

Pequannock Township School District

Curriculum Syllabus

Technology Revolution / Grade 6

Course Description:

The Technology Revolution course is the beginning of the technology journey for our middle school students. They will be introduced to the history and development of technology and how it has affected and improved their lives and their communities. An introduction to the seven simple machines gives students a basis for understanding how many modern and complicated machines function. Students will be introduced to basic engineering drawing, the use of an architect's scale, two and three dimensional drawings, and as well as technical writing and formal presentations. Students will participate in the design and production of wood products, using simple machines, as an introduction to understanding manufacturing processes using any material. Learning the proper and safe use of hand tools, the students will be able to construct a spring/lever driven model car following the specifications contained on engineering drawings. Our sixth graders will have the all-important hands-on experiences necessary for true understanding of manufacturing and basic scientific concepts.

Course Proficiencies:

The following is a list of proficiencies that describe what students are expected to know and be able to do as a result of successfully completing this course. The following proficiencies are the basis of the assessment of student achievement. The learner will demonstrate mastery of:

1. Each student will develop the ability to be on time, focus on work at hand, and conduct him/herself in a safe manner in the lab, classroom, and tech area.
8.2.2.G.2
2. Each student will develop problem solving skills relating to understanding and using materials and processes. 8.2.8.B.1
3. Students will demonstrate appropriate safety practices in environments in this cluster to ensure a safe workplace. 9.4.12.0.44
4. Students will apply their understanding of ratios to technical drawings and sketches. 6.RP.1.

5. Each student will develop the necessary skills to follow the design process during prototype creation. MS-ETS1-1 - 4
6. Each student will analyze the interactions among various technologies and collaborate to create a product or system demonstrating their interactivity.
8.2.12.G.1
7. Students will develop presentation skills such as using appropriate eye contact, adequate volume, and clear pronunciation. SL.6.4.
8. Each student will develop skills to produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. W.6.4.
9. Students will be provided with an opportunity to study the importance of technology and how it has and will continue to influence his/her life in the future.
8.2.4.A.1
10. Students will present information written and orally in a concise, coherent manner. W.8.6
11. Students will communicate clearly and effectively and with reason. CRP4.
12. Each student will utilize critical thinking to make sense of problems and persevere in solving them. CRP8.
13. Each student will work productively in teams while using cultural global competence. CRP12.

Scope and Sequence

Unit 1 (1 Trimester Course)

As students begin the trimester in this class, there are essentials that need to be understood and mastered. The most important essential in any class, classroom or laboratory is safety. Following and understanding safety rules and why these rules are important, will help keep students from being injured. Additionally and obviously, the proper handling of equipment and supplies by the student and influencing peers to follow those same rules, he/she will control his/her own safety.

Outstanding presentations of completed work can sometimes be more important than the content of that presentation. Proper and neat lettering, neat line work, correct measurements, simplification of fractions, and presenting information verbally and written are lifelong necessary skills. All will be addressed at the beginning of every STEM subject area course at PV Middle School.

Unit 2 (1 Trimester Course)

All items created or envisioned will be first imagined and designed either electronically or on paper and then could be manufactured. This unit is the beginning of the students understanding of the world of manufacturing and production.

The Engineering Drawing Unit to the 6th grade STEM program is extremely important. Here the students will learn how to interpret and envision an object from multiple points of view and then be able to break that object down into three or more two dimensional drawings/objects. This conceptual understanding is paramount to understanding the engineering process. The students will neatly draw these three dimensional objects, provide dimensions to the drawings, and accurately read engineering designs.

Unit 3 (1 Trimester Course)

During this unit, students will learn the proper and safe use of hand tools to make a product from detailed plans using various types of wood material.

In this unit, students will apply their engineering drawing knowledge. Working from plans, students will learn how to use hand tools to individually manufacture a specified wood product. Students will use: a square, crosscut saw, coping saw, electric hand drill, hammer, chisel, circle template, wood vise, ruler, and 45 degree triangle.

Unit 4 (1 Trimester Course)

The industrial revolution jump-started the development of industrialized nations. The industrial revolution was jump started by the combination of simple machines into complex labor and time saving machines. It is important for students to have a background understanding of machines, both simple and complex, in order to be able to progress in STEM and other courses as well as understanding the world around them.

Understanding the uses and development of simple machines will give students an understanding of how engineering works through the use of physics. In order for students to develop insight into solving mechanical force problems, the understanding of simple

machines is critical. As their understanding grows they will begin to understand how the combination of simple machines into compound/complex machines is a development of the human interaction with science and the world around them.

Assessments

Evaluation of student achievement in this course will be based on the following:

- Verbal and written presentations of information and demonstration of appropriate lab conduct
- Various drawings and engineer design readings will be combined to assess learning.
- Student collaboration, ability to follow directions and the final wood manufactured product will be assessed.
- Written/oral assessments about simple machines including a mini project related to simple machines addressing a problem in the town and a final project related to simple machines addressing a problem within the school

Curriculum Resources

Anchor Programs/Teacher Materials

- Investigative subsystem packet and research websites
- 16 scale ruler
- engineering drawings (aerial views and cross sections)
- model objects (to use to create drawings)
- Various tools including, crosscut saw, hammer, chisel, portable electric drill, coping saw, circle template, ruler, pencil, wood vise, and square.
- Chromebooks for report and presentation creation

Home and School Connection

The following are suggestions and/or resources that will help parents support their children:

- Have ongoing discussions on overall lab safety and the importance of following lab rules

- Explore resources such as <https://www.mindresearch.org/stem-resources> and <https://www.edutopia.org/article/STEM-resources-downloads>
- Visit places such as the Liberty Science Center to further promote student exploration of STEM topics