Southmoreland School District
Electricity & Electronics Curriculum Overview

Electricity & Electronics Overview:

This course will give a basic understanding of electricity and home circuitry. Concepts utilized will be Ohm's Law, electrical safety, wiring, series and parallel circuits and how they relate to electrical devices. Students will build, test and analyze circuits commonly found in society. Skills will include schematic reading, board soldering and circuit prototyping.

Module Titles:

Module 1: Electricity Basics
Module 2: Alternating Current (House Wiring)
Module 3: Direct Current (DC Electronics)
- **Section 1: Batteries**
- **Section 2: Electrical Components**
- **Section 3: Ohm's Law**
- **Section 4: Series, Parallel, Series-Parallel Circuits**
- **Section 5: Soldering**

Module Overviews:

Module 1: Electricity Basics
Students will discuss various electricity production styles as well as the basic science principles behind electricity production and electrical current. Students will define the 4 electrical values of voltage, current, resistance and power, letters of expression, units and abbreviations in regards to electrical values. These form the basic build blocks to the course and will be utilized throughout the entire semester.

Module 2: Alternating Current (House Wiring)
Students will analyze household electrical circuits and develop skills in regards to installation, running cables, and hand tool usage. Focus on electrical safety will be emphasized during the entire process. Students will build example circuits and troubleshoot solutions for circuit issues.

Module 3: Direct Current (DC Electronics)
Students will learn and prototype a variety of circuits as seen in multiple DC electronics used in society. These will be broken down into sections however will build upon each other as we progress through the module. Students will identify industry based schematic symbols and begin to form the foundation of DC circuit knowledge.

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Section 1: Batteries
Students will identify various portable power sources from single use to rechargeable sources and list properties of each. These will relate to all portable electronics which require some form of power source.

Section 2: Electrical Components
Common components such as resistors, capacitors, transistors, integrated circuits, their properties and uses will be discussed. These will lead to sample prototype circuits on breadboards and formal soldering projects.

Section 3: Ohm's Law
The proportional relationship between voltage, current and resistance as well as power. Students will solve single variable equations for missing or unknown values as well as solve realistic problems in electrical circuits. This will then be applied to circuit properties in the next section.

Section 4: Series, Parallel, Series-Parallel Circuits
Students will understand that loads along one path are series and multiple paths form parallel circuits, however we will then discuss the specific properties of each electrical value and how they relate to series and parallel circuits. Students will apply ohm's law to solve for total resistance, voltage, current and power. Students will then follow the properties of each type of circuit and calculate the voltage and current drops of each load within the circuit. All will be blended in a combined series-parallel circuit which will involve properties of each.

Section 5: Soldering
Students will finalize all learned knowledge and skills through soldering a basic circuit. As students build competency, projects will involve additional parts and schematic reading to develop final practical projects.