Course Overview

Elementary School | STEM | 3rd grade - *Last Updated on September 8, 2025*

DESCRIPTION

K-12 Content Area | Mission & Philosophy Statement
Mission Statement Our mission is to inspire young learners to explore the intersection of engineering and automation through hands-on, collaborative projects that challenge them to design solutions for real-world problems. Using the **Engineering Design Process**, we empower students to develop creativity, critical thinking, and technical skills that build confidence as innovative problem solvers. **Philosophy Statement** We believe that meaningful learning happens when students actively engage in designing, building, and testing solutions to practical challenges. Our approach emphasizes collaboration, resilience, and iterative improvement, helping students understand that failure is part of the path to success. Through units like **Building Automated Systems**, **Engineering Rescue Shuttles**, and **Engineering Magnetic Dog Doors**, students connect scientific principles—such as automation, physics, and magnetism—to tangible engineering problems that impact safety and daily life. We prioritize fostering curiosity, empathy, and a growth mindset, preparing students to become thoughtful innovators who positively impact their communities and beyond.

Course Description
STEM Engineering & Automation This hands-on course introduces students to fundamental engineering and computer science concepts through three engaging units: **Building Automated Systems**, **Engineering Rescue Shuttles**, and **Engineering Magnetic Dog Doors**. Each unit emphasizes collaboration, creativity, and problem-solving through the **Engineering Design Process**. **Building Automated Systems** Students explore computer-controlled automated systems and learn how inputs and outputs can be used to improve safety and efficiency at home. Through activities and discussions, they design and build automated systems that solve real-world problems. **Engineering Rescue Shuttles** Working in teams, students design and test rescue shuttles that must land near a person in need of water rescue. They investigate how different shuttle variables affect flight distance and use their findings to create effective, safe designs. **Engineering Magnetic Dog Doors** Students collaborate to engineer a magnetic door system for a dog shelter. The system must allow dogs wearing magnetic collars to enter while keeping other animals out. By applying their understanding of

magnetic attraction and repulsion, students design, test, and refine their solutions.

Course Benefits

Throughout the course, students:

- Apply the **Engineering Design Process** to design, test, and improve solutions.
- Develop foundational skills in engineering, automation, and physics.
- Enhance teamwork, creativity, and critical thinking.

By course end, students gain confidence as young engineers ready to tackle everyday challenges with innovation and purpose.

STANDARDS

Pennsylvania Common Core - Grade 3 - Mathematics

CC.2.4.3.A.1 CC.2.4.3.A.4

Pennsylvania - Grade 3 - Science, Technology & Engineering, And Environmental Literacy & Sustainability Standards (STEELS) (2023)

3.2.3.A 3.2.3.B 3.2.3.C 3.2.3.D 3.5.3-5.C 3.5.3-5.G 3.5.3-5.I 3.5.3-5.J

3.5.3-5.K 3.5.3-5.L 3.5.3-5.M 3.5.3-5.N 3.5.3-5.Q 3.5.3-5.R 3.5.3-5.S 3.5.3-5.T

3.5.3-5.U 3.5.3-5.W 3.5.3-5.A 3.5.3-5.B 3.5.3-5.O 3.5.3-5.P 3.5.3-5.BB 3.5.3-5.CC

Pennsylvania - Grade 3 - Science and Technology and Engineering

3.4.3.C1

Pennsylvania - Grade 3-5 - Computer Science

1B.CS.01 1B.CS.02 1B.AP.08 1B.AP.09 1B.AP.10 1B.AP.12 1B.AP.15 1B.AP.16

COURSE OBJECTIVES

Specific objectives for this course are aligned to the Pennsylvania Science, Technology, & Engineering, Environmental Literacy & Sustainability (STEELS) standards, Common Core Mathematics standards, Science, Technology and Engineering standards, 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

RESOURCES

District Approved Program Resources	District Approved Supplemental Resources	District Approved Technology Resources
• Youth Engineering Solutions. (2023). *Engineering Magnetic Dog Doors.* Boston Museum of Science. https://yes.mos.org/unit/engineering-magnetic-dog-doors/ • Youth Engineering Solutions. (2023). *Engineering Rescue Shuttles.* Boston Museum of Science. https://yes.mos.org/unit/engineering-rescue-shuttles/ • Youth Engineering Solutions. (2023). *Building Automated systems.* Boston Museum of Science. https://yes.mos.org/unit/computer-science-essentials-building-automated-systems/		