Course Overview

Elementary School | STEM | Kindergarten - *Last Updated on September 8, 2025*

DESCRIPTION

K-12 Content Area | Mission & Philosophy Statement
Mission Statement Our mission is to inspire young learners to become curious problem-solvers who use science, engineering, and creativity to improve their world. Through engaging, hands-on experiences, we empower Kindergarten students to explore how people, technology, and the environment are connected—and to imagine solutions that make a positive impact on their communities and planet. **Philosophy Statement** We believe that children learn best through active exploration, collaboration, and purposeful play. By guiding students through the **Engineering Design Process**, we nurture both critical thinking and creativity, helping them see themselves as capable engineers from the very start of their education. Our approach integrates real-world environmental challenges—such as reducing waste, protecting habitats, and staying safe in the sun—into developmentally appropriate projects that encourage persistence, teamwork, and responsible citizenship. In our Kindergarten STEM program, every project is an opportunity for students to: • Investigate how the world works through observation and experimentation. • Design and improve solutions that address authentic needs. • Build empathy for others and the environment through thoughtful engineering. Our philosophy is simple: when children understand that their ideas can make a difference, they gain the confidence, skills, and mindset to become lifelong learners and innovators.

Course Description
Kindergarten STEM: Engineering for a Better World This engaging Kindergarten STEM course introduces young learners to the foundations of engineering, problem-solving, and environmental stewardship through three hands-on units: **Engineering Sun Hats**, **Designing Trash Collectors**, and **Programming Robots to Recycle**. **Engineering Sun Hats** Students explore how sunlight warms the Earth and how shade can keep us cooler. They investigate materials that block sunlight, then use the Engineering Design Process to create and improve a sun hat that meets their personal needs. This unit builds understanding of form, function, and how engineers design solutions to everyday problems. **Designing Trash Collectors** Students learn about the environmental impact of human-made trash and how technology can help protect

ecosystems. They work to engineer a device that removes trash from a model pond while keeping water loss to a minimum. Along the way, they apply the Engineering Design Process, test and refine their ideas, and connect their work to topics such as animal habitats, recycling, and environmental stewardship.

Programming Robots to Recycle

In this unit, students discover how recycling reduces human impact on the environment and how robots can help with repetitive tasks. They design and improve simple programs—sometimes using classmates as "robots"—to simulate cleaning up a park efficiently. Collaboration, persistence, and problem-solving are emphasized throughout the process.

Course Benefits

Across all three units, students:

- Develop foundational engineering skills through the **Engineering Design Process**.
- Build early science knowledge about sunlight, ecosystems, recycling, and human impact on the environment.
- Strengthen social-emotional skills including teamwork, creativity, and perseverance.

By the end of the course, students will see themselves as problem-solvers who can use science and engineering to make the world a better place.

STANDARDS

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

3.1.K.A · 3.2.K.D · 3.3.K.B · 3.5.K-2.B · 3.5.K-2.C · 3.5.K-2.G · 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.V · 3.5.K-2.AA · 3.5.K-2.DD · 3.3.K.C · 3.3.K.E

3.4.K-2.D · 3.5.K-2.D · 3.5.K-2.E · 3.5.K-2.F · 3.5.K-2.J · 3.5.K-2.K · 3.5.K-2.T · 3.5.K-2.U

3.5.K-2.X

Pennsylvania - Grade K-2 - Computer Science

1A.AP.08 · 1A.AP.10 · 1A.AP.11 · 1A.AP.14

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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.

ASSESSMENT TYPES

- 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

RESOURCES

District Approved Program Resources	District Approved Supplemental Resources	District Approved Technology Resources
• Youth Engineering Solutions. (2023). *Engineering sun hats*. Boston Museum of Science. https://yes.mos.org/unit/engineering-sun-hats/ • Youth Engineering Solutions. (2023). *Engineering Trash Collectors*. Boston Museum of Science. https://yes.mos.org/unit/engineering-trash-collectors/ • Youth Engineering Solutions. (2023). *Programming Robots to Recycle*. Boston Museum of Science. https://yes.mos.org/unit/sort-it-out-programming-robots-to-recycle/		