CENTRAL BUCKS
SCHOOL DISTRICT

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

Table of Contents

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.”	

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-22.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.
- **T**he 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.