Unit 8: Electrical Circuits

Content Area: **Technology**
Course(s): **Engineering Design 1**
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Enduring Understandings

1. A circuit is comprised of a power source, a load and a conductor.

2. Voltage, current and resistance are related and their values in a circuit are reliant on one another.

3. Electricity is a form of energy that can be transformed by moving electric charges doing work in various devices.

4. A potential difference has to be maintained in order to move charges between two points.

5. Even simple circuits using simple components can perform complex tasks.

6. Safety must be considered when designing and creating electrical systems.

7. Digital and analog circuits perform very different task and each has applications in electrical engineering.

Essential Questions

1. How is an electrical circuit similar to a water pipe?

2. How can an electrical circuit be controlled?

3. How are electrical circuits a part of everyday life?

4. How are voltage, resistance and current related in an electrical circuit?

5. What are the safety issues that need to be taken into consideration when creating electrical circuits?

6. What are the applications of digital and analog circuits?

Content

Vocabulary:

Alternating Current (AC), Ampere, Capacitor, Coulomb, Current, Direct Current (DC), Diode, Electric Motor, Farad, Light Emitting Diode (LED), Load, Polarity, Potentiometer, Resistance, Resistor, Voltage, Mechatronics, Servo Motor, Digital, Analog, Circuit, Schematic Diagram, Battery

Skills

1. Calculate voltage, current and resistance in an electrical circuit.

2. Operate a multimeter to record electrical measurements in a circuit.

3. Create an electrical circuit given a written description of it.

4. Create schematic diagrams of electrical circuits.

5. Create a physical electrical circuit using a schematic diagram as a guide.

Resources

Electrical components (various)

Multimeters

Eletrical prototyping tools

Eletrical prototyping materials

Standards

TECH.8.2.12.B.4	Investigate a technology used in a given period of history, e.g., stone age, industrial revolution or information age, and identify their impact and how they may have changed to meet human needs and wants.
TECH.8.2.12.D.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
TECH.8.2.12.D.4	Assess the impacts of emerging technologies on developing countries.
TECH.8.2.12.D.CS1	Apply the design process.
TECH.8.2.12.D.CS3	Assess the impact of products and systems.