Making an Electrical Circuit

An Educator's Reference Desk Lesson Plan

Submitted by: Kirsten Rosenberg and Bill Moe
Email: chevy@selway.umt.edu
School/University/Affiliation: The University of Montana
Endorsed by: Lisa Blank
The University of Montana

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Grade Level(s): 4

Subject(s):

- Science/Physics

Duration: 45 minutes

Description: Students will be provided with a battery, insulated wire, and a light bulb. They will be asked to create an electrical circuit that will light the light bulb.

Goals: Students will understand the concept of electricity and electrical circuits.

Objectives:

1. Students will be able to construct an electrical circuit.
2. Students will be able to describe and identify open circuits and closed circuits.

Materials:

- batteries
- insulated wire
- light bulbs
- teacher-made worksheet (see **Procedure** for details)

Procedure:
Scientific Explanation:
Questions: How do you use electricity in your daily lives? How would it affect you if you could not use these items for a week?

Focus Phase:

Divide students into groups of four and present each group with a set of materials (battery, insulated wire, and light bulb). Ask students, "Do you think that you could make a light bulb light with two wires and a battery?" Ask them to test their

hypothesis by constructing a circuit, which would light the light bulb with their materials.

Allow students to build their circuits while you go around the room observing and asking them thought provoking questions. Give subtle suggestions to those that are becoming frustrated. Ask questions to those that have successfully constructed their circuit.

- Can you make the light bulb light a different way?
- What would happen if you turned the light bulb sideways?
- How many different ways can you get the light bulb to light?
- What would happen if the wire were underneath the light bulb?

Challenge Phase:
After students have had time to successfully construct their electrical circuits, ask them to compare their results with other students. Have them discuss why the light bulb lit. After a short period of discussion ask a student or a group of students to draw a diagram of their circuit on the board.

Discuss the diagram with the rest of the class. Do they agree or disagree with the diagram? Have groups that disagree draw a diagram of their electrical circuit on the board. Discuss these diagrams. After a classroom consensus has been reached, begin asking discussion questions:

- What made the light bulb light?
- What was the power source?
- What did the wires do?
- Is this circuit open or closed?
- Did electricity flow through the wire when the circuit was open?
- Did electricity flow throughout the wire when the circuit was closed?

Concept Introduction Phase:
To reinforce the concept, demonstrate a closed electrical circuit and an open circuit. Have students make a circle holding hands. Have one person squeeze a hand. Once that student's hand is squeezed, have him or her squeeze the next person's hand and so on. Now remove one student from the circle so there is a gap; have them try squeezing hands. Have students sit back down and discuss open vs. closed circuits. Ask questions:

- What happened when we broke hands?
- What kind of circuit was it when we broke hands?
- What kind of circuit was it when we were all holding hands?
- What kind of circuit did you make today with the battery, wire, and light bulb?

Concept Application:
Pass out the teacher-made worksheet. [**Note:** The authors regret that the original worksheet could not be included with this lesson plan. Teachers can create their own

worksheet by drawing examples of open and closed circuits. Students will need to identify which circuits are open and which circuits are closed.]

Students will use their knowledge to predict which circuits will light the light bulb and which will not. If time allows, go over the worksheet and discuss the correct answers and why they are correct/incorrect.

Assessment: Were students on task? Were students working cooperatively with their groups? When asked a question regarding their circuit, were students able to relevantly respond to the question? Did students demonstrate an understanding of electrical circuits on their worksheets?