

Circuit Lesson Plan

Science Standards Addressed

CDE Standard 1 – Physical Science

1st Grade: Earth Systems Science: Earth's materials can be compared and classified based on their properties

4th Grade: Physical Science: Energy comes in many forms such as light, heat, sound, magnetic, chemical, and electrical

Adams 50 Standards

Level 2: **SC.02.41.01.03** Energy comes in many forms such as light, heat, sound, magnetic, chemical, and electrical

Level 5: **SC.05.41.01.03** Energy comes in many forms such as light, heat, sound, magnetic, chemical, and electrical

SC.05.81.02.03 There are different forms of energy and those forms of energy can be changed from one to another - but total energy is conserved

Objective: The lesson is designed as a hands on introduction to electrical circuits. Simple electrical circuits provide a tangible demonstration of electrical energy, and can be very engaging to young students. The original lesson plan was aimed at 1st grade students, but can be modified for more advanced students as well.

Materials (per group)

- 1.5 V battery (D battery, though others may be substituted)
- Small pre-wired bulb, speaker, etc., the more variety the better
- Alligator clips
- Pre-stripped wires
- Tape (optional)
- Student notebooks (optional)

Pre-activity Prep

- Test all of the batteries and bulbs, etc., making sure that they are working
- Give a brief safety talk to the students, emphasizing safe handling of batteries (i.e. don't throw them) and Alligator clips (i.e. don't Alligator clip other people)

Procedure:

1. The students should be broken up into groups of 2-4 people.
2. Pass out the materials to each group.
3. Challenge the students, telling them that they have 10 minutes (adjust time as needed) to make the lightbulb glow (make the speaker produce sounds, etc.). Allow the students to explore on their own, with minimal guidance from the instructor. Suggested hints:
 - Try connecting the metal parts together (electrical current flows easily through metal)
 - Point out that the battery and the light bulb (speaker, etc.) both have two terminals (metal parts).

4. Eventually one of the student teams will stumble upon a working circuit. Stop the class and ask the successful team to describe what they did.
5. Ask the remaining students to replicate the successful circuit, assisting as necessary. Students from the successful team can help out others as needed.
6. After everyone has built a circuit, explain to the class that all circuits have 3 basic components:
 1. A power source (the battery)
 2. Connections (the wires/alligator clips)
 3. A load (the lightbulb, etc.)
7. With student participation, draw a diagram that shows a completed circuit. Discuss how all of the elements of the circuit are used, and show that the electrical current travels in a circular path. Have the students duplicate the diagram in their notebooks, if possible.
8. Allow for more free exploration of the materials after the explanation. Encourage students to try new ways of connecting the components

Modifications

As written, the activity is appropriate for grades 1-3. If necessary, it is easy to make the activity more difficult by challenging the students to connect multiple things in the same circuit.