

Electricity and Circuits

Florida Benchmark: SC.5.P.11.1: Explore the properties of electrical circuits and energy flow.

NGSS Standard: 4-PS3-2: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

A. GRADE LEVEL: 5th Grade

B. SUBJECT: STEM/Science

C. DATE: [Insert Date]

D. DURATION: 60 minutes

E. LESSON FOCUS: Students will explore the properties of electrical circuits and the flow of energy, understanding how circuits function and identifying the components of a complete circuit.

F. MATERIALS:

- Batteries (1.5V AA)
- Wires with alligator clips
- Light bulbs (small, 1.5V)
- Switches
- Breadboards
- Electrical tape
- Circuit diagrams (printed)
- Safety goggles
- PowerPoint presentation for discussion

G. LESSON OBJECTIVES:

1. Identify the components of an electrical circuit.
2. Understand how energy flows through a complete circuit.
3. Construct simple electrical circuits and observe energy transfer.
4. Analyze why circuits may or may not work.

H. PROCEDURES:

1. INTRODUCTION:

- Begin with a brief discussion on how electricity is used in everyday life.
- Show a simple circuit and ask students to predict what will happen when the circuit is closed.
- Explain key terms: circuit, conductor, insulator, switch, battery, and bulb. The discussion will be presented using a PowerPoint for visual clarity.

2. EXPERIMENT:

- Divide students into small groups and distribute materials.

- Guide students in building a simple series circuit using a battery, wires, and a bulb.
 - Introduce the concept of an open and closed circuit.
 - Challenge groups to create a circuit that includes a switch to control the light.
 - 3. **OBSERVATION:**
 - Students will record their observations on a worksheet, noting whether the bulb lights up and why.
 - Discuss common issues, such as loose connections or incorrect polarity.
 - 4. **GENERALIZATION:**
 - Lead a group discussion to summarize findings, emphasizing how a complete path is necessary for energy flow.
 - Relate the lesson to real-world applications, such as household wiring and safety.
 - 5. **ASSESSMENT:**
 - Students will complete a quiz on circuit components and energy flow.
 - Groups will present their circuits and explain how they function.
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Note 1: Safety

Always wear safety goggles when working with electrical components. Never connect batteries in a way that could cause overheating. Inspect wires for damage before use to prevent short circuits. Encourage students to handle components carefully to avoid any electrical hazards.

Note 2: Accommodations

Provide visual aids and bilingual instruction for ELL students. Use simplified diagrams and one-on-one guidance for ESE students. Allow extra time for students who need additional support. Encourage peer collaboration for students who benefit from working in pairs or small groups.