Mount Pleasant Central School District

Engineering 1, Science/Arts

We believe that all students should have a strong understanding of science and its application to critically assess information in the modern world and make decisions to solve real-world problems.

How do engineers design (and redesign) solutions to solve problems? In this class, students will explore a variety of general engineering fields and create multiple prototypes and designs to solve problems and challenges utilizing the engineering design process. Our main goal is to have students understand that scientific engineering principles are used to design products that are functional and practical, and that the process is an iterative one and constantly improving itself. We emphasize the engineering design process to help students design thoughtful solutions and creative designs to problem-solve. Students will be assessed on their ability to apply scientific engineering principles and the engineering design process to solve challenges and problems. This will include projects that involve designing, prototyping, testing solutions, and redesigning.

Unit Title	Month	Content	Vocabulary	Standards	Skills	Big Ideas	Assessments
Title of the Unit	Month in which the unit is begun.	- No more than two key content, themes or topics that are taught in this unit of study. -	- No more than five key vocabulary or terms that are taught in this unit of study.	The most critical New York State standard taught in this unit of study. (Code)	- No more than two of the most critical performance indicators, skills, competencies or portrait qualities taught in this unit of study.	The most important takeaway that students should understand as a result of this unit of study.	The primary type of product and a very brief description of what students will be asked to complete at the end of the unit of study.
Drawing for Engineering	September	- How do engineers represent designs?	- Isometric - Orthographic - Scale - Construction	MP.4	- Draw a multitude of views of an object - Utilize isometric scale to create a 3d image of an object	Designs can be displayed and presented in a multitude of formats.	Scale Drawings Orthographic Drawings Isometric Drawings
Engineering Design Process	September	- What methods do engineers use to solve problems?	- Design - Prototype - Iterate	HS-ETS1-2	- Conduct research on a variety of topics - Design adequate	Designs are prototyped, tested, and redesigned.	Statapult

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					prototypes. - Collect appropriate data to address iterations.		
Computer Aided Design	November	- How can engineers use computers to model?	- Extrude - Rotate - Sketch	MP.4	- Dimension Sketches accurately - Turn 2D sketches into 3D projections.	Computer programs can be used to accurately design parts and prototypes.	Onshape Exercises
3d Printing	December	- How can engineers take computer models and make them 3D objects?	- STL - Scale - Level	HS-ETS1-4	- CADing unique designs - Turning CAD files into STL files	Computer designed parts can be physically created.	CAD Project
Circuitry and Breadboards	January	- How can engineers design and follow schematic drawings to create different kinds of circuitry?	- Current -Voltage and Amperes -Schematic Drawings -Open/ Close Circuit -Series/ Parallel	11-12.TST	- Creating schematic drawings -Building circuits with a breadboard -Measuring voltage	Learning to design, connect, and troubleshoot electronic circuits.	Circuitry Practical

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			Circuits		and amperes		
Arduino Coding	March	- How can engineers program and code a device to tell it what to do?	-Programming - Input/ Output -Pin/ Digital Pin -Ground -Setup/ Loop	MP.4	- Writing and editing code to program an arduino -Building circuits on a breadboard controlled by an arduino	Using simple computer code to make objects interactive and light up.	Light Sculpture
Architecture	April	- How can engineers scale model projects?	- Bird's Mouth - Sill - Stud - Gable	HS-ETS1-4	- Accurately scale models - Properly wire lighting circuits	Multiple fields of engineering are used together to design solutions.	Scale Model House