



QUEST

Course Level: Elementary

Grade: 1

Time/Credit: 40 minutes per week

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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. 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	10 days
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.
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- 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.