



Northern York County School District

Curriculum Overview

Course: 5th Grade Discovery

Grade Level: 5

Development/Revision Date: January 2025

Length of Time: 30 Days

Course Description:

This course offers an in-depth examination of the engineering design process, emphasizing the identification and evaluation of effective solutions to real-world problems. Students will engage in research and hands-on testing to determine the best solutions, learning to identify failure points and challenges in existing designs, which will then be used as opportunities for improvement.

Also, students will understand the intricate relationships between technology, engineering, science, and other content areas, and how these connections influence design and problem-solving. Throughout the course, students will develop critical thinking while working collaboratively on practical projects to apply their knowledge. This course is aligned to the Pennsylvania STEELS State Standards and the fifth grade STEELS PSSA (Pennsylvania System of School Assessment).

Course Objectives:

- Determine which tested solution best solves a problem
- Research and test possible solutions
- Identify failure points or challenges in designs, leading to opportunities for improvement
- Identify, evaluate, and compare multiple solutions to resolve problems
- Understand the relationships between technology, engineering, science, and other content areas

Related Standards:

Pennsylvania STEELS State Standards

- **3.5.3-5.N** Identify why a product or system is not working properly.
- **3.5.3-5.B** Examine information to assess the trade-offs of using a product or system.
- **3.5.3-5.J** Explain how technologies are developed or adapted when individual or societal needs and wants change.
- **3.5.3-5.EE** Explain how solutions to problems are shaped by economic, political, and cultural forces.
- **3.5.3-5.T** Apply universal principles and elements of design.
- **3.5.3-5.Z** Create a new product that improves someone's life.
- **3.5.3-5.GG** Describe the unique relationship between science and technology, and how the natural world can contribute to the human-made world to foster innovation.
- **3.5.3-5.HH** Differentiate between the role of scientists, engineers, technologists, and others in creating and maintaining technological systems.

- **3.5.3-5.X** Explain how various relationships can exist between technology and engineering and other content areas.
- **3.5.3-5.M** Demonstrate essential skills of the engineering design process.
- **3.5.3-5.I** Design solutions by safely using tools, materials, and skills.
- **3.5.3-5.R** Apply tools, techniques, and materials in a safe manner as part of the design process.
- **3.5.3-5.P** Evaluate the strengths and weaknesses of existing design solutions, including their own solutions.
- **3.5.3-5.C** Can follow directions to complete a technological task.
- **3.5.3-5.A** Can use appropriate symbols, numbers and words to communicate key ideas about technological products and systems.
- **3.5.3-5.U** Can evaluate designs based on criteria, constraints, and standards.

Units:

- Computer Science Essentials
- Engineering Design Process
- Engineering Practices

Concepts:

- **DESIGN IN TECHNOLOGY AND ENGINEERING EDUCATION** - Effective design involves understanding constraints and criteria, testing solutions for performance, collaborating with peers to enhance ideas, and developing skills and vocabulary to evaluate and improve designs.
- **NATURE AND CHARACTERISTICS OF TECHNOLOGY AND ENGINEERING** - Scientists, engineers, and technologists collaborate by leveraging their unique expertise to transform raw materials into tools and products that meet human needs, while considering constraints and criteria during the design and testing process to improve solutions.
- **APPLYING, MAINTAINING, AND ASSESSING TECHNOLOGICAL PRODUCTS AND SYSTEMS** - Technological systems and products do not last forever. It is important to identify why the technology is not working, what could be a logical explanation, and what is the easiest solution to address the problem.
- **INFLUENCE OF SOCIETY ON TECHNOLOGICAL DEVELOPMENT** - When something changes in the environment, technologies are developed in response to the new conditions. Engineers improve existing technologies by designing and

Competencies:

- Explores new technologies and formulates strategies for the enhancement of existing concepts.
- Employs grade-appropriate tools, materials, and processes safely in the construction of projects.
- Demonstrates proficiency in locating and utilizing resources to effectively address technological inquiries.
- Participates in iterative design processes to refine and improve products through hands-on experimentation.
- Enhances written and oral communication skills for the effective articulation of ideas and information.
- Illustrates the interconnections among human-designed products and their implications in various contexts.
- Analyzes ethical dilemmas associated with technology, including the evaluation of trade-offs.
- Collaborates effectively in small groups to successfully complete design-based projects.

<p>creating to meet new constraints and requirements.</p> <ul style="list-style-type: none"> • CORE CONCEPTS OF TECHNOLOGY AND ENGINEERING - Inventions arise to meet human needs and improve the natural world, and their success depends on research, testing against criteria and constraints, and collaboration to enhance designs. • INTEGRATION OF KNOWLEDGE, TECHNOLOGIES, AND PRACTICES - Science studies the natural world, technology changes the environment to meet human needs, and engineering creates or alters technologies, all of which can be taught through hands-on projects that help students understand these concepts. 	
<p>Learning Activities:</p> <ul style="list-style-type: none"> • Ask questions and define problems • Plan and carry out investigations • Engage in argument from evidence • Develop and use models • Analyze and interpret data • Construct explanations and design solutions • Obtain, evaluate, and communicate information • Use math and computational thinking 	<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Formative assessments such as student discussion, questioning, peer collaborative activities, reflections, and projects.
<p>Other Assessment Measures:</p> <ul style="list-style-type: none"> • SeeSaw portfolio 	
<p>Textbook/Primary Resource:</p> <p>Engineering is Elementary. (2024). <i>Engineering is elementary (2nd ed.)</i>. Youth Engineering Solutions.</p>	
<p>Supplemental Resource Materials:</p>	