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.
    - 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 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.
- **T**hat 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.
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:

- 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.