

Wallenpaupack Area School District Planned Course Curriculum Guide

BCIT

STEM 8

Course Description:

The middle school STEM course introduces students to the fundamental concepts of science, technology, engineering, and mathematics through engaging hands-on projects and experiments. Students will develop critical thinking skills, problem-solving abilities, and teamwork through activities that emphasize real-world applications of STEM principles. This course aims to inspire curiosity, creativity, and a lifelong passion for STEM fields.

Initial Creation Date (if applicable) and Revision Dates:

Written 4/15/24

Wallenpaupack Area School District Curriculum	
COURSE: STEM	GRADE/S: 8
UNIT 1: Science	TIMEFRAME: 5 days

<p>PA COMMON CORE/NATIONAL STANDARDS:</p> <p>3.2.8.A1 – Differentiate between mass and weight.</p> <p>3.2.8.B1 – Explain how inertia is a measure of an object’s mass. Explain how momentum is related to the forces acting on an object.</p> <p>3.2.8.B2 – Identify situations where kinetic energy is transformed into potential energy, and vice versa.</p> <p>3.2.8.B6 – Explain how physics principles underlie everyday phenomena and important technologies.</p> <p>3.4.8.E6 – Analyze the steps involved in the manufacturing process (e.g., design, development, production, marketing and servicing of products and systems).</p> <p>3.4.8.E7 – Analyze factors that determine structural design (e.g., building laws and codes, style, convenience, cost, climate, and function).</p>
<p>UNIT OBJECTIVES (SWBATS):</p> <ul style="list-style-type: none"> • Explain basic physics terms. • Apply physics knowledge to the design of their projects. • Demonstrate how physics principles underlie everyday phenomena and important technologies. • Identify laws and codes that regulate structural design. • Work independently as well as in a group to problem solve and communicate through a task.
<p>INSTRUCTIONAL STRATEGIES/ACTIVITIES:</p> <ul style="list-style-type: none"> • Projects • Video • Presentations • Internet Resources
<p>ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):</p> <ul style="list-style-type: none"> • Projects • Classwork • Quizzes
<p>DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment): Appropriate accommodations based on the student’s IEP/504 Plan and/or student ability.</p>
<p>RESOURCES (Technology Based Resources, Text Resources, etc.):</p> <ul style="list-style-type: none"> • Computers • TV Display • Internet • Project Supplies (miscellaneous items)
<p>KEY VOCABULARY: Gravity, mass, energy, momentum, force, inertia, motion, Newton’s Law of Motion, velocity, acceleration/deceleration, design, engineering, physics, speed, velocity, potential energy, kinetic energy, centripetal force, friction</p>

Wallenpaupack Area School District Curriculum	
COURSE: STEM	GRADE/S: 8
UNIT 2: Technology	TIMEFRAME: 5 days

<p>PA COMMON CORE/NATIONAL STANDARDS:</p> <p>3.2.8.A3 – Explain how changes in matter are accompanied by changes in energy.</p> <p>3.4.8.B3 – Explain how throughout history, new technologies have resulted from the demands, values, and interests of individuals, businesses, industries, and societies.</p> <p>3.4.8.B4 – Explain how societal and cultural priorities and values are reflected in technological devices.</p> <p>3.4.8.C1 – Evaluate the criteria and constraints of a design.</p> <p>3.4.8.C3 – Analyze how a multi-disciplinary (STEM) approach to problem solving will yield greater results.</p> <p>3.4.8.E6 – Analyze the steps involved in the manufacturing process (e.g., design, development, production, marketing and servicing of products and systems).</p> <p>3.2.8.B3 – Explain how changes in temperature are accompanied by changes in kinetic energy.</p> <p>3.2.8.B6 – Explain how physics principles underlie everyday phenomena and important technologies.</p> <p>3.4.8.A1 – Analyze the development of technology based on affordability or urgency.</p> <p>3.3.8.A2 – Describe renewable and nonrenewable energy resources.</p>
<p>UNIT OBJECTIVES (SWBATS):</p> <ul style="list-style-type: none"> • Explain basic physics terms. • Apply physics knowledge to the design of their projects. • Explain how and why technology has evolved over time. • Distinguish between renewable and nonrenewable resources. • Identify laws and codes that regulate air traffic. • Describe basic coding terms. • Work independently as well as in a group to problem solve and communicate through a task.
<p>INSTRUCTIONAL STRATEGIES/ACTIVITIES:</p> <ul style="list-style-type: none"> • Projects • Video • Presentations • Internet Resources
<p>ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):</p> <ul style="list-style-type: none"> • Projects • Classwork • Quizzes
<p>DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment): Appropriate accommodations based on the student’s IEP/504 Plan and/or student ability.</p>
<p>RESOURCES (Technology Based Resources, Text Resources, etc.):</p> <ul style="list-style-type: none"> • Computers • TV Display • Internet • Project Supplies (miscellaneous items)
<p>KEY VOCABULARY: Text coding, block coding, physics, flight dynamics, flight, lift, drag, roll, yaw, gravity, thrust, renewable/nonrenewable resources</p>

Wallenpaupack Area School District Curriculum	
COURSE: STEM	GRADE/S: 8
UNIT 3: Engineering	TIMEFRAME: 5 Days

<p>PA COMMON CORE/NATIONAL STANDARDS:</p> <p>3.2.8.A1 – Differentiate between mass and weight.</p> <p>3.2.8.A6 – Explain the importance of accuracy and precision in making valid measurements.</p> <p>3.4.8.C1 – Evaluate the criteria and constraints of a design.</p> <p>3.4.8.E5 – Describe how governmental regulations influence the design, operation and efficiency of transportation systems.</p> <p>3.4.8.E6 – Analyze the steps involved in the manufacturing process (e.g., design, development, production, marketing and servicing of products and systems).</p> <p>3.4.8.E7 – Analyze factors that determine structural design (e.g., building laws and codes, style, convenience, cost, climate, and function).</p>
<p>UNIT OBJECTIVES (SWBATS):</p> <ul style="list-style-type: none"> • Explain and demonstrate the importance of design in structures. • Describe the different elements of structural design. • Compare pros and cons to different building strategies. • Demonstrate the efficiency of different types of materials in the manufacturing/building process.
<p>INSTRUCTIONAL STRATEGIES/ACTIVITIES:</p> <ul style="list-style-type: none"> • Projects • Video • Presentations • Internet Resources
<p>ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):</p> <ul style="list-style-type: none"> • Projects • Classwork • Quizzes
<p>DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment): Appropriate accommodations based on the student’s IEP/504 Plan and/or student ability.</p>
<p>RESOURCES (Technology Based Resources, Text Resources, etc.):</p> <ul style="list-style-type: none"> • Computers • TV Display • Internet • Project Supplies (miscellaneous items)
<p>KEY VOCABULARY: Design, strength, engineering, tension, compression, buoyancy</p>

Wallenpaupack Area School District Curriculum	
COURSE: STEM	GRADE/S: 8
UNIT 4: Math	TIMEFRAME: 5 Days

<p>PA COMMON CORE/NATIONAL STANDARDS:</p> <p>3.1.8.A9 – Explain the importance of accuracy and precision in making valid measurements.</p> <p>3.4.8.C3 – Analyze how a multi-disciplinary (STEM) approach to problem solving will yield greater results.</p> <p>3.4.8.D3 – Interpret and evaluate the accuracy of the information obtained and determine its usefulness.</p> <p>15.2.8.D – Compare and contrast occupations in a virtual versus a traditional work environment.</p> <p>CC.2.2.8.B.2 – Understand the connections between proportional relationships, lines, and linear equations.</p>
<p>UNIT OBJECTIVES (SWBATS):</p> <ul style="list-style-type: none"> • Collect data from various experiments. • Analyze and present data collected. • Use algebraic expressions to present their findings. • Demonstrate buying and selling stocks. • Demonstrate scale. • Calculate interest.
<p>INSTRUCTIONAL STRATEGIES/ACTIVITIES:</p> <ul style="list-style-type: none"> • Projects • Video • Presentations • Internet Resources
<p>ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):</p> <ul style="list-style-type: none"> • Projects • Classwork • Quizzes
<p>DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment): Appropriate accommodations based on the student’s IEP/504 Plan and/or student ability.</p>
<p>RESOURCES (Technology Based Resources, Text Resources, etc.):</p> <ul style="list-style-type: none"> • Computers • TV Display • Internet • Project Supplies (miscellaneous items)
<p>KEY VOCABULARY: Stocks, investments, interest, statistics, proportions, scale</p>