

Pequea Valley School District
STEM

Unit 1: STEM Selfie

Course: STEM 6

Grade: 6

Planning the Focus Based on the Desired Result
What do you want all students to know, understand and do by the end of the unit?

Unit Essential Question(s):

- How do I utilize my laptop to create, collaborate, communicate, and think critically?
- How do I communicate a message effectively using digital resources

Keystone Eligible Content/PA Core Standard

- **CC.1.2.6.G-** Integrate information presented in different media or formats (e.g. visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
- **CC.1.4.6.A-** Write informative/ explanatory texts to examine a topic and convey ideas, concepts, and information clearly.
- **CC.1.4.6.U-** Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.
- **CC.1.4.6.V-** Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.

Pacing: Approximate number of class sessions per unit

- 9

Tier 3 Vocabulary (Content specific vocabulary)

sync, salary, median, career, cluster, average, training opportunity, research, citation

Know - What do students need to **know** in order to be able to do and understand? *List concepts, such as facts, formulas, key vocabulary and knowledge “nuggets”.*

- Know job descriptions as basic duties of the job
- Jobs have a variety of qualifications in terms of types of education and experience in different fields/tools/technologies.
- Jobs offer a variety of ways of compensation, including further education, salary, health care, and other opportunities.
- Know how to use iWork tools (keynote and pages) and other publication applications to produce content and media.
- Research a topic by asking questions about the topic during brainstorming.

Understand - What do students need to **understand**? What is the **big idea**? *List broad concepts or “big ideas” in a statement of enduring understanding.*

- Many careers require integrating STEM related principles.
- Career searching includes many elements to analyze, including personal expertise, interest, experience, salary, and willingness of educational pursuits and/or goals.
- Creating a presentation involves effective planning and analyzing of information for big ideas and themes.

Learning Outcome - What do students need to be able to **accomplish** by the unit’s end? *List skills and competencies.*

- Students will complete a research paper on a STEM Related career based on their career cruising personal test. Research includes job descriptions and expectations, salary, schooling and training, and why they personally would pursue this career.
- Students will create a presentation and speak about the major tenets of their career research.

Assessments:

- Project Rubric- STEM Selfie Pages Document
- Project Rubric- STEM Selfie Keynote Project

Software/Resources:

- iWork Suite - Pages, Keynote
- Laptop
- Internet access
- career cruising accounts for all students

Pequea Valley School District
STEM

Unit 2: Hack My Class

Course: STEM 6

Grade: 6

Planning the Focus Based on the Desired Result
What do you want all students to know, understand and do by the end of the unit?

Unit Essential Question(s):

- What steps do I take to create a solution that solves a problem?

Keystone Eligible Content/PA Core Standard

- CC.2.4.4.A.1- Solve problems involving measurement and conversions from a larger unit to a smaller unit.

Pacing: Approximate number of class sessions per unit

- 12

Tier 3 Vocabulary (Content specific vocabulary)

- Ask, Imagine, Plan, Create, Improve, Prototype, invention, innovation, brainstorming, constraints, engineer,

Know - What do students need to **know** in order to be able to do and understand? *List concepts, such as facts, formulas, key vocabulary and knowledge “nuggets”.*

- Know the steps of the Engineering Design Process
- Know the rules of brainstorming

Understand - What do students need to **understand**? What is the **big idea**? *List broad concepts or “big ideas” in a statement of enduring understanding.*

- Inventions and innovations to objects and systems are created by utilizing the Engineering Design Process.
- There are positives and negatives to all considerations in the design of inventions and innovations.
- The engineering design process is a fluid and iterative process where students revisit steps in the process.

Learning Outcome - What do students need to be able to **accomplish** by the unit’s end? *List skills and competencies.*

- Students will be able to describe each of the steps of the Engineering design process as it pertains to their invention.
- Students will show evidence of the steps of the design process as it pertains to their invention.

Assessments:

- Prototype
- Hack My Class document

Software/Resources:

- consumable materials (various)
- tools for manipulating materials (cardboard cutters, glue, hot glue guns, carpenter squares, rulers, etc.)
- laptop

Pequea Valley School District
STEM

Unit 3: EV3 Robotics

Course: STEM 6

Grade: 6

Planning the Focus Based on the Desired Result
What do you want all students to know, understand and do by the end of the unit?

Unit Essential Question(s)

- How do I create algorithms and code to solve problems?

Keystone Eligible Content/PA Core Standard

1. **CC.2.1.6.D.1-** Understand ratio concepts and use ratio reasoning to solve problems.
2. **CC.2.1.6.E.2-** Identify and choose appropriate processes to compute fluently with multi-digit numbers.
3. **CC.2.2.6.B.1-** Apply and extend previous understandings of arithmetic to algebraic expressions.
4. **CC.2.2.6.B.2-** Understand the process of solving a one-variable equation or inequality and apply to real-world and mathematical problems.

Pacing: Approximate number of class sessions per unit

- 16

Tier 3 Vocabulary (Content specific vocabulary)

- rotation, pi, algorithm, sequence, circumference, radius, diameter, proportion, loop, condition

Know - What do students need to **know** in order to be able to do and understand? *List concepts, such as facts, formulas, key vocabulary and knowledge “nuggets”.*

- Use a formula to find the circumference of a circle. $2\pi*r$
- Convert a distance to the number of rotations in a program.
- Complete experiments using coding to identify the speed of a robot.
- Find and make appropriate measurements/calculations to create an algorithm that solves a problem using a robot.

Understand - What do students need to **understand**? What is the **big idea**? *List broad concepts or “big ideas” in a statement of enduring understanding.*

- Understand that the engineering design process involves all fields of STEM in order to solve problems.
- Understand that computers follow coded algorithms in sequence.
- Understand that scientists use measurements to solve problems
- Proportions and ratios can be applied to solve real-world problems and contexts.

Learning Outcome - What do students need to be able to **accomplish** by the unit's end? *List skills and competencies.*

- Students need to create algorithms that solve problems that involve coding within 2 turns and 6 blocks of code.
- Students need to reflect on initial code attempts and communicate the changes to the code to make it successful.

Assessments:

- STEM City Stories doc.

Software/Resources:

1. EV3 Software- 1 per laptop
2. class set of laptops
3. Ev3 Mindstorms kits (12)