recognize and use elements and principles of design to create works of art.
- 9.1.3.B: Recognize, know, use, and demonstrate a variety of appropriate art materials, tools, and techniques.

Supporting PA Visual Arts Standards

- 9.2.3.L: Identify and describe art that reflects cultural patterns and designs.
- 9.3.3.A: Recognize critical processes used to examine works of art.

National Core Arts Standards

Priority National Core Arts Standards

- VA:Cr1.2.3a: Apply knowledge of resources and tools to create patterns and designs.
- VA:Cr2.1.3a: Create personally satisfying artwork using line and pattern.

Supporting National Core Arts Standards

- VA:Cr2.2.3a: Demonstrate safe and proficient use of art materials.
- VA:Re7.1.3a: Discuss how artists use line and pattern to convey meaning.
- VA:Cn10.1.3a: Develop a work of art based on observation and design principles.

Acceptable Evidence:

Formative Assessments

- Observation during line exercises and pattern creation.
- Sketchbook or notebook practice with varied lines and repetitions.
- Peer discussion or mini-reflections on how line and pattern create rhythm and movement.

Summative Assessments

- Completed artwork demonstrating varied lines, contour, and repeated patterns.
- Use of positive space and expressive line in composition.
- Written or verbal reflection on how line and pattern influence visual impact.
- Peer and self-assessment using **CBSD Art Department Rubric**.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Experiment with different line types and weights using pencil, marker, or paint.
- Practice contour line drawing to define shapes and edges.
- Create patterns by repeating lines, shapes, and colors across a surface.
- Study artist examples and identify how line and repetition create rhythm and emphasis.
- Combine geometric and organic shapes in a patterned composition.
- Collaborative pattern-making exercises to explore repetition and movement.
- Reflect on the visual impact of line and pattern in student work and peers' work.

Instructional Strategies:

- Teacher modeling line variation and pattern creation.
- Guided exercises exploring horizontal, vertical, diagonal, and contour lines.
- Use think-alouds to demonstrate repetition and rhythm.
- Peer and group critiques with sentence frames for art vocabulary.
- Anchor charts showing examples of expressive and contour lines, and repeated patterns.

Differentiation / Intervention / Enrichment Options

Differentiation:

- Provide line templates or pre-drawn shapes for students needing guidance.
- Use visual charts to show line types, weights, and directions.
- Offer small-group modeling for students needing extra support with repetition and pattern planning.

Intervention:

- Focus on one type of line at a time before combining complex patterns.
- Use limited shapes or colors for patterned exercises.
- Provide guided tracing exercises for fine motor or motor-planning support.

Enrichment:

- Encourage students to create multi-layered patterns with varied line weights and directions.
- Explore cultural or historical patterns, integrating research into artwork.
- Challenge students to combine multiple media (e.g., marker + watercolor) to create dynamic patterned compositions.

For Language Development:

- Pre-teach vocabulary with visuals and examples of patterns in art.
- Sentence frames: "I used ____ type of line to show ____," "The repetition of ____ creates ____," "This line acts as positive space because ____."
- Encourage partner talk or group discussions to explain pattern choices.
- Label materials and anchor charts to reinforce vocabulary.

Central Bucks School District – Course of Study – Grade 3 Art

Unit 6 – Art History and Cultures

Desired Results:

In this unit, students explore art history and cultural heritage through the lens of ancient Egypt, Greece, and Rome. They learn to recognize key symbols, significant artworks, and the roles of artists within these civilizations, using developmentally appropriate vocabulary. Students gain insight into how historical context, artistic purpose, and cultural values shape creative expression. This content is designed to be woven throughout Units 1–5, enriching lessons and helping students connect contemporary artmaking to historical traditions and global perspectives.

Essential Questions

- How did art reflect the beliefs and values of ancient Egypt and Greece?
- What symbols or design elements help us understand a culture's artwork?
- How do artists use their skills to serve their community or society?
- How can we apply lessons from historical art to our own creative work?

Enduring Understandings

- Art reflects cultural values, beliefs, and historical context.
- Artists have served important social, religious, and functional roles throughout history.
- Symbols, motifs, and design elements convey meaning across time and place.
- Learning about art history enhances observation, interpretation, and creative choices.

Knowledge:

Students will know:

- Key features of ancient Egyptian art, such as pyramids, pharaohs, hieroglyphics, tombs, sarcophagi, and gods/goddesses.
- Key features of ancient Greek/Roman art and architecture, such as columns, temples, statues, pottery, and mythological subjects.
- Names of notable historical artists such as Imhotep, Thutmose, Bek, Phidias, Polykleitos, and Exekias.
- How symbolism, function, and design contribute to meaning in historical art.

Vocabulary:

- Ancient Egypt / Greek / Roman, Symbol, Design, Pharaoh, Pyramid, Hieroglyphics, Sarcophagus, Mummy, Tomb, Papyrus, Gods/Goddesses, Myth, Olympics, Pottery, Column, Temple, Statue, Athena, Parthenon, Imhotep, Thutmose, Bek, Phidias, Polykleitos, Exekias

Suggested Artists and Cultures:

- Imhotep – Ancient Egyptian architect and artist, designer of the Step Pyramid.
- Thutmose – Egyptian sculptor known for statues of Pharaohs and deities.
- Bek – Ancient Egyptian royal sculptor.
- Phidias – Greek sculptor of the Parthenon and Athena statue.
- Polykleitos – Greek sculptor, known for idealized human proportions.
- Exekias – Ancient Greek vase painter and potter.
- Ancient Egyptian Art – Symbolism in tombs, pyramids, and sarcophagi.

- Ancient Greek / Roman Art – Architecture, sculpture, and pottery reflecting mythology, civic ideals, and daily life.

Skills:

Students will be able to...

- Identify and describe key features of Egyptian and Greek/Roman artworks.
- Use age-appropriate art vocabulary to discuss historical works.
- Compare historical artworks to contemporary projects.
- Draw connections between culture, purpose, and artistic choices.
- Reflect on how historical art inspires or informs their own creative work.

Standards:

Pa Visual Arts Standards

Priority PA Visual Arts Standards

- 9.1.3.C: Understand how art is connected to culture, society, and history.
- 9.2.3.A: Identify and describe art from different historical and cultural contexts.

Supporting PA Visual Arts Standards

- 9.2.3.L: Recognize art that expresses cultural values, community identity, and historical context.
- 9.3.3.A: Examine processes and techniques used by historical artists.

National Core Arts Standards

Priority National Core Arts Standards

- VA:Re7.1.3a: Identify and describe how cultural and historical context informs art.
- VA:Cn10.1.3a: Use knowledge of historical art to develop personal artwork.

Supporting National Core Arts Standards

- VA:Re8.1.3a: Analyze how images influence understanding of time and place.
- VA:Cn11.1.3a: Make connections between personal artwork and historical/cultural art.

Acceptable Evidence:

Formative Assessments

- Observation and discussion of student engagement during history lessons.
- Sketchbook exercises drawing Egyptian or Greek motifs.
- Short reflections comparing historical and contemporary art.

Summative Assessments

- Written or verbal description of a chosen historical artwork using vocabulary.
- Artwork inspired by historical symbols, patterns, or architecture.
- Peer or teacher evaluation of accuracy in identifying historical features and symbolic meaning.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Examine images or replicas of Egyptian pyramids, tombs, sarcophagi, and Greek temples.
- Identify and discuss key symbols and motifs in ancient artwork.

- Draw or paint patterns and designs inspired by Egyptian or Greek art.
- Compare functional objects (pottery, architecture) and purely decorative artwork.
- Explore how artists like Imhotep, Phidias, and Exekias balanced function, design, and meaning.
- Integrate historical references into ongoing projects in Units 1–5 when relevant (e.g., using Egyptian patterns in a mural, Greek forms in sculpture).
- Reflect on how understanding history enhances observation and creative decisions.

Instructional Strategies:

- Use visual aids and replicas to introduce key artworks.
- Storytelling and discussion to explain cultural context and symbolism.
- Guided sketching or tracing of historical motifs.
- Think-alouds to connect historical art techniques to contemporary classroom projects.
- Encourage pair or small-group discussions to verbalize observations and insights.

Differentiation / Intervention / Enrichment Options

Differentiation:

- Provide labeled visuals of symbols and artworks for reference.
- Offer guided tracing or templates for sketching historical patterns.
- Scaffold discussion questions for students needing language support.

Intervention:

- Focus on identifying one key symbol or artwork per lesson.
- Use simplified timelines and maps to contextualize ancient cultures.
- Provide sentence starters for describing artworks: “This artwork shows _____,” “The symbol means _____.”

Enrichment:

- Research additional artists, symbols, or architecture from the cultures studied.
- Compare Egyptian and Greek art with art from another world culture.
- Incorporate historical motifs into larger creative projects across Units 1–5.

For Language Development:

- Pre-teach key vocabulary with images, gestures, or props.
- Use sentence frames: “I notice _____ in this artwork,” “This symbol represents _____.”
- Encourage oral descriptions, paired reading of historical texts, and sketch-to-speak exercises.



Grade 4 Art

Course Number: 4AR Art - 04

Course Level: Academic

Grade: 4th

Development Date: 2025 - 2026

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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**Central Bucks School District
Teaching and Learning Principles**

K – 12 Art Program Learning Principles

1. All learners are capable of complex and high-quality work if the right learning conditions are established.
2. Students of art learn when modeling of products and processes are demonstrated that address appropriate learning criteria.
3. Students learn when they are focused on the objectives and actively engaged in the learning experience.
4. Students of art learn when a connection is made to prior learning and personal interests.
5. Students learn when they are provided with a safe environment where they can experiment and take creative risks.
6. Learning is most effective when differences in learners' prior knowledge, interests, and strengths are accommodated.
7. Learners succeed when they believe the task is attainable with reasonable effort.
8. Students learn when they see and demonstrate links between new learning, possibilities for future learning, and its multi-disciplinary applications.
9. Greater learning depends upon repeated performance to increase fluency and accuracy.
10. Students learn when they reflect upon and summarize the learning experience.
11. Successful learning requires the ability to reflect, self-assess and use feedback to self-adjust.
12. Various visual arts processes can foster creative thinking, providing students with an essential real-world skill.
13. Students can use the creative process to problem solve and generate new concepts for learning.
14. Students of art can use appropriate technology to enhance creative growth and creative process.

Central Bucks School District – Grade 3 Art

Enduring Understandings

Students will understand that:

Creating (NCAS Create) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- Self-expression is central to creativity. Artists use visual elements—such as color, line, and form—to communicate emotions, identity, and personal stories.
- Color is a powerful tool for communication. Understanding color theory, including tertiary colors, helps artists express mood, emotion, and meaning in their work.
- Space and balance enhance visual impact. Artists organize space using foreground, middleground, background, and positive/negative space to create depth and harmony.
- Three-dimensional form conveys structure and story. Sculptural techniques like pinching, coiling, and slab-building allow artists to create expressive, tactile works that reflect personal and cultural narratives.
- Line creates movement and rhythm. Varied line styles and repetition guide the viewer's eye, unify compositions, and express energy or emotion.

Connecting (NCAS Connect) — PA Visual Arts: 9.2 Historical & Cultural Contexts (Visual Arts)

- Art builds community. Collaborative artmaking allows individuals to express shared ideas, celebrate diversity, and foster a sense of belonging.
- Art reflects history and culture. Historical and folk art traditions use motifs, symbols, and techniques to communicate beliefs, values, and everyday life across time and place.
- Art connects disciplines and supports lifelong skills. Visual arts foster problem-solving, collaboration, and creative thinking applicable across academic and real-world contexts.

Responding (NCAS Respond) — PA Visual Arts: 9.3 Critical Response (Visual Arts)

- Artmaking involves thoughtful choices and reflection. Artists plan, revise, and assess their work to improve craftsmanship and communicate ideas effectively.

Presenting (NCAS Present) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- Art builds community. Collaborative artmaking allows individuals to express shared ideas, celebrate diversity, and foster a sense of belonging.

Central Bucks School District
Grade 4 Art
Essential Questions

Creating (NCAS Create) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- How can artists use color to show emotion or express who they are?
- What are tertiary colors, and how are they created?
- How can color choices help communicate ideas in art?
- How do artists use space and balance to organize their artwork?
- What is the difference between positive and negative space?
- How do foreground, middleground, and background help create depth?
- How can artists use symmetry, repetition, or contrast to create visual balance?
- How can artists transform clay into three-dimensional forms?
- What are the different hand-building techniques and when are they used?
- How do artists use texture, pattern, and relief to enhance sculptures?
- How can artists use different types and weights of line to create movement and energy in artwork?
- In what ways does repetition and pattern contribute to visual rhythm and balance?
- How can details and embellishments enhance the meaning or mood of an artwork?
- How do artists use line to guide the viewer's eye and communicate ideas or emotion?

Connecting (NCAS Connect) — PA Visual Arts: 9.2 Historical & Cultural Contexts (Visual Arts)

- How can art bring people together to create a sense of community?
- In what ways can our individual artwork express who we are within a group?
- In what ways can color connect to our feelings and relationships with others?
- How can three-dimensional artwork communicate personal or cultural stories?
- How did people in the past use art to tell stories and communicate ideas?
- What can art from different historical periods teach us about culture and everyday life?
- How do motifs and symbols convey meaning in art?
- How can we use historical styles to inspire our own creative expression?

Responding (NCAS Respond) — PA Visual Arts: 9.3 Critical Response (Visual Arts)

- What responsibilities do artists have when working together on a shared project?
- How do routines and studio habits help artists work safely and creatively?

Presenting (NCAS Present) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- How can art bring people together to create a sense of community?

Central Bucks School District – Course of Study Overview

Grade 4 Art

Desired Results

Course Description:

Students develop creative thinking and artistic skills through hands-on exploration of color theory, spatial design, sculpture, and art history. Projects emphasize self-expression, collaboration, and cultural awareness, including studies of Renaissance, Middle Ages, and Pennsylvanian Folk Art. The course fosters confidence, craftsmanship, and community through both individual and group artworks.

Prerequisite: N/A

Committee Members: CBSD Elementary Art team

Acceptable Evidence.

Completed Art Projects

- Final artworks demonstrating thoughtful use of color, shape, line, pattern, and 3D form.
- Sculptures showcasing craftsmanship and hand-building techniques.

Sketchbook Entries

- Planning sketches, color studies, and practice exercises that show creative exploration.
- Reflections on technique, process, and personal artistic choices.

Student Reflections

- Written or verbal reflections on materials, outcomes, and cultural or historical influences.
- Comparisons between 2D and 3D work, emphasizing self-expression and growth.

Peer Feedback

- Active participation in critique sessions.
- Thoughtful and constructive comments that support collaborative learning.

Vocabulary Use

- Accurate and purposeful use of art vocabulary in discussions and written reflections.

Artist Connections

- Responses to studied artists (e.g., Henry Moore, Alma Thomas) that show understanding of style and context.
- Artworks inspired by Renaissance, Middle Ages, and Pennsylvanian Folk Art traditions.

Collaborative Work

- Group projects that foster classroom community and shared artistic goals.

Process Documentation

- Photos, notes, or digital records showing stages of project development and decision-making.

Course Grading: CBSD Art Department Common Language Rubric

Central Bucks School District

Grade 4 Art – Pacing Guide

UNITS of Study	Unit 1- Social & Emotional Learning	Unit 2 – Color	Unit 3 Space & Balance	Unit 4 – 3-D Form & Sculpture	Unit 5– Line	Unit 6 – Art History & Cultures
DAYS	2	7	7	7	7	5

NOTE:

All units of study align with the PA Visual Arts Standards and National Standards. Each unit will employ the creative process, with specific, daily, and ongoing formative feedback. This creative cycle is a progression that will repeat until a point of completion is determined:

1. Inspire & Research
2. Plan, Sketch and Practice
3. Envision, Create & Revise
4. Share, Reflect and Assess

Units of study may need to be combined & overlapped to account for studio space, equipment/materials, and the teacher’s professional judgment based on differentiated student needs.

Content	Days
Unit 1 - Social & Emotional Learning	
Inspire & Research	2
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	
Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC)	
Unit 2 - Color	
Inspire & Research	7
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	
Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC)	
Unit 3 – Space & Balance	
Inspire & Research	7
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	

Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC)	
Unit 4 – 3-D Form & Sculpture	
Inspire & Research	7
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	
Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC)	
Unit 5 - Line	
Inspire & Research	7
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	
Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC)	
Unit 6 art History & Culture Threaded throughout units	
Inspire & Research	6
Plan, Sketch and Practice	
Envision, Create & Revise	
Share, Reflect and Assess	
Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC)	

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Central Bucks School District – Course of Study – Grade 4 Art

Unit 1 – Social and Emotional Learning

Desired Results:

Students will explore a variety of art materials and themes through the creation of a collaborative class or school wide art display. Students will become familiar with art room expectations and routine through direct instruction and practice. Students will understand the value of self-expression as part of a community display and how to be an active member of a school community.

Essential Questions:

- How can art bring people together to create a sense of community?
- In what ways can our individual artwork express who we are within a group?
- What responsibilities do artists have when working together on a shared project?
- How do routines and studio habits help artists work safely and creatively?

Enduring Understandings:

Students will understand that...

- Artists can use collaboration to express shared ideas and build community.
- Every artist's voice and vision adds to the beauty and meaning of a collective artwork.
- Successful artmaking involves respect for materials, space, and one another.
- Art class routines and studio habits support creativity, safety, and positive artistic explorations

Knowledge

Students will know...

- The routines, procedures, and expectations that help the art room function safely and respectfully.
- The value of self-expression in sharing ideas, emotions, and identity through art.
- How to be an active and positive member of a creative community.
- That artists can work together to create collaborative art that communicates shared messages and builds connections.
- That murals and large-scale displays can express ideas about identity, belonging, and community pride.

Vocabulary

- **Growth Mindset** – Believing that persistence and effort help me improve.
- **Collaborate** – Working together with others to create something as a team.
- **Community** – A group of people who share a space, purpose, or goal while celebrating similarities and differences.
- **Mural** – A large artwork painted or created directly on a wall or public surface.
- **Self-Expression** – Sharing ideas, thoughts, and feelings through creative choices in art.

Suggested Artists (*not limited to*)

- **Kelsey Montague** – A contemporary artist based in Nashville, known for large wall murals filled with doodles or Zentangle-style patterns. Her *#WhatLiftsYou* project invites people to interact with her murals by taking photos and reflecting on what brings them joy.
- **Greg Mike** – A contemporary muralist from Atlanta, Georgia, known for his colorful, cartoon-like characters and vibrant street art. Originally influenced by graffiti, his work now appears in cities around the world.

- **Peter H. Reynolds** – Author and illustrator of *The Dot*, a children’s book that celebrates creativity, courage, and individuality. His work has inspired *International Dot Day*, where people around the world create art starting with just a dot.
- **Diego Rivera** – A Mexican muralist whose large frescoes depict scenes of Mexican life, culture, and history. His murals helped inspire public art movements around the world.

Skills

Students will be able to...

- Follow classroom routines and use art materials safely and responsibly.
- Contribute ideas and artwork to a collaborative group project.
- Use visual elements (line, shape, color, repetition) to express personal identity and feelings.
- Demonstrate teamwork, respect, and encouragement while creating with others.
- Reflect on their role in the classroom community and how art can bring people together.
- Describe how artists use murals and public art to share messages and celebrate community.

Standards Alignment

PA Visual Arts Standards

Priority Standards:

- 9.1.5.A – Know and use the elements and principles of each art form to create works in the arts and humanities.
- 9.1.5.B – Recognize, know, use, and demonstrate a variety of appropriate arts elements and principles to produce, review, and revise original works.
- 9.1.5.C – Identify and use comprehensive vocabulary within the arts.
- 9.1.5.H – Handle materials, equipment, and tools safely at work and performance spaces.
- 9.4.5.A – Identify uses of expressive symbols that show empathy, community, and connection through the arts.

Supporting Standards:

- 9.2.5.A – Explain the historical, cultural, and social context of an individual work in the arts.
- 9.3.5.A – Identify critical processes used in the examination of works in the arts and humanities.
- 9.4.5.B – Describe why the arts are important in daily life and within a community.

National Core Arts Standards

Priority Standards:

- VA:Cr1.1.4a – Brainstorm multiple approaches to a creative art or design problem.
- VA:Cr2.1.4a – Explore and invent art-making techniques and approaches.
- VA:Cr2.2.4a – Collaboratively set goals and create artwork that is meaningful and has personal or community relevance.
- VA:Pr6.1.4a – Analyze how art exhibited inside and outside of schools (in museums or community settings) contributes to communities.

Supporting Standards:

- VA:Re7.1.4a – Compare responses to a work of art before and after experiencing it in different ways.
- VA:Cn10.1.4a – Create works of art that reflect community cultural traditions.
- VA:Cn11.1.4a – Recognize that people use art to communicate experiences and ideas.

Acceptable Evidence:

Performance Tasks:

- Students collaboratively design and create a class or school-wide mural or community art display that communicates a shared theme (e.g., belonging, kindness, or creativity).
- Each student contributes an individual artwork or section that expresses personal identity or ideas, demonstrating understanding of self-expression within a group project.
- Students participate in a class reflection or artist statement, describing how their work contributes to the overall meaning of the collaborative piece.
- Students demonstrate safe and respectful artroom practices while using materials and working with peers.

Acceptable Evidence of Learning Other Than Performance Tasks:

Formative Assessment:

- Teacher observation of student engagement, cooperation, and adherence to artroom routines.
- Quick sketch or journal entry illustrating what “community” means in art.
- Group brainstorming and planning sketches for the class mural.
- Vocabulary and concept checks (oral discussion or visual matching).
- Exit ticket: “One way I helped my art community today...”

Summative Assessment:

- Completed collaborative mural or class display evaluated on creativity, teamwork, craftsmanship, and communication of theme.
- Individual reflection or self-assessment rubric addressing effort, collaboration, and understanding of self-expression.
- Peer feedback discussion: students identify how the artwork represents shared ideas and community.
- Teacher evaluation of participation, safe material use, and adherence to expectations during the creative process.

Suggested Learning Experiences and Instruction

Learning Experiences:

- **Community Brainstorm:** Begin with a class discussion on what “community” means. Create a visual web or anchor chart with student ideas about belonging, helping others, and expressing identity through art.
- **Artist Exploration:** Introduce selected artists (Kelsey Montague, Greg Mike, Peter H. Reynolds, Diego Rivera). Show visuals and guide students in noticing colors, symbols, and messages that connect to community and self-expression.
- **Mini Practice Activities:**
 - Draw or paint a symbol that represents “what lifts you.”
 - Create a “dot” inspired by *The Dot* to express individuality.
 - Experiment with color, pattern, and line to create a personal motif or emblem.
- **Collaborative Design Planning:** In groups or as a class, sketch ideas for a mural or community display. Decide on a shared theme or message that represents the class.
- **Final Collaborative Artwork:** Students contribute individual sections or panels to a class mural or installation. Combine pieces into one display to represent unity and diversity within the classroom community.
- **Reflection and Sharing:** Hold a class gallery walk or presentation where students explain how their section expresses who they are and how the final artwork builds community.

Instructional Strategies:

- **Modeling and Guided Practice:** Demonstrate artroom routines, safe material use, and collaborative decision-making.
- **Think-Alouds:** Verbalize how artists plan, experiment, and problem-solve during creation.
- **Visual Supports:** Use step-by-step visuals, anchor charts, and exemplar artworks to clarify expectations.
- **Collaborative Learning:** Encourage students to share materials, exchange feedback, and make creative choices together.
- **Reflection and Discussion:** Facilitate short group reflections after each work session to reinforce community values and studio habits.
- **Integrating Art Vocabulary:** Embed key terms (collaboration, mural, community) in instructions and class dialogue.

Differentiation / Intervention / Enrichment Options:

- **For Diverse Learners:**
 - Provide visual instructions and checklists for students who benefit from structure.
 - Offer pre-cut shapes or guided templates for students needing fine motor support.
 - Allow alternative media choices (collage, drawing, digital art) for varied comfort levels.
 - Assign supportive peer partners or “art buddies” to model teamwork.
- **For Enrichment:**
 - Challenge advanced learners to design layout plans for the mural or lead color palette selection.
 - Encourage independent research on a chosen mural artist and a short presentation or digital slide.
 - Offer opportunities to add 3D or mixed-media elements to the mural for texture and depth.
- **For Intervention:**
 - Break the project into smaller, sequential goals with visual progress tracking.
 - Provide guided sentence stems for reflections (e.g., “My artwork shows...”).
 - Use small group instruction to reteach concepts or routines as needed.

For Language Development:

- Pre-teach key vocabulary with visuals, gestures, and real examples (e.g., photos of murals, community art).
- Use sentence frames to support oral and written expression (e.g., “Our class mural shows...” or “I worked with my group by...”).
- Incorporate multilingual labels or translations of core terms (community, mural, collaborate).
- Encourage partner talk before whole-group sharing to build confidence and fluency.
- Connect vocabulary to personal experiences (“Where have you seen art in your community?”).
- Display anchor charts and bilingual visuals that stay up for reference throughout the unit.

Central Bucks School District – Course of Study – Grade 4 Art

Unit 2 – Color: Tertiary

Desired Results:

In this unit, students will deepen their understanding of color theory by exploring tertiary colors—created by mixing primary and secondary colors. Students will apply this knowledge to create expressive artworks that communicate emotion and individuality through color choices. Building upon the collaborative and community themes from Unit 1, students will reflect on how color can express feelings, moods, and relationships, enhancing both their technical skills and their social-emotional awareness.

Essential Questions:

- How can artists use color to show emotion or express who they are?
- What are tertiary colors, and how are they created?
- How can color choices help communicate ideas in art?
- In what ways can color connect to our feelings and relationships with others?

Enduring Understandings:

Students will understand that...

- Artists use color intentionally to express emotions, ideas, and identity.
- Tertiary colors are created by mixing primary and secondary colors.
- Knowledge of the color wheel helps artists make creative choices that strengthen their artwork.
- Color can be a powerful tool for communication and self-expression.

Knowledge

Students will know...

- How primary and secondary colors mix to form tertiary colors.
- The placement and relationship of colors on the color wheel.
- That color choices can express emotions or ideas in artwork.
- The terms hue, saturation, and value as ways to describe color.
- How to use color intentionally to create visual balance and harmony.

Vocabulary

- **Primary Colors** – Red, yellow, and blue; colors that cannot be made by mixing others.
- **Secondary Colors** – Orange, green, and purple; created by mixing two primary colors.
- **Tertiary Colors** – Colors made by mixing a primary and a secondary color next to each other on the color wheel (e.g., red-orange, blue-green).
- **Hue** – Another word for color.
- **Saturation** – The intensity or brightness of a color.
- **Color Wheel** – A circular diagram that shows relationships between colors.

Suggested Artists (not limited to)

- Wassily Kandinsky – Used abstract shapes and colors to express emotions and music.
- Henri Matisse – Known for his use of vibrant color and expressive cut-paper collages.
- Alma Thomas – African American painter celebrated for her joyful, rhythmic use of color and brushstrokes.
- Peter H. Reynolds – Author and illustrator of *Sky Color*, emphasizing creativity and seeing color in new ways.

Skills

Students will be able to...

- Identify and mix tertiary colors accurately using paint or digital tools.
- Arrange and label colors on a color wheel.
- Use color purposefully to express emotion or mood in a composition.
- Apply understanding of color relationships to improve visual balance.
- Reflect on how their color choices communicate feelings or ideas.

Standards Alignment

PA Visual Arts Standards

Priority:

- 9.1.5.A – Know and use the elements and principles of art to create works in the arts.
- 9.1.5.B – Demonstrate use of arts elements to produce, review, and revise works.
- 9.1.5.C – Identify and use comprehensive arts vocabulary.
- 9.1.5.H – Handle materials, equipment, and tools safely.

Supporting:

- 9.2.5.A – Explain cultural and social context of an artwork.
- 9.3.5.A – Identify critical processes used in the examination of works in the arts.
- 9.4.5.A – Identify uses of expressive symbols that show emotion and connection through the arts.

National Core Arts Standards

Priority:

- VA:Cr1.1.4a – Brainstorm multiple approaches to a creative art problem.
- VA:Cr2.1.4a – Explore and invent art-making techniques and approaches.
- VA:Cr2.2.4a – Collaboratively set goals and create meaningful artwork.

Supporting:

- VA:Re7.1.4a – Compare responses to a work of art before and after experiencing it in different ways.
- VA: Cn11.1.4a – Recognize that people use art to communicate experiences and ideas.

Acceptable Evidence:

Performance Tasks:

- Create an expressive artwork using tertiary colors to communicate a specific emotion or mood.
- Label and present a personal color wheel showing primary, secondary, and tertiary colors.
- Participate in a class critique, identifying how color affects emotion and meaning in peers' work.

Formative:

- Observation and feedback during color-mixing activities.
- Sketchbook planning pages demonstrating correct color relationships.

Summative:

- Final artwork assessed on technical accuracy (color mixing) and expressive quality.
- Written or verbal reflection on how color communicates emotion.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Demonstrate color mixing to review primary and secondary colors.
- Introduce tertiary colors and model mixing techniques.
- Guide students in creating a personal color wheel with labeled sections.
- Explore how colors can represent feelings using abstract painting or design.
- Students create an expressive composition that uses tertiary colors to convey a chosen emotion (e.g., joy, calm, excitement).
- Display finished works with artist statements describing their emotional color choices.

Instructional Strategies:

- Direct demonstration and guided practice.
- Visual references and anchor charts for vocabulary and process.
- Think-alouds to explain expressive color decisions.
- Peer discussion and critique circles focused on mood and color.
- Integration of social-emotional check-ins (“How do colors make you feel today?”).

Differentiation / Intervention / Enrichment Options:

- **Differentiation:** Provide pre-mixed color examples or color recipe cards for additional support.
- **Intervention:** Scaffold with color-mixing worksheets and one-on-one guided practice.
- **Enrichment:** Challenge students to design complementary or analogous color schemes; introduce digital art tools for color exploration.
- **Collaboration:** Pair students strategically for peer modeling or language support.

For Language Development:

- Use labeled color charts and visuals to reinforce vocabulary.
- Provide sentence frames such as “This color makes me feel...” or “I mixed ____ and ____ to make...”.
- Encourage partner talk and collaborative critique using accessible language.
- Connect color terms to real-life objects (e.g., “orange like a sunset,” “blue like the sky”).
- Offer multilingual color vocabulary references for multilingual learners.

Central Bucks School District – Course of Study – Grade 4 Arts

Unit 3: Space and Balance

Desired Results:

In this unit, students will explore how artists use space and balance to create visually engaging and well-organized compositions. They will learn to identify and use positive and negative space, as well as foreground, middleground, and background, to show depth and create interest. Students will apply these concepts in both two-dimensional and paper-cut artworks inspired by global art traditions such as Polish Wycinanki, Japanese Notan, and the optical designs of M.C. Escher. Through observation, discussion, and hands-on practice, students will develop an understanding of how thoughtful use of space contributes to the overall balance and success of an artwork.

Essential Questions:

- How do artists use space and balance to organize their artwork?
- What is the difference between positive and negative space?
- How do foreground, middleground, and background help create depth?
- How can artists use symmetry, repetition, or contrast to create visual balance?

Enduring Understandings:

Students will understand that...

- Artists organize space to create balance, depth, and visual interest.
- Positive and negative space work together to define form and composition.
- Foreground, middleground, and background help show distance and perspective.
- Art from different cultures demonstrates creative ways to use space and balance.

Knowledge:

Students will know...

- The definitions and visual differences between positive and negative space.
- How to identify foreground, middleground, and background in an image.
- That balance in art can be achieved through symmetry, contrast, and repetition.
- That artists use composition to organize visual elements effectively.
- Examples of cultural art forms that emphasize space and balance, such as Wycinanki (Polish paper cutting) and Japanese Notan art.

Vocabulary:

- **Positive Space** – The areas of an artwork that contain the main subjects or forms.
- **Negative Space** – The empty or open areas surrounding the main subjects; the “space around and between.”
- **Foreground** – The part of a picture that appears closest to the viewer.
- **Middleground** – The area between the foreground and background.
- **Background** – The part of a picture that appears farthest away.
- **Balance** – The way elements are arranged to create a sense of stability or harmony.
- **Composition** – The placement or organization of elements within an artwork.

Suggested Artists (not limited to)

- **Danuta Wojda** – Polish artist known for traditional *Wycinanki* paper-cut designs using positive/negative space.

- **Janet Brooke** – Contemporary artist inspired by Japanese *Notan* light–dark balance.
- **M.C. Escher** – Dutch artist known for tessellations and optical illusions.
- **Polish Wycinanki** – Symmetrical paper-cut folk art.
- **Japanese Notan** – Design concept exploring contrast of light and dark shapes.

Skills

Students will be able to...

- Identify and describe positive and negative space in works of art.
- Recognize and label foreground, middleground, and background within a composition.
- Create balanced compositions using symmetry, repetition, and contrast.
- Apply understanding of space to create depth in two-dimensional artwork.
- Use cutting and arrangement techniques to explore balance and visual rhythm.
- Reflect on how artists use space to guide the viewer's eye and communicate ideas.

Standards Alignment

PA Visual Arts Standards

Priority:

- 9.1.5.A – Know and use the elements and principles of art to create works in the arts.
- 9.1.5.B – Demonstrate use of arts elements to produce, review, and revise original works.
- 9.1.5.C – Identify and use comprehensive vocabulary within the arts.
- 9.1.5.H – Handle materials, equipment, and tools safely.

Supporting:

- 9.2.5.A – Explain historical, cultural, and social context of individual works in the arts.
- 9.3.5.A – Identify critical processes used in the examination of works in the arts.
- 9.4.5.A – Identify uses of expressive symbols that show connection and meaning through the arts.

National Core Arts Standards

Priority:

- VA:Cr1.1.4a – Brainstorm multiple approaches to a creative art or design problem.
- VA:Cr2.1.4a – Explore and invent art-making techniques and approaches.
- VA:Cr2.3.4a – Document, describe, and evaluate choices made during the creative process.

Supporting:

- VA:Re7.1.4a – Compare responses to works of art before and after describing visual elements.
- VA:Cn10.1.4a – Create works of art reflecting community and cultural traditions.
- VA:Cn11.1.4a – Recognize that people use art to communicate ideas and experiences.

Acceptable Evidence:

Performance Tasks:

- Create a paper-cut design inspired by Wycinanki or Notan traditions that demonstrates balance and contrast between positive and negative space.
- Produce a drawing or collage showing foreground, middleground, and background to illustrate spatial depth.
- Reflect verbally or in writing on how the arrangement of shapes or layers creates balance and interest.

Other Evidence of Learning:

Formative:

- Teacher observation of planning sketches and discussions about space.
- Exit ticket: “How can I use space to make my art more balanced?”

Summative:

- Final artwork scored on understanding of spatial organization, balance, and craftsmanship.
- Student self-assessment using checklist of spatial vocabulary and design principles.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Class discussion: Examine examples of positive and negative space in cultural and contemporary art.
- Demonstration: Show how to create contrast and balance using black and white paper (Notan).
- Practice Activity: Label and sketch examples of foreground, middleground, and background from reference images.
- Studio Project: Design and create a *Wycinanki* or *Notan*-inspired paper-cut composition.
- Reflection: Compare how different cultures use space and symmetry in artmaking.

Instructional Strategies:

- Direct instruction and modeling of paper-cutting and compositional layout.
- Visual exemplars and anchor charts for key concepts.
- Guided practice followed by independent work time.
- Peer critique to discuss balance and depth.
- Integration of art history and cultural appreciation.

Differentiation / Intervention / Enrichment Options:

- **Differentiation:** Provide templates or simplified patterns for students who need extra support.
- **Intervention:** Offer pre-drawn shapes for cutting and assembling compositions; use tracing options to reduce fine motor challenges.
- **Enrichment:** Challenge advanced learners to design a tessellation or multi-layered paper composition inspired by M.C. Escher.
- **Collaboration:** Pair students for partner cutting, folding, and layout critique.

For Language Development:

- Use labeled visuals of space-related vocabulary (foreground, negative space, balance).
- Provide sentence frames: “My positive space shows...” or “The background helps create...”
- Encourage partner discussions describing space and balance in their own and others’ work.
- Incorporate multilingual vocabulary posters and picture references.
- Connect visual language to emotion (“Balanced art feels calm; unbalanced art feels exciting.”).

Central Bucks School District – Course of Study – Grade 4 Art

Unit 4: 3D Sculpture and Form – Hand-Building Techniques

Desired Results:

In this unit, students will explore three-dimensional art by learning basic hand-building techniques such as pinching, coiling, and slab construction to create original clay sculptures. Through guided instruction and experimentation, students will develop an understanding of form, structure, and spatial awareness, while expressing their own ideas and creativity. This unit also introduces students to local and historical ceramic artists, connecting cultural and artistic traditions to personal work.

Essential Questions:

- How can artists transform clay into three-dimensional forms?
- What are the different hand-building techniques and when are they used?
- How do artists use texture, pattern, and relief to enhance sculptures?
- How can three-dimensional artwork communicate personal or cultural stories?

Enduring Understandings:

Students will understand that...

- Artists manipulate clay using hand-building techniques such as pinching, coiling, and slab construction to create functional or decorative forms.
- Scoring and slipping are essential for joining clay pieces securely.
- Texture, pattern, and relief add interest and meaning to three-dimensional art.
- Three-dimensional artworks can express personal creativity, tell a story, or reflect cultural traditions.
- Observing and studying other artists inspires new techniques and ideas in their own work.

Knowledge

Students will know...

- Key hand-building techniques: **pinch, coil, slab**.
- How to use **slip** and **score** to attach clay pieces.
- How to create **relief, texture, and patterned surfaces** on clay forms.
- How to handle clay safely and follow studio procedures.
- Examples of local and historical ceramic artists, including **Henry Chapman Mercer** and **Helen Weisz**.

Vocabulary

- **Pinch** – Shaping clay by squeezing it between fingers and thumb.
- **Coil** – A rolled, snake-like piece of clay used to build walls.
- **Slab** – A flat sheet of clay used for building shapes or tiles.
- **Slip** – Wet clay mixture used as glue to attach pieces.
- **Score** – Scratching lines into clay before joining pieces.
- **Hand-Building** – Creating clay art with hands and simple tools, without a pottery wheel.
- **Relief** – Raised or recessed elements on the surface of a sculpture or tile.
- **Texture** – The tactile or visual surface quality of an artwork.

Suggested Artists (not limited to)

- **Henry Chapman Mercer** – Bucks County artist and founder of Moravian Pottery and Tile Works; his tile designs draw on medieval, folk, Biblical, and historical motifs.

- **Helen Weisz** – Bucks County artist producing low-fired, colored clay tiles and sculptures; works in bas-relief and textured clay forms.
- **Peter Voulkos** – American ceramicist known for abstract, expressive sculptures using slabs and coils.
- **Beatrice Wood** – American sculptor and ceramicist noted for her experimental hand-built forms.
- **Margaret Boozer** – Contemporary artist exploring texture, relief, and narrative in clay sculpture.

Skills

Students will be able to...

- Identify and demonstrate hand-building techniques: pinch, coil, and slab.
- Use score and slip to attach clay pieces securely.
- Create three-dimensional forms with attention to structure and stability.
- Add texture, pattern, or relief to enhance visual interest in clay pieces.
- Reflect on their creative choices and how they communicate meaning in 3D forms.
- Analyze and discuss the techniques and styles of professional ceramic artists.

Standards

PA Visual Arts Standards

Priority:

- 9.1.5.A – Know and use the elements and principles of art to create works in the arts.
- 9.1.5.B – Demonstrate use of arts elements to produce, review, and revise works.
- 9.1.5.H – Handle materials, equipment, and tools safely.

Supporting:

- 9.1.5.C – Identify and use comprehensive arts vocabulary.
- 9.2.5.A – Explain historical, cultural, and social context of individual works in the arts.
- 9.3.5.A – Identify critical processes in the examination of works in the arts.

National Visual Arts Standards

Priority:

- VA:Cr1.1.4a – Brainstorm multiple approaches to a creative art problem.
- VA:Cr2.1.4a – Explore and invent art-making techniques and approaches.
- VA:Cr2.2.4a – Apply artistic techniques to create meaningful works.

Supporting:

- VA:Re7.1.4a – Compare responses to works of art before and after discussing visual elements.
- VA:Cn10.1.4a – Create works of art reflecting community, culture, or personal interests.

Acceptable Evidence:

Performance Tasks:

- Create a clay sculpture or tile using hand-building techniques, demonstrating proper use of pinch, coil, and slab methods.
- Incorporate texture, relief, and decorative details to enhance the design.
- Reflect verbally or in writing on how the form communicates meaning or personal expression.

Formative Assessment:

- Observation of technique practice during studio time.

- Sketchbook planning of forms and textures.
- Exit ticket: “One thing I tried today with clay and what I learned.”

Summative Assessment:

- Completed sculpture or tile graded on craftsmanship, use of techniques, creativity, and attention to detail.
- Self-assessment or peer critique on effectiveness of form, texture, and structure.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Demonstration and practice of pinch, coil, and slab methods.
- Explore texture techniques using simple tools (stamps, combs, or found objects).
- Study tiles and sculptures by Mercer and Weisz for inspiration and discussion.
- Create an original clay sculpture or tile incorporating hand-building techniques and textural detail.
- Gallery walk and reflection: students discuss form, balance, and narrative in their work and others’.

Instructional Strategies:

- Teacher modeling and step-by-step demonstration.
- Guided practice with scaffolded instruction for complex forms.
- Think-alouds to verbalize the reasoning behind technique choices.
- Peer discussion and feedback circles for reflective learning.

Differentiation / Intervention / Enrichment Options:

- **Differentiation:** Provide pre-rolled coils or slab templates for students needing extra support.
- **Intervention:** Work in small groups or 1:1 to reinforce hand-building skills.
- **Enrichment:** Encourage advanced students to create multi-part sculptures or explore mixed media combinations.

For Language Development:

- Vocabulary charts with images of pinch, coil, slab, score, and slip.
- Sentence frames: “I used ____ technique to create ____ because ____.”
- Partner discussions and reflective writing connecting clay work to personal ideas or local artists.
- Multilingual visual aids showing steps for each hand-building technique.

Central Bucks School District – Course of Study – Grade 4 Art

Unit 5: Line — Weight, Variety, Repetition, and Movement

Desired Results:

Students will explore how artists use line in a variety of ways to create movement, pattern, and detail. They will experiment with different line weights, directions, and styles to communicate energy and emotion in their artwork. Through observation, practice, and discussion of contemporary and historical artists, students will understand how line can be both expressive and functional in a composition.

Essential Questions:

- How can artists use different types and weights of line to create movement and energy in artwork?
- In what ways does repetition and pattern contribute to visual rhythm and balance?
- How can details and embellishments enhance the meaning or mood of an artwork?
- How do artists use line to guide the viewer's eye and communicate ideas or emotion?

Enduring Understandings:

Students will understand that...

- Lines can be varied in weight, direction, and style to create movement, pattern, and emphasis.
- Repetition and rhythm in lines help unify a composition and guide the viewer's attention.
- Details and embellishments enhance visual interest and communicate meaning.
- Artists intentionally manipulate line to express energy, emotion, and narrative in their artwork.
- Observing how other artists use line can inspire personal creativity and technical growth.

Knowledge

Students will know...

- How to use line to create details and embellishment.
- How to vary line direction, weight, and repetition to create visual movement.
- How to identify and describe repetition and pattern in artwork.

Vocabulary

- **Movement** – A sense of motion created through lines, shapes, or colors that lead the viewer's eye.
- **Details** – Small elements that enhance and complete a composition.
- **Line Weight** – The thickness or thinness of a line.
- **Repetition** – The repeated use of lines, shapes, or colors to create unity
- **Pattern** – A design created through repeated elements.

Suggested Artists (not limited to):

- **Keith Haring** – American artist known for his bold, energetic line drawings and movement-filled figures that express joy and social messages.
- **Bridget Riley** – British Op Art painter who uses repetition and line to create optical illusions and the sense of motion.
- **Sol LeWitt** – Conceptual artist who uses systematic line drawings and geometric repetition to explore visual rhythm and structure.

- **Joan Miró** – Spanish painter who used playful, expressive lines to create movement and imagination in his abstract compositions.
- **Mary Blair** – American illustrator and designer for Disney, known for her bold use of color and whimsical line work that creates visual rhythm and storytelling.

Skills

The students will be able to ...

- Identify and describe different types of lines (straight, curved, wavy, zigzag) and line weights in artworks.
- Experiment with line weight, direction, and style to create visual movement and energy.
- Use repetition and pattern to create rhythm and unify a composition.
- Add details and embellishments to enhance the meaning, mood, or focus of an artwork.
- Analyze and discuss how other artists use line to convey emotion, movement, and ideas.
- Apply line intentionally in their own artwork to guide the viewer's eye and communicate visual messages.
- Reflect on how their use of line contributes to the overall composition and effectiveness of their artwork.

Standards

PA Visual Arts Standards

Priority:

- 9.1.5.A – Know and use the elements and principles of each art form to create works in the arts and humanities.
- 9.1.5.B – Recognize, know, use, and demonstrate a variety of appropriate arts elements and principles to produce, review, and revise original works.

Supporting:

- 9.1.5.C – Identify and use comprehensive vocabulary within the arts.
- 9.3.5.A – Identify critical processes in the examination of works in the arts and humanities.

National Visual Arts Standards

Priority:

- VA:Cr1.1.4a – Brainstorm multiple approaches to a creative art or design problem.
- VA:Cr2.1.4a – Explore and invent art-making techniques and approaches.

Supporting:

- VA:Re7.2.4a – Analyze components in visual imagery that convey messages.
- VA:Cn10.1.4a – Create works of art that reflect community, culture, or personal interests.

Acceptable Evidence:

Performance Tasks:

- Create an artwork that demonstrates movement and rhythm through line.
- Experiment with different line weights and repetition to design a unified pattern.
- Participate in a gallery walk to discuss how line affects movement and mood in compositions.

Formative Assessment:

- Sketchbook explorations of varied lines and patterns.
- Vocabulary and visual matching activities.
- Exit slip: "One way I used line to create movement today..."

Assessment:

- Completed line artwork graded on creativity, craftsmanship, and demonstration of line variety and movement.
- Self-assessment or reflection on how line communicates energy or emotion in their work

Suggested Learning Experiences and Instruction

Learning Experiences:

- Line variety exercises using markers, pens, or digital tools.
- Create an abstract drawing using repetition and overlapping lines to suggest motion.
- Study artworks by Haring, Riley, and LeWitt to identify how artists use pattern and line weight.
- Group challenge: design a collaborative mural or border design emphasizing movement through line.

Instructional Strategies:

- Teacher modeling and guided drawing warm-ups.
- Think-alouds to analyze artist examples and discuss use of line.
- Peer feedback circles focusing on how effectively movement is conveyed.
- Integrate music or rhythm activities to inspire movement-based line drawings.

Differentiation/Intervention/Enrichment Options:

- **Differentiation:** Provide pre-drawn outlines for students needing fine motor support; use adaptive drawing tools.
- **Intervention:** Use tracing and repetition drills to strengthen control and understanding of line direction.
- **Enrichment:** Encourage advanced students to explore abstract composition, optical art, or layered media to emphasize movement.

For Language Development:

- Use labeled visual aids to reinforce vocabulary (e.g., “line weight,” “repetition,” “pattern”).
- Sentence frames for art discussion:
 - “I used [type of line] to show [movement/feeling].”
 - “The artist’s lines make the picture feel...”
- Encourage multilingual learners to create a visual glossary of line types with examples.
- Integrate short writing reflections comparing how different artists use line to express energy and rhythm.

Central Bucks School District – Course of Study – Grade 4 Art

Unit 6: Art History and Culture Middle Ages, Renaissance, and Pennsylvanian Folk Art

Desired Results:

Students will explore how people in the past used art to tell stories, decorate their surroundings, and communicate beliefs. This unit focuses on art from the Middle Ages, the Renaissance, and Pennsylvanian folk traditions, including colorful tiles, illuminated manuscripts, and stained glass. Through hands-on projects inspired by these historical and cultural artworks, students will learn how motifs, symbols, and patterns reflect cultural values and everyday life.

Essential Questions:

- How did people in the past use art to tell stories and communicate ideas?
- What can art from different historical periods teach us about culture and everyday life?
- How do motifs and symbols convey meaning in art?
- How can we use historical styles to inspire our own creative expression?

Enduring Understandings:

Students will understand that...

- Art has been used throughout history to communicate stories, beliefs, and cultural values.
- Motifs, patterns, and symbols are important tools artists use to convey meaning.
- Historical artworks from different regions and time periods show distinct styles, materials, and techniques.
- Creating artwork inspired by historical and cultural traditions helps us understand and connect with the past.
- Observing and analyzing historical art informs personal creativity and artistic decision-making.

Knowledge

Students will know...

- Key characteristics of **Middle Ages, Renaissance, and Pennsylvania German folk art**.
- Common artistic techniques such as **relief, stained glass, illuminated manuscripts, and tile decoration**.
- Notable artists including **Leonardo da Vinci** (Renaissance) and **Henry Chapman Mercer** (PA German Folk Art).
- How to identify **motifs, patterns, and symbols** in historical and folk artworks.
- How cultural and historical context influences artistic choices.

Vocabulary:

- **Motif** – A repeated design, pattern, or symbol in artwork.
- **Folk Art** – Art created by people in a culture, often reflecting traditions and everyday life.
- **Relief** – A sculptural technique where shapes project from a flat surface.
- **Tile** – A flat piece of fired clay used for decoration or functional purposes.
- **Illuminated Manuscript** – A decorated hand-written book, often with gold or colorful designs.
- **Stained Glass** – Colored glass arranged in patterns or images, often used in windows.
- **Medieval Art** – Art produced in Europe from roughly the 5th to the late 15th century.
- **Renaissance Art** – European art from the 14th–17th centuries emphasizing realism, perspective, and human emotion.

Suggested Artists (not limited to)

- **Leonardo da Vinci** – Renaissance artist known for portraits, drawings, and inventive techniques.
- **Henry Chapman Mercer** – Bucks County artist; created Moravian tiles incorporating medieval, folk, and historical motifs.
- **Anonymous PA German Folk Artists** – Craftspeople who produced redware tiles, decorative motifs, and colorful folk designs.
- **Klimt** – For pattern, motif, and gold leaf inspiration in cross-disciplinary discussion.
- **Local Historical Collections** – Artifacts from Fonthill Castle, Mercer Museum, and regional folk art exhibitions.

Skills

Students will be able to...

- Identify key artistic features of Medieval, Renaissance, and Pennsylvania German folk art.
- Recognize and create motifs, patterns, and symbols in their own artwork.
- Apply hand-building or drawing techniques to create tiles, reliefs, or manuscript-style designs.
- Analyze and discuss how historical context influenced the purpose and style of artworks.
- Connect personal artistic choices to cultural inspiration and historical examples.
- Reflect on how art from the past continues to influence contemporary art and design.

Standards

PA Visual Arts Standards

Priority:

- 9.1.5.A – Know and use the elements and principles of art to create works in the arts.
- 9.2.5.A – Explain historical, cultural, and social context of individual works in the arts.
- 9.1.5.C – Identify and use comprehensive arts vocabulary.

Supporting:

- 9.3.5.A – Identify critical processes in the examination of works in the arts.
- 9.4.5.A – Identify uses of expressive symbols that show meaning through art.

National Visual Arts Standards

Priority:

- VA:Re7.1.4a – Compare responses to works of art from different historical and cultural contexts.
- VA:Cr2.1.4a – Explore and invent art-making techniques inspired by historical and cultural examples.

Supporting:

- VA:Cn10.1.4a – Create works reflecting cultural and historical traditions.
- VA:Cn11.1.4a – Recognize that people use art to communicate ideas, stories, and beliefs.

Acceptable Evidence:

Performance Tasks:

- Create a tile, relief, or manuscript-inspired artwork using motifs and patterns learned from historical examples.
- Reflect on how their artwork demonstrates understanding of cultural or historical influences.
- Participate in a discussion comparing Medieval, Renaissance, and PA Folk artworks.

Formative Assessment:

- Sketchbook exercises identifying motifs, symbols, or patterns.
- Observation of in-progress artworks and discussion of techniques.

- Quick labeling exercises: match artwork to period/style or identify motifs.

Summative Assessment:

- Completed artwork assessed on craftsmanship, use of motifs, and cultural/historical relevance.
- Written or verbal reflection connecting their creative choices to the historical and cultural examples studied.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Examine images of Medieval, Renaissance, and PA German Folk Art to identify motifs, patterns, and relief.
- Hands-on project: create a tile, relief, or manuscript-style design inspired by historical examples.
- Guided discussion on cultural symbolism in art.
- Compare and contrast techniques across historical periods.
- Optional field trip or virtual tour of Mercer Museum or local collections.

Instructional Strategies:

- Teacher-led demonstrations and step-by-step project modeling.
- Visual references and anchor charts to reinforce vocabulary.
- Peer discussion and critique focusing on motifs, symbols, and historical accuracy.
- Integrate social studies and cultural context to strengthen cross-curricular connections.

Differentiation / Intervention / Enrichment Options:

- Differentiation: Provide templates or guided motifs for students needing extra support.
- Intervention: Use simplified patterns and small-scale projects to reinforce techniques.
- Enrichment: Challenge students to design multi-tile installations or combine historical styles in one composition.

For Language Development:

- Use labeled visuals for motifs, relief, and historical terms.
- Sentence frames: "My motif represents ____ because ____."
- Partner discussion to describe how their artwork connects to historical examples.
- Multilingual glossary of key terms with images.



Sculpture

Course Number: 8365

Course Level: Beginner

Grade: 9 -10-11-12

Time/Credit: .5 (9-week courses)

Development Date: June 2026

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901
Central Bucks School District

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**Central Bucks School District
Teaching and Learning Principles**

K – 12 Art Program Learning Principles

1. All learners are capable of complex and high-quality work if the right learning conditions are established.
2. Students of art learn when modeling of products and processes are demonstrated that address appropriate learning criteria.
3. Students learn when they are focused on the objectives and actively engaged in the learning experience.
4. Students of art learn when a connection is made to prior learning and personal interests.
5. Students learn when they are provided with a safe environment where they can experiment and take creative risks.
6. Learning is most effective when differences in learners' prior knowledge, interests, and strengths are accommodated.
7. Learners succeed when they believe the task is attainable with reasonable effort.
8. Students learn when they see and demonstrate links between new learning, possibilities for future learning, and its multi-disciplinary applications.
9. Greater learning depends upon repeated performance to increase fluency and accuracy.
10. Students learn when they reflect upon and summarize the learning experience.
11. Successful learning requires the ability to reflect, self-assess and use feedback to self-adjust.
12. Various visual arts processes can foster creative thinking, providing students with an essential real-world skill.
13. Students can use the creative process to problem solve and generate new concepts for learning.
14. Students of art can use appropriate technology to enhance creative growth and creative process.

**Central Bucks School District
Enduring Understandings**

Students will understand that:

Creating (NCAS Create) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- Sculpture incorporates the elements and principles of design to create balanced, meaningful three-dimensional works.
- Mastery of diverse tools, techniques, and materials allows artists to communicate ideas and solve creative challenges.
- Functional and sculptural art allow artists to explore and communicate ideas, emotions, and aesthetics through innovative forms.
- Abstract and representational sculptures provide unique opportunities to challenge traditional artistic traditions.
- The process of creating sculpture involves planning, experimentation, and refinement to address design challenges and achieve artistic intent.

Connecting (NCAS Connect) — PA Visual Arts: 9.2 Historical & Cultural Contexts (Visual Arts)

- Sculpture reflects and influences cultural, historical, and social contexts, offering insight into human experiences across time.
- Understanding the history of sculpture enhances appreciation and informs contemporary practices.
- Sculpture connects with disciplines such as architecture, industrial design, and environmental science to impact daily life and community.

Responding (NCAS Respond) — PA Visual Arts: 9.3 Critical Response (Visual Arts)

- Evaluation and critique foster growth and the ability to make informed decisions about the creative process and final work.

Presenting (NCAS Present) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- Installation art and large-scale sculptures integrate diverse perspectives, materials, and spaces to create immersive experiences.

Central Bucks School District

Essential Questions

Students will consider:

Creating (NCAS Create) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- How do the elements and principles of design influence the creation of three-dimensional art?
- How can tools and materials be manipulated to effectively communicate artistic ideas?
- How can functional objects become works of art without losing their purpose?
- What role does abstraction play in communicating ideas that are not representational?
- How does the creative process evolve from an initial concept to a completed sculpture?

Connecting (NCAS Connect) — PA Visual Arts: 9.2 Historical & Cultural Contexts (Visual Arts)

- How does sculpture reflect the cultural and historical context of its creation?
- In what ways do contemporary trends in sculpture build on or challenge historical traditions?
- How does sculpture intersect with other fields, such as architecture, engineering, and environmental design?

Responding (NCAS Respond) — PA Visual Arts: 9.3 Critical Response (Visual Arts)

- What role do critique and feedback play in refining a work of art?

Presenting (NCAS Present) — PA Visual Arts: 9.1 Production, Performance & Exhibition (Visual Arts)

- In what ways do installation artworks transform space and engage audiences in unique experiences?

Central Bucks School District – Course of Study Overview

Sculpture

Desired Results

This 9-week course, meeting daily for 83 minutes, immerses students in the world of three-dimensional art by exploring foundational concepts and skills across sculpture, crafts, and industrial design. Students will engage with a wide array of media, techniques, and creative approaches, while also studying the evolution and current trends of 3D design in art history. Through hands-on, exploratory projects, students will work with materials such as metal, clay, wax, wood, wire, glass, plastic, papier-mâché, plaster, fabrics, fibers, and found objects. Each unit will incorporate aspects of art history, criticism, and aesthetics to deepen understanding and appreciation of three-dimensional art.

This course requires no prerequisites and has no fee.

Course Units

- **Unit One:** Intro to 3D Art
- **Unit Two:** Functional
- **Unit Three:** Sculptural
- **Unit Four:** Abstraction
- **Unit Five:** Installation

Prerequisite: NO

Committee Members: Deb Thomas, Sam Schollenberger, Gabby Miller, Rebecca Panitch

Acceptable Evidence.

Course Grading: CBSD District Rubric

**Central Bucks School District
Sculpture – Pacing Guide**

PA Visual Arts Standards: 9.1. Production 9.2. Historical and Cultural Contexts 9.3. Critical Response 9.4. Aesthetic Response			National Core Arts: Visual Arts Standards Creating Presenting Responding Connecting		
UNITS of Study	Unit 1- Introduction to 3D ART	Unit 2 – Functional	Unit 3 Sculptural	Unit 4 – Abstraction	Unit 5 – Installation
DAY	3	10	10	11	11
NOTE: Content 1. All units of study align to the PA Visual Arts Standards, National Standards & employ the creative process, with specific, daily, and ongoing formative feedback. 2. This creative cycle is a progression that will repeat until a point of completion is determined: 1. Inspire & Research 2. Plan, Sketch and Practice 3. Envision, Create & Revise 4. Share, Reflect and Assess 3. Units of study may need to be combined & overlapped to account for studio space, equipment/materials, and teacher’s professional judgment based on differentiated student needs.					Days Total 45

Content	Days
Unit 1 - Introduction to 3D art	3
Inspire & Research: Students explore foundational 3D art concepts through examples of historical and contemporary sculptures, focusing on how artists use the elements of art and principles of design to create dynamic works. Formative Assessment Throughout Learning Cycle	.5
Plan, Sketch, and Practice: Students create preliminary sketches and maquettes to experiment with additive and subtractive techniques, developing confidence with tools and materials. Formative Assessment Throughout Learning Cycle	.5
Envision, Create & Revise:	1.5

Students construct their first 3D forms, focusing on craftsmanship and balance, while revising their work based on feedback and self-assessment.	
Formative Assessment Throughout Learning Cycle	
Share, Reflect, and Assess: Students present their completed sculptures in a class critique, reflecting on their artistic choices and the application of design principles.	.5
Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC) .5	
Unit 2 - Functional	10
Inspire & Research: Students analyze functional art objects from various cultures and time periods, considering how aesthetics and usability intersect in design.	1
Plan, Sketch, and Practice: Students design functional objects through detailed sketches, prototypes, and material experiments, focusing on ergonomics and utility.	1 or 2
Formative Assessment Throughout Learning Cycle	
Envision, Create & Revise: Students construct functional pieces such as pottery, lamps, or furniture, refining their designs to balance practicality and visual appeal.	7 or 8
Formative Assessment Throughout Learning Cycle	
Share, Reflect, and Assess: Students display their functional objects and explain their design process in a critique, assessing both usability and artistic quality	.5
Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC)	.5
Unit 3 - Sculptural	10
Inspire & Research: Students examine how artists use volume, mass, and space to create powerful sculptural works, referencing iconic pieces from different movements.	1
Formative Assessment Throughout Learning Cycle	
Plan, Sketch, and Practice: Students draft designs and build maquettes or armatures to explore form, texture, and composition before creating final sculptures.	1 or 2
Formative Assessment Throughout Learning Cycle	
Envision, Create & Revise: Students construct their sculptures using chosen materials and techniques, continually revising based on teacher and peer feedback.	7 or 8
Formative Assessment Throughout Learning Cycle	
Share, Reflect, and Assess: Students participate in a gallery walk, sharing their sculptures and receiving critique, while writing reflections on their creative journey.	.5
Formative Assessment Throughout Learning Cycle	
Employ Summative Assessment (RUBRIC) .5	.5

Unit 4 -Abstraction	11
Inspire & Research: Students study abstract art, exploring how artists simplify or distort forms to communicate ideas, emotions, or concepts. Formative Assessment Throughout Learning Cycle	1
Plan, Sketch, and Practice: Students brainstorm and sketch abstract designs, experimenting with shapes, textures, and materials to represent their chosen themes. Formative Assessment Throughout Learning Cycle	1 or 2
Envision, Create & Revise: Students build abstract sculptures, integrating symbolic elements and mixed media while refining their pieces through feedback. Formative Assessment Throughout Learning Cycle	8 or 9
Share, Reflect, and Assess: Students showcase their abstract sculptures in a critique, articulating their conceptual intentions and interpreting the meaning behind their work. Formative Assessment Throughout Learning Cycle	.5
Employ Summative Assessment (RUBRIC) .5	.5
Unit 5 -Installation	11
Inspire & Research: Students explore site-specific installation art, analyzing how artists transform spaces to engage viewers or convey messages. Formative Assessment Throughout Learning Cycle	1
Plan, Sketch, and Practice: Students collaboratively design installations through sketches, models, and material tests, considering spatial relationships and audience interaction. Formative Assessment Throughout Learning Cycle	1 or 2
Envision, Create & Revise: Students build and install their works, adjusting elements to enhance impact and engagement with the space. Formative Assessment Throughout Learning Cycle	8 or 9
Share, Reflect, and Assess: Students host an installation showcase, inviting critiques and reflecting on their work's effect on the audience and environment. Formative Assessment Throughout Learning Cycle	.5
Employ Summative Assessment (RUBRIC) .5	.5

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

None

Central Bucks School District – Course of Study – Sculpture

Unit1 – Introduction to 3D Art

Desired Results:

This unit introduces students to the foundational elements of three-dimensional art, focusing on basic materials, tools, and processes. Students will explore how form, balance, and proportion are applied in 3D work.

Enduring Understandings: Students will understand that...

- The principles of form, space, and proportion are fundamental to creating successful 3D artwork.
- The creative process and sketching involve conceptualizing, planning, sketching, and refining ideas before bringing them to life in three dimensions.
- Hands-on experimentation with various materials and techniques is essential for developing sculptural skills and understanding the properties of different media.
- Understanding the relationship between form and space helps students develop the ability to create cohesive and dynamic sculptural works.

Essential Questions:

- How do the principles of form, space, and proportion influence the creation of 3D art?
- What role does the creative process play in the development of a successful 3D sculpture?
- How can sketching and planning help an artist conceptualize and refine their sculptural ideas?
- What are the advantages and challenges of using different materials and techniques in sculpture?
- How does the relationship between form and space impact the way a viewer interacts with and interprets 3D artwork?

Knowledge: Students will know...

- Vocabulary:
 - Elements of Art: Line, Shape, Form, Space, Texture, Value, Color
 - Principles of Design: Balance, Contrast, Emphasis, Movement, Pattern, Rhythm, Unity
 - Three-Dimensional (3D) Art
 - Composition
 - Positive and Negative Space
 - Additive and Subtractive Techniques
 - Armature
 - Maquette
 - Medium/Media

Skills:

Students will be able to...

- Identify and apply the elements of art and principles of design in three-dimensional works.
- Sketch and plan designs for three-dimensional projects using 2D representations (e.g., drawing, schematics).

- Build a maquette or prototype to visualize a concept in 3D.
- Use additive and/or subtractive techniques to construct 3D forms.
- Safely handle and manipulate basic tools and materials used in sculpture.
- Critique their own and others' work to evaluate use of form and composition.

Suggested Artists:

- Alexander Calder: Known for his mobiles and wire sculptures, introducing balance and movement.
- Louise Nevelson: Explored assemblage art using found objects and creating monochromatic installations.
- Barbara Hepworth: Abstract and modernist sculptures focusing on form and space.
- Auguste Rodin: Classical sculpture for an introduction to mass and emotion in 3D art.
- Jean Dubuffet: Use of unconventional materials and textural surfaces.

Priority Standards:

- **PA Standards:**
 - Standard 9.1.12.A: Know and use the elements and principles of each art form to create works in the arts and humanities.
 - Standard 9.2.12.I: Identify, explain, and analyze philosophical beliefs as they relate to works in the arts.
- **National Standards:**
 - Creating, Anchor Standard 1: Generate and conceptualize artistic ideas and work.
 - Connecting, Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.

Supporting Standards:

- **PA Standards:**
 - Standard 9.1.12.C: Integrate and apply advanced vocabulary to the arts forms.
 - Standard 9.4.12.B: Analyze works of art influenced by experiences or societal values.
- **National Standards:**
 - Presenting, Anchor Standard 6: Convey meaning through the presentation of artistic work.

Acceptable Evidence:

Performance Tasks:

- Create a maquette that demonstrates understanding of the elements of art and principles of design in 3D form.
- Complete a small free-standing sculpture using additive and/or subtractive techniques, incorporating balance and harmony.

Acceptable Evidence of Learning Other than Performance Tasks:

Formative Assessment:

- Sketchbook assignments exploring 3D shapes and composition.
- Group discussions analyzing 3D art examples for design principles.
- Exit tickets describing the challenges of working in 3D versus 2D.

Summative Assessment:

- Rubric-based evaluation of maquettes and sculptures focusing on creativity, craftsmanship, and design application.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Explore the elements and principles of design through hands-on activities using basic materials (e.g., clay, wire).
- Create a maquette as an introduction to additive and subtractive techniques.
- Analyze famous 3D works to identify elements and principles of design.

Instructional Strategies:

- Demonstrate basic 3D art techniques through teacher-led modeling.
- Facilitate small group discussions analyzing sculptures and their composition.
- Provide guided practice sessions for handling tools and materials safely.

Differentiation/Intervention/Enrichment Options:

- **Differentiation:** Provide templates or step-by-step guides for students needing more structure.
- **Intervention:** Provide personalized support or alternative resources to help ensure successful creation.
- **Enrichment:** Encourage advanced students to experiment with more complex forms or additional materials.

For Language Development:

- Introduce a word wall featuring vocabulary (e.g., "armature," "composition").
- Use sentence starters for critique discussions (e.g., "This sculpture uses balance because...").
- Incorporate visual aids, diagrams, and videos to reinforce key terms and concepts.

Central Bucks School District – Course of Study – Sculpture

Unit 2 – Functional

Desired Results

This unit focuses on creating utilitarian objects, and exploring the intersection of art and function.

Essential Questions:

- How can sculpture serve a functional purpose while maintaining aesthetic value?
- What role does the balance between form and function play in the design of functional sculptures?
- How do materials and techniques impact the creation of functional objects in sculpture?
- In what ways can functional sculpture address practical needs while showcasing creativity and artistic expression?
- What challenges arise when designing functional sculpture, and how can artists resolve them to create both practical and visually compelling works?

Enduring Understandings:

Students will understand that...

- Sculpture can serve a functional purpose in addition to its aesthetic value, creating objects that are both practical and beautiful.
- Successful functional sculpture requires a balance between form (the artistic elements) and function (the practical use of the object).
- The design and creation of functional objects involves a deep understanding of materials, techniques, and their suitability for practical use.
- The intersection of art and utility offers unique challenges and opportunities for creativity and innovation in sculpture.
- Functional sculpture can enhance daily life, combining craftsmanship and design to create objects that are both useful and artistically significant.

Knowledge:

Students will know...

- **Vocabulary:**
 - Functional Art
 - Utility vs. Aesthetics
 - Form and Function
 - Industrial Design
 - Craftsmanship
 - Ergonomics
 - Symmetry and Asymmetry
 - Proportion
 - Kiln (for clay)
 - Glaze

Skills:

Students will be able to...

- Design functional objects that balance aesthetics and practicality.

- Construct utilitarian objects using appropriate materials and techniques (e.g., clay, wood, metal).
- Apply knowledge of ergonomics and proportion to enhance usability.
- Explore surface treatments (e.g., glazing, polishing, texturing) to enhance both function and appearance.
- Experiment with form to create visually engaging yet practical designs.
- Analyze the relationship between function and design in historical and contemporary examples.
- Reflect on and revise works based on peer and self-critique.

Suggested Artists:

- Eva Zeisel: Ceramic artist known for functional and elegant pottery designs.
- Charles and Ray Eames: Industrial designers famous for their furniture design.
- George Ohr: Known as the “Mad Potter of Biloxi,” exploring exaggerated and functional pottery forms.
- William Morris: Leader in the Arts and Crafts movement, emphasizing craftsmanship in functional art
- Ernesto Neto: Known for interactive textile installations.
- Isamu Noguchi: Sculptor and designer known for creating functional yet artistic objects like furniture and lighting.

Priority Standards:

- **PA Standards:**
 - Standard 9.1.12.E: Demonstrate the ability to analyze the principles of 3D design.
- **National Standards:**
 - Creating, Anchor Standard 2: Organize and develop artistic ideas and work.

Supporting Standards:

- **PA Standards:**
 - Standard 9.1.12.B: Recognize, compare, and apply styles from different historical periods and cultures.
- **National Standards:**
 - Responding, Anchor Standard 7: Perceive and analyze artistic work.

Acceptable Evidence:

Performance Tasks:

- Design and create a functional object (e.g., a bowl, vase, lamp) that balances aesthetics and function.
- Write a short artist statement explaining how form and function were considered in the design process.

Acceptable Evidence of Learning Other than Performance Tasks:

Formative Assessment:

- Quick design sketches focusing on proportions and utility.
- Peer critiques of draft designs and material choices.
- Journals documenting material tests and construction plans.

Summative Assessment:

- Rubric-based evaluation of the functional object, emphasizing craftsmanship, design balance, and functionality.
- Peer or self-assessment comparing initial sketches to the final product.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Design and construct a functional object, such as a ceramic bowl or wire lamp.
- Explore historical and contemporary examples of functional art.
- Test and refine prototypes to ensure both aesthetic and practical success.
- Design and construct a piece of wearable art.

Instructional Strategies:

- Use think-alouds to model the design-thinking process.
- Organize peer critique sessions to evaluate the balance of form and function.
- Integrate videos or guest presentations on industrial or craft design.

Differentiation/Intervention/Enrichment Options:

- **Differentiation:** Allow students to choose from a range of functional projects suited to their skill level.
- **Intervention:** Simplify designs for struggling students, focusing on basic forms.
- **Enrichment:** Challenge advanced students to design multi-functional or modular objects.

For Language Development:

- Provide sentence frames for peer critiques (e.g., “I think this object is functional because…”).
- Use bilingual glossaries or translations for key vocabulary.
- Assign small writing tasks, such as describing the design process in simple terms.

Central Bucks School District – Course of Study – Sculpture

Unit 3 – Sculptural

Desired Results:

This unit emphasizes free-standing, representational, or expressive forms. Students will work on projects focusing on volume, mass, and space relationships.

Essential Questions:

- How do advanced sculptural techniques expand the creative possibilities for both abstract and representational sculpture?
- In what ways do materials and methods influence the final form, size, and texture of a sculpture?
- How can experimenting with form, space, and movement enhance the effectiveness of a sculpture?
- What role do technical skills play in refining a sculptor's ability to communicate ideas and emotions through their work?
- How can sculpture push the boundaries of traditional artistic practices while remaining grounded in technical mastery?

Enduring Understandings:

Students will understand that...

- Advanced sculptural techniques offer new possibilities for creating both abstract and representational artworks.
- Sculpture can vary in form, size, and texture, and the choices of material and method significantly affect the final piece.
- Mastery of technical skills in sculpture allows for greater creative freedom and exploration of new ideas.
- Form, space, and movement are key elements in sculpture that can influence the visual and emotional impact of the work.
- Experimentation with diverse materials and methods can expand students' sculptural vocabulary and artistic expression.

Knowledge:

Students will know...

- **Vocabulary:**

- Sculpture
- Free-Standing Sculpture
- Relief Sculpture (Bas-Relief and High-Relief)
- Volume
- Mass
- Armature
- Additive vs Subtractive Sculpture
- Modeling (in clay or wax)
- Casting
- Chiseling
- Texture

Skills:

Students will be able to...

- Analyze the relationships between volume, mass, and space in a sculpture.
- Construct free-standing and/or relief sculptures using additive, subtractive, and modeling techniques.
- Use armature to support larger or more intricate sculptural forms.
- Explore texture and surface treatments to add detail and enhance visual interest.
- Integrate multiple materials in the creation of a cohesive sculpture.
- Reflect on and revise works based on peer and self-critique.

Suggested Artists:

- Henry Moore: Focused on organic forms and the relationship between mass and space.
- Alberto Giacometti: Known for elongated human figures exploring texture and movement.
- Michelangelo: Classical examples of subtractive sculpture, such as David.
- Ruth Asawa: Wire sculptures emphasizing repetition, texture, and negative space.
- Richard Serra: Large-scale, industrial sculptures emphasizing space and viewer interaction.
- Claus Oldenberg: Large-scale sculptures of everyday objects
- Ursula Con Rydingsvard – large-scale sculpture utilizing natural materials
- Steve Tobin – Abstract artist utilizing mathematics and nature to create root-inspired art

Priority Standards:

- **PA Standards:**
 - Standard 9.1.12.B: Recognize, compare, and apply styles from different historical periods and cultures.
 - Standard 9.1.12.D: Analyze and evaluate the characteristics of functional vs. non-functional art.
- **National Standards:**
 - Creating, Anchor Standard 3: Refine and complete artistic work.

Supporting Standards:

- **PA Standards:**
 - Standard 9.3.12.B: Apply critical processes in the examination of works of art.
- **National Standards:**
 - Responding, Anchor Standard 9: Apply criteria to evaluate artistic work.

Acceptable Evidence:

Performance Tasks:

- Create a relief sculpture or free-standing piece that demonstrates understanding of volume, mass, and negative space.
- Incorporate texture and surface treatment to enhance the overall aesthetic and narrative of the sculpture.

Acceptable Evidence of Learning Other than Performance Tasks:

Formative Assessment:

- In-progress critiques discussing use of space and material manipulation.
- Studio exercises on creating texture and balance in sculptural forms.
- Worksheets analyzing sculptural examples for spatial relationships.

Summative Assessment:

- Rubric-based evaluation of the sculpture based on use of space, craftsmanship, and creative intent.
- Written or oral reflection connecting their work to specific elements of 3D design.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Create a free-standing or relief sculpture using additive or subtractive methods.
- Experiment with texture and surface treatments to enhance visual appeal.
- Study examples of volume, mass, and negative space in sculptures.

Instructional Strategies:

- Demonstrate techniques such as modeling, carving, or assembling.
- Facilitate gallery walks to discuss classmates' works in progress.
- Use visual analysis activities to examine famous sculptures.

Differentiation/Intervention/Enrichment Options:

- **Differentiation:** Provide pre-made armatures for students who need extra support.
- **Intervention:** Pair students with peers for collaborative learning.
- **Enrichment:** Encourage independent research on advanced sculptural techniques.

For Language Development:

- Pair ELLs with peers for collaborative critique and vocabulary reinforcement.
- Incorporate labeled diagrams to explain sculptural concepts.
- Provide sentence starters for reflection, such as, "The texture in my sculpture was created by..."

Central Bucks School District – Course of Study – Sculpture

Unit 4 – Abstraction

Desired Results:

Students explore abstract design principles and techniques, focusing on non-representational art. This unit challenges students to convey meaning through color, shape, texture, and composition.

Essential Questions:

- What makes a sculpture abstract, and how can abstraction communicate emotions or ideas?
- How does the use of form, shape, and space in abstract sculpture affect how we experience and interpret the work?
- In what ways can abstract sculpture push the boundaries of traditional sculptural practices?
- How can abstract sculptures evoke emotional or intellectual responses from viewers without using recognizable figures or forms?

Enduring Understandings:

Students will understand that...

- What makes a sculpture abstract, and how can abstraction communicate emotions or ideas?
- How does the use of form, shape, and space in abstract sculpture affect how we experience and interpret the work?
- In what ways can abstract sculpture push the boundaries of traditional sculptural practices?
- How can abstract sculptures evoke emotional or intellectual responses from viewers without using recognizable figures or forms?

- What role do materials and techniques play in the development of abstract sculpture, and how can they influence the meaning of the work?
- What role do materials and techniques play in the development of abstract sculpture, and how can they influence the meaning of the work?

Knowledge:

Students will know...

- **Vocabulary:**
 - Abstract Art
 - Non-Representational
 - Simplification
 - Organic vs. Geometric Shapes
 - Visual Rhythm
 - Negative Space
 - Symbolism
 - Distortion
 - Mixed Media
 - Conceptual Art

Skills:

Students will be able to...

- Create non-representational sculptures that convey ideas or emotions.
- Experiment with simplifying forms to focus on essential shapes and textures.
- Incorporate symbolic and conceptual elements into abstract works.
- Use mixed media and unconventional materials to push creative boundaries.
- Analyze abstract works to interpret their meaning and the artist's intent.
- Develop original abstract sculptures that challenge traditional norms.
- Reflect on and revise works based on peer and self-critique.

Suggested Artists:

- Constantin Brâncuși: Abstract forms that simplify subjects to their essence.
- Pablo Picasso: Cubist sculptures exploring the abstraction of human and still-life forms.
- Joan Miró: Abstract works with playful, organic shapes and bold colors.
- Barbara Hepworth: Abstract sculptures with holes and spaces exploring form and balance.
- Naum Gabo: Constructivist works focusing on transparency and spatial abstraction.

Priority Standards:

- PA Standards:
 - Standard 9.1.12.A: Apply concepts of balance, contrast, and unity to create layered compositions.
- National Standards:
 - Creating, Anchor Standard 2: Organize and develop artistic ideas and work.

Supporting Standards:

- PA Standards:
 - Standard 9.2.12.J: Explore how layering and composition relate to various art traditions and techniques.
- National Standards:
 - Responding, Anchor Standard 8: Interpret intent and meaning in artistic work.

Acceptable Evidence:

Performance Tasks:

- Create an abstract sculpture using mixed media that communicates an idea, concept, or emotion.
- Present and explain the intent and interpretation of the work during a class critique.

Acceptable Evidence of Learning Other than Performance Tasks:

Formative Assessment:

- Concept sketches focusing on abstraction techniques like simplification and distortion.
- Class discussions interpreting abstract works by historical or contemporary artists.
- Progress check-ins documenting choices in materials and techniques.

Summative Assessment:

- Rubric-based assessment evaluating creativity, material use, and ability to communicate abstract concepts.
- Critique participation to assess understanding of abstract art vocabulary and peer engagement.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Design and create an abstract sculpture that communicates an idea or emotion.
- Explore abstraction through simplification and distortion exercises.
- Study the works of modern and contemporary abstract artists.

Instructional Strategies:

- Facilitate brainstorming sessions to help students identify concepts or emotions for their sculptures.
- Use guided practice to experiment with non-traditional materials.
- Incorporate reflective writing to connect the artistic process with personal expression.

Differentiation/Intervention/Enrichment Options:

- **Differentiation:** Provide pre-selected themes or ideas for abstract sculptures.
- **Intervention:** Offer scaffolds, such as templates or step-by-step examples.
- **Enrichment:** Encourage students to integrate symbolic elements or mixed media.

For Language Development:

- Provide vocabulary cards with visuals for terms like "non-representational" and "simplification."
- Offer prompts for explaining abstract work (e.g., "My sculpture represents...").
- Incorporate collaborative discussions to practice using key terms.

Central Bucks School District – Course of Study – Sculpture

Unit 5 – Installation

Desired Results:

This unit focuses on creating immersive 3D environments or site-specific works that engage viewers.

Essential Questions:

- What makes installation art different from traditional sculpture or painting?
- How can an artist transform a space and engage the viewer through installation art?

- How does the use of site-specificity and materials in installation art affect its meaning and interpretation?
- How do viewers interact with installation art, and how does that interaction influence their perception of the work?
- In what ways can installation art challenge traditional notions of what art is and where it can be placed?

Enduring Understandings:

Students will understand that...

- Installation art transforms a space by creating immersive, site-specific works that engage the viewer's senses and emotions.
- The meaning of installation art is shaped by the interaction between the artwork, its environment, and the materials used.
- Installation art offers a unique experience for the viewer, shifting the focus from the object itself to the overall spatial experience and viewer engagement.
- Understanding the history, techniques, and evolution of installation art deepens our appreciation of how space, context, and materials communicate meaning.

Knowledge:

Students will know...

- Vocabulary
 - Installation Art
 - Site-Specific Art
 - Immersive Experience
 - Audience Interaction
 - Environmental Art
 - Scale
 - Context
 - Assemblage
 - Found Objects
 - Spatial Relationships

Skills:

Students will be able to...

- Design and construct site-specific installation art that transforms space.
- Plan and arrange materials to create an immersive or interactive experience.
- Consider spatial relationships, scale, and context when designing installations.
- Integrate found objects and unconventional materials into installation projects.
- Could collaborate with peers to create large-scale or multi-faceted works.
- Reflect on the impact of their installation, including audience interaction and environmental considerations.
- Reflect on and revise works based on peer and self-critique.

Suggested Artists:

- Yayoi Kusama: Known for immersive environments with repetition and scale.
- Christo and Jeanne-Claude: Large-scale environmental installations engaging with space and audience.
- Cornelia Parker: Installation art focusing on destruction and reconstruction.
- Kara Walker: Site-specific installations exploring storytelling and social themes.

- Olafur Eliasson: Interactive installations that explore light, color, and natural phenomena.

Priority Standards:

- **PA Standards:**
 - Standard 9.1.12.B: Experiment with abstraction techniques, breaking down forms and exploring imagination.
 - Standard 9.4.12.C: Analyze and interpret the use of abstraction in art and its impact on the viewer.
- **National Standards:**
 - Creating, Anchor Standard 3: Refine and complete artistic work.

Supporting Standards:

- **PA Standards:**
 - Standard 9.1.12.C: Analyze how artists use imagination and abstraction to communicate.
- **National Standards:**
 - Connecting, Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.

Acceptable Evidence:

Performance Tasks:

- Design and install a site-specific artwork that transforms the space and engages the viewer.
- Collaboratively create an installation addressing a cultural, social, or environmental theme.

Acceptable Evidence of Learning Other than Performance Tasks:

Formative Assessment:

- Group brainstorming sessions to develop installation concepts.
- Planning sketches or 3D models showing spatial relationships and material use.
- Feedback loops on installation arrangements and audience interaction strategies.

Summative Assessment:

- Rubric-based evaluation of the installation for spatial transformation, thematic connection, and audience engagement.
- Post-installation reflection analyzing how the piece functioned in its environment and the viewers' responses.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Plan, design, and install a site-specific artwork that engages viewers.
- Explore spatial relationships and audience interaction through mock installations.
- Study environmental and social themes in contemporary installation art.
- Projects could include large scale works or interactive installations.

Instructional Strategies:

- Use collaborative planning sessions to design installations.
- Provide scaffolds, such as spatial diagrams and templates, to aid in planning.

- Facilitate guided critiques that focus on the relationship between materials, space, and audience.

Differentiation/Intervention/Enrichment Options:

- **Differentiation:** Allow students to choose between individual and group installations.
- **Intervention:** Provide smaller-scale projects for students needing additional support.
- **Enrichment:** Encourage exploration of digital components (e.g., video or sound) in installations.

For Language Development:

- Use sentence frames for critique, such as “This installation interacts with space by...”
- Incorporate visual planning tools, like annotated sketches or diagrams.
- Provide bilingual labels and prompts for installation components.

CENTRAL BUCKS SCHOOL DISTRICT
Course of Study
Recommendation for
Adoption

Course: **Ceramics 4**

Date: September 2026

Student Level: Advanced

Grade Level: 11 & 12

Characterization of Course of Study:

Ceramics 4 offers advanced students in grades 11-12 the opportunity to refine their ceramic techniques and strengthen their artistic voice through complex, self-directed projects. Building on skills from Ceramics 1-3, students will engage in advanced wheel-throwing, sculptural design, and experimental forms.

Students will develop a unique portfolio of functional and non-functional works that explore contemporary and historical influences. An emphasis is placed on pushing boundaries in surface treatments, glaze layering, and mixed media. Through critiques, students will articulate their creative processes, explore aesthetic decision-making, and respond to feedback.

Prerequisite: Ceramics 3, B or better, or teacher recommendation.

Reasons for Proposed Adoption:

Ceramics 4 is recommended for adoption to provide advanced students with a rigorous continuation of the ceramic's pathway. The course supports independent studio practice, advanced craftsmanship, portfolio development, and personal artistic voice while aligning with CBSD curriculum goals and both PA Visual Arts standards and National Visual Arts Standards.

All CBSD art writing teams consider the following while writing curriculum:

1. *All COS will be converted from the 4 strands of DBAE to Common Units of study with standards embedded*
 2. Discipline-Based Art Education: (Production, Criticism, Aesthetics, History)
 3. Crosswalk to National Visual Arts Standards (Creating, Presenting, Responding, Connecting)
 4. Pacing guides that reflect the Creative Process Continuum
 5. Updated Technology, Terminology, Suggested Artists, and Vocabulary
 6. Updated Learning Principles
-

(Date of Approval)

Principals

(Date of Approval)

Curriculum Committee

(Date of Approval)

The Board of School Directors

_____ Revision Date



Ceramics 4

Course Number: 8364

Course Level: Advanced

Grade: 11-12

Time/Credit: 1.0 / 1 semester

Development Date: 2025 - 2026

School Board Approval: November, 2025

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

Central Bucks School District
Ceramics 4
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**Central Bucks School District
Teaching and Learning Principles**

K – 12 Art Program Learning Principles

1. All learners are capable of complex and high-quality work if the right learning conditions are established.
2. Students of art learn when modeling of products and processes are demonstrated that address appropriate learning criteria.
3. Students learn when they are focused on the objectives and actively engaged in the learning experience.
4. Students of art learn when a connection is made to prior learning and personal interests.
5. Students learn when they are provided with a safe environment where they can experiment and take creative risks.
6. Learning is most effective when differences in learners' prior knowledge, interests, and strengths are accommodated.
7. Learners succeed when they believe the task is attainable with reasonable effort.
8. Students learn when they see and demonstrate links between new learning, possibilities for future learning, and its multi-disciplinary applications.
9. Greater learning depends upon repeated performance to increase fluency and accuracy.
10. Students learn when they reflect upon and summarize the learning experience.
11. Successful learning requires the ability to reflect, self-assess and use feedback to self-adjust.
12. Various visual arts processes can foster creative thinking, providing students with an essential real-world skill.
13. Students can use the creative process to solve problems and generate new concepts for learning.
14. Students of art can use appropriate technology to enhance creative growth and creative process.

**Central Bucks School District
Enduring Understandings**

Students will understand that:

Standards Connection: Creating / PA 9.1.12 Production

Ceramics as a Form of Expression

- Ceramics is both a functional craft and a fine art form, capable of conveying personal, cultural, and conceptual ideas.
- Through the integration of form, texture, surface design, and glazing, ceramics can express a wide range of emotions, narratives, and cultural contexts.
- The relationship between function and aesthetics in ceramics allows for both utility and deep artistic expression.

Standards Connection: Creating / PA 9.1.12 Production

Creative Process and Experimentation

- Growth as an artist comes from pushing creative boundaries, experimenting with materials, and embracing risk and innovation.
- The creative process is dynamic, requiring iterative exploration, problem-solving, and the ability to adapt.
- Experimentation, including the use of unconventional materials and techniques, is essential for expanding artistic horizons.
- Embracing failure as a part of experimentation encourages resilience and deepens understanding of the medium.

Standards Connection: Connecting / PA 9.2.12 Art History

Historical and Contemporary Context

- Understanding historical and contemporary ceramic practices enriches artistic exploration and personal voice.
- Ceramics have played a significant role in human culture, from utilitarian objects in everyday life to sculptural works that push the boundaries of art.
- The study of different ceramic traditions from around the world broadens students' perspectives and informs their own creative processes.
- Contemporary ceramic artists continue to push the boundaries of the medium, incorporating new technologies, styles, and cross-disciplinary influences.

Standards Connection: Responding / PA 9.3.12 Art Criticism

Critique and Reflection

- Thoughtful critique and reflection enhance artistic growth and foster deeper connections between intent and outcome.
- Critiques are an opportunity to analyze and discuss artistic decisions, pushing students to consider the formal, conceptual, and emotional aspects of their work.
- Reflection helps students articulate their creative choices, analyze successes and challenges, and identify areas for improvement.
- The process of self-assessment and peer review is vital for developing a critical eye and refining artistic expression.

Standards Connection: Creating and Presenting / PA 9.1.12 Production and PA 9.4.12 Art Aesthetics

Technical Mastery and Personal Style

- Advanced ceramic techniques, when mastered, enable artists to develop and communicate their unique artistic identity.
- Mastery of techniques such as wheel-throwing, sculpting, and glazing allows artists to fully control the form and finish of their work, giving them the freedom to push creative boundaries.
- Personal style evolves through the integration of technique, material choices, and conceptual development.
- The refinement of technical skills provides the foundation for more nuanced and sophisticated artistic expression

**Central Bucks School District
Essential Questions.**

Standards Connection: Creating / PA 9.1.12 Production

Ceramics as a Form of Expression

- How can ceramic art reflect personal, cultural, or societal themes?
- How do different cultural contexts and histories influence the way ceramics are created and perceived?
- In what ways can ceramics be used to tell a story or represent abstract concepts?
- What makes a ceramic piece resonate as art versus craft?
- How does the intention behind a piece and the level of craftsmanship affect its artistic value?
- Can something be both a functional object and a work of art? How?

Standards Connection: Creating / PA 9.1.12 Production

Creative Process and Experimentation

- How can experimentation with techniques and materials lead to artistic breakthroughs?
- What role does trial and error play in the creation of innovative ceramic pieces?
- How can new or unfamiliar techniques help expand artistic potential?
- What role do mistakes and unexpected outcomes play in the creative process?
- How can an artist learn from mistakes and use them to enhance their work?
- In what ways can failure lead to new opportunities for artistic growth?

Standards Connection: Connecting / PA 9.2.12 Art History

Historical and Contemporary Context

- How do historical and contemporary ceramic practices influence modern ceramics?
- What traditions and innovations shape the contemporary ceramic landscape?
- How do modern artists draw on or subvert historical ceramic techniques in their work?
- What can we learn from studying ceramic works from other cultures?
- What universal themes or techniques can be found in ceramics across different cultures?
- How does understanding cultural symbolism deepen our appreciation of ceramic art?

Standards Connection: Responding / PA 9.3.12 Art Criticism

Critique and Reflection

- How can receiving and providing feedback refine artistic decisions?
- What types of feedback are most helpful in the artistic process?
- How can critiques be used to push the boundaries of a student's creative and technical abilities?
- What methods can be used to articulate the connection between process, intent, and final outcome?
- How can students verbalize and defend their artistic decisions during critiques?

- In what ways does the ability to reflect on one's work improve the overall creative process?

Standards Connection: Creating and Presenting / PA 9.1.12 Production and PA 9.4.12 Art Aesthetics

Technical Mastery and Personal Style

- How do advanced ceramic techniques impact the ability to convey meaning and aesthetics?
- How does mastering techniques like glazing, firing, or sculptural detail affect the message or impact of a piece?
- How can the technical aspects of ceramics be used to emphasize conceptual ideas?
- In what ways can an artist use ceramics to develop and showcase their personal style?
- How do material choice, process, and form contribute to an artist's unique voice?
- How does mastery of the technical side of ceramics allow for greater freedom in artistic expression?

Central Bucks School District – Course of Study Overview Ceramics 4

Desired Results

8364 Ceramics 4

(18 weeks, 1 credit)

Course Description:

Ceramics 4 offers advanced students in grades 11-12 the opportunity to refine their ceramic techniques and strengthen their artistic voice through complex, self-directed projects. Building on skills from Ceramics 1-3, students will engage in advanced wheel-throwing, sculptural design, and experimental forms.

Students will develop a unique portfolio of functional and non-functional works that explore contemporary and historical influences. An emphasis is placed on pushing boundaries in surface treatments, glaze layering, and mixed media. Through critiques, students will articulate their creative processes, explore aesthetic decision-making, and respond to feedback.

Prerequisite: Ceramics 3, B or better, or teacher recommendation.

Committee Members: Deb Thomas, Tina Warren, Allison Theis, and Alison Thompson

Course Grading: CBSD Rubrics

Suggested Acceptable Evidence.

Oral Assessments

- Group Critiques
- Individual Critiques
- Class Discussions

Written Assessments

- Self-Evaluations
- Written Critiques

- Rubrics

Performance Assessments

- Class Exercises (Skills Development)
- Preliminary Studies (Brainstorming; Thumbnail Sketches)
- Project/Unit Assignments (All media; All forms)
- Sketchbook Assignments
- Technique Demonstrations
- Photographic Documentation

Central Bucks School District – Ceramics 4 - Pacing Guide

Priority National Visual Arts Standards – Creating, Present, Respond, Connect PA Visual Arts Standards: Production 9.1.12 - Art History 9.2.12 - Art Criticism 9.3.12 - Art Aesthetics 9.4.12						
UNITS of Study	Unit 1- Conceptual & Imagination	Unit 2 – Figurative	Unit 3 Form/ Function	Unit 4 – Identity	Unit 5 – Portraiture	Unit 6 – Non-Representational
DAY	15	15	15	15	15	15
Content						Days
NOTE: 1. All units of study align to the National Visual Arts Standards & PA Visual Arts Standards & employ the creative process, with specific, daily, and ongoing formative feedback. 2. This creative cycle is a progression that will repeat until a point of completion is determined: 1. Inspire & Research 2. Plan, Sketch and Practice 3. Envision, Create & Revise 4. Share, Reflect and Assess 3. Units of study may need to be combined & overlapped to account for studio space, equipment/materials, and teacher’s professional judgment based on differentiated student needs.						Total 90
Unit 1 - Conceptual & Imagination						
Inspire & Research 1. Introduction to Conceptual Art ○ Overview of conceptual art in ceramics and other mediums.						1.5

- Students research contemporary artists known for conceptual ceramic work. 2. Art Movement Exploration - Investigate different conceptual art movements and how they challenge traditional ceramics. 3. Gallery/Artist Study - Class discussion and analysis of selected artists' works. Formative Assessment Throughout Learning Cycle	
Plan, Sketch, and Practice 1. Brainstorming and Idea Development - Students create mood boards or word maps to help define their concept/theme. 2. Initial Sketching - Students begin sketching ideas based on their research and concept. - Experimentation with forms and abstract designs. 3. Techniques - If needed, students practice relevant ceramic techniques for their concept. 4. Design: Student will develop their final design Formative Assessment Throughout Learning Cycle	2
Envision, Create & Revise 1. Begin Construction - Start building the conceptual piece, incorporating abstract and symbolic forms. - Students focus on craftsmanship while maintaining creative freedom. 2. Revisions and Experimentation - Review and refine the work based on personal critique or feedback from peers. - Introduce new elements based on creative revision. - Introduce surface decorating options Formative Assessment Throughout Learning Cycle	10
Share, Reflect, and Assess 1. Group Critique - Students present their work to the class for group critique and feedback. - Reflect on how effectively their conceptual intentions are conveyed. 2. Final Reflection and Self-Assessment - Students complete self-reflections on their process, their challenges, and successes. - Instructor provides a final assessment based on creativity, technical execution, and clarity of concept. Formative Assessment Throughout Learning Cycle	1.5
Employ Summative Assessment (RUBRIC) .5	.5
Unit 2 – Figurative	
Inspire & Research 1. Explore Figurative Sculpture	1

○ Study historical and contemporary figurative sculpture. ○ Discuss anatomical studies and expressive use of form. ○ Discuss the art over function 2. Analysis of Cultural and Personal Figures ○ Examine how historical and cultural figurative works can represent emotions and moods. Formative Assessment Throughout Learning Cycle	
Plan, Sketch, and Practice 1. Anatomical Proportions and Gestures ○ Students study the human figure's proportions, gestures, and expression. 2. Initial Sketching and Maquettes ○ Students sketch the human figure in different poses and expressions, experimenting with gesture and emotion. ○ Create small maquettes or rough clay models for planning. 3. Sculpting Techniques Practice ○ Students practice sculpting human features and figures in clay. ○ Discuss and practice adding expression and detail to the figure. Formative Assessment Throughout Learning Cycle	2.5
Envision, Create & Revise 1. Begin Sculpting the Figurative work(2 days) ○ Students begin their figurative sculpture, focusing on proportions, expression, and emotional depth. 2. Refine and Add Details (4 days) ○ Focus on refining surface details, textures, and features. ○ Students revise and adjust their work based on feedback. 3. Surface Decoration and Glazing (2 days) ○ Students work on adding surface decoration, texture, and refining glaze layers. Formative Assessment Throughout Learning Cycle	8
Share, Reflect, and Assess 1. Group Critique (1 day) ○ Students present their work to the class for critique. ○ Emphasis on the connection between form, expression, and emotional depth. Formative Assessment Throughout Learning Cycle	1
Employ Summative Assessment (RUBRIC) 1. Self-Reflection and Final Assessment ○ Students reflect on their process and how their sculpture conveys emotion ○ Instructor provides final assessment based on craftsmanship,	.5
Unit 3 – Form Verses Function	
Inspire & Research 1. Introduction to Functional Ceramics ○ Study historical and contemporary functional ceramics (e.g., teapots, mugs). ○ Explore how form and function coexist in ceramics. 2. Analyze the Balance of Form and Function	2

○ Discuss how aesthetics influence the usability and ergonomics of functional pieces. 3. Artist Case Study ○ Research and present an artist who prioritizes aesthetic values over function in ceramics. Formative Assessment Throughout Learning Cycle	
Plan, Sketch, and Practice (6 Days) 1. Sketch Functional Designs (2 days) ○ Students sketch their ideas for functional ceramic pieces (e.g., cups, plates, teapots). ○ Focus on pushing and enhancing the aesthetic appeal with practical design. 2. If needed, practice throwing and Handbuilding techniques ○ Students practice throwing on the wheel and hand-building essential components (e.g., handles, lids, spouts) Formative Assessment Throughout Learning Cycle	2.5
Envision, Create & Revise 1. Begin Construction ○ Students create functional ceramic pieces, focusing on form and usability while using nontraditional aesthetic values and pushing their creative boundaries. 2. Surface Decoration and Glazing ○ Students work on adding surface decoration, texture, and refining glaze layers. Formative Assessment Throughout Learning Cycle	9
Share, Reflect, and Assess 1. Group Critique and Peer Feedback ○ Students present their work to the class and receive feedback on form and function. 2. Instructor final assessment of the piece's usability, creativity, and technical skill. Formative Assessment Throughout Learning Cycle	1
Employ Summative Assessment (RUBRIC) 1. Self-Reflection and Final Assessment (.5 days) ○ Reflect on how well the project prioritizes artistic design with functionality.	.5
Unit 4 – Identity	
Inspire & Research 1. Introduction to Identity in Ceramics ○ Study how artists express identity in ceramics and art in general. 2. Examine Historical expression of identity in art. 3. Research different artistic interpretations 4. Research Portraiture ○ Discuss how style, symbols and motifs enhance the meaning in personal identity Formative Assessment Throughout Learning Cycle	2
Plan, Sketch, and Practice 1. Sketch Symbols and Concepts	2.5

Students begin developing their concepts, sketching symbolic elements. 2. Practice final layout for multiple views Formative Assessment Throughout Learning Cycle	
Envision, Create & Revise 1. Begin Sculpting - Students begin sculpting their sculptures, adding symbolic elements. 2. Refinement and Texturing - Continue refining the sculpture, adding textures and symbols that represent the subject's identity. 3. Surface Decoration and Glazing - Students work on adding surface decoration, texture, and refining glaze layers. Formative Assessment Throughout Learning Cycle	9
Share, Reflect, and Assess 1. Group Critique and Peer Feedback Students present their works for feedback on expression, symbolism, and craftsmanship. Formative Assessment Throughout Learning Cycle	1
Employ Summative Assessment (RUBRIC) 1. Self-Reflection and Final Assessment - Students reflect on how well their work represents identity. - Instructor assesses the work based on technical skill, expression, and symbolic depth.	.5
Unit 5 – Portraiture	
Inspire & Research 1. Introduction to Portraiture in Ceramics - Study how portraiture is used in ceramics and art in general. 2. Examine Historical and Cultural Portraits - Research different artistic interpretations of portraits and self-portraits. - Research Symbolism in Portraiture - Discuss how symbols and motifs enhance the meaning in portraiture. Formative Assessment Throughout Learning Cycle	1.5
Plan, Sketch, and Practice 1. Sketch Portrait Concepts - Students begin developing their portrait concepts, sketching facial features and symbolic elements. 2. Practice Facial Features and Proportions - Practice sculpting human facial features, focusing on expression and proportion. 3. Develop final design plan Formative Assessment Throughout Learning Cycle	2
Envision, Create & Revise 1. Begin Sculpting the Portrait Students begin sculpting their portrait sculptures, adding facial features and symbolic elements.	10

2. Refinement and Texturing - Continue refining the sculpture, adding textures and symbols that represent the subject's identity. 3. Surface Decoration and Glazing - Students work on adding surface decoration, texture, and refining glaze layers. Formative Assessment Throughout Learning Cycle	
Share, Reflect, and Assess (1.5 Days) 1. Group Critique and Peer Feedback (1 day) Students present their works for feedback on expression, symbolism, and craftsmanship. Formative Assessment Throughout Learning Cycle	1
Employ Summative Assessment (RUBRIC) 1. Self-Reflection and Final Assessment Students reflect on how well their work represents identity. 2. Instructor assesses the work based on technical skill, expression, and symbolic depth.	.5
Unit 6 -Non-Representational	
Inspire & Research 1. Introduction to Abstract Ceramics - Study abstract ceramic works and how they explore composition through form, texture, and color. 2. Research Abstract Techniques - Explore different techniques for abstract ceramics, focusing on texture, color, and form. 3. Analyze Non-Representational Artists - Students research artists known for abstract or non-representational work in ceramics. Formative Assessment Throughout Learning Cycle	2
Plan, Sketch, and Practice 1. Sketch Abstract Concepts - Students sketch ideas for non-representational sculptures, exploring shapes, lines, and textures. 2. If needed, practice Abstract Techniques - Students practice techniques such as texture building, carving, and experimenting with glazes. Formative Assessment Throughout Learning Cycle	2.5
Envision, Create & Revise 1. Begin Creating Non-Representational Work - Students begin creating abstract sculptures, focusing on the emotional impact of forms. 2. Refine and Experiment with Surface Treatments - Students revise and refine their non-representational pieces, experimenting with glazes and texture. 3. Surface Decoration and Glazing - Students work on adding surface decoration, texture, and refining glaze layers. Formative Assessment Throughout Learning Cycle	9
Share, Reflect, and Assess	1

1. Group Critique Students present their abstract work for critique, with a focus on emotional communication.	
Employ Summative Assessment (RUBRIC) 1. Self-Reflection and Final Assessment - Students complete self-reflection on the creative process and artistic decisions. - Instructor assesses the piece based on creativity, technique	.5

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

Central Bucks School District – Ceramics 4

Unit 1 - Conceptual and Imagination

Desired Results:

Artists use conceptual ceramics to transcend functionality, creating works that provoke thought and evoke emotion by blending imagination with technical skill.

Enduring Understandings:

- Conceptual art challenges traditional approaches by prioritizing ideas and imagination over conventional forms.
- The creative process allows artists to communicate abstract or unconventional concepts through ceramics.

Essential Questions:

- How can ceramic art be used to express abstract ideas or emotions?
- In what ways does imagination expand the boundaries of traditional ceramic practices?

Knowledge:

Students will know...

Vocabulary:

- Conceptual Art
- Abstraction
- Symbolism
- Narrative Art
- Idea Development
- Experimental Techniques
- Mixed Media
- Visual Metaphor
- Process Art
- Artist Statement

Skills: Students will be able to...

- The students will be able to generate and develop conceptual ideas for ceramic works.
- The students will be able to use advanced ceramic techniques to communicate abstract and imaginative themes.
- The students will be able to integrate mixed media into ceramic pieces to enhance conceptual depth.
- The students will be able to create artist statements to articulate their creative processes and intentions.
- The students will be able to evaluate and refine their designs based on feedback and critique.

Suggested artists (Not limited to)

1. **Ai Weiwei** – A Chinese contemporary artist who uses ceramics and found objects to examine history, power, culture, and human rights.
2. **Arlene Shechet** – An American ceramic artist known for expressive, abstract forms that celebrate clay's movement, texture, and unpredictability.
3. **Theaster Gates** (*also appears in Unit 4 for identity and cultural memory connections*) – An American artist who uses ceramics, sculpture, and installation to explore history, community, labor, and cultural memory.
4. **Mitchell Grafton** – A ceramic artist known for imaginative, detailed sculptural works that often combine humor, fantasy, and storytelling.
5. **Tiffany Schmierer** – A ceramic artist whose layered, colorful surfaces explore nature, memory, place, and environmental themes.
6. **Sigita Lukošūnienė** – A Lithuanian ceramic artist known for delicate figurative and narrative ceramic works with emotional and symbolic qualities.
7. **Diana Farfan** – A ceramic sculptor known for whimsical, expressive figures that explore imagination, emotion, and storytelling.

Priority Standards:

PA Visual Arts Standard:

- 9.1.12.C: Integrate and apply advanced ceramic techniques to create works of art that convey complex, conceptual ideas.

Aligned National Core Arts Standards:

- Creating (VA:Cr1.2.IIIa): Choose from a range of materials and methods of traditional and contemporary artistic practices to plan works of art and design that explore complex themes.
- Creating (VA:Cr2.1.IIIa): Experiment, innovate, and take risks to pursue ideas, forms, and meanings that emerge in the process of artmaking or designing.

Supporting Standards:

PA Visual Arts Standards:

- 9.2.12.D: Analyze how historical and cultural contexts influence the development of conceptual art.

Aligned National Core Arts Standards:

- **Responding (VA:Re7.2.IIIa):** Determine the commonalities within a group of artists or visual images attributed to a particular type of art, time period, or culture.
- **Connecting (VA:Cn11.1.IIIa):** Demonstrate how media, technique, and context influence meaning in art and design.

PA Visual Arts Standards:

- 9.3.12.A: Apply critical thinking to interpret, evaluate, and defend personal artistic choices.

Aligned National Core Arts Standards:

- **Responding (VA:Re8.1.IIIa):** Evaluate the effectiveness of an image or images to influence ideas, feelings, and behaviors of specific audiences.
- **Responding (VA: Re9.1.IIIa):** Construct evaluations of a work of art or collection of works based on differing sets of criteria.

Suggested Acceptable Evidence:

Performance Tasks:

- Create a conceptual ceramic piece that incorporates abstract or symbolic elements to convey a narrative or idea.
- Develop a mixed-media ceramic sculpture integrating found objects or unconventional materials.
- Write and present an artist statement explaining the conceptual foundation and creative decisions of the piece.

Acceptable Evidence Other Than Performance Tasks:

Formative Assessment:

- Sketchbook and idea development exercises focusing on brainstorming and refining conceptual designs.
- Class discussions analyzing conceptual artwork for inspiration and techniques.
- Exit tickets summarizing the student's progress and ideas during the creation process.

Summative Assessment:

- Final critique of the conceptual ceramic project using a rubric evaluating creativity, technical execution, and alignment with the intended concept.

- Assessed personal progress using rubrics, reflecting on the development process, obstacles encountered, and key takeaways.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Explore various contemporary and historical conceptual ceramic artworks through virtual or in-person gallery visits.
- Engage in brainstorming sessions where students sketch and discuss their conceptual ideas for a final ceramic project.
- Use digital tools like mood boards or Pinterest to curate visual references for their creative concepts.
- Participate in group discussions where students explain their project concepts, receive feedback, and adjust their ideas accordingly.

Instructional Strategies:

- **Inquiry-Based Learning:** Encourage students to explore questions about conceptual art, asking them to consider "What is the role of imagination in art?" and "How can ceramics communicate abstract ideas?"
- **Scaffolded Instruction:** Start with simple projects that focus on basic concepts of abstraction and progressively challenge students with more complex assignments that push their creative boundaries.
- **Critique Sessions:** Foster a supportive environment for critiques where students discuss their work in progress, offering constructive feedback to peers.
- **Modeling & Demonstration:** Model the process of transforming a concept into a physical form, discussing materials, techniques, and surface treatments.

Differentiation/Intervention/Enrichment Options:

- **Intervention:** Provide templates or structured brainstorming guides for students who struggle with conceptualization. Offer individualized guidance during the ideation process.
- **Enrichment:** Offer students opportunities to experiment with unconventional media in their work, such as incorporating found objects or other mixed-media elements into their sculptures.
- **Flexible Groupings:** Pair students who are struggling with peers who excel at generating creative ideas for collaborative projects.

For Language Development:

- Provide sentence starters and vocabulary lists related to the concepts of symbolism, abstraction, and artistic intent.
- Use visual prompts and graphic organizers to help students organize their ideas and express their conceptual thinking.
- Engage multilingual learners in peer feedback sessions where they can practice articulating their thoughts in English with the support of classmates.

Central Bucks School District – Course of Study – Ceramics 4

Unit 2 – Figurative

Desired Results:

Through figurative ceramics, artists explore the human form as a vessel for storytelling, emotion, and cultural reflection, merging technical accuracy with creative interpretation.

Enduring Understandings:

- Figurative ceramics use the human form to explore identity, culture, and shared experiences.
- The study of anatomy and proportion enhances the creation of lifelike or stylized representations in ceramics.

Essential Questions:

- How can ceramic forms capture the complexity of human expression and movement?
- What roles do figurative ceramics play in representing societal values or individual narratives?

Knowledge:

Students will know...

- **Vocabulary:**
 - Functional Art
 - Aesthetic Design
 - Balance
 - Utility
 - Form
 - Structural Integrity
 - Decorative Techniques
 - Ergonomics
 - Throwing and Altering

Suggested artists (Not limited to)

Students will know...

1. **Klara Kristalova** – A Swedish ceramic sculptor known for dreamlike, figurative works that blend childhood, folklore, nature, and transformation.
2. **Linda Lewis** – An American ceramic artist who creates expressive figurative clay sculptures that explore storytelling, emotion, family, and shared human experiences.
3. **Elya Yalonetskaya** – A ceramic sculptor known for poetic figurative works inspired by mythology, history, storytelling, and the emotional power of clay.
4. **Anne-Sophie Gilloen** – A French ceramic artist whose soft, whimsical figures explore everyday emotions, dreams, humor, and quiet moments of reflection.
5. **Christina Orthwein** – A Pennsylvania ceramic artist who works in figurative sculpture, carved slab forms, jewelry, and low-relief tile with strong design and nature-inspired details.
6. **Sharon McCoy** – A narrative ceramic sculptor who uses bold color, symbolism, humor, and found objects to create imaginative figurative works.
7. **Jurga Martin** – A French-Lithuanian sculptor known for tender, expressive figures that capture movement, emotion, and poetic human presence.
8. **Fred Yokel** – An American ceramic artist known for humorous, hand-built figures and animals that capture gesture, movement, and everyday human behavior.

Skills:

Students will be able to...

- The students will be able to model the human form using proportion and anatomical accuracy.
- The students will be able to create expressive figurative sculptures that convey emotion or narrative. The students will be able to analyze and apply historical and contemporary approaches to figurative ceramics.
- The students will be able to explore gesture and movement in three-dimensional forms.
- The students will be able to incorporate surface detailing to enhance the realism or stylization of their figurative works.

Priority Standards:**PA Visual Arts Standards:**

- **9.1.12.B:** Demonstrate mastery of techniques in modeling the human form through advanced ceramic methods.

Aligned National Core Arts Standards:

- **Creating (VA:Cr2.1.IIIa):** Experiment, innovate, and take risks to pursue ideas, forms, and meanings that emerge in the process of artmaking or designing.
- **Creating (VA:Cr2.2.IIIa):** Demonstrate understanding of and proficiency in advanced ceramic techniques and craftsmanship to achieve an intended aesthetic.

Supporting Standards:**PA Visual Arts Standards**

- **9.2.12.C:** Analyze the historical significance and evolution of figurative representation in ceramics.

Aligned National Core Arts Standards:

- **Responding (VA:Re7.2.IIIa):** Determine the commonalities within a group of artists or visual images attributed to a particular type of art, time period, or culture.
- **Connecting (VA:Cn11.1.IIIa):** Demonstrate how media, technique, and context influence meaning in art and design, particularly in the historical evolution of figurative ceramics.

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PA Standard Visual Arts Standards

- **9.4.12.A:** Analyze how figurative art can reflect personal and societal values and emotions.

Aligned National Core Arts Standards:

- **Responding (VA:Re8.1.IIIa):** Evaluate the effectiveness of an image or images to influence ideas, feelings, and behaviors of specific audiences.
- **Connecting (VA:Cn10.1.IIIa):** Synthesize knowledge of social, cultural, historical, and personal contexts to create meaningful art that reflects identity and values.

Suggested Acceptable Evidence:**Performance Tasks:**

- Sculpt a figurative ceramic piece that accurately portrays human anatomy, gesture, or expression.
- Create a relief sculpture of the human figure focusing on stylization or realism.
- Complete a series of figurative studies experimenting with different poses and techniques.

Acceptable Evidence Other Than Performance Tasks:

Formative Assessment:

- Gesture drawing sessions to practice human proportions and movement.
- Peer feedback sessions on maquettes or in-progress work.
- Quick quizzes on figurative art vocabulary and anatomical terms.

Summative Assessment:

- Critique of the final figurative sculpture based on anatomy, expression, and craftsmanship.
- Portfolio submission including sketches, process photos, and final work with a written explanation of artistic choices.
- Assessed personal progress using rubrics, reflecting on the development process, obstacles encountered, and key takeaways.

Suggested Learning Experiences and Instruction**Learning Experiences:**

- Study classical and contemporary figurative sculptures, analyzing how artists represent the human form.
- Conduct live drawing sessions using mannequins or peers to practice gesture drawing and human anatomy.
- Create small-scale maquettes (models) of figurative sculptures before building the final piece.
- Experiment with different tools and techniques for adding details and texture to human forms.

Instructional Strategies:

- **Modeling:** Demonstrate proper proportions, anatomy, and technique for sculpting the human form, breaking down the process into manageable steps.
- **Collaborative Learning:** Have students work in pairs or small groups to provide feedback on each other's figurative sculptures.
- **Visual Learning:** Use visual aids like anatomical charts or online resources to help students understand the structure and proportions of the human body.
- **Peer Reviews:** Use peer critique sessions where students can give and receive feedback on their figurative work, focusing on areas such as expression, proportion, and accuracy.

Differentiation/Intervention/Enrichment Options:

- **Intervention:** Provide templates or guides for drawing and sculpting basic human shapes for students who need additional support with proportion.
- **Enrichment:** Encourage advanced students to experiment with stylized figurative work or focus on creating expressive, non-realistic figures.
- **Choice:** Allow students to choose whether they want to work in a realistic or abstract style for their figurative sculptures, based on their interests and skill level.

For Language Development:

- Use visual vocabulary cards to help students learn terms related to anatomy and figurative art.
- Encourage students to describe the human form using both technical and emotional language (e.g., describing the posture or expression).
- Use pairing strategies where multilingual learners collaborate with peers to verbalize and discuss the anatomical and artistic elements of their sculptures.

Central Bucks School District – Course of Study – Ceramics 4

Unit 3 – Form Verses Function

Desired Results:

Ceramics that navigate the intersection of form and function challenge the viewer to reconsider the relationship between utility and aesthetic value.

Enduring Understandings:

- The tension between form and function drives the exploration of ceramics as both art and utility.
- A successful piece balances design, craftsmanship, and purpose.

Essential Questions:

- What distinguishes functional ceramics from sculptural forms?
- How can an artist challenge traditional boundaries between form and function?

Knowledge:

Students will know...

- Vocabulary:
 - Proportion
 - Anatomy
 - Gesture
 - Figurative Sculpture
 - Stylization
 - Realism
 - Expression
 - Relief Sculpture
 - Three-Dimensional Form
 - Surface Detailing

Suggested artists (Not limited to)

- **Theire-Hicham El Madi** – A Moroccan designer who blends ceramics, wood, metal, and craft traditions to create contemporary functional objects and interiors.

- **Ana Shiohita** – A Vancouver-based ceramic artist known for playful, altered forms that suggest movement, gravity, and exaggerated drippy surfaces.
- **Moran Trabelsi** – A Tel Aviv ceramicist who creates hand-built sculptural vessels inspired by seashells, underwater forms, and organic natural patterns.
- **Catalin Filip (Melo Clay)** – A Romanian-born, UK-based ceramic artist and designer whose sculptural lamps and vessels explore gravity, movement, and clay's natural distortions.
- **Vanessa Singenzia** – A Romanian ceramic artist and founder of UAU Studio whose bold hand-built objects blur the line between function, sculpture, and design.
- **Martha Grover** – An American functional potter known for elegant thrown and altered porcelain forms with flowing curves, soft color, and refined details.
- **Michael Boroniec** – An American ceramic sculptor known for Spatial Spiral vessels that deconstruct wheel-thrown forms into ribbon-like layers and negative space.
- **Kallia Panopoulou** – A Greek ceramicist whose hand-built vessels draw inspiration from sea creatures, flowers, bones, stones, and organic textures.

Skills:

Students will be able to...

- The students will be able to design and create ceramic pieces that balance functionality and aesthetics.
- The students will be able to construct structurally sound functional forms such as bowls, teapots, or vessels.
- The students will be able to alter traditional forms to explore the intersection of art and utility.
- The students will be able to refine decorative techniques, including glazing and texturing, to enhance both form and function.
- The students will be able to critique the effectiveness of functional and non-functional designs.

Priority Standards:

PA Visual Arts Standards

- **9.1.12.E:** Deliberate and refine designs that balance functionality with creative expression in ceramics.

Aligned National Core Arts Standards:

- **Creating (VA:Cr1.2.IIIa):** Choose from a range of materials and methods of traditional and contemporary artistic practices to plan works of art and design that explore complex themes.
- **Creating (VA:Cr2.3.IIIa):** Engage in constructive critique with peers and self-reflection to refine technical and expressive qualities in ceramics, ensuring both function and aesthetics are considered.

Supporting Standards:

PA Visual Arts Standards:

- **9.2.12.A:** Evaluate how traditional and contemporary practices address the balance between form and function.

Aligned National Core Arts Standards:

- **Responding (VA:Re7.2.IIIa):** Determine the commonalities within a group of artists or visual images attributed to a particular type of art, time period, or culture.
- **Connecting (VA:Cn11.1.IIIa):** Demonstrate how media, technique, and context influence meaning in ceramic design, specifically addressing how function and form have evolved over time.

PA Visual Arts Standard:

- **9.3.12.C:** Critique the effectiveness of design choices in functional and non-functional ceramic pieces.

Aligned National Core Arts Standards:

- **Responding (VA:Re9.1.IIIa):** Construct evaluations of a work of art or collection of works based on differing sets of criteria, focusing on both functionality and artistic merit.
- **Presenting (VA:Pr5.1.IIIa):** Investigate, select, and apply methods or processes for displaying ceramics to enhance their meaning, including the relationship between form and function.

Suggested Acceptable Evidence:**Performance Tasks:**

- Design and construct a functional ceramic piece, such as a teapot or bowl, balancing structural integrity and aesthetic appeal.
- Create a non-functional ceramic form that explores abstract or decorative possibilities.
- Develop a comparative analysis of two ceramic pieces: one functional and one non-functional.

Acceptable Evidence Other Than Performance Tasks:**Formative Assessment:**

- Sketches and planning documents showing the design process for functional and non-functional forms.
- Practice exercises on creating lids, handles, or other functional components.
- Peer reviews of design concepts focusing on the balance of form and function.

Summative Assessment:

- Presentation of final works during a gallery-style critique with rubric-based evaluation.
- Written comparison analyzing the creative and technical aspects of form versus function in the student's work.
- Assessed personal progress using rubrics, reflecting on the development process, obstacles encountered, and key takeaways.

Suggested Learning Experiences and Instruction**Learning Experiences:**

- Compare functional ceramic works (e.g., teapots, mugs) with non-functional sculptures, analyzing how form and aesthetics serve different purposes.
- Design and create a functional ceramic piece, such as a teapot or plate, while ensuring that it is both usable and visually appealing.
- Experiment with alterations to traditional forms to create functional pieces with a unique artistic twist.
- Create a non-functional, abstract ceramic piece that explores form and design without considering practical use.

Instructional Strategies:

- **Hands-On Learning:** Allow students to actively participate in the creation of both functional and non-functional ceramics, guiding them through each step.
- **Problem-Based Learning:** Challenge students with specific design problems (e.g., "How can you create a teapot that also functions as a work of art?").

- **Discussion and Debate:** Facilitate class discussions where students debate whether certain ceramic pieces are successful in balancing form and function.
- **Demonstration:** Show students how to properly build functional pieces like lids, spouts, or handles, while also focusing on aesthetics.

Differentiation/Intervention/Enrichment Options:

- **Intervention:** Provide structured templates or molds for students who need more support in creating functional pieces. Offer step-by-step guidance in constructing functional elements like handles or spouts.
- **Enrichment:** Invite students to explore mixed-media or experimental techniques to enhance both the function and form of their creations.
- **Flexible Grouping:** Group students based on skill level for collaborative work on functional projects, allowing for peer mentorship.

For Language Development:

- Provide sentence starters and questions to guide students as they explain their design choices.
- Create visual diagrams that connect specific vocabulary terms (e.g., "ergonomics," "structure," "texture") to examples of functional pieces.
- Use peer-to-peer sharing in small groups to support multilingual learners in expressing their design ideas.

Central Bucks School District – Course of Study – Ceramics 4

Unit 4 – Identity

Desired Results:

Ceramic works exploring identity integrate symbolism and craftsmanship to reflect personal and cultural narratives.

Enduring Understandings:

- Identity in ceramics can be expressed through symbolic, abstract, or representational forms.
- Art provides a means to explore and communicate individual and collective identity.

Essential Questions:

- How can ceramics convey aspects of personal or cultural identity?
- What role does symbolism play in expressing identity through art?

Knowledge:

Students will know...

Vocabulary:

- Identity
- Representation
- Symbolic Imagery

- Cultural Context
- Personal Narrative
- Abstract vs. Literal Expression
- Emotional Expression

Suggested artists (Not limed to)

1. **Robert Lugo** – A Philadelphia ceramic artist known for combining classical pottery forms, portraiture, hip-hop culture, and social justice themes.
2. **Jennifer Datchuk** – A ceramic and mixed-media artist whose porcelain works explore identity, beauty, gender, race, and personal history.
3. **Theaster Gates** (*also appears in Unit 1 for conceptual and imagination connections*) – An artist who uses ceramics, sculpture, installation, and community-based practice to examine history, labor, culture, and collective memory.
4. **Brendan Tang** – A ceramic artist known for hybrid sculptures that combine Asian vessel traditions, manga imagery, technology, and questions of cultural identity.
5. **Elissa Farrow-Savos** – A figurative sculptor whose narrative works use clay, paint, and found objects to explore emotion, memory, strength, and personal storytelling.
6. **Su Griggs** – A ceramic sculptor and storyteller whose whimsical mixed-media figures explore imagination, nature, mystery, and emotional expression.
7. **Julie Woodrow** – A ceramic artist whose carved vessels and sculptures merge animal forms, nature, pattern, and themes of protection, healing, and hope.
8. **Elizabeth Price** – A ceramic sculptor known for expressive figures that use gesture, posture, color, and pattern to suggest mood, story, and identity.

Skills:

Students will be able to...

- Create ceramic works that reflect personal or cultural identity.
- Use symbolism and iconography to communicate themes of identity.
- Analyze the role of ceramics in expressing identity across different cultures and periods.
- Experiment with techniques that enhance conceptual storytelling in ceramic art.
- Articulate the relationship between artistic choices and the expression of identity.

Priority Standards:

PA Visual Arts Standards:

- **9.1.12.A:** Apply media, techniques, and processes in ceramics to create works that explore and express identity.

Aligned National Core Arts Standards:

- **Creating (VA:Cr1.2.IIIa):** Choose from a range of materials and methods of traditional and contemporary artistic practices to plan works of art and design that explore complex themes, such as identity.
- **Creating (VA:Cr2.1.IIIa):** Experiment, innovate, and take risks to pursue ideas, forms, and meanings that emerge in the process of artmaking, particularly in relation to personal and cultural identity.

Supporting Standards:

PA Visual Arts Standards:

- **9.2.12.B:** Relate works of portraiture to the contexts of the cultures and time periods in which they were created.

Aligned National Core Arts Standards

- **Responding (VA:Re7.2.IIIa):** Determine the commonalities within a group of artists or visual images attributed to a particular type of art, time period, or culture.
- **Connecting (VA:Cn11.1.IIIa):** Demonstrate how media, technique, and context influence meaning in art and design, particularly in the historical and cultural evolution of portraiture.

PA Visual Arts Standards:

- **9.4.12.B:** Analyze how artists use portraiture to comment on personal and collective identity.

Aligned National Core Arts Standards:

- **Responding (VA:Re8.1.IIIa):** Evaluate the effectiveness of an image or images to influence ideas, feelings, and behaviors of specific audiences, particularly in relation to identity.
- **Connecting (VA:Cn10.1.IIIa):** Synthesize knowledge of social, cultural, historical, and personal contexts to create meaningful art that reflects identity and values.

Suggested Acceptable Evidence:**Performance Tasks:**

- Create a ceramic piece that incorporates symbolic elements representing identity.
- Design an abstract or representational work that explores themes of personal or cultural identity.
- Write an artist statement connecting their ceramic work to personal experiences or cultural influences.

Acceptable Evidence Other Than Performance Tasks:**Formative Assessment:**

- Identity mapping activities to brainstorm symbols and themes for artwork.
- Small group critiques of works-in-progress focusing on symbolism and craftsmanship.
- Guided reflection prompts about the meaning and cultural context of chosen imagery.

Summative Assessment:

- Rubric-based evaluation of the ceramic work, focusing on technical skills, symbolism, and alignment with the theme of identity.
- Written reflection analyzing how their work communicates personal or collective identity.
- Assessed personal progress using rubrics, reflecting on the development process, obstacles encountered, and key takeaways.

Suggested Learning Experiences and Instruction**Learning Experiences:**

- Analyze and discuss how different cultures and time periods have used ceramics to express identity.
- Create a ceramic work that visually represents personal or cultural identity through symbolism.
- Explore the role of abstraction and representation in communicating identity.

Instructional Strategies:

- Inquiry-Based Learning: Encourage students to explore, “How can art express identity?”

- Modeling and Guided Practice: Demonstrate techniques for incorporating symbolic imagery into ceramic forms.
- Discussion: Facilitate conversations about the significance of identity in art.

Differentiation/Intervention/Enrichment Options:

- **Intervention:** Provide simple guides and offer hands-on support during the modeling process.
- **Enrichment:** Allow students to expand their work by adding symbolic elements to their work, such as using textures or colors to express deeper layers of identity.
- **Choice:** Let students choose between different ways to express the identity of someone else to encourage personal connection to the project.

For Language Development:

- Use visual aids and gesture-based descriptions to support multilingual learners in understanding the facial and anatomical structures involved in portraiture.
- Provide vocabulary-building activities where students practice using terms related to identity, symbolism, and expression in their artist statements.
- Encourage multilingual learners to pair up with English-proficient students for peer discussions on the symbolic elements in their portraits.

Central Bucks School District – Course of Study – Ceramics 4

Unit 5– Portraiture

Desired Results:

Ceramic portraiture combines artistic skill and symbolism to create a visual representation of the human experience.

Enduring Understandings:

- Portraiture in ceramics reflects identity through symbolic and literal representations.
- Ceramics provides a unique medium for capturing the essence of a person or cultural identity

Essential Questions:

- How can ceramic portraits convey aspects of personal or collective identity?
- In what ways do artists use symbolism in portraiture to communicate meaning?

Knowledge:

Students will know...

Vocabulary:

- Portraiture
- Representation
- Symbolic Imagery
- Texture and Detail
- Emotional Expression
- Bust (sculpture)
- Caricature

Suggested artists (Not limed to)

1. **Johnson Tsang** – A Hong Kong ceramic artist known for highly realistic and surreal porcelain portraits that stretch, distort, and transform the human face.
2. **Zhanna Martin** – A ceramic artist known for stylized figurative and portrait-based works that explore expression, character, and emotional storytelling.
3. **Noi Volkov** – A ceramic artist whose narrative works often combine portrait imagery, symbolism, pattern, and painterly surface treatment.
4. **Christopher David White** – An American ceramic sculptor known for trompe l’oeil works that mimic weathered wood and explore themes of nature, decay, transformation, and perception.
5. **Alicia Reyes McNamara** – A mixed-media and ceramic artist whose figurative works explore identity, memory, cultural hybridity, and personal narrative.
6. **Esra Derinalp** – A ceramic artist known for expressive figurative forms that use gesture, texture, and surface detail to communicate emotion and story.
7. **Nathan Murray** – A ceramic artist whose sculptural and portrait-based works emphasize character, expression, craftsmanship, and contemporary storytelling.

Skills:

Students will be able to...

- Create ceramic portraits that reflect personal or cultural identity.
- Use sculptural techniques to develop realistic or stylized representations of the human form.
- Analyze the use of portraiture in historical and contemporary ceramic art.
- Experiment with techniques to create lifelike or abstract representations in clay.
- Articulate the relationship between artistic choices and the expression of identity in portraiture.

Priority Standards:

PA Visual Arts Standards:

- **9.1.12.A:** Apply media, techniques, and processes in ceramics to create works that explore and express identity.

Aligned National Core Arts Standards:

- **Creating (VA:Cr1.2.IIIa):** Choose from a range of materials and methods of traditional and contemporary artistic practices to plan works of art and design that explore complex themes, such as identity through portraiture.
- **Creating (VA:Cr2.1.IIIa):** Experiment, innovate, and take risks to pursue ideas, forms, and meanings that emerge in the process of artmaking, particularly in relation to self-expression and identity in portraiture.

Supporting Standards:

PA Visual Arts Standard:

- **9.2.12.B:** Relate works of portraiture to the contexts of the cultures and time periods in which they were created.

Aligned National Core Arts Standards:

- **Responding (VA:Re7.2.IIIa):** Determine the commonalities within a group of artists or visual images attributed to a particular type of art, time period, or culture, with a focus on portraiture.
- **Connecting (VA:Cn11.1.IIIa):** Demonstrate how media, technique, and context influence meaning in portraiture, examining its evolution across cultures and historical periods.

PA Visual Arts Standard:

- **9.4.12.B:** Analyze how artists use portraiture to comment on personal and collective identity.

Aligned National Core Arts Standards:

- **Responding (VA:Re8.1.IIIa):** Evaluate the effectiveness of an image or images to influence ideas, feelings, and behaviors of specific audiences, particularly in relation to identity and self-representation.
- **Connecting (VA:Cn10.1.IIIa):** Synthesize knowledge of social, cultural, historical, and personal contexts to create meaningful art that reflects identity and values through portraiture.

Suggested Acceptable Evidence:

Performance Tasks:

- Create a ceramic portrait or bust representing a personal or cultural narrative.
- Incorporate symbolic elements into a portrait to reflect aspects of identity or heritage.
- Write an artist statement linking the work to personal experiences or cultural influences.

Acceptable Evidence Other Than Performance Tasks:

Formative Assessment:

- Thumbnail sketches and concept mapping for ceramic portraits.
- Critiques focusing on craftsmanship, expression, and symbolism in portraiture.
- Reflections on how portraiture conveys identity and emotion.

Summative Assessment:

- Rubric-based evaluation of the ceramic portrait, focusing on technical skills, likeness, and symbolism.
- Written analysis explaining how their work communicates personal or cultural identity.
- Assessed personal progress using rubrics, reflecting on the development process, obstacles encountered, and key takeaways.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Study portraiture from various historical and cultural perspectives.
- Create a self-portrait or a portrait of a peer using ceramic techniques.
- Use symbolic imagery in portraiture to reflect identity, emotions, or experiences.

Instructional Strategies:

- **Inquiry-Based Learning:** Encourage students to explore, “How can art express identity?”
- **Modeling and Guided Practice:** Demonstrate techniques for incorporating symbolic imagery into ceramic forms.
- **Discussion:** Facilitate conversations about the significance of identity in art.

Differentiation/Intervention/Enrichment Options:

- **Intervention:** Provide simple guides and offer hands-on support during the modeling process.
- **Enrichment:** Allow students to expand their work by incorporating multiple portraits or view as well as adding symbolic elements to their work, such as using textures or colors to express deeper layers of identity.
- **Choice:** Let students choose between different styles of portraiture to encourage personal connection to the project.

For Language Development:

- Use visual aids and gesture-based descriptions to support multilingual learners in understanding the facial and anatomical structures involved in portraiture.
- Provide vocabulary-building activities where students practice using terms related to design elements and principles as well as portraiture
- Encourage multilingual learners to pair up with English-proficient students for peer discussions on the symbolic elements in their portraits.

Central Bucks School District – Course of Study – Ceramics 4

Unit 6 – Non-Representational

Desired Results:

Non-representational ceramics utilize abstract forms and innovative textures to transcend literal representation, fostering open-ended interpretations and emotional connections.

Enduring Understandings:

- Non-representational ceramics prioritize form, texture, and color over literal imagery to convey meaning.
- Abstract ceramics invite individual interpretation and evoke emotional responses.

Essential Questions:

- How can non-representational ceramics evoke meaning without relying on recognizable imagery?
- What role do texture, color, and form play in abstract ceramic works?

Knowledge:

Students will know...

Vocabulary:

- Abstract Form
- Non-Representational Art
- Organic Shapes
- Geometric Forms
- Texture
- Visual Rhythm
- Negative Space
- Color Theory (in abstraction)
- Expressionism
- Composition

Suggested artists (Not limited to)

1. **Ruth Duckworth** – A German-born ceramic sculptor known for elegant abstract wall reliefs and organic forms that connect landscape, architecture, texture, and movement.
2. **Ron Nagle** – An American ceramic artist known for small-scale abstract sculptures with bold color, unusual surfaces, playful forms, and precise craftsmanship.
3. **Torbjørn Kvasbø** – A Norwegian ceramic artist known for dynamic abstract forms, stacked tube-like structures, expressive surfaces, and a strong sense of energy and physical movement.
4. **Ken Price** – An American ceramic artist known for colorful abstract forms that blur the line between sculpture, vessel, surface design, and object.
5. **Jami Porter Lara** – A ceramic artist who hand-builds vessel-like forms inspired by plastic bottles, exploring ecology, material culture, function, and contemporary design.
6. **James Oughtibridge** – A British ceramic artist known for large, abstract sculptural forms with folded surfaces, dramatic silhouettes, and richly textured finishes.
7. **Ayumi Shigematsu** – A Japanese ceramic artist whose abstract and organic forms often explore movement, memory, nature, and the expressive possibilities of clay surfaces.

Skills:

Students will be able to...

- The students will be able to design and create non-representational ceramic pieces that focus on elements of form, texture, and composition.
- The students will be able to experiment with abstraction by manipulating shape, line, and surface.
- The students will be able to analyze and apply the principles of balance, rhythm, and movement in non-representational art.
- The students will be able to incorporate color theory into the glazing process to evoke emotion or mood.
- The students will be able to evaluate the effectiveness of abstract designs through peer critique and personal reflection.

Priority Standard Alignment**PA Visual Arts Standards:**

- **9.1.12.C:** Experiment with abstraction through advanced ceramic forms, focusing on the elements and principles of art.

Aligned National Core Arts Standards:

- **Creating (VA:Cr2.1.IIIa):** Experiment, innovate, and take risks to pursue ideas, forms, and meanings that emerge in the process of artmaking, particularly in abstract ceramic forms.
- **Creating (VA:Cr2.3.IIIa):** Engage in constructive critique with peers and self-reflection to refine technical and expressive qualities in non-representational ceramics.

Supporting Standards:**PA Visual Arts Standards**

- **9.3.12.D:** Interpret abstract works, providing reasoning for the impact of artistic decisions on the viewer.

Aligned National Core Arts Standards:

- **Responding (VA:Re8.1.IIIa):** Evaluate the effectiveness of an image or images to influence ideas, feelings, and behaviors of specific audiences, particularly in non-representational art.
- **Responding (VA:Re9.1.IIIa):** Construct evaluations of a work of art or collection of works based on differing sets of criteria, emphasizing abstraction and viewer interpretation.

PA Visual Arts Standards

- **9.4.12.C:** Assess the emotional and conceptual impact of non-representational ceramics.

Aligned National Core Arts Standards:

- **Connecting (VA:Cn10.1.IIIa):** Synthesize knowledge of social, cultural, historical, and personal contexts to create meaningful art that explores abstraction and its conceptual impact.
- **Responding (VA:Re7.1.IIIa):** Analyze how responses to art develop over time based on knowledge of and experience with art and life, focusing on the interpretation of non-representational ceramics.

Suggested Acceptable Evidence:**Performance Tasks:**

- Create a non-representational ceramic piece focusing on the elements of art (line, shape, texture, form, and color).
- Experiment with abstract techniques by manipulating forms on the wheel or hand-building.

- Design and glaze a piece that uses color theory to evoke emotion or mood.

Acceptable Evidence Other Than Performance Tasks:

Formative Assessment:

- Quick exercises on abstract design concepts, such as creating organic and geometric shapes.
- Peer critiques exploring the emotional or conceptual impact of abstract designs.
- Practice in texturing and glazing techniques to enhance abstract forms.

Summative Assessment:

- Final critique of the abstract ceramic piece using a rubric evaluating creativity, technical execution, and artistic impact.
- Written analysis of how the piece uses abstraction to communicate ideas or emotions.
- Assessed personal progress using rubrics, reflecting on the development process, obstacles encountered, and key takeaways.

Suggested Learning Experiences and Instruction

Learning Experiences:

- Explore non-representational and abstract ceramic works, focusing on how forms, colors, and textures convey emotion or ideas without recognizable subject matter.
- Experiment with creating abstract shapes and forms through both hand-building and wheel-throwing techniques.
- Use color theory to experiment with glazes and surfaces to evoke specific moods or themes in non-representational work.
- Engage in a group critique session to discuss how abstract works communicate meaning without direct representation.

Instructional Strategies:

- **Exploration and Experimentation:** Encourage students to experiment with non-traditional shapes, textures, and colors to convey their ideas in abstract form.
- **Discussion-Based Learning:** Use group discussions to help students understand how non-representational art can express emotion or thought without relying on recognizable subjects.
- **Individualized Guidance:** Provide personalized feedback and guidance for students exploring non-representational techniques, helping them refine their concepts.
- **Visual Learning:** Use abstract artwork examples to show how artists use composition and color to evoke feelings and ideas.

Differentiation/Intervention/Enrichment Options:

- **Intervention:** Offer templates or sample exercises in abstract design that guide students in exploring composition without the pressure of representation.
- **Enrichment:** Allow advanced students to push boundaries by incorporating multiple materials or techniques into their non-representational work.
- **Flexible Grouping:** Pair students with varying levels of skill to foster peer learning and discussion on abstract forms.

For Language Development:

- Provide graphic organizers that help multilingual learners describe their work using emotional or conceptual language.

- Introduce abstract art vocabulary and have students practice using these terms in group discussions and critiques.
- Encourage students to create visual or digital journals to express and reflect on their artistic ideas and progress throughout the unit.



Request for Approval and Biology Course of Study Updates

September 2026

Introductions



Ms. Mary Courtney
Supervisor of K-12 Science



Goal of Presentation



Share updated course of study document for Biology

Seek approval for new course of study document
for Environmental Science



10 minutes



Agenda



Background



Course Overview



Next Steps



Background: Science – High School

Suggested Science Sequence

Grade 9	Grade 10	Grade 11/12
Environmental Science	Biology	Chemistry/Physics

↓

New COS

↓

Updated COS



Curriculum Writing Teams

Environmental Science

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Biology

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Curricular Components for each of Course of Study Document

Curricular Structure

- **Course Overview**
- **Pacing Guides**
- **Resources** (Required & Supplementary)
 - Environmental Science: Cengage National Geographic Environmental Science
 - Biology: HMH Biology
- **Course Grading**
- **Unit Overviews:**
 1. **Desired Results:** Enduring Understandings, Essential Questions, Knowledge & Skills, and Priority/Supporting Standards
 2. **Acceptable Evidence:** Performance Tasks, Formative and Summative Assessments
 3. **Learning Experiences & Instruction:** includes differentiation options and language development.

Course Highlights

- Phenomena-Based Learning
- 5E Approach to Instruction and Learning (Engage, Explore, Explain, Elaborate, Evaluate)
- Common Assessments
- Performance Based Assessments
- Hands-on activities and labs
- Guaranteed and Viable curriculum: all teachers follow the course of study, pacing guides, and administer common unit assessments.



Biology – Update Only

Course Overview

- Offered at Practical, Academic and Honors level
- Builds a strong foundation in life science through the study of cells, energy, genetics, evolution, and biodiversity.
- Prerequisite: Environmental Science
- Aligns with the STEELS Life Science Standards

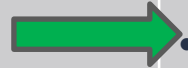
Course Content

- **Unit 1: From Cells to Organisms: Structure and Function** – Explores how cells, tissues, organs, and organ systems work together to maintain life.
- **Unit 2: From Light to Life: Carbon, Photosynthesis, and Cellular Respiration** – Energy and matter flow through living systems to support life processes.
- **Unit 3a: From Genes to Generations. Part 1: Inheritance and Variation of Traits** – Investigates how genetic information is passed from one generation to the next and contributes to variation among organisms.
- **Unit 3b: From Genes to Generations. Part 2: Natural Selection and Evolution** – Explores how populations change over time through natural selection, adaptation, and evolution.

Environmental Science - Changes

Grade 9 Science (previous)

- Geosphere
- Biosphere
- Hydrosphere
- Atmosphere
- Sustaining Earth's Systems



Environmental Science (current)

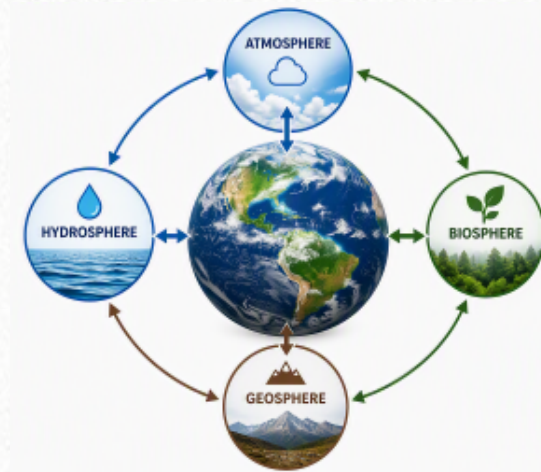
- **Earth's Systems Interactions:** Examines Earth's four spheres as Interconnected Systems
- **Ecology and Ecosystem Dynamics:** deeper look into the biosphere
- **Human Impact and Sustainability**
- **Environmental Literacy and Action**

Key Benefits:

- Provides students with a deeper understanding of how Earth's systems, ecosystems, and human actions are interconnected, reflecting the complexity of real-world environmental challenges.
- Builds critical thinking, scientific literacy, and responsible decision-making skills that prepare students for college, careers, and life.



Environmental Science – Seeking Approval



Course Overview

- Offered at both Academic and Honors level
- Introduces students to a foundational understanding of Earth's interconnected systems.
- Prerequisite: Grade 8 Science
- Aligns with the STEELS Earth Science, Life Science, and ELS Standards

Course Content

- **Unit 1: Earth's Systems Interactions** - Exploration of the geosphere, hydrosphere, atmosphere, and biosphere, and how these systems interact.
- **Unit 2: Ecology and Ecosystem Dynamics** - Examination of ecological relationships such as energy flow, biodiversity, and population dynamics.
- **Unit 3: Human Impact and Sustainability** - Study of natural resources, human influences on the environment, and strategies for conservation.
- **Unit 4: Environmental Literacy and Action** - Development of skills to think critically about environmental topics and sustainability.



Next Steps

- Implementation of Science Curriculum in classrooms
- Continued monitoring and optimizing based on teacher and student feedback.



Biology

Course Number: 3010, 3020, 3040

Course Level: Honors, Academic, Practical

Grade: 9-10

Time/Credit: 18 weeks / 1 credit

Development Date: 2025 – 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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Central Bucks School District

Teaching and Learning Principles

The Central Bucks School District's K-12 science education principles are aligned with the **Pennsylvania Science, Technology & Engineering, and Environmental Literacy & Sustainability (STEELS)** Standards, which were adopted in July 2022. The STEELS Standards guide the study of the natural and human-made world through inquiry, problem solving, critical thinking, and authentic exploration. There are six principles that are important in the teaching of science, and they include:

- Children are born investigators.
- Science must focus on core ideas and practices.
- Understanding develops over time.
- Science and engineering require both knowledge and practices.
- Teaching science must connect with student interests.
- In the teaching of science, we promote equity.

Therefore, the goal of science education is to ensure that all students will be able to engage as technological and engineering literate members of a global society, using their learning to:

1. Approach science as a reliable and tentative way of knowing and explaining the natural world and designed world.
2. Weigh evidence and use scientific approaches to ask questions, investigate, and make informed decisions.
3. Make and use observations to analyze relationships and patterns to explain phenomena, develop models, and make predictions.
4. Evaluate systems, to connect how form determines function and how any change to one component affects the entire system.
5. Explain how the natural and designed worlds are interrelated, and the application of scientific knowledge and technology can have beneficial, detrimental, or unintended consequences.

Sources:

- National Research Council (NRC). 2012. *A Framework for K–12 science education: Practices, crosscutting concepts, and core ideas*. Washington, DC: National Academies Press.
- Pennsylvania Department of Education (PDE). 2023. [Communities - SAS \(pdesas.org\)](https://www.pdesas.org/)
- Pennsylvania Department of Education (PDE). 2023. [STEELS Hub: Curriculum Frameworks: Science Long Term Transfer Goals](#)

Central Bucks School District

Enduring Understandings

Students will understand that:

Earth and Space Science

- The Universe is composed of a variety of different objects, which are organized into systems, each of which develops according to accepted physical processes and laws.
- Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.
- The Earth's surface processes affect and are affected by human activities.

Life Science

- All organisms are made of cells and can be characterized by common aspects of their structure and functioning.
- Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.
- Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to, their parents.
- Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.

Physical Science

- Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.
- All forces between objects arise from a few types of interactions: gravity, electromagnetism, and the strong and weak nuclear interactions.
- Interactions of objects or systems of objects can be predicted and explained using the concept of transfer of energy from one object or system of objects to another.
- Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.

Environmental Literacy and Sustainability

- Living things, including humans, utilize natural resources in ways that impact agricultural and environmental systems.
- Human cultures and societies experience and interact with the environment in various ways.
- Watersheds and wetlands function as interconnected systems that support, impact, and are influenced by living things.
- The environment provides multi-faceted opportunities to develop and apply interdisciplinary literacy skills to investigate complex issues at various scales.
- Conducting scientific investigations using place-based inquiry and authentic, outdoor field experience(s) are essential to understanding local environmental issues.
- Best management practices and data driven resource management, as well as environmental laws and policies, encourage environmental sustainability.
- Environmental stewardship practices are essential to improving environmental quality, sustainability, and community well-being.
- Environmental justice plays an important role in providing equitable protection from environmental hazards or concerns for all people.

Technology and Engineering

- The study of technology and engineering requires knowledge of the natural world and the human-made world.
- Design is a fundamental human activity.
- There is no single, best solution as designs can always be improved and refined.

Central Bucks School District

Essential Questions

Students will understand:

Earth and Space Science

- What is the Universe and what is Earth's place in it?
- How and why is Earth constantly changing?
- How do Earth's processes and human activities affect each other?

Life Science

- How do organisms interact with their environment and what are the effects of these interactions?
- How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?
- How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?

Physical Science

- How can one explain the structure, properties, and interactions of matter?
- How can one explain and predict interactions between objects within systems?
- How is energy transferred and conserved?
- How are waves used to transfer energy and information?

Environmental Literacy and Sustainability

- How do living things utilize natural resources in ways that impact agricultural and environmental systems? How do agricultural systems interact with environmental systems?
- How do human cultures and societies experience, interact, and value local, regional, and/or global environments? How do various human cultures express their beliefs about nature and the environment? How are natural resources managed by people from various cultures and communities?
- How do watersheds and wetlands function as interconnected systems that support, impact, and are influenced by living things? How do human actions impact the functions of watersheds and wetlands?
- How do investigations of local environmental issues expand understanding and facilitate potential solutions to other local, regional, and/or global environmental issues?
- How do we balance societal values, practices, and cost-benefit analysis (long-term and short-term) in addressing environmental issues? How can conducting local field investigations lead to identifying, understanding, and addressing environmental issues in my community?
- How do actions and regulations support the equitable availability of resources for current and future generations?
- How can human actions improve environmental quality, sustainability, and community well-being?
- How do human actions impact environmental justice issues for individuals and communities? How do human actions impact the equitable access, use, and disposal of natural resources?

Technology and Engineering

- Why is it important to have an understanding of the natural and human-made worlds?
- Why is design important to human activity?
- Why is there no single correct solution in design?

Central Bucks School District – Course of Study

Course Overview

Desired Results

Course Description:

3020 Academic Biology: (18 weeks, 1 credit)

Biology provides students with the fundamental principles that explain how life functions, grows, and evolves. The course begins with an exploration of how cells work together to form complex organisms, focusing on characteristics of life, cell specialization, and homeostasis. Students then examine how energy flows through living systems by studying photosynthesis, cellular respiration, and the role of key biological molecules. Students explore how traits are inherited, which is followed by the study of evolution, natural selection, and biodiversity. Inquiry-based labs, activities, and discussions help students build a strong foundation in life science and develop scientific thinking skills. The Biology Keystone Exam will be administered at the conclusion of this course. Prerequisite: Academic or Honors Environmental Science

3010 Honors Biology: (18 weeks, 1 credit)

Honors Biology covers the same core concepts as Academic Biology but is designed to challenge students with a faster pace, greater depth of content, and more complex scientific practices. Students are expected to work more independently, demonstrate higher-level thinking skills, and engage more deeply with scientific analysis and problem-solving. The course places increased emphasis on critical thinking, data interpretation, and application of knowledge, preparing students for advanced science coursework. The Biology Keystone Exam will be administered at the conclusion of this course. Prerequisite: Academic Environmental Science (A- or better) or Honors Environmental Science (B or better)

3040 Practical Biology: (18 weeks, 1 credit)

Practical Biology uses a problem-based approach to the biological sciences. The course content aligns with Academic Biology and covers the same core concepts while incorporating additional instructional supports and intervention strategies. Students explore how cells function within organisms, how energy moves through living systems, how traits are inherited, and how evolution shapes biodiversity. Through hands-on investigations, real-world applications, and structured learning experiences, students develop an understanding of fundamental biological concepts. The Biology Keystone Exam will be administered at the conclusion of this course. Prerequisite: Academic or Honors Environmental Science.

Committee Members: Judith Elinow, Colleen Haag, Cheryl Choe, Diane Liddington, Kelley Peloquin, Michelle Spera

Acceptable Evidence.

Course Grading:

Marking Period 1 – 50%

Marking Period 2 – 50%

Biology Pacing Guide

Content	Days
Unit 1 – From Cells to Organism: Structure and Function	25
Introduction to Cells	8
Characteristics of Life	1
Levels of Organization: Cells → Tissues → Organs → Organ Systems → Organism	1
Formative Assessments Interventions and Enrichments	1
Cell Overview: Prokaryotes vs Eukaryotes and Plant vs. Animal	1
Cell Structure and Function: Organelles as systems in a cell	2
Formative Assessments Interventions and Enrichments	1
Summative Assessment	1
Cell Cycle, Mitosis, and Differentiation	7
Overview of Cell Cycle (checkpoints and apoptosis)	2
Mitosis	1
Formative Assessments Interventions and Enrichments	1
Differentiation & Stem Cells / Epigenetic Signals	1
Formative Assessments Interventions and Enrichments	1
Summative Assessment	1
Homeostasis and Feedback Mechanisms	8
Overview of Homeostasis and feedback loops Positive vs Negative feedback	2
Formative Assessments Interventions and Enrichments	1
Cell Membrane and Transport Mechanisms Osmosis, Passive and Active Transport	2
Lab Focus (e.g., Osmosis/Membrane/Microscopy)	1
Formative Assessments Interventions and Enrichments	1
Summative Assessment	1
Unit Review	1
District Common Unit Summative Assessment	1
Unit 2 – From Light to Life	19
Chemical Reactions & Cell Energy (ATP; endergonic vs. exergonic)	2
Formative or Summative Assessments Interventions and Enrichments	1
Carbon-Based Molecules	2
Formative or Summative Assessments Interventions and Enrichments	1
Photosynthesis (inputs/outputs; rate factors)	3
Formative or Summative Assessments Interventions and Enrichments	1
Cell Respiration (aerobic/anaerobic; energy transfer)	3
Formative or Summative Assessments	1

Interventions and Enrichments	
Energy and Carbon Cycling (ecosystem flow; efficiencies)	2
Formative or Summative Assessments	1
Interventions and Enrichments	
Review	1
District Common Summative Assessment	1
Unit 3 – From Genes to Generations	36
Part 1. Inheritance and Variation of Traits	21
DNA Structure and Replication	2
Formative or Summative Assessments	1
Interventions and Enrichments	
Protein Synthesis (transcription/translation; mutations)	3
Formative or Summative Assessments	1
Interventions and Enrichments	
Gene Expression and Regulation	2
Formative or Summative Assessments	1
Interventions and Enrichments	
Meiosis (variation; errors/nondisjunction)	2
Formative or Summative Assessments	1
Interventions and Enrichments	
Mendel and Heredity (Punnett, pedigrees; non-Mendelian)	2
Traits and Probability	1
Formative or Summative Assessments	1
Interventions and Enrichments	
Mutations and Genetic Diversity	1
Formative or Summative Assessments	1
Interventions and Enrichments	
Unit Review	1
District Common Summative Assessment	1
Part 2: Natural Selection and Evolution	15
Lines of Evidence for Evolution (fossils, anatomy, embryos, molecular, biogeography)	3
Formative or Summative Assessments	1
Interventions and Enrichments	
Natural Selection (conditions; adaptation vs. acclimatization)	2
Formative or Summative Assessments	1
Interventions and Enrichments	
Evolution of Populations (patterns; speciation, isolation)	2
Formative or Summative Assessments	1
Interventions and Enrichments	
Biodiversity and Humans (resilience; human impacts; solutions)	2
Formative or Summative Assessments	1
Interventions and Enrichments	
Unit Review	1
District Common Summative Assessment	1
Keystone Review	2
Hominid Skulls Lab Exploration	
Human Impacts on Biodiversity Project	3

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

Required Texts/Software:

HMH Biology Science Dimensions (v2: 2026)

- **ISBN-10:** 0544861787
- **ISBN-13:** 978-0544861787

Supplementary Texts/Software:

- **Explore Learning (Explorelearning.com):** *ExploreLearning.com houses the world's largest library of interactive online simulations for math and science education in grades 3-12. The online simulations are called Gizmos.*

Central Bucks School District – Course of Study – Biology

Unit 1 – From Molecules to Organisms: Structure and Function

Desired Results:

Essential Questions:

- What structures and processes distinguish living systems from non-living systems?
- How does structure relate to function in cells and organisms?
- How do interactions among cells, tissues, organs, and organ systems support the functioning of multicellular organisms?
- How do organisms grow, repair, and maintain themselves over time?
- How can cells with the same genetic information become specialized for different roles?
- How do organisms maintain stable internal conditions in a changing environment?
- How do feedback mechanisms regulate biological systems and what happens when these systems are disrupted?

Enduring Understandings:

Students will understand that...

- Organisms have characteristic structures which enable functions and behaviors that allow them to grow, reproduce, and die.
- Cells are the fundamental unit of life, and their ability to carry out life functions depends on the coordinated interactions among specialized structures within the cell.
- In multicellular organisms, biological organization is hierarchical. Cells form tissues, tissues form organs, organs form organ systems, and these systems interact to support the functioning of the whole organism.
- Growth, maintenance, and repair in multicellular organisms depend on regulated cell division that produces genetically identical cells through mitosis.
- Although cells contain the same genetic information, selective gene expression allows cells to differentiate and develop specialized structures and functions.
- Cellular differentiation enables complex organisms to form specialized tissues and organs, supporting division of labor and system-level coordination.
- Organisms rely on a balance of cell division, specialization, and controlled cell death to grow, develop, and stay healthy.
- Living organisms maintain stable internal conditions through homeostatic mechanisms that respond to internal and external changes.
- Feedback mechanisms regulate biological systems. Negative feedback loops counteract change to maintain stability, while positive feedback loops amplify responses to complete specific biological processes.
- Cell membranes play a central role in maintaining homeostasis by controlling the movement of substances into and out of cells through passive and active transport mechanisms.
- Interacting systems at multiple levels, including cellular, tissue, organ, and organ system levels, work together to regulate vital processes such as temperature, glucose levels, and water balance.

Knowledge:

Part 1: Characteristics of Life and Introduction to Cells

Students will know:

- The characteristics of life that distinguish living from non-living systems.
- That a cell is the most basic unit of life and contains organelles that perform specific functions.
- The differences between prokaryotic and eukaryotic cells, including how organelle specialization provides advantages.
- The structural and functional differences between plant and animal cells.

- The hierarchical organization of biological structures: cells → tissues → organs → organ systems → organism.
- How the coordinated function of organelles enables cells to carry out processes necessary for life.
- Vocabulary: Cell, prokaryote, eukaryote, organelle, nucleus, mitochondria, cell membrane, cell wall, cytoplasm, chloroplast, tissue, organ, organ system, organism, structure-function, biotic, abiotic, growth and development, unicellular, multicellular, asexual reproduction, sexual reproduction.
- Honors Vocabulary: Endoplasmic reticulum (ER), Golgi apparatus, ribosome, lysosome

Part 2: Cell Cycle, Mitosis, and Differentiation

Students will know:

- Cells divide through the cell cycle, which includes DNA replication, mitosis, and cytokinesis.
- Mitosis produces two genetically identical daughter cells, enabling growth, repair, and maintenance in multicellular organisms.
- Cellular differentiation allows genetically identical cells to develop into specialized cell types, guided by gene expression and environmental signals.
- Stem cells vary in their differentiation potential: totipotent, pluripotent, multipotent, and unipotent.
- Selective gene expression influences cell differentiation and specialization.
- Dysregulated cell division (e.g., cancer) can disrupt normal growth and organismal function.
- The coordinated activity of specialized cells forms tissues, organs, and organ systems that work together to maintain life functions.
- Vocabulary: Cell cycle, DNA replication, interphase, mitosis, cytokinesis, daughter cell, stem cells, differentiation, gene expression, tissue, organ, organ system,
- Honors Vocabulary: Epigenetic, apoptosis, checkpoint, cancer, totipotent, pluripotent, multipotent, unipotent

Part 3: Transport, Homeostasis and Feedback Mechanisms

Students will know:

- Homeostasis is the regulation of stable internal conditions in organisms.
- Negative feedback loops counteract changes in internal conditions to maintain equilibrium (e.g., blood glucose regulation, thermoregulation).
- Positive feedback loops amplify responses until a physiological process is completed (e.g., blood clotting, labor).
- Cell membranes are selectively permeable structures that control the exchange of materials and play a critical role in maintaining cellular homeostasis through passive and active transport processes.
- How diffusion and facilitated diffusion allow molecules to move passively across membranes.
- How osmosis allows water to move across semipermeable membranes, and how osmoregulation maintains water balance in cells and organisms.
- Active transport moves molecules against concentration gradients using energy (ATP).
- How disruptions to homeostasis can be predicted and analyzed using feedback loop models.
- Vocabulary: Homeostasis, negative feedback loop, positive feedback loop, regulation, excretory system, heart rate, circulatory system, nervous system, transpiration, temperature regulation.
- Honors Vocabulary: phospholipid bilayer, selectively permeable, diffusion, facilitated diffusion, osmosis, osmoregulation, thermoregulation, active transport, concentration gradient, equilibrium, stimulus, response, receptor, hypertonic, hypotonic, isotonic, endocytosis, exocytosis.

Skills:

Students will be able to...

Part 1: Characteristics of Life and Introduction to Cells

- Identify and describe the characteristics of life in living organisms.
- Compare and contrast living vs. non-living systems using evidence from observations or investigations.
- Use models to illustrate the relationship between components of living and nonliving systems
- Distinguish between prokaryotic and eukaryotic cells, including structural differences and organelle functions.
- Compare plant and animal cell structures and explain how organelles support cell functions.

- Explain how the organization in eukaryotic cells allows these cells to perform specialized functions within an organism.
- Construct and interpret models of hierarchical biological organization: cells → tissues → organs → organ systems → organism.
- Explain how organelle interactions support life-sustaining cellular processes.
- Use microscopes to observe and describe cellular structures.
- Discuss examples of specialized cells and interpret how their structures relate to their functions.

Part 2: Cell Cycle, Mitosis, and Differentiation

- Observe stages of the cell cycle and mitosis using prepared slides or simulations.
- Model DNA replication, mitosis, and cytokinesis to explain how two identical daughter cells are formed.
- Explain how mitosis contributes to growth, repair, and maintenance in multicellular organisms.
- Analyze the regulation of the cell cycle, including checkpoints, apoptosis, and the role of environmental/internal signals.
- Compare normal and dysregulated cell division scenarios (e.g., cancer) and explain potential consequences.
- Explain the process of cellular differentiation and how stem cells become specialized cells.
- Describe how tissues, organs, and organ systems arise from coordinated cell differentiation and support organismal functions.

Part 3: Transport, Homeostasis and Feedback Mechanisms

- Plan and conduct investigations to examine feedback mechanisms in biological systems (e.g., heart rate, glucose regulation, stomatal responses).
- Analyze data sets to identify negative and positive feedback loops and predict outcomes of system perturbations.
- Construct and revise models/diagrams of feedback loops to represent homeostatic regulation.
- Interpret experimental or case study results to identify disruptions to homeostasis (e.g., dehydration, diabetes) and predict physiological responses.
- Analyze how the components of the cell membrane work together to regulate the movement of substances into and out of cells and maintain stable internal conditions.
- Investigate and model passive transport processes: diffusion and osmosis.
- Analyze osmoregulation examples in cells and organisms.
- Compare passive and active transport mechanisms and solve problems involving energy requirements.

Priority Standards:

3.1.9-12.B: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. *Assessment Boundary:* Assessment does not include interactions and functions at the molecular or chemical reaction levels.

3.19-12.C: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. *Assessment Boundary:* Assessment does not include the cellular processes involved in the feedback mechanism.

3.19-12.D: Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. *Assessment Boundary:* Assessment does not include specific gene control mechanisms or rote memorization of the steps of mitosis.

Supporting Standards:

CC.3.5.9-10.G: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

CC.3.6.9-12.F: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

CC.3.6.9-10.G: Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

Acceptable Evidence:

Performance Tasks:

- Cell Structure & Function Model: Students develop a model of a cell showing organelles and their functions, linking structure to function.
- Homeostasis: Students analyze a scenario and construct a feedback loop diagram predicting physiological responses.
- Cell Cycle & Differentiation: Students model mitosis and differentiation to illustrate development from zygote to specialized cells.
- Levels of Biological Organization: Students develop a model tracing cells → tissues → organs → organ systems → organism.

Acceptable Evidence of Learning Other Than Performance Tasks:

Formative Assessment

- “Can You Explain It” Lesson Self Checks using HMH Biology Resource
- Classroom Discussions & Think-Pair-Share: Students discuss characteristics of life, homeostasis examples, or cell division concepts.
- Conceptual Check-ins (CERs): Students answer claim-evidence-reasoning questions related to phenomena such as sewer lice, osmosis investigations, or other phenomena.
- Interactive HMH Digital Quizzes/Activities: Short checks on cell types, organelle functions, transport mechanisms, and feedback loops.
- Exit Tickets & Quick Writes: Students summarize key concepts from lessons (e.g., models of mitosis, negative vs. positive feedback).
- Lab Observations & Data Analysis: Students record and interpret data from diffusion, osmosis, or heart rate investigations.
- Diagram/Model Tasks: Students model feedback loops, cell hierarchy diagrams, or cell cycle models.

Summative Assessment

- Chapter/Concept Assessments: Assess understanding of cell structures, organelle functions, homeostasis, feedback loops, cell cycle, mitosis, and differentiation.
- District Common Unit Assessments: Combination of multiple-choice, short answer, and applied tasks requiring modeling or explanation.
- Laboratory Reports
- Performance-Based Assessment: Graded models, diagrams, or simulations demonstrating mastery of key unit concepts.
- Canvas/Online Assignments: HMH-aligned tasks that require students to apply knowledge to case studies, simulations, and real-world scenarios.

Suggested Learning Experiences and Instruction

Learning Experiences:

Part 1: Characteristics of Life and Introduction to Cells

Students will:

- Analyze phenomena involving living vs. non-living systems to identify the characteristics of life.
- Observe cells using microscopes/images and compare structural features of different cell types (e.g., epithelial, muscle, nerve, plant epidermis).
- Construct models of the hierarchical organization of biological structures (cells → tissues → organs → organ systems → organism).
- Examine how cellular structures (ribosomes, ER, mitochondria, membrane, nucleus) contribute to the cellular processes that maintain life.

Part 2: Cell Cycle, Mitosis, and Differentiation

Students will...

- Observe prepared slides (e.g., onion root tip) or simulation to observe mitosis.
- Use models or simulations to illustrate DNA replication, mitosis, and the formation of two identical daughter cells.
- Analyze scenarios where cell division is dysregulated (e.g., cancer) and explain the consequences.
- Model how environmental and internal signals regulate cell cycle checkpoints and programmed cell death.
- Explain how mitosis supports growth, repair, and maintenance of multicellular organisms.

Part 3: Transport, Homeostasis and Feedback Mechanisms

Students will...

- Plan and conduct investigations on feedback mechanisms (e.g., heart rate changes under different conditions, plant stomate responses, glucose regulation simulations).
- Analyze datasets showing negative feedback loops (thermoregulation, blood glucose regulation) and positive feedback loops (blood clotting, labor).
- Construct and revise feedback loop diagrams that model the stability of internal conditions.
- Interpret disruptions to homeostasis (e.g., dehydration, diabetes) and predict how body systems respond.
- Explore cell membrane structure and function, focusing on phospholipids, transport proteins, and receptor proteins.
- Investigate simple diffusion and facilitated diffusion using models or demonstrations.
- Review osmosis and analyze osmoregulation case studies, showing how cells and organisms maintain water balance.
- Compare passive vs. active transport and complete targeted practice applying these concepts.

Instructional Strategies: Instruction is grounded in phenomena-driven learning and structured using the 5E Learning Cycle to support investigation, analysis, and application of learning.

Part 1: Characteristics of Life and Introduction to Cells

- Engage: Introduce the anchor phenomenon and facilitate initial predictions and CER responses to stimulate curiosity about what makes something alive.
- Explore: Conduct hands-on labs observing cells via microscopes and HMH digital images and use simulations to explore living vs. non-living, prokaryotic vs. eukaryotic cell differences and plant vs. animal cell organelles.
- Explain: Students create and explain hierarchical models of biological organization (cells → tissues → organs → organ systems → organism).
- Honors Level - Elaborate: Students apply structure-function understanding by modeling organelles as interacting systems within a cell. Extend learning with comparative analysis tasks using HMH digital resources.

Part 2: Cell Cycle, Mitosis, and Differentiation

- Engage: Present anchor phenomenon through HMH animations or videos showing growth from zygote to multicellular organism. Pose questions about cell division and differentiation to stimulate curiosity.
- Explore: Microscope labs or HMH virtual simulations to identify mitosis phases. Model DNA replication, mitosis, and cytokinesis.
- Explain: Students use guided notes to explain cell cycle regulation, checkpoints, apoptosis, and differentiation using HMH diagrams and resources. Connect observations to cell function and organismal growth.
- Honors Level - Elaborate: Students analyze dysregulated cell division scenarios (cancer, tissue damage) using case studies or HMH extensions. Apply understanding of differentiation to explain stem cell specialization and system-level coordination.

Part 3: Transport, Homeostasis and Feedback Mechanisms

- Engage: Present the anchor phenomenon via teacher-created, HMH case study videos or simulations. Elicit prior knowledge about feedback loops, homeostasis, and membrane transport.
- Explore: Students plan and conduct investigations of feedback mechanisms (heart rate, glucose regulation) using HMH lab simulations. Hands-on or virtual labs to investigate diffusion, facilitated diffusion, osmosis, and active transport. Analyze and model osmoregulation scenarios.

- Explain: Students use guided notes, animations, and interactive media to explain negative and positive feedback loops, cell membrane structure, and transport mechanisms. Students construct and revise feedback loop diagrams, connecting experimental observations to theoretical models.
- Honors Level - Elaborate: Students apply concepts to case studies of homeostatic disruptions (dehydration, diabetes). Use simulations to predict how internal and environmental changes affect system responses. Compare passive vs. active transport and analyze energy requirements in real-life examples.

Differentiation: Intervention/Enrichment Options:

Interventions:

- Scaffolded materials: Guided notes, labeled diagrams, chunked lessons.
- Visual supports: Graphic organizers, color-coded charts for organelles, feedback loops, and cell cycle.
- Hands-on activities: Physical models, manipulatives, labs for mitosis, diffusion, and osmosis.
- Stepwise guidance: Checklists, tiered questioning, think-aloud modeling.
- Peer & tech support: Collaborative learning, HMH simulations, text-to-speech.

Enrichments:

- Higher-order thinking: Analyze complex case studies, predict outcomes of disruptions.
- Research & projects: Stem cells, gene editing, organ system adaptations.
- Problem-based learning: Design experiments, model multicellular system responses.
- Cross-disciplinary connections: Math and chemistry applications for cellular processes.
- HMH honors extensions: Articles and simulations on viruses, epigenetics, and endocrine system regulation.

For Language Development:

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Teach only essential vocabulary (as indicated in knowledge section).
- Pre-teach vocabulary or have the ELD teacher pre-teach it if possible.
- Utilize Digital HMH Biology resource which contains translations to over 100 languages.

Central Bucks School District – Course of Study – Biology

Unit 2 – From Light to Life: Matter and Energy in Organisms and Ecosystems

Desired Results:

Essential Questions:

- Why do living systems need energy, and how is it transferred and transformed?
- How do cells store and release energy to support life processes?
- How do we use sugar (energy) and rearrange C, H, O to create the molecules of life?
- How does carbon move through living systems and the environment?
- How does energy from the sun get converted to chemical energy living organisms can use to perform life functions?
- Where does the mass of photosynthetic organisms come from?
- How do photosynthesis and cellular respiration support life at multiple levels?
- How does energy flow and matter cycling differ across cells, organisms, and ecosystems?
- How do human activities affect the flow of energy and cycling of carbon in Earth systems?

Enduring Understandings:

Students will understand that...

- Living systems require a constant input and transformation of energy to power chemical reactions that support growth, maintenance, and reproduction.
- Chemical reactions in cells transfer and transform energy, with ATP serving as a temporary energy carrier that supports cellular work.
- Carbon atoms can be rearranged to form a wide variety of carbon-based molecules whose structures determine their functions in living organisms.
- Matter is conserved as atoms are reorganized and continuously cycled within and between living and Earth systems.
- Photosynthesis transforms light energy into stored chemical energy, providing the primary source of energy and matter for most life on Earth.
- Cellular respiration releases energy stored in food molecules through chemical reactions that result in a net transfer of energy usable for cellular work.
- Energy flows through biological systems and is ultimately dissipated as heat, while matter is recycled.
- Photosynthesis and cellular respiration are interconnected processes that drive the cycling of carbon and the flow of energy from cells to ecosystems, and human activities can alter these cycles with significant consequences.

Knowledge:

Part 1: Chemical Reactions & Cell Energy

Students will know:

- Cells require energy to carry out life processes.
- ATP is the main molecule cells use to transfer energy.
- Chemical reactions in cells transfer and transform energy.
- Some reactions release energy (exergonic), while others require energy (endergonic).
- Energy is conserved during energy transformations.
- Vocabulary: Mitochondria, cellular respiration, energy, chemical reaction, chemical energy, stored energy, ATP, ADP, metabolism, enzyme, reactant, product, input, output
- Honors Vocabulary: endothermic, exothermic, activation energy, catalyst

Part 2: Carbon-Based Molecules

Students will know:

- Carbon is a key element in organic molecules essential to life.
- Carbohydrates, lipids, proteins, and nucleic acids have specific structures and functions.
- Energy and matter in ecosystems are ultimately derived from carbon-based molecules.
- Vocabulary: Organic molecule/macromolecule, carbohydrate, lipid, protein, nucleic acid, monosaccharide, polysaccharide, polymer, monomer, hydrocarbon, amino acid, matter, element, metabolism, nucleotide.

Part 3: Photosynthesis

Students will know:

- Light energy is converted into chemical energy in plants and some bacteria.
- Photosynthesis produces carbohydrates and oxygen from carbon dioxide and water.
- Factors such as light intensity, water availability, and temperature affect the rate of photosynthesis.
- Vocabulary: Photosynthesis, chloroplast, chlorophyll, glucose, chemical energy, autotroph, light independent reactions, glucose, light energy.
- Honors Vocabulary: Light-dependent reactions, Calvin cycle, kinetic energy, potential energy, thylakoid, stroma, photosystems.

Part 4: Cellular Respiration

Students will know:

- Cells extract energy from glucose through aerobic and anaerobic respiration.
- ATP is generated by breaking chemical bonds in food molecules.
- Oxygen is required for aerobic respiration; anaerobic respiration occurs when oxygen is limited.
- Vocabulary: Cellular respiration, mitochondria, chemical energy, stored energy, ADP/ATP, aerobic, anaerobic, energy transfer.
- Honors Vocabulary: Glycolysis, Krebs cycle, electron transport chain

Part 5: Energy & Carbon Cycling

Students will know:

- Energy flows through ecosystems from producers to consumers to decomposers.
- Ecological efficiency limits energy transfer between trophic levels.
- Carbon cycles through the biosphere, atmosphere, hydrosphere, and geosphere via photosynthesis, respiration, and decomposition.
- Human activity (e.g., greenhouse gas emissions, deforestation) affects carbon cycling and ecosystem resilience.
- Vocabulary: Energy flow, trophic level, food chain, food web, carbon cycle, biosphere, atmosphere, hydrosphere, geosphere, human impact, ecosystem, greenhouse gas.
- Honors Vocabulary: ecological efficiency

Skills:

Students will be able to...

Part 1: Chemical Reactions & Cell Energy

- Explain the role of ATP in storing and transferring energy.
- Analyze chemical reactions as energy-releasing or energy-requiring.
- Model energy transformations in cellular processes.

Part 2: Carbon-Based Molecules

- Identify the function of carbohydrates, lipids, proteins, and nucleic acids.
- Understand that sugar molecules are composed of carbon, hydrogen and oxygen which can be rearranged to create other large macromolecules (such as proteins and DNA).
- Explain how carbon-based molecules provide energy and building blocks for cells.
- Relate organic molecules to energy flow in ecosystems.
- Model how matter and energy flow through different organizational levels of living systems by the rearrangement of elements within molecules.
- Model and describe the process of how polymers are formed from monomers as well as the process to break the polymers down to form monomers.

Part 3: Photosynthesis

- Model and explain the conversion of light energy into chemical energy.
- Model how plants take in water and carbon dioxide and convert them into glucose and oxygen.
- Identify and describe the inputs and outputs in photosynthesis.
- Analyze factors affecting photosynthesis rates using data from experiments or simulations.
- Explain the connection between photosynthesis and energy availability in ecosystems.

Part 4: Cellular Respiration

- Describe aerobic and anaerobic respiration pathways.
- Explain how ATP is produced and used in cellular activities.
- Model energy extraction from food molecules and its flow to the organism.
- Model how energy is transferred from one system of interacting molecules to another.
- Explain how energy is released by cellular respiration contributing to thermoregulation.

Part 5: Energy & Carbon Cycling

- Construct models of energy flow through ecosystems.
- Compare how matter and energy can move through ecosystems aerobically or anaerobically.
- Explain how photosynthesis, anaerobic/aerobic respiration provide most of the energy for life processes.
- Analyze ecological efficiency and its effect on energy transfer.
- Explain carbon cycling among living organisms and the environment.
- Evaluate human impact on carbon cycling and ecosystem resilience.

Priority Standards:

3.1.9-12.E: Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.

Assessment Boundary: Assessment does not include specific biochemical steps.

3.1.9-12.F: Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

Assessment Boundary: Assessment does not include the details of specific chemical reactions or identification of macromolecules.

3.1.9-12.G: Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

Assessment Boundary: Assessment should not include identification of the steps or specific processes involved in cellular respiration.

3.1.9-12.J: Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. *Assessment Boundary: Assessment does not include the specific chemical processes of either aerobic or anaerobic respiration*

3.1.9-12.K: Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. *Assessment Boundary: Assessment does not include the specific chemical steps of photosynthesis and respiration.*

Supporting Standards:

CC.3.5.9-12.A: Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

CC.3.5.9-10.G: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

CC.3.6.9-12.B: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

CC.3.6.9-12.D: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

CC.3.6.9-12.H: Draw evidence from informational texts to support analysis, reflection, and research.

Acceptable Evidence:

Performance Tasks –

- Construct ATP cycle and energy transfer models.
- Model photosynthesis and cellular respiration pathways and connect to carbon cycling.
- Build ecosystem food webs showing energy flow and ecological efficiency.
- Analyze human impact on carbon cycling and predict ecosystem outcomes.

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment:

- “Can You Explain It” Lesson Self Checks using HMH Biology Resource
- Classroom Discussions & Think-Pair-Share: Students discuss how energy flows through cells and ecosystems or compare photosynthesis and cellular respiration.
- CER Responses (Claim-Evidence-Reasoning): Students respond to questions about ATP production, energy transformations, ecological efficiency, or carbon cycling using HMH digital prompts or lab observations.
- HMH Interactive Quizzes & Simulations: Short formative checks on concepts like ATP usage, biomolecule functions, photosynthesis, cellular respiration, trophic levels, and carbon flow.
- Exit Tickets & Quick Writes: Students summarize key concepts, such as the effect of light intensity on photosynthesis or the role of decomposers in carbon cycling.
- Lab Observations & Data Analysis: Students record and interpret data from investigations of photosynthesis, respiration, or ecosystem energy transfer.
- Diagram/Model: Students develop models of energy flow, ATP cycles, photosynthesis/respiration, or carbon cycling.

Summative Assessment:

- Chapter/Concept Assessments: Assess understanding of energy transfer, ATP, photosynthesis, cellular respiration, biomolecule roles, trophic levels, ecological efficiency, and carbon cycling through multiple-choice, short answer, and applied modeling questions.
- District Common Unit Assessments: Combination of multiple-choice, short answer, and applied tasks requiring modeling or explanation.
- Laboratory Reports
- Performance-Based Assessments: Graded models or digital projects demonstrating mastery of energy transfer, ATP cycles, photosynthesis/respiration connections, or ecosystem energy flow.
- Canvas/HMH Assignments: Digital tasks requiring students to apply knowledge to case studies, simulations, or real-world phenomena

Suggested Learning Experiences and Instruction

Learning Experiences:

Part 1: Chemical Reactions & Cell Energy

Students will:

- Model ATP production and usage in cellular processes using HMH simulations.
- Demonstrate exergonic and endergonic reactions in lab or virtual activities.

Part 2: Carbon-Based Molecules

Students will:

- Explore macromolecule structure and function through models, interactive HMH activities, and lab investigations.
- Analyze nutrient composition in foods.

Part 3: Photosynthesis

Students will:

- Conduct hands-on or virtual experiments modeling light-dependent reactions and carbohydrate production.
- Examine factors affecting photosynthesis (light, water, temperature) using HMH labs.
- Relate this knowledge to cellular energy storage.

Part 4: Cellular Respiration

Students will:

- Simulate aerobic and anaerobic respiration in HMH virtual labs.
- Measure cellular respiration outputs in model organisms or lab simulations.

Part 5: Energy & Carbon Cycling

Students will:

- Build models of food webs, trophic levels, and energy flow using HMH interactive tools.
- Trace carbon cycling through ecosystems and model human impact using HMH case studies.

Instructional Strategies: Instruction is grounded in phenomena-driven learning and structured using the 5E Learning Cycle to support investigation, analysis, and application of learning.

Part 1: Chemical Reactions & Cell Energy

- Engage: Introduce the anchor phenomenon with HMH interactive simulations showing ATP generation and energy use in cells. Pose questions about everyday energy use in organisms to activate prior knowledge.
- Explore: Hands-on or virtual labs demonstrating exergonic vs. endergonic reactions. Model ATP hydrolysis and phosphorylation using physical manipulatives or HMH digital tools.
- Explain: Students use guided notes and animations to explain ATP as the energy currency of the cell and its role in cellular work. Students diagram energy transformations between ATP, ADP, and chemical reactions.
- Honors Level - Elaborate: Students apply concepts to real-world examples, such as muscle contraction or nerve signaling. Compare energy transfer efficiency in different reactions or organisms using HMH digital simulations.

Part 2: Carbon-Based Molecules

- Engage: Introduce phenomenon using HMH media showing how glucose is used to make larger carbon-based molecules. Pose guiding questions: “How does energy captured in molecules support life.”
- Explore: Lab investigations identifying carbohydrates, lipids, proteins, and nucleic acids using qualitative tests or virtual labs. HMH interactive modeling of molecular structures and bonding.
- Explain: Guided instruction on monomers, polymers, and the relationship between molecular structure and function. Students create diagrams linking chemical structure to energy storage or functional roles in cells.
- Honors Level - Elaborate: Students apply concepts to compare energy content of carbohydrates, lipids, and proteins. Explore examples such as ATP synthesis, glucose storage, and macromolecule building in different organisms.

Part 3: Photosynthesis

- Engage: HMH videos or simulations showing light energy being converted into chemical energy in plant cells. Pose guiding questions: “Where does the mass of a plant come from?” and “How is sunlight used by cells?”
- Explore: Labs on photosynthesis (leaf disks, oxygen sensors, or virtual HMH labs). Modeling light-dependent and light-independent reactions with physical or digital manipulatives.
- Explain: Students use guided notes and interactive animations to explain the conversion of light energy to chemical energy (ATP, NADPH, glucose). Students relate photosynthesis to matter and energy flow in ecosystems.
- Honors Level - Elaborate: Students analyze factors affecting photosynthesis (light, CO₂, temperature). Connect photosynthesis to cellular respiration and energy cycling in ecosystems.

Part 4: Cellular Respiration

- Engage: HMH simulations showing glucose breakdown and ATP production in cellular respiration. Pose questions about why organisms need to perform respiration even if they perform photosynthesis.
- Explore: Lab investigations of cellular respiration (yeast, CO₂ sensors, or HMH virtual labs). Model glycolysis, Krebs cycle, and electron transport as energy transfer processes using manipulatives or digital simulations.
- Explain: Students link ATP production to energy use, matter cycling, and organismal function. Students diagram energy flow from glucose to ATP.
- Honors Level - Elaborate: Students compare aerobic vs. anaerobic respiration efficiency. Apply knowledge to real-life scenarios, e.g., exercise, fermentation, or plant metabolism at night.

Part 5: Energy & Carbon Cycling

- Engage: HMM ecosystem simulations demonstrating energy flow and carbon cycling. Discuss human impacts on ecosystems, such as deforestation and CO₂ emissions.
- Explore: Construct and analyze food webs and energy pyramids using HMM digital tools or manipulatives. Investigate carbon cycle case studies: photosynthesis, respiration, decomposition, fossil fuel emissions.
- Explain: Students use guided notes and HMM interactive media to explain energy transfer efficiency, trophic levels, and ecosystem carbon balance. Students connect cellular energy processes to ecosystem-level cycling.
- Honors Level - Elaborate: Students explore ecological efficiency and its limits on energy availability for successive trophic levels.

Differentiation/Intervention/Enrichment Options:

Interventions:

- Scaffolded materials: Guided notes, labeled diagrams, and chunked lessons for photosynthesis, cellular respiration, and energy flow in ecosystems.
- Visual supports: Graphic organizers and color-coded charts for energy transfer, trophic levels, carbon cycling, and metabolic pathways.
- Hands-on activities: Physical models, manipulatives, and labs for ATP production, photosynthesis, cellular respiration, and ecosystem simulations.
- Stepwise guidance: Checklists, tiered questioning, and think-aloud modeling for analyzing chemical reactions, carbon-based molecules, and energy/matter flow.
- Peer & tech support: Collaborative learning, HMM virtual labs, interactive simulations, and text-to-speech options to support comprehension of complex processes.

Enrichments:

- Higher-order thinking: Analyze complex case studies on energy efficiency, human impacts on carbon cycling, or extreme environmental conditions.
- Research & projects: Investigate cellular energy transformations, photosynthesis adaptations in different plants, or effects of climate change on ecosystems.
- Problem-based learning: Design experiments modeling energy and matter transfer, simulate ecosystem disruptions, or predict outcomes of altered carbon cycles.
- Cross-disciplinary connections: Explore math and chemistry applications in ATP calculations, energy budgets, and chemical reaction modeling.
- HMM honors extensions: Articles, simulations, and digital investigations on advanced topics such as cellular metabolism, global carbon cycling, and climate change impacts on ecosystems.

For Language Development:

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Teach only essential vocabulary (as indicated in knowledge section).
- Pre-teach vocabulary or have the ELD teacher pre-teach it if possible.
- Utilize Digital HMM Biology resource which contains translations to over 100 languages.

Central Bucks School District – Course of Study – Biology
Unit 3a – From Genes to Generations – Inheritance and Variation of Traits

Desired Results:

Essential Questions:

- How does the structure of DNA determine the structure and function of proteins and, ultimately, traits?
- How is genetic information passed from one generation to the next?
- Why do individuals of the same species have different traits?
- How are the characteristics of one generation related to the previous generation?
- Why (How) do individuals of the same species vary in how they look, function and behave?
- How can probability be used to predict the outcomes of a genetic cross?
- How can data be used to determine patterns of inheritance?
- How can biotechnology be used to address modern problems?
- What constitutes an ethical use of biotechnology?

Enduring Understandings:

Students will understand that...

- DNA provides the instructions for an organism's traits, and these traits are expressed through proteins.
- Environmental factors can influence the expression of traits in organisms.
- The reproductive process leads to genetic variation in a number of ways.
- Genetic inheritance usually follows predictable patterns, resulting in a variety of traits in offspring.
- Probability can be used to predict the likelihood of traits in offspring.
- Genetic diversity contributes to the survival and resilience of populations.
- Modern genetic techniques can be applied to many societal issues, but they involve ethical considerations.

Knowledge:

Part 1: DNA Structure and Replication

Students will know:

- DNA is the universal code of life, consisting of a double helix structure made of nucleotides (phosphate, deoxyribose sugar, nitrogenous base).
- Complementary base pairing (A–T, C–G) allows DNA to store and transmit genetic information.
- DNA replication is semi-conservative, producing two identical DNA molecules from one original molecule.
- Enzymes (such as DNA helicase, DNA polymerase, and ligase) are involved in DNA replication.
- Vocabulary: Nucleotide, DNA, RNA, Genes, Protein, Protein synthesis, DNA replication, transcription, translation
- Honors Vocabulary: Double helix, complementary base pairing, replication, semi-conservative, helicase, polymerase, ligase, template strand, daughter strand.

Part 2: Protein Synthesis

Students will know:

- Genes in DNA code for proteins, which carry out specific cellular functions.
- Transcription is the process of copying DNA into mRNA.
- Translation is the process by which ribosomes read mRNA to synthesize proteins using tRNA and amino acids.
- Mutations in DNA can affect protein structure and function.
- Vocabulary: Transcription, translation, codon, amino acid, ribosome, gene, protein, genetic mutation, gene expression, mRNA, tRNA, rRNA
- Honors Vocabulary: anticodon, stop codon, start codon

Part 3: Gene Expression and Regulation

Students will know:

- Gene expression is regulated, so not all genes are active in all cells or at all times.
- Cells with the same DNA can develop different structures and functions because they express different genes.
- Internal and external factors can influence gene expression.
- Both genetic and environmental factors contribute to the traits observed in organisms.
- Environmental conditions can affect the expression of traits without changing the DNA sequence.
- Vocabulary: DNA, gene, gene expression, regulation, protein, traits
- Honors: Epigenetic factors, such as DNA methylation and histone modification, can affect gene expression without changing the DNA sequence.
- Honors Vocabulary: epigenetics, transcription factors, promoter, environmental influence.

Part 4: Meiosis

Students will know:

- Meiosis is the process by which gametes (sperm and egg) are produced, halving the chromosome number.
- Meiosis introduces genetic variation through crossing over (prophase I) and independent assortment (metaphase I).
- Differences between meiosis and mitosis include number of divisions, chromosome number in daughter cells, and genetic variation.
- Errors in meiosis can lead to chromosomal disorders.
- Vocabulary: Meiosis, genetic mutation, genetic variation, homologous chromosomes
- Honors Vocabulary: gamete, sister chromatids, haploid, diploid, crossing over, independent assortment, tetrad, nondisjunction

Part 5: Mendel, Heredity, Traits, and Probability

Students will know:

- Mendelian inheritance involves dominant and recessive alleles and predictable ratios of phenotypes in offspring.
- Punnett squares, probability, and pedigrees can be used to predict inheritance patterns.
- Genetic variation results from meiosis, fertilization, mutations, and environmental influences.
- Vocabulary: DNA, gene, allele, chromosome, dominant, recessive, homozygous, heterozygous, genotype, phenotype, traits, Punnett square, probability, genetic mutation, genetic variation, inheritance.
- Honors Vocabulary: Non-Mendelian inheritance, incomplete dominance, codominance, polygenic trait, multiple alleles.

Skills:

Students will be able to...

Part 1: DNA Structure and Replication

- Describe the structure of DNA and explain how complementary base pairing allows for replication.
- Model the process of DNA replication, comparing the roles of enzymes (helicase, DNA polymerase, and ligase).
- Compare and contrast the template strand and daughter strand in replication.
- Explain how replication errors can lead to mutations.

Part 2: Protein Synthesis

- Model transcription and translation to explain how DNA codes for proteins.
- Use codons and anticodons to demonstrate the role of mRNA and tRNA in protein synthesis.
- Predict the effect of mutations on protein structure and function.
- Explain the functional relationship between genes, proteins, and cell function.

Part 3: Gene Expression and Regulation

- Explain how and why genes are regulated.
- Analyze how various other factors (such as environmental factors) can influence phenotype.
- Compare expressed and non-expressed genes and explain their effects on cell function.

Part 4: Meiosis

- Explain how meiosis produces genetically unique gametes.
- Compare meiosis and mitosis in terms of genetic variation.
- Explain how processes, such as crossing over and independent assortment, create genetic variation.
- Predict how errors during meiosis (e.g., nondisjunction) affect offspring.
- Make and defend a claim, using evidence, about how genetic variation occurs.

Part 5: Mendel, Heredity, Traits, and Probability

- Make and defend a claim about how genetic variation occurs.
- Use Punnett squares and probability as evidence to explain patterns of inheritance.
- Analyze pedigree data to determine inheritance patterns and support a claim.
- Explain how variation results from reproduction, DNA errors, and environmental mutations.

Priority Standards:

3.1.9-12.A: All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (This will also reoccur in Unit 3). *Assessment Boundary: Assessment does not include identification of specific cell or tissue types, whole-body systems, specific protein structures and functions, or the biochemistry of protein synthesis.*

3.1.9-12.P: Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. *Assessment Boundary: Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.*

3.1.9-12.Q: Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. *Assessment Boundary: Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.*

3.1.9-12.R: Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. *Assessment Boundary: Assessment does not include Hardy-Weinberg calculations*

Supporting Standards:

CC.3.5.9-12.A: Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

CC.3.5.9-10.I: Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

CC.3.6.9-12.A: Write arguments focused on discipline-specific content.

CC.3.6.9-12.B: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

CC.3.6.9-12.H: Draw evidence from informational texts to support analysis, reflection, and research.

Acceptable Evidence:

Performance Tasks –

- DNA & Protein Synthesis Model: Students build a model illustrating DNA replication, transcription, and translation.
- Gene Regulation Case Study: Students analyze environmental influences on gene expression and present predictions.
- Meiosis & Heredity: Model meiosis stages, crossing over, and independent assortment, linking to genetic variation in offspring.
- Genetic Probability Task: Solve Punnett square and pedigree problems, predicting inheritance patterns. (e.g. Dragon Genetics activity)

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment:

- “Can You Explain It” Lesson Self Checks using HMH Biology Resource
- Classroom discussions, think-pair-share on DNA, proteins, and inheritance.

- HMH digital quizzes and practice problems on replication, transcription, translation, gene regulation, meiosis, and Punnett squares.
- Exit tickets summarizing gene expression, mutations, or inheritance patterns.
- Lab observations and data analysis for meiosis simulations or probability experiments.
- CER responses for phenomena like genetic variation and trait inheritance.

Summative Assessment:

- Chapter/Concept Assessments: covering DNA structure, protein synthesis, gene regulation, meiosis, and inheritance.
- District Common Unit Assessments: Combination of multiple-choice, short answer, and applied tasks requiring modeling or explanation
- Laboratory reports
- Performance-based assessment: DNA/protein models and genetic predictions.
- Canvas/HMH online assignments requiring applied explanations and analysis of genetic scenarios.

Suggested Learning Experiences and Instruction

Learning Experiences:

Part 1: DNA Structure and Replication

Students will:

- Build DNA models to visualize nucleotide pairing and double helix structure.
- Simulate DNA replication with physical or digital manipulatives.
- Analyze cases of replication errors and mutations.

Part 2: Protein Synthesis

Students will:

- Transcribe and translate DNA sequences into amino acid chains using codon charts.
- Use HMH simulations to visualize transcription and translation processes.
- Investigate real-world examples of mutations affecting protein function (e.g., sickle-cell anemia).

Part 3: Gene Expression and Regulation

Students will:

- Explore gene regulation using simulations or diagrams showing promoter interactions.
- Analyze how environmental changes can affect gene expression.
- Honors: Model epigenetic changes and their effects on phenotype.

Part 4: Meiosis

Students will:

- Observe meiosis through simulations, animations, or prepared slides.
- Model crossing over and independent assortment with manipulatives.
- Compare meiotic errors with case studies (e.g., Down syndrome, Turner syndrome).

Part 5: Mendel, Heredity, Traits, and Probability

Students will:

- Use Punnett squares to predict inheritance patterns and support claims about how traits are passed.
- Analyze pedigrees to identify patterns of inheritance and use data as evidence to support genetic claims.
- Conduct probability experiments (coins, dice, or genetic simulations) to model inheritance and use results as evidence to explain variation in traits.

Instructional Strategies: Instruction is grounded in phenomena-driven learning and structured using the 5E Learning Cycle to support investigation, analysis, and application of learning.

Part 1: DNA Structure and Replication

- Engage: Use animations showing DNA replication and real-world mutation examples.

- Explore: Build models of DNA and simulate replication.
- Explain: Students discuss roles of enzymes, such as helicase, polymerase, and ligase, using diagrams.
- Honors Level - Elaborate: Analyze replication errors and potential effects on proteins.

Part 2: Protein Synthesis

- Engage: Show simulations showing transcription and translation.
- Explore: Translate DNA sequences into amino acids using codon charts.
- Explain: Students explain relationship between DNA, RNA, and proteins.
- Honors Level - Elaborate: Predict outcomes of mutations using real-world examples.

Part 3: Gene Expression and Regulation

- Engage: Show cases of gene silencing or activation in cells.
- Explore: Simulate gene expression using interactive HMH digital tools.
- Explain: Students discuss and explain how gene expression is regulated and how differences in gene expression contribute to variations in cell function and observable traits.
- Honors Level - Elaborate: Examine environmental influence on gene expression.

Part 4: Meiosis

- Engage: Use animations to visualize chromosome behavior.
- Explore: Model meiosis and simulate gamete formation.
- Explain: Students compare meiosis to mitosis and highlight sources of variation.
- Honors Level - Elaborate: Predict consequences of meiotic errors.

Part 5: Mendel, Heredity, Traits, and Probability

- Engage: Present family pedigree examples.
- Explore: Solve Punnett square and probability problems.
- Explain: Discuss Mendelian vs. non-Mendelian inheritance patterns.
- Honors Level - Elaborate: Predict outcomes using data from pedigrees or probability simulations.

Differentiation/Intervention/Enrichment Options:

Interventions:

- Scaffolded materials: Guided notes, labeled DNA/protein synthesis diagrams, chunked lessons for replication, transcription, translation, and meiosis.
- Visual supports: Graphic organizers, color-coded charts for DNA structure, codon tables, gene expression pathways, and Punnett squares.
- Hands-on activities: Physical or digital models for DNA, RNA, proteins, meiosis, and inheritance patterns.
- Stepwise guidance: Checklists for completing Punnett square exercises, meiosis simulations, and gene expression models; tiered questioning to support comprehension.
- Peer & tech support: Collaborative learning, HMH simulations, interactive pedigree tools, text-to-speech features, and step-by-step HMH guided exercises.
- Simplified practice: Start with monohybrid crosses and gradually simple dihybrid and non-Mendelian patterns.

Enrichments:

- Higher-order thinking: Analyze complex case studies of genetic disorders, epigenetics, or population genetics.
- Research & projects: Investigate CRISPR, gene therapy, or biotechnology applications for solving societal problems.
- Problem-based learning: Design experiments to predict inheritance patterns, model genetic crosses, or simulate environmental impacts on gene expression.
- Cross-disciplinary connections: Use math to calculate probabilities in Punnett squares and Hardy-Weinberg equilibrium; incorporate chemistry to explore molecular structures of DNA and proteins.
- HMH honors extensions: Explore detailed simulations of gene regulation, genetic mutations, pedigrees, and the ethical implications of biotechnology.

For Language Development:

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.

- Teach only essential vocabulary (as indicated in knowledge section).
- Pre-teach vocabulary or have the ELD teacher pre-teach it if possible.
- Utilize Digital HMH Biology resource which contains translations to over 100 languages.

Central Bucks School District – Course of Study – Biology

Unit 3b – From Genes to Generations – Natural Selection and Evolution

Desired Results:

Essential Questions:

- Why do individuals of the same species vary in how they look, function, and behave?
- How do patterns in data help explain why some traits become more common in a population?
- What evidence supports that all species are related through common ancestry?
- How does genetic variation affect survival and reproduction?
- How does natural selection lead to adaptation in populations?
- How does the environment influence populations over multiple generations?
- How can new species form over time?
- Why do some organisms go extinct, and how does this affect ecosystems?
- How does evolution explain both the similarities and diversity of life on Earth?
- What is biodiversity, and how do human activities impact it?

Enduring Understandings:

Students will understand that...

- Natural selection is a primary driving force of evolution, leading to adaptation of populations.
- Variation among individuals of the same species results from both genetic and environmental factors and provides the basis for natural selection.
- Genetic variation arises through multiple mechanisms and allows populations to adapt over time.
- In a given environment, individuals with certain traits are more likely to survive and reproduce, which can change the traits of a population over generations.
- All species share a common ancestor, and this relationship is supported by evidence from anatomical, developmental, and genetic similarities.
- Patterns in data and trait distributions can be used to explain how populations change over time.
- Barriers to reproduction can lead to the formation of new species.
- Extinction occurs when species lack adaptations needed for survival, and human activities are accelerating this process.
- Biodiversity results from ongoing evolutionary change, and greater biodiversity promotes ecosystem resilience.

Knowledge:

Part 1: Lines of Evidence for Evolution

Students will know:

- Fossil records, comparative anatomy, embryology, molecular biology, and biogeography provide evidence for evolution.
- Patterns of homology, analogy, and vestigial structures indicate evolutionary relationships.
- Multiple lines of evidence are used together to support the theory of evolution.
- Vocabulary: Fossil, homologous structures, analogous structures, vestigial structures, common ancestor, DNA evidence, biogeography.
- Honors Vocabulary: phylogeny, clade,

Part 2: Natural Selection

Students will know:

- Natural selection acts on variation within populations; survival and reproductive success depend on advantageous traits.
- Environmental pressures determine which traits are favorable.
- Vocabulary: Natural selection, biological fitness, adaptation, selective pressure, phenotype, genotype.

Part 3: Evolution of Populations

Students will know:

- Populations evolve over time through changes in allele frequencies caused by natural selection, mutation, and sexual reproduction.
- Data and graphical patterns can be used to show how traits change in populations over time.
- Reproductive barriers can lead to speciation.
- Vocabulary: Evolution, Population, gene pool, allele frequency, speciation, reproductive isolation, genetic variation, mutation, sexual reproduction.

Part 4: Biodiversity and Humans

Students will know:

- Biodiversity arises from evolutionary processes and contributes to ecosystem resilience.
- Human activities impact biodiversity, affecting ecosystems and species survival.
- Vocabulary: Biodiversity, extinction, conservation, ecosystem resilience, adaptation, sustainability, human disturbances.
- Honors Vocabulary: Anthropogenic impact

Skills:

Students will be able to....

Part 1: Lines of Evidence for Evolution

- Analyze and interpret fossil, anatomical, embryological, and molecular evidence to infer evolutionary relationships.
- Compare homologous, analogous, and vestigial structures to evaluate evidence of common ancestry and evolutionary change.
- Construct evidence-based explanations describing how multiple lines of evidence support the theory of evolution.
- Honors: Develop and interpret phylogenetic trees to illustrate evolutionary relationships among species.

Part 2: Natural Selection

- Describe the conditions necessary for natural selection to occur (variation, competition, differential survival, and reproduction).
- Model how advantageous traits increase in frequency in populations over generations.
- Compare acclimatization vs. adaptation in response to environmental change.
- Predict how environmental pressures influence population traits and outcomes.

Part 3: Evolution of Populations

- Model changes in allele frequencies in populations over time due to natural selection, mutation, and sexual reproduction.
- Compare and contrast the processes of speciation and reproductive isolation.
- Explain how genetic variation arises and contributes to population evolution.
- Analyze population-level data to identify patterns of evolutionary change.

Part 4: Biodiversity and Humans

- Evaluate how human-driven environmental changes affect biodiversity and ecosystem resilience.
- Develop and use models to predict the impact of environmental changes on species survival.
- Construct explanations linking natural selection to adaptation and speciation in populations.
- Analyze case studies to propose solutions for conservation and mitigating biodiversity loss.

Priority Standards:

3.1.9-12.R: Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. *Assessment Boundary: Assessment does not include Hardy-Weinberg calculations*

3.1.9-12.S: Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. *Assessment Boundary: N/A*

3.1.9-12.T: Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to

mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. *Assessment Boundary: Assessment does not include other mechanisms of evolution, such as genetic drift, gene flow through migration, and co-evolution.*

3.1.9-12.U: Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

Assessment Boundary: Assessment is limited to basic statistical and graphical analysis. Assessment does not include allele frequency calculations.

3.1.9-12.V: Create or revise a simulation to test a solution to mitigate the adverse impacts of human activity on biodiversity. *Assessment Boundary: N/A*

3.1.9-12.W: Construct an explanation based on evidence for how natural selection leads to adaptation of populations.

Assessment Boundary: N/A

3.1.9-12.X: Evaluate the evidence supporting claims that changes in environmental conditions may result in (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. *Assessment Boundary: N/A*

Supporting Standards:

CC.3.5.9-12.A: Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

CC.3.5.9-10.H: Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem

CC.3.6.9-12.B: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

CC.3.6.9-12.D: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

CC.3.6.9-12.F: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

CC.3.6.9-12.H: Draw evidence from informational texts to support analysis, reflection, and research.

Acceptable Evidence:

Performance Tasks –

- Evolution: Students compile fossil, anatomical, embryological, and molecular evidence supporting evolutionary relationships. (e.g. analyzing primate protein)
- Natural Selection: Students conduct or view a simulation of selection pressures and analyze population changes over generations.
- Phylogenetic Tree: Construct trees showing relatedness among species based on anatomical or molecular data.
- Human Impact: Model human-driven environmental changes and propose biodiversity conservation strategies.

Formative Assessment:

- “Can You Explain It” Lesson Self Checks using HMH Biology Resource
- Classroom discussions and think-pair-share on evidence for evolution.
- Conceptual CER check-ins explaining adaptations or population changes.
- Interactive HMH quizzes on natural selection, speciation, and biodiversity.
- Exit tickets summarizing main lines of evidence or adaptation outcomes.

Summative Assessment:

- Chapter/Concept Assessments: Multiple-choice, short answer, and applied questions on evolution, natural selection, population evolution, and biodiversity.
- District Common Unit Assessments: Combination of multiple-choice, short answer, and applied tasks requiring modeling or explanation
- Lab Reports: Simulation analyses, fossil or anatomical evidence investigations.
- Performance-Based Assessment: Phylogenetic trees, population change models, or conservation proposals.

- HMM-aligned assignments: Case studies, modeling exercises, and evidence-based explanations.

Suggested Learning Experiences and Instruction

Learning Experiences:

Part 1: Lines of Evidence for Evolution

- Examine fossil casts, HMM simulations, and phylogenetic trees to identify evolutionary patterns.
- Compare homologous and analogous structures through images, models, or lab dissections.
- Analyze embryonic development stages to infer evolutionary relationships.

Part 2: Natural Selection

- Simulate natural selection using HMM digital labs (e.g., predator-prey models, beak size variations).
- Observe case studies of adaptations in modern populations.
- Analyze environmental pressures and resulting phenotypic changes.

Part 3: Evolution of Populations

- Model changes in allele frequencies over generations using simulations or physical manipulatives.
- Investigate speciation through examples of reproductive isolation.
- Construct population models to visualize genetic variation and selection effects.

Part 4: Biodiversity and Humans

- Explore real-world human impacts on biodiversity through case studies.
- Use HMM interactive simulations to model ecosystem resilience and species extinction.
- Research conservation strategies and propose mitigation solutions.

Instructional Strategies: Instruction is grounded in phenomena-driven learning and structured using the 5E Learning Cycle to support investigation, analysis, and application of learning.

Part 1: Lines of Evidence for Evolution

- Engage: Introduce fossil evidence or unusual species with shared traits.
- Explore: Hands-on fossil analysis, anatomical comparisons, embryology observations.
- Explain: Analyze how multiple lines of evidence, including fossils, comparative anatomy, embryology, molecular biology, and biogeography, support common ancestry and evolutionary change.
- Honors Level - Elaborate: Build phylogenetic trees using molecular or anatomical data.

Part 2: Natural Selection

- Engage: Present scenarios where populations face selective pressures.
- Explore: Simulate survival outcomes in varying environmental conditions.
- Explain: Discuss natural selection mechanisms using HMM models and videos.
- Honors Level - Elaborate: Students predict trait prevalence under hypothetical environmental changes.

Part 3: Evolution of Populations

- Engage: Show a population-level phenomenon (e.g., antibiotic resistance).
- Explore: Conduct simulations modeling allele frequency shifts across generations.
- Explain: Mini-lessons on reproductive isolation, mutation, and sexual reproduction effects.
- Honors Level - Elaborate: Predict outcomes for populations under different selective pressures.

Part 4: Biodiversity and Humans

- Engage: Examine local or global biodiversity issues.
- Explore: Investigate case studies on human impacts and ecosystem changes.
- Explain: Guided discussion on biodiversity, ecosystem resilience, and conservation.
- Honors Level - Elaborate: Propose solutions to mitigate biodiversity loss using simulations or research.

Differentiation/Intervention/Enrichment Options:

Interventions:

- Scaffolded materials: Guided notes, labeled diagrams for evolutionary evidence, HMM chunked lessons.
- Visual supports: Color-coded charts for adaptations, reproductive barriers, and phylogenetic trees.

- Hands-on activities: Physical or virtual models of selection, speciation, and population changes.
- Stepwise guidance: Checklists for simulations, Punnett-type adaptation predictions, and tree construction.
- Peer & tech support: Collaborative modeling, interactive HMM simulations, text-to-speech, and guided data interpretation.

Enrichments:

- Higher-order thinking: Analyze real-world biodiversity crises, predict adaptation outcomes, and evaluate conservation strategies.
- Research & projects: Study human evolution, endangered species, or long-term climate impacts on populations.
- Problem-based learning: Design models to test hypotheses about evolution under environmental pressures.
- Cross-disciplinary connections: Use statistics and probability to analyze trait distributions in populations.
- HMM honors extensions: Explore molecular evolution, genome comparisons, and advanced speciation case studies.

For Language Development:

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Teach only essential vocabulary (as indicated in knowledge section).
- Pre-teach vocabulary or have the ELD teacher pre-teach it if possible.
- Utilize Digital HMM Biology resource which contains translations to over 100 languages.



Environmental Science

Course Number: 3900 and 3920

Course Level: Honors and Academic

Grade: High School

Time/Credit: 18 weeks / 1 credit

Development Date: 2025 – 2026

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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Central Bucks School District

Teaching and Learning Principles

The Central Bucks School District's K-12 science education principles are aligned with the **Pennsylvania Science, Technology & Engineering, and Environmental Literacy & Sustainability (STEELS)** Standards, which were adopted in July 2022. The STEELS Standards guide the study of the natural and human-made world through inquiry, problem solving, critical thinking, and authentic exploration. There are six principles that are important in the teaching of science, and they include:

- Children are born investigators.
- Science must focus on core ideas and practices.
- Understanding develops over time.
- Science and engineering require both knowledge and practices.
- Teaching science must connect with student interests.
- In the teaching of science, we promote equity.

Therefore, the goal of science education is to ensure that all students will be able to engage as technological and engineering literate members of a global society, using their learning to:

1. Approach science as a reliable and tentative way of knowing and explaining the natural world and designed world.
2. Weigh evidence and use scientific approaches to ask questions, investigate, and make informed decisions.
3. Make and use observations to analyze relationships and patterns to explain phenomena, develop models, and make predictions.
4. Evaluate systems, to connect how form determines function and how any change to one component affects the entire system.
5. Explain how the natural and designed worlds are interrelated, and the application of scientific knowledge and technology can have beneficial, detrimental, or unintended consequences.

Sources:

- National Research Council (NRC). 2012. *A Framework for K–12 science education: Practices, crosscutting concepts, and core ideas*. Washington, DC: National Academies Press.
- Pennsylvania Department of Education (PDE). 2023. [Communities - SAS \(pdesas.org\)](https://www.pdesas.org/)
- Pennsylvania Department of Education (PDE). 2023. [STEELS Hub: Curriculum Frameworks: Science Long Term Transfer Goals](#)

Central Bucks School District

Enduring Understandings

Students will understand that:

Earth and Space Science

- The Universe is composed of a variety of different objects, which are organized into systems, each of which develops according to accepted physical processes and laws.
- Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.
- The Earth's surface processes affect and are affected by human activities.

Life Science

- All organisms are made of cells and can be characterized by common aspects of their structure and functioning.
- Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.
- Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to, their parents.
- Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.

Physical Science

- Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.
- All forces between objects arise from a few types of interactions: gravity, electromagnetism, and the strong and weak nuclear interactions.
- Interactions of objects or systems of objects can be predicted and explained using the concept of transfer of energy from one object or system of objects to another.
- Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.

Environmental Literacy and Sustainability

- Living things, including humans, utilize natural resources in ways that impact agricultural and environmental systems.
- Human cultures and societies experience and interact with the environment in various ways.
- Watersheds and wetlands function as interconnected systems that support, impact, and are influenced by living things.
- The environment provides multi-faceted opportunities to develop and apply interdisciplinary literacy skills to investigate complex issues at various scales.
- Conducting scientific investigations using place-based inquiry and authentic, outdoor field experience(s) are essential to understanding local environmental issues.
- Best management practices and data driven resource management, as well as environmental laws and policies, encourage environmental sustainability.
- Environmental stewardship practices are essential to improving environmental quality, sustainability, and community well-being.
- Environmental justice plays an important role in providing equitable protection from environmental hazards or concerns for all people.

Technology and Engineering

- The study of technology and engineering requires knowledge of the natural world and the human-made world.
- Design is a fundamental human activity.
- There is no single, best solution as designs can always be improved and refined.

Central Bucks School District

Essential Questions

Students will understand:

Earth and Space Science

- What is the Universe and what is Earth's place in it?
- How and why is Earth constantly changing?
- How do Earth's processes and human activities affect each other?

Life Science

- How do organisms interact with their environment and what are the effects of these interactions?
- How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?
- How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?

Physical Science

- How can one explain the structure, properties, and interactions of matter?
- How can one explain and predict interactions between objects within systems?
- How is energy transferred and conserved?
- How are waves used to transfer energy and information?

Environmental Literacy and Sustainability

- How do living things utilize natural resources in ways that impact agricultural and environmental systems? How do agricultural systems interact with environmental systems?
- How do human cultures and societies experience, interact, and value local, regional, and/or global environments? How do various human cultures express their beliefs about nature and the environment? How are natural resources managed by people from various cultures and communities?
- How do watersheds and wetlands function as interconnected systems that support, impact, and are influenced by living things? How do human actions impact the functions of watersheds and wetlands?
- How do investigations of local environmental issues expand understanding and facilitate potential solutions to other local, regional, and/or global environmental issues?
- How do we balance societal values, practices, and cost-benefit analysis (long-term and short-term) in addressing environmental issues? How can conducting local field investigations lead to identifying, understanding, and addressing environmental issues in my community?
- How do actions and regulations support the equitable availability of resources for current and future generations?
- How can human actions improve environmental quality, sustainability, and community well-being?
- How do human actions impact environmental justice issues for individuals and communities? How do human actions impact the equitable access, use, and disposal of natural resources?

Technology and Engineering

- Why is it important to have an understanding of the natural and human-made worlds?
- Why is design important to human activity?
- Why is there no single correct solution in design?

Central Bucks School District – Course of Study

Course Overview

Desired Results

Course Description:

3920 Academic Environmental Science: (18 weeks, 1 credit)

Environmental Science introduces students to the complex and interconnected systems that shape our planet. Students begin by exploring the geosphere, hydrosphere, and atmosphere, gaining a foundational understanding of Earth's systems and how they interact. The course then examines the importance of sustaining these systems, emphasizing natural resources, human impact, and conservation strategies. In the ecology unit, students investigate relationships between organisms and their environments, focusing on energy flow, biodiversity, and population dynamics. The final unit builds students' environmental literacy, encouraging them to analyze environmental challenges, evaluate solutions, and consider sustainability from multiple perspectives. Throughout the course, students engage in hands-on investigations and real-world problem solving, developing critical thinking skills and a deeper understanding of Earth's systems and their environment.

3900 Honors Environmental Science: (18 weeks, 1 credit)

In Honors Environmental Science, students are introduced to the complex and interconnected systems that shape our planet. Students begin by exploring the geosphere, hydrosphere, and atmosphere, developing a comprehensive understanding of Earth's systems and how they interact. The course emphasizes sustaining these systems, with an advanced focus on natural resources, human impact, and conservation strategies. Students investigate relationships between organisms and their environments, focusing on energy flow, biodiversity, population dynamics, and environmental literacy. Students will engage in rigorous hands-on investigations, simulations, and real-world problem solving, while developing high-level critical thinking and scientific communication skills. Honors students will examine a variety of nonfiction texts that deepen their understanding of environmental challenges.

Committee Members: Stacy Caldwell, Matthew Coverdale, Kyle Dennis, Christina Gillespie, Jennifer Yeager

Acceptable Evidence.

Course Grading:

Marking Period 1 – 45%

Marking Period 2 – 45%

Final Exam – 10%

Environmental Science Pacing Guide

Content	Days
Unit 1 – Earth Systems Interactions	35
Earth’s Formation & Geologic History	5
Formative or Summative Assessments Interventions and Enrichments	1
Plate Tectonics & Earth’s Interior	6
Formative or Summative Assessments Interventions and Enrichments	1
Feedback & Changing Earth’s Systems	6
Formative or Summative Assessments Interventions and Enrichments	1
Properties of Water & Water’s Role in Earth Systems	6
Formative or Summative Assessments Interventions and Enrichments	1
Atmosphere, Climate Change, and Coevolution of Earth’s Systems	6
Review & Unit 1- District Common Summative Assessment	2
Unit 2 –Ecology & Ecosystem Dynamics	28
Energy, Matter, and Ecosystem Dynamics	9
Formative or Summative Assessments Interventions and Enrichments	1
Biodiversity and Ecosystem Stability	7
Formative or Summative Assessments Interventions and Enrichments	1
Population Dynamics, Biodiversity, and Human Impacts	8
Review & Unit 2- District Common Summative Assessment	2
Unit 3 – Human Impact & Sustainability	12
Human Dependence on and Use of Resources	2
Formative or Summative Assessments Interventions and Enrichments	1
Climate, Hazards, and Earth System Interactions	2
Formative or Summative Assessments Interventions and Enrichments	1
Human Impacts on Ecosystems and Biodiversity	2
Formative or Summative Assessments Interventions and Enrichments	1
Sustainability and Environmental Decision-Making	1
Review & Unit 3- District Common Summative Assessment	2
Unit 4 – Environmental Literacy & Action	8
Environmental Literacy: Local environmental issue investigation, Data analysis and research, Proposed solutions and communication	6

Environmental Literacy Capstone Project- District Common Unit Summative Assessment	2
Review & Final Exam	2
Total Days	85

NOTE: Additional remediation in standards/content from the grade level (or previous grade level) where the student completes this course will be provided for students when the teacher determines a student has not yet mastered that content. Enrichment opportunities will also be provided to meet the needs of students that acquire an understanding of the content faster than their class peers.

Required Texts and Software

Required Texts/Software:

- **Cengage:** National Geographic Environmental Science-Sustaining Your World (1st edition updated 2023)
ISBN: 9780357541845
- **Biozone** Earth and Space Science (2nd edition 2022)
ISBN: 9781988566931

Supplementary Texts/Software:

- **Pearson** Earth Science (2018)
ISBN: 9781323205877
- **Explore Learning (Explorelearning.com):** *ExploreLearning.com houses the world's largest library of interactive online simulations for math and science education in grades 3-12. The online simulations are called Gizmos.*

Central Bucks School District – Course of Study – Environmental Science

Unit 1 – Earth Systems Interactions

Desired Results:

Essential Questions

- How do scientists use evidence from rocks, fossils, planetary materials, and radiometric data to explain Earth's origin and age?
- What evidence supports the structure of Earth's interior and the theory of plate tectonics?
- How and why is earth constantly changing and how do Earth's major systems interact?
- How do internal and surface processes interact to shape Earth's landscapes over different spatial and temporal scales?
- How does energy flow through Earth's systems and drive climate patterns and feedback mechanisms?
- How do the physical and chemical properties of water influence Earth materials and surface processes?
- How do interactions among the atmosphere, hydrosphere, geosphere, and biosphere regulate climate and environmental change?
- How have Earth's systems and life influenced one another throughout geologic history?
- How do scientists use data, modeling, and system analysis to predict future changes in Earth's climate and biodiversity?

Enduring Understandings:

Students will understand that...

- Earth's history is recorded in rocks, fossils, and geologic structures; these provide evidence of formation, change, and evolution.
- Continental rocks, which can be older than 4 billion years, are generally much older than the rocks of the ocean floor, which are less than 200 million years old.
- Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history.
- Spontaneous radioactive decay follows a characteristic exponential decay law. Nuclear lifetimes allow radiometric dating to be used to determine the ages of rocks and other materials.
- The structure and dynamics of Earth's interior drive plate motion, surface features, and long-term cycling of matter through thermal convection and tectonic processes.
- Earth's surface is continuously reshaped by interactions among constructive and destructive forces operating across multiple spatial and temporal scales.
- The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space.
- Water's molecular structure and physical properties make it essential for transferring energy and matter and for shaping Earth's surface through weathering, erosion, and deposition.
- Carbon, water, and energy cycle through interconnected Earth systems, linking atmospheric, biological, geological, and hydrological processes.
- Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen.
- Earth and life coevolve; biological processes influence atmospheric and geochemical conditions, while environmental changes shape biodiversity and evolution.
- Scientific models, data analysis, and evidence-based argumentation are essential tools for understanding past Earth processes and forecasting future system impacts.

Knowledge:

Students will know...

- **Earth's Formation & Geologic History:** Students will know how Earth formed and differentiated into layers; how radiometric dating is used to determine the age of rocks. Vocabulary: Earth's differentiation, crust, mantle, core, Lithosphere, asthenosphere, Radiometric dating, Half-life, Continental Crust, Oceanic Crust.
- **Plate Tectonics & Earth's Interior:** Students will know the structure of Earth's interior, the role of mantle convection in driving plate motion, the differences between the lithosphere and asthenosphere, and how seismic data reveals Earth's structure. Vocabulary: Plate tectonics, Subduction, Rift zone, Mid-ocean ridge, Mantle convection, Seismic waves (P-waves, S-waves), Lithosphere, asthenosphere, Earthquake epicenter and focus, Hotspot.
- **Feedback and Changing the Earth's Systems:** Students will know how energy flows through Earth's systems, the organization of climate systems, how feedback mechanisms operate, and how ice sheets influence climate. Vocabulary: Atmosphere, Climate vs. weather, Climate system, Energy flow, radiation, conduction, convection, Feedback mechanisms (positive and negative), Ice sheets, glaciers, Atmospheric circulation.
- **Properties of Water & Water's Role in Earth Systems:** Students will know how water moves through the hydrologic cycle, the properties of water that enable it to shape Earth's surface. Vocabulary: Hydrologic cycle, evaporation, condensation, precipitation, Infiltration, runoff, Water density, polarity, and specific heat.
- **Atmosphere, Climate Change & Coevolution of Earth's Systems:** Students will know the layers of the atmosphere, how the air circulates, the impacts on climate, how changes in Earth's Atmosphere leads to changes in biodiversity, how carbon cycles between all spheres and the combustion of fossil fuels can cause warming in the atmosphere. Students will know how changes in Earth's atmosphere have influenced the evolution and distribution of life and how organisms have altered atmospheric conditions over time. Vocabulary: troposphere, stratosphere, mesosphere, thermosphere, exosphere, cryosphere, greenhouse effect, greenhouse gases, ocean acidification, sea-level, carbon cycle, hydrosphere, atmosphere, geosphere, biosphere, carbon dioxide, climate model, precipitation, pH, weathering

Skills:

Students will be able to:

Earth's Formation & Geologic History:

- Analyze evidence from Earth materials, meteorites, and radiometric dating to construct an account of Earth's formation and early history.
- Use radiometric dating to determine the age of rocks and fossils.

Plate Tectonics & Earth's Interior:

- Model mantle convection and explain its role in plate motion.
- Evaluate evidence from continental and oceanic crust to support the theory of plate tectonics.
- Identify lithosphere and asthenosphere in models of Earth's interior.

Feedback and Changing the Earth's Systems

- Model energy flow through Earth's systems and describe effects on climate.
- Identify feedback mechanisms in climate systems and predict their impact.
- Analyze geoscience data to explain how changes in one Earth system create feedbacks that influence other Earth systems.

Properties of Water & Water's Role in Earth Systems

- Plan and conduct investigations to determine how the properties of water influence Earth materials and surface processes.
- Model the hydrologic cycle and trace water movement through Earth systems.
- Analyze properties of water that shape Earth's surface.

Atmosphere, Climate Change & Coevolution of Earth's Systems.

- Analyze how atmospheric structure and circulation influence weather and climate patterns.
- Model carbon movement among geosphere, hydrosphere, atmosphere, and biosphere.
- Analyze climate data to identify trends and patterns.
- Use predictive models to forecast potential climate changes and impacts.

- Analyze how surface processes impact biodiversity.
- Construct an evidence-based argument explaining how Earth's systems and life have influenced one another throughout geologic history.

Priority Standards:

3.3.9-12.E: Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. Assessment Boundary: Assessment of the results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.

3.3.9-12.F: Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. Assessment Boundary: N/A

3.3.9-12.G: Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. Assessment Boundary: N/A

3.3.9-12.H: Analyze geoscience data to make the claim that one change to Earth's surface can create feedback that causes changes to other Earth systems. Assessment Boundary: N/A

3.3.9-12.I: Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. Assessment Boundary: Assessment does not include memorization of the details of the formation of specific geographic features of Earth's surface. Assessment Boundary: N/A

3.3.9-12.J: Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean floor features. Assessment Boundary: Assessment does not include memorization of the details of the formation of specific geographic features of Earth's surface.

3.3.9-12.K: Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. Assessment Boundary: N/A

3.3.9-12.L: Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. Assessment Boundary: N/A

3.3.9-12.N: Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. Assessment Boundary: Assessment does not include a comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth's other systems.

3.3.9-12.S: Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. Assessment Boundary: Assessment is limited to one example of a climate change and its associated impacts

Supporting Standards:

CC.3.5.9-12.A: Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

CC.3.5.9-10.B: Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

CC.3.5.9-12.B: Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms

CC.3.5.9-10.G: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

CC.3.5.9-10.H: Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.

CC.3.6.9-12.A: Write arguments focused on discipline-specific content

CC.3.6.9-12.B: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

CC.3.6.9-12.F: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Acceptable Evidence:

Performance Tasks:

- Scientific Writing
- Problem Solving Activities
- Real-world Application
- Laboratory/Safety Skills

Acceptable Evidence of Learning other than Performance Tasks:

- Mastery Checks
 - Critical Thinking Questions
 - Summary of Key Concepts

Formative Assessment:

- Learning Checks
 - Warm-ups
 - Closure/ Exit Tickets
 - Open ended responses

Summative Assessment:

- Section Assessments (Quiz)
- Project based learning opportunities
- District Common Unit Summative Assessment
 - Multiple Choice and Free Response
 - Scientific inquiry questions

Suggested Learning Experiences and Instruction

Learning Experiences:

Earth's Formation & Geologic History - Students will:

- Investigate methods of estimating age through relative and absolute comparisons.
- Analyze geological processes shaping Earth's surface through rock formation and tectonic interactions.
- Compare properties of continental and oceanic crust using modeling and sample data.
- Conduct radiometric dating investigations interpreting decay models and half-life data.
- Examine mineral and extraterrestrial evidence to construct explanations of Earth's age and early formation.
- Analyze robotic exploration and probe mission datasets to compare Earth with other planetary bodies.
- Construct geologic timelines integrating fossil, mineral, and planetary evidence.

Plate Tectonics & Earth's Interior – Students will:

- Investigate processes that continually reshape Earth's surface using data analysis and modeling.
- Map Earth's internal structure using seismic data and Earth layer models.
- Model lithosphere and asthenosphere interactions to explain crustal movement.
- Analyze continental motion patterns as evidence of tectonic processes.
- Examine sources of internal heat and their role in convection.
- Investigate temperature gradients within Earth's interior through modeling and interpretation of data.
- Develop and refine models demonstrating mantle convection and plate boundary interactions.

Feedback & Changing Earth's Systems– Students will:

- Analyze interactions between constructive and destructive surface processes through modeling and case studies.
- Investigate positive and negative feedback mechanisms influencing climate systems.
- Analyze how feedback mechanisms, including changes in Earth's reflectivity, can amplify or reduce environmental change.
- Examine long-term environmental changes such as glaciation patterns and climate shifts.
- Use system models to predict how changes in one Earth system influence others.

Properties of Water & Water's Role in Earth's Systems – Students will:

- Investigate molecular and physical properties of water through laboratory exploration.
- Model hydrologic cycling across Earth's systems.
- Examine the role of water in melting and geological transformation processes.
- Conduct investigations demonstrating water's influence on erosion, deposition, and surface change.
- Analyze connections between water properties and energy/matter transfer across systems.

Atmosphere, Climate Change, & Coevolution of Earth's Systems – Students will:

- Analyze global temperature datasets and develop explanations for climate trends.
- Investigate atmospheric structure and energy transfer processes.
- Model atmospheric circulation patterns and climate interactions.
- Examine coevolution of life and Earth systems using environmental and biological case studies.
- Analyze historical atmospheric composition changes.
- Investigate impacts of the Great Oxygenation Event on Earth systems.
- Examine relationships between environmental change and biodiversity patterns.
- Model carbon cycling among Earth systems.
- Simulate climate change scenarios and interpret predictive models.
- Integrate ecological, geological, and atmospheric evidence to model system interactions over time.

Instructional Strategies: Instruction in this unit is anchored in real-world phenomena and case studies and uses the 5E learning cycle.

Earth's Formation & Geologic History

- Engage: Introduce phenomena such as rock layers, fossils, or planetary comparisons to prompt questions about Earth's origin and age.
- Explore: Students investigate radiometric dating, analyze rock and fossil evidence, and construct geologic timelines using models and data.
- Explain: Students develop explanations for Earth's formation and age using evidence. Direct instruction clarifies geologic history, radioactive decay, and early Earth processes.
- Honors Level - Elaborate: Students compare Earth with other planetary bodies and refine models of Earth's early development.

Plate Tectonics & Earth's Interior

- Engage: Use phenomena such as earthquakes, volcanoes, or continental movement to generate questions about Earth's structure.
- Explore: Students analyze seismic data, model Earth's layers, and investigate plate boundary interactions.
- Explain: Students explain how Earth's interior drives plate motion. Direct instruction clarifies mantle convection, lithosphere interaction, and tectonic processes.
- Honors Level - Elaborate: Students refine models and analyze patterns in tectonic activity across different regions.

Feedback & Changing Earth's Systems

- Engage: Present phenomena such as climate shifts or glacial changes to prompt questions about system interactions and feedback.
- Explore: Students investigate feedback mechanisms, analyze case studies, and model system interactions.
- Explain: Students explain how feedback processes influence climate and Earth systems. Direct instruction clarifies energy flow and positive and negative feedbacks.
- Honors Level - Elaborate: Students use models and data to predict how changes in one Earth system impact others.

Properties of Water & Water's Role in Earth's Systems

- Engage: Use phenomena such as erosion, flooding, or water movement to prompt questions about water's role in shaping Earth.
- Explore: Students investigate water's properties, model the hydrologic cycle, and examine its role in surface processes.

- Explain: Students explain how water transfers energy and matter within and across systems. Direct instruction clarifies water properties and system interactions.
- Honors Level - Elaborate: Students connect water processes to broader Earth system changes and refine models of water movement.

Atmosphere, Climate Change, & Coevolution of Earth's Systems

- Engage: Introduce phenomena such as rising temperatures or atmospheric changes to generate questions about climate and system interactions.
- Explore: Students analyze climate data, model atmospheric processes, and investigate carbon cycling and system interactions.
- Explain: Students explain climate patterns and the coevolution of Earth's systems and life. Direct instruction clarifies atmospheric structure, energy transfer, and climate processes.
- Honors Level - Elaborate: Students interpret climate models, connect system interactions, and predict future changes.

Differentiation: Intervention/Enrichment Options: Instruction is differentiated through scaffolded modeling, data analysis, and investigation tasks to support all learners.

Intervention:

- Scaffold content through vocabulary support, guided notes, graphic organizers, and models.
- Provide structured investigations, teacher-guided data analysis, and frequent formative feedback.
- Use simulations, visuals, modified datasets, and flexible pacing to support understanding.

Enrichment

- Extend learning through independent research, student-designed investigations, and analysis of additional datasets.
- Apply advanced quantitative models, digital simulations, and evidence-based evaluation of scientific claims.
- Connect learning to climate forecasting, engineering solutions, sustainability, and real-world environmental challenges.

For Language Development:

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Teach only essential vocabulary (as indicated in knowledge section).
- Pre-teach vocabulary or have the ELD teacher pre-teach it if possible.

Central Bucks School District – Course of Study – Environmental Science

Unit 2 – Ecology and Ecosystem Dynamics

Desired Results:

Essential Questions:

- How do the Earth's major spheres support life?
- What are the major ecosystem components?
- How do organisms interact with one another and with their environment within ecosystems?
- How does energy flow and matter cycle through ecosystems?
- What is biodiversity and why is it important?
- What role do species play in ecosystems?
- How does life on Earth change over time?
- What factors affect biodiversity?
- How do species interact?
- How do biodiversity and ecosystem services support life on Earth?
- How do environmental changes impact ecosystems?
- What factors regulate population growth and ecosystem stability?

Enduring Understandings:

Students will understand that...

- Earth's spheres (geosphere, hydrosphere, atmosphere, biosphere) are interconnected, and energy from the Sun drives ecosystem processes.
- Energy flows through ecosystems via producers, consumers, and decomposers, with energy loss at each trophic level.
- Matter cycles through ecosystems (water, carbon, nitrogen, phosphorus), supporting life and ecosystem stability.
- Food chains, food webs, and energy pyramids model ecosystem relationships and energy transfer.
- Scientists use observations, experiments, models, and data analysis to study ecosystems.
- Biodiversity exists at genetic, species, and ecosystem levels and enhances ecosystem resilience and stability.
- Species play different roles; keystone species and invasive species can significantly influence ecosystem structure.
- Changes in biodiversity affect ecosystem function and can be measured through scientific sampling.
- Population size and growth are influenced by resources, environmental conditions, and species interactions.
- Resource partitioning and symbiotic relationships shape species interactions and ecosystem stability.
- Predator-prey dynamics and succession regulate population and ecosystem changes over time.
- As the environment and populations of species change, there are resulting changes in ecosystems.
- Human activities impact ecosystems, but conservation and sustainability strategies can preserve biodiversity and ecosystem services.
- Group behaviors affect individual survival, reproduction, and population stability.

Knowledge:

Energy, Matter, and Ecosystem Dynamics - Students will know...

- Earth's interconnected spheres - Ecosystems exist within Earth's interconnected spheres (geosphere, hydrosphere, atmosphere, biosphere) and that energy entering Earth's systems, primarily from the Sun, drives ecological processes. They will know how the greenhouse effect influences Earth's energy balance and affects ecosystem conditions.
- Trophic Levels and Energy Transfer - Energy enters ecosystems through producers and is transferred through trophic levels to consumers and decomposers. They will know that energy transfer between trophic levels is inefficient, limiting population size and ecosystem productivity.

- Food Chains, Food Webs, and Energy Pyramids - Food chains and food webs model feeding relationships within ecosystems and how energy pyramids illustrate decreasing energy availability at higher trophic levels.
- Matter Cycling in Ecosystems - Matter is conserved and cycles through ecosystems via biogeochemical processes, including the water, carbon, nitrogen, and phosphorus cycles. They will know how these cycles support life and contribute to ecosystem stability.
- How Scientists Study Ecosystems - Scientists use field studies, experiments, models, and data analysis to study ecosystems and understand interactions among organisms and their environment.
- Vocabulary: Earth systems, biosphere, atmosphere, hydrosphere, geosphere, energy input, greenhouse effect, systems thinking, Energy flow, producer, consumer, decomposer, trophic level, autotroph, heterotroph, energy efficiency, Food chain, food web, energy pyramid, biomass pyramid, trophic transfer, ecological efficiency, Biogeochemical cycles, carbon cycle, water cycle, nitrogen cycle, phosphorus cycle, nutrient cycling, matter conservation, Ecological model, field study, simulation, variable, data analysis, systems model

Biodiversity and Ecosystem Stability - Students will know...

- Biodiversity varies across ecosystems and that changes in biodiversity can significantly impact ecosystem stability and function.
- Different levels of biodiversity, including genetic diversity, species diversity, and ecosystem diversity, and how biodiversity contributes to healthy ecosystems.
- Biodiversity can be measured and quantified using sampling methods and data analysis.
- Roles of Species in Ecosystems: Species play different roles within ecosystems, and that keystone and invasive species can disproportionately affect ecosystem structure and resilience.
- Vocabulary: Biodiversity, ecosystem stability, ecosystem function, species loss, Species richness, genetic diversity, ecosystem diversity, Biodiversity index, sampling, population sampling, data interpretation, Keystone species, invasive species, native species, ecosystem resilience.

Population Dynamics and Species Interactions - Students will know...

- Population size and growth are influenced by environmental conditions, resource availability, and interactions among organisms.
- Resource partitioning reduces competition by allowing species to occupy different niches within an ecosystem.
- Different types of symbiotic relationships and how these interactions affect population size and ecosystem balance.
- Predator-prey interactions regulate population sizes and create feedback loops within ecosystems.
- Ecological Succession: Ecosystems change over time through primary and secondary succession following disturbance.
- A complex set of interactions within an ecosystem can keep its number and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem.
- Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability.
- Population Growth Models: Populations grow in predictable patterns influenced by limiting factors and carrying capacity.
- Changes (induced by human activity) in the environment- including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change- can disrupt an ecosystem and threaten the survival of some species.
- Human Impacts and Ecosystem Management: Human activities affect ecosystems and how conservation and sustainability strategies can support ecosystem health.
- Vocabulary: Population dynamics, population density, species interaction, Resource partitioning, niche, competition, Symbiosis, mutualism, commensalism, parasitism, Predator, prey, population regulation, feedback loop, Ecological succession, primary succession, secondary succession, disturbance, Exponential growth, logistic growth, carrying capacity, limiting factors, Sustainability, conservation, ecosystem, habitat fragmentation, restoration ecology, human disturbances, biodiversity

Skills:

Students will be able to...

Energy, Matter, and Ecosystem Dynamics

- Use models and data to describe energy flow through ecosystems, including trophic levels, food chains, and food webs.
- Analyze and calculate energy transfer efficiency and its impact on ecosystem productivity.
- Represent matter cycling (carbon, nitrogen, water, phosphorus) mathematically and explain its role in ecosystem stability.
- Construct and interpret ecological models to predict effects of changes in energy or matter flow.

Biodiversity and Ecosystem Stability

- Evaluate evidence to explain how biodiversity contributes to ecosystem resilience and stability.
- Use data to assess the effects of species loss, invasive species, or keystone species on ecosystems.
- Apply sampling and quantitative methods to measure species richness and diversity.
- Revise explanations of ecosystem function based on new data regarding biodiversity changes.

Population Dynamics and Species Interactions

- Analyze factors affecting population growth, carrying capacity, and species interactions using mathematical or computational representations.
- Interpret and construct population growth models (exponential, logistic) to predict changes under different environmental conditions.
- Evaluate predator–prey dynamics, symbiosis, and resource partitioning in relation to population stability.
- Assess the influence of group behaviors on survival and reproduction within species.
- Use evidence to explain how ecosystems maintain stability or shift under changing conditions, including human impacts.

Priority Standards:

3.1.9-12.H: Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. Assessment Boundary: Assessment is limited to proportional reasoning to describe the cycling of matter and flow of energy.

3.1.9-12.I: Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. Assessment Boundary: Assessment does not include deriving mathematical equations to make comparisons.

3.1.9-12.L: Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. Assessment Boundary: Assessment is limited to provided data.

3.1.9-12.M: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. Assessment Boundary: N/A

3.1.9-12.N: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. Assessment Boundary: N/A

3.3.9-12.O: Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce. Assessment Boundary: N/A

Supporting Standards:

CC.3.5.9-12.A: Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

CC.3.6.9-12.B: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

CC.3.5.9-10.G: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

CC.3.5.9-10.H: Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.

Acceptable Evidence:

Performance Tasks:

- Scientific Writing
- Problem Solving Activities
- Real-world Application
- Laboratory/Safety Skills

Acceptable Evidence of Learning other than Performance Tasks:

- Mastery Checks
 - Critical Thinking Questions
 - Summary of Key Concepts

Formative Assessment:

- Learning Checks
 - Warm-ups
 - Closure/ Exit Tickets
 - Open ended responses

Summative Assessment:

- Section Assessments (Quiz)
- Project based learning opportunities
- District Common Unit Summative Assessment
 - Multiple Choice and Free Response
 - Scientific inquiry questions

Suggested Learning Experiences and Instruction

Learning Experiences:

Energy, Matter, and Ecosystem Dynamics - Students will:

- Examine the interactions among Earth's spheres (geosphere, hydrosphere, atmosphere, biosphere) and analyze how energy from the Sun drives ecosystem processes.
- Examine Ecosystems to explore biotic and abiotic factors.
- Evaluate Greenhouse effect to understand the role of greenhouse gases in Earth's energy balance, and exploring human activities (fossil fuels, deforestation) that enhance this natural process.
- Construct and interpret food chains, food webs, and energy pyramids to model energy flow and trophic interactions in ecosystems.
- Analyze energy transfer efficiency and its effect on ecosystem productivity and population size.
- Model and represent the cycling of matter (carbon, nitrogen, water, phosphorus) and describe its role in ecosystem stability.
- Collect and analyze data to understand how biotic and abiotic components support ecosystem structure.

Biodiversity and Ecosystem Stability - Students will:

- Explore patterns of biodiversity at the genetic, species, and ecosystem levels and evaluate how biodiversity contributes to ecosystem resilience and stability.
- Measure and quantify biodiversity using sampling methods and data analysis.
- Investigate the roles of species within ecosystems, including keystone and invasive species, and assess their impact on ecosystem structure and function.
- Analyze how changes in biodiversity influence ecosystem stability and nutrient cycling.
- Apply conservation and sustainability principles to propose strategies that maintain biodiversity and ecosystem health.

Population Dynamics, Species Interactions, and Human Impacts - Students will:

- Examine factors influencing population size, growth, and regulation, including resource availability, environmental conditions, and species interactions.
- Analyze different types of species interactions, such as competition, symbiosis, predator–prey relationships, and resource partitioning, and determine their effects on ecosystem stability.
- Explore ecological succession and predict changes in ecosystems over time following disturbances.
- Develop and interpret population growth models (exponential and logistic) to assess carrying capacity and limiting factors.
- Evaluate human impacts on populations and ecosystems and explore strategies for conservation, restoration, and sustainable ecosystem management.

Instructional Strategies: Instruction in this unit is anchored in real-world phenomena and case studies and uses the 5E learning cycle.

Energy, Matter, and Ecosystem Dynamics

- Engage: Introduce phenomena such as ecosystem productivity or disruptions in food webs to prompt questions about energy flow and system interactions.
- Explore: Students model food chains, food webs, and energy pyramids, and investigate matter cycling (carbon, nitrogen, water, phosphorus) using data and simulations.
- Explain: Students construct explanations of energy flow, matter cycling, and system interactions. Direct instruction clarifies trophic relationships, energy transfer efficiency, and the role of biotic and abiotic factors.
- Honors Level - Elaborate: Students apply models to new scenarios, analyze ecosystem data, and explain how changes in one component affect system stability.

Biodiversity and Ecosystem Stability

- Engage: Present phenomena such as species loss or changes in biodiversity to generate questions about ecosystem stability.
- Explore: Students measure biodiversity using sampling methods and analyze the roles of species, including keystone and invasive species.
- Explain: Students explain how biodiversity contributes to ecosystem resilience. Direct instruction supports understanding of biodiversity levels and ecosystem function.
- Honors Level - Elaborate: Students evaluate the impacts of biodiversity changes and propose conservation strategies to maintain ecosystem health.

Population Dynamics and Species Interactions

- Engage: Use phenomena such as population fluctuations or predator–prey relationships to prompt questions about population change.
- Explore: Students develop and interpret population models and investigate species interactions, including competition, symbiosis, and succession.
- Explain: Students explain factors affecting population growth and ecosystem stability. Direct instruction clarifies population models, carrying capacity, and interaction types.
- Honors Level - Elaborate: Students apply models to predict population changes under different conditions and evaluate human impacts on ecosystems.

Differentiation: Intervention/Enrichment Options: Instruction is differentiated through scaffolded modeling, data analysis, and investigation tasks to support all learners.

Intervention:

- Scaffold learning through vocabulary support, graphic organizers, guided investigations, visual models, and simulations of ecological systems.
- Provide structured data analysis, small-group instruction, and frequent formative feedback to support understanding of ecosystem interactions and population dynamics.

- Use modified datasets, worked examples, and flexible supports to strengthen interpretation of ecological models and environmental data.

Enrichment

- Extend learning through advanced data analysis, quantitative population and ecosystem modeling, student-designed investigations, and independent research.
- Apply ecological concepts to authentic environmental issues, conservation challenges, and sustainability initiatives.
- Evaluate scientific claims, interpret complex datasets, and use evidence to propose solutions to ecological and environmental problems.

For Language Development:

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Teach only essential vocabulary (as indicated in knowledge section).
- Pre-teach vocabulary or have the ELD teacher pre-teach it if possible.

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Unit 3 – Human Impact and Sustainability

Desired Results:

Essential Questions:

- How do humans depend on and impact Earth's systems?
- How do natural resources, hazards, and climate influence human systems?
- How do tradeoffs shape decisions about resource use and sustainability?
- How do environmental changes affect ecosystems and human societies?

Enduring Understandings:

Students will understand that...

- As the environment and populations of species change, there are resulting changes in ecosystems.
- Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things.
- All materials, energy, and fuels that humans use are derived from natural sources, some of which are renewable and others are not.
- Natural processes can cause sudden or gradual changes to Earth's systems that may impact human societies.
- Human activities in agriculture, industry, and everyday life impact land, water, and air systems.
- Sustainability requires responsible resource management informed by data, best practices, and policy decisions.

Knowledge:

Students will know...

- Current climate models predict increasing global temperatures influenced by greenhouse gas emissions and interactions among Earth systems.
- Interactions among the atmosphere, hydrosphere, and biosphere are modified by human activity and can be studied using simulations and models.
- Resource availability has shaped the development of human societies.
- Natural hazards and geologic processes impact human populations and migration patterns.
- Resource extraction and energy production involve tradeoffs, including economic, environmental, and social costs and benefits.
- Sustainability requires evaluating constraints such as cost, safety, reliability, and environmental impact.
- Human activities can disrupt ecosystems and biodiversity through pollution, habitat destruction, overexploitation, invasive species, and climate change.
- Maintaining biodiversity is essential for ecosystem stability and human well-being.

Skills:

Students will be able to...

- Categorize and analyze relationships between human systems and Earth systems
- Analyze data and models to explain the impacts of human activity on Earth systems
- Evaluate tradeoffs of resource use and sustainability decisions using evidence
- Interpret how natural hazards and climate patterns influence human systems
- Construct evidence-based explanations about sustainability and environmental impacts

Priority Standards:

3.3.9-12.M: Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. Assessment Boundary: Assessment does not include running computational representations but is limited to using the published results of scientific computational models.

3.3.9-12.O: Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. Assessment Boundary: N/A

- 3.3.9-12.P:** Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. Assessment Boundary: N/A
- 3.3.9-12.R:** Evaluate or refine a technological solution that reduces the impact of human activities on natural systems.
- 3.4.9-12.C:** Analyze and interpret how issues, trends, technologies, and policies impact watershed and water resources.
- 3.4.9-12.G:** Analyze and evaluate how best resource management practices and environmental laws achieve sustainability of natural resources

Supporting Standards:

- CC.3.5.9-12.A:** Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
- CC.3.5.9-10.G:** Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
- CC.3.5.9-10.H:** Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
- CC.3.6.9-12.B:** Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
- CC.3.6.9-12.F:** Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Acceptable Evidence:

Performance Tasks:

- Scientific Writing
- Problem Solving Activities
- Real-world Application
- Laboratory/Safety Skills

Acceptable Evidence of Learning other than Performance Tasks:

- Mastery Checks
 - Critical Thinking Questions
 - Summary of Key Concepts

Formative Assessment:

- Learning Checks
 - Warm-ups
 - Closure/ Exit Tickets
 - Open ended responses

Summative Assessment:

- Section Assessments (Quiz)
- Project based learning opportunities
- District Common Unit Summative Assessment
 - Multiple Choice and Free Response
 - Scientific inquiry questions

Suggested Learning Experiences and Instruction

Learning Experiences:

Human Dependence on and Use of Resources - Students will:

- Examine how humans depend on natural resources for energy, materials, food, and water.
- Analyze how resource availability has shaped the development of human societies.
- Evaluate renewable and nonrenewable resource use, including benefits, limitations, and long-term impacts.
- Investigate how resource extraction and energy production impact Earth systems.

Climate, Hazards, and Earth System Interactions - Students will:

- Analyze climate data and models to identify trends and explain changes in global and regional systems.
- Investigate how interactions among the atmosphere, hydrosphere, and biosphere are influenced by human activity.
- Examine natural hazards and their impacts on human populations and the environment.
- Analyze how weather, climate, and environmental changes influence human systems and decision-making.

Human Impacts on Ecosystems and Biodiversity - Students will:

- Analyze how human activities impact ecosystems through pollution, habitat destruction, overexploitation, and climate change.
- Evaluate how changes in biodiversity affect ecosystem stability and human systems.
- Examine case studies to identify patterns in environmental change and system interactions.
- Investigate how human actions can disrupt or support ecosystem processes.

Sustainability and Environmental Decision - Students will:

- Evaluate sustainable practices in agriculture, water use, and resource management.
- Analyze environmental policies and economic systems used to address environmental challenges.
- Evaluate tradeoffs among environmental, economic, and social factors in sustainability decisions.
- Use evidence to assess and compare solutions that promote sustainable resource use and environmental stewardship.

Instructional Strategies: Instruction in this unit is anchored in real-world phenomena and case studies and uses the 5E learning cycle.

Human Dependence on and Use of Resources

- Engage: Introduce phenomena such as resource demand or sustainability initiatives (e.g., Greening of American Schools) to prompt questions about human dependence on Earth systems.
- Explore: Students analyze data on resource use, energy production, and resource availability, including examples from agricultural and energy systems.
- Explain: Students explain how human societies depend on natural resources and how resource use impacts Earth systems. Direct instruction clarifies resource types, availability, and tradeoffs.
- Honors Level - Elaborate: Students evaluate resource management strategies using case studies (e.g., global sustainability comparisons such as the U.S. and China).

Climate, Hazards, and Earth System Interactions

- Engage: Use phenomena such as climate trends or glacial melting (e.g., Melting Ice in Greenland) to generate questions about system interactions.
- Explore: Students analyze climate data, investigate hazards, and examine system interactions influenced by human activity.
- Explain: Students explain how climate and natural processes influence human systems. Direct instruction clarifies climate drivers, feedbacks, and Earth system interactions.
- Honors Level - Elaborate: Students analyze how changes in climate systems affect human populations, agriculture, and resource availability.

Human Impacts on Ecosystems and Biodiversity

- Engage: Present phenomena such as ecosystem change or food system innovation (e.g., Growing Power: An Urban Food Oasis) to prompt inquiry.
- Explore: Students analyze case studies and data related to human impacts on ecosystems, including land use, agriculture, and resource extraction.
- Explain: Students explain how human activities impact biodiversity and ecosystem stability. Direct instruction clarifies key impact mechanisms and system responses.
- Honors Level - Elaborate: Students evaluate strategies for conservation, sustainable agriculture, and ecosystem management.

Sustainability and Environmental Decision-Making

- Engage: Introduce decision-making scenarios and case studies (e.g., Colorado River Study, global sustainability comparisons) to frame real-world problems.

- Explore: Students investigate sustainability practices, policies, and economic tools used to address environmental challenges.
- Explain: Students explain how tradeoffs influence environmental decisions. Direct instruction clarifies cost-benefit analysis, policy, and sustainability frameworks.
- Honors Level - Elaborate: Students evaluate and compare solutions to environmental problems using evidence and defined criteria.

Differentiation: Intervention/Enrichment Options: Instruction is differentiated through scaffolded modeling, data analysis, and investigation tasks to support all learners.

Intervention:

- Scaffold content through vocabulary support, guided notes, graphic organizers, and models.
- Provide structured investigations, teacher-guided data analysis, and frequent formative feedback.
- Use simulations, visuals, modified datasets, and flexible pacing to support understanding.

Enrichment:

- Extend learning through independent research, student-designed investigations, and analysis of additional datasets.
- Apply advanced quantitative models, digital simulations, and evidence-based evaluation of scientific claims.
- Connect to policy, engineering, sustainability, climate forecasting/scenario analysis.

For Language Development:

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Teach only essential vocabulary (as indicated in knowledge section).
- Pre-teach vocabulary or have the ELD teacher pre-teach it if possible.

Central Bucks School District – Course of Study – Environmental Science

Unit 4 – Environmental Literacy and Action

Desired Results:

Essential Questions:

- How can investigating local environmental issues lead to informed solutions?
- How do human actions and policies affect sustainability and environmental equity?
- How can evidence be used to propose and justify solutions to environmental problems?

Enduring Understandings:

Students will understand that...

- Environmental literacy requires applying scientific knowledge to real-world problems and decisions.
- Investigation of local environmental issues can inform broader regional and global understanding.
- Sustainable solutions require balancing environmental, social, and economic considerations.
- Data-driven decision-making supports responsible environmental stewardship and policy development.
- Environmental justice and equity influence access to resources and exposure to environmental risks.

Knowledge:

Students will know...

- Scientific understanding of Earth systems, ecosystems, and human impacts developed in Units 1–3
- Methods for investigating environmental issues, including data collection, modeling, and research
- Principles of sustainability, environmental policy, and decision-making frameworks
- How multiple perspectives, including social and cultural factors, influence environmental decisions

Skills:

Students will be able to...

- Plan and conduct an investigation of a local environmental issue
- Gather, evaluate, and synthesize information from multiple sources
- Analyze quantitative and qualitative data to identify patterns and relationships
- Develop and justify evidence-based solutions to environmental problems
- Evaluate solutions using criteria such as cost, impact, and equity
- Communicate findings and recommendations clearly through written, visual, or oral formats
- Apply systems thinking to explain complexity and predict unintended consequences

Priority Standards:

3.3.9-12.Q: Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. Assessment Boundary: Assessment for computational simulations is limited to using provided multi-parameter programs or constructing simplified spreadsheet calculations.

Assessment Boundary: N/A

3.4.9-12.A: Analyze and interpret how issues, trends, technologies, and policies impact agricultural, food, and environmental systems and resources

3.4.9-12.B: Apply research and analytical skills to evaluate the conditions and motivations that lead to conflict, cooperation, and change among individuals, groups, and nations.

3.4.9-12.C: Analyze and interpret how issues, trends, technologies, and policies impact watershed and water resources.

3.4.9-12.D: Apply research and analytical skills to systematically investigate environmental issues ranging from local issues to those that are regional or global in scope.

3.4.9-12.E: Plan and conduct an investigation utilizing environmental data about a local environmental issue.

3.4.9-12.F: Evaluate and communicate the effect of integrated pest management practices on indoor and outdoor environments.

3.4.9-12.G: Analyze and evaluate how best resource management practices and environmental laws achieve sustainability of natural resources

3.4.9-12.H: Design and evaluate solutions in which individuals and societies can promote stewardship in environmental quality and community well-being.

3.4.9-12.I: Analyze and interpret data on regional environmental conditions and its implications on environmental justice and social equity.

Supporting Standards:

CC.3.5.9-12.A: Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

CC.3.6.9-12.B: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

CC.3.6.9-12.H: Draw evidence from informational texts to support analysis, reflection, and research.

Acceptable Evidence:

Performance Tasks:

- Scientific Writing
- Problem Solving Activities
- Real-world Application

Formative Assessment:

- Learning Checks
 - Warm-ups
 - Closure/ Exit Tickets

Summative Assessment:

- Environmental Literacy and Action Capstone Project- District Common Unit Summative Assessment

Suggested Learning Experiences and Instruction

Learning Experiences:

Students will:

- Identify and investigate a local environmental issue connected to Earth systems, ecosystems, and human impacts.
- Develop and refine research questions to guide investigation of environmental problems and their causes.
- Gather, evaluate, and synthesize information from multiple credible sources, including scientific data, case studies, and policy perspectives.
- Analyze quantitative and qualitative data to identify patterns, relationships, and system interactions.
- Apply systems thinking to explain how environmental, social, and economic factors interact within the issue.
- Evaluate how human actions, policies, and resource use influence environmental outcomes and equity.
- Develop evidence-based solutions that address the environmental issue and consider sustainability and feasibility.
- Evaluate tradeoffs among environmental, economic, and social factors when comparing potential solutions.
- Communicate findings and recommendations using data, models, and evidence to support claims.
- Justify proposed solutions using scientific reasoning, sustainability principles, and consideration of multiple perspectives.

Instructional Strategies: Instruction in this unit is grounded in project-based, phenomena-driven learning and structured using the 5E Learning Cycle to support investigation, analysis, and application of environmental literacy.

- Engage: Students are introduced to local or regional environmental issues and relevant examples to generate questions and define a focus for investigation.
- Explore: Students conduct research, gather and analyze data, and investigate the causes, impacts, and systems associated with the issue using multiple sources and methods.

- **Explain:** Students construct evidence-based explanations of the issue and its underlying system interactions. Direct instruction supports research methods, data analysis, systems thinking, and environmental policy concepts.
- **Honors Level - Elaborate:** Students extend their understanding by evaluating potential solutions, analyzing tradeoffs, and refining proposals based on environmental, economic, and social criteria.

Differentiation: Intervention/Enrichment Options: Instruction is differentiated through scaffolded modeling, data analysis, and investigation tasks to support all learners.

Intervention:

- Scaffold learning through vocabulary support, graphic organizers, guided research and investigations, structured data analysis, and teacher feedback.
- Provide small-group instruction, curated resources, project checkpoints, and flexible supports to strengthen scientific reasoning, systems thinking, and communication skills.

Enrichment:

- Extend learning through advanced data analysis, independent research, systems modeling, and evidence-based evaluation of environmental issues and solutions.
- Apply learning to authentic environmental challenges through solution design, stakeholder analysis, and communication of recommendations.

For Language Development:

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Teach only essential vocabulary (as indicated in knowledge section).
- Pre-teach vocabulary or have the ELD teacher pre-teach it if possible.

CENTRAL BUCKS SCHOOL DISTRICT
Course of Study
Recommendation for Adoption

Course: Academic Environmental Science, Honors Environmental Science

Date: 09-03-2026

Student Level: Academic and Honors

Grade Level: Grade 9

Characterization of Course of Study:

Environmental Science introduces students to the complex and interconnected systems that shape our planet. Students begin by exploring the geosphere, hydrosphere, and atmosphere, gaining a foundational understanding of Earth's systems and how they interact. The course then examines the importance of sustaining these systems, emphasizing natural resources, human impact, and conservation strategies. Students investigate relationships between organisms and their environments, focusing on energy flow, biodiversity, population dynamics, and environmental literacy. Throughout the course, students engage in hands-on investigations and real-world problem solving, developing critical thinking skills, and a deeper understanding of Earth's systems and their environment.

Reasons for Proposed Adoption:

With the full implementation of Pennsylvania's new STEELS standards, it was essential to adopt updated science resources that aligned with the newly revised Earth Science and Environmental Literacy and Sustainability standard. After a thorough review of multiple resources, the Environmental Science team recommended using a combination of the National Geographic Environmental Science and Biozone Earth and Space Science resources to support learning in the Environmental Science course. This combination provides a cohesive and engaging learning experience, offers strong support for diverse learners, and best meets the instructional needs of Central Bucks teachers and students. This course document aligns instruction to the new resources that will be used to teach these standards starting in the 2026 – 2027 school year.

Principal Approval Date: _____

Curriculum Committee Approval Date: _____

School Board Approval Date: _____