Course Overview

Elementary School | STEM | 2nd grade - *Last Updated on September 8, 2025*

DESCRIPTION

K-12 Content Area | Mission & Philosophy Statement

Mission Statement

Our mission is to nurture curiosity, creativity, and problem-solving skills in young learners by engaging them in hands-on engineering and computer science projects. Through collaborative challenges and the **Engineering Design Process**, we empower students to explore how science and technology intersect with the natural world and human needs, inspiring them to become innovative thinkers and compassionate problem solvers.

Philosophy Statement

We believe that learning is most meaningful when students actively investigate real-world problems and design creative solutions. By fostering teamwork, resilience, and iterative thinking, we help students develop confidence in their abilities to tackle challenges.

In units like **Engineering Pumpkin Pollinators**, **Creating Animations**, and **Engineering Bandages**, students connect scientific concepts with practical design, discovering how engineering impacts both ecosystems and everyday life. We emphasize the importance of empathy and functionality, encouraging learners to consider how their designs can support living things and improve well-being.

Our approach cultivates not only technical skills but also social-emotional growth, preparing students to be thoughtful innovators who contribute positively to their communities and the world.

Course Description

STEM Engineering & Creative Design

This engaging course invites students to explore engineering and computer science concepts through three interactive, hands-on units: **Engineering Pumpkin Pollinators**, **Creating Animations**, and **Engineering Bandages**. Each unit integrates the **Engineering Design Process**, fostering creativity, problem-solving, and collaboration.

Engineering Pumpkin Pollinators

Students learn why pollination is essential for plants and how bees help transfer pollen between flowers. Working in pairs, they design, build, and refine hand pollinators to move pollen from one flower to another. They apply their knowledge of pollination and material properties to create effective, tested solutions.

Creating Animations

Through age-appropriate activities, discussions, and readings, students explore the world of computer animation. They use the **Engineering Design Process** to design and produce an animation that communicates an idea about animals, blending creativity with technical skills.

Engineering Bandages

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Students work together to design and test bandages that cover and protect a model cut. They investigate how different parts of a bandage work together and how materials and design choices influence performance. Using what they learn, they create and refine innovative solutions.

Course Benefits

Across all units, students:

- Apply the **Engineering Design Process** from concept to final product.
- Build foundational knowledge in science, engineering, and computer science.
- Strengthen collaboration, creativity, and critical thinking skills.

By the end of the course, students understand how engineers and designers use creativity and problem-solving to improve everyday life and the natural world.

STANDARDS

Pennsylvania - Grade 2 - Science, Technology & Engineering, And Environmental Literacy & Sustainability Standards (STEELS) (2023)

3.1.2.B 3.2.2.A 3.2.2.B 3.4.K-2.D 3.5.K-2.B 3.5.K-2.C 3.5.K-2.K 3.5.K-2.L

3.5.K-2.M 3.5.K-2.N 3.5.K-2.O 3.5.K-2.P 3.5.K-2.Q 3.5.K-2.S 3.5.K-2.T 3.5.K-2.U

3.5.K-2.V 3.5.K-2.X 3.5.K-2.AA 3.5.K-2.DD 3.5.K-2.E 3.5.K-2.F 3.5.K-2.G

3.5.K-2.H 3.5.K-2.I 3.5.K-2.J

Pennsylvania - Grade K-2 - Computer Science

1A.CS.01 1A.DA.05 1A.AP.08 1A.AP.10 1A.AP.11 1A.AP.12 1A.AP.14 1A.AP.15

COURSE OBJECTIVES

Specific objectives for this course are aligned to the Pennsylvania Science, Technology, & Engineering, Environmental Literacy & Sustainability (STEELS) as well as the Pennsylvania Computer Science standards.

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ASSESSMENT TYPES

- Journal check
- Pre-assessment
- Post-assessment
- Exit ticket
- Peer-to-peer feedback (informal)
- Final project assessment (using a rubric)
- Informal teacher-to-student questioning
- Informal observation of student work
- Formative assessments
- Summative assessment

SUGGESTED METHODS OF INSTRUCTION

- Direct instruction
- Inquiry Based Learning
- Cooperative learning
- Story-Based Learning
- Project-Based Learning

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RESOURCES

District Approved Program Resources	District Approved Supplemental Resources	District Approved Technology Resources
• Youth Engineering Solutions. (2023). *Engineering Pumpkin Pollinators.* Boston Museum of Science. https://yes.mos.org/unit/engineering-pumpkin-pollinators/ • Youth Engineering Solutions. (2023). *Creating Animations.* Boston Museum of Science. https://yes.mos.org/unit/computer-science-essentials-creating-animations/ • Youth Engineering Solutions. (2023). *Engineering Bandages.* Boston Museum of Science. https://yes.mos.org/unit/engineering-bandages/		