

**Manchester College  
Education Department**

**Lesson By:** Natalie Aschenbrenner

Adapted from: Kirsten Rosenberg and Bill Moe's lesson at:

<http://www.eduref.org/Virtual/Lessons/Science/Physics/PHS0066.html>

**Lesson Title:** Lighting Light Bulbs

**Length:** 1 hour

**Age or Grade Level:** 4<sup>th</sup> grade

**Subject:** Science/Physics

**Academic Standards:**

4.2.3 Make simple and safe electrical connections with various plugs, sockets, and terminals.

**Objectives:**

1. Provided with batteries, insulated wire, and light bulbs, students will manipulate the materials to make an electrical circuit that lights a light bulb with 100% accuracy.

**Advanced Preparation by the Teacher:**

Obtain materials and make a kit for each group.

**Materials:** batteries, insulated wire, light bulbs, and one flashlight

(Also, metal paper clips and rubber bands for gifted students.)

**Introduction: (ENGAGE)**

Turn off all the lights and shut the window shades so the classroom is dark. Tell the students to imagine they are living in the 1800's and it is night time. Ask the students what they might do to provide themselves light at night. (Knowledge) Once a student suggests lighting a candle light a candle for the class to observe. Ask the students if they think the candle provides very much light. (Knowledge) Then turn on a flashlight and ask the students if the candle or the flashlight gives off more light. Tell the students they are going to learn how to light a light bulb.

**Step by Step Plan (ENCOURAGE):**

1. Turn on the lights and break the students in to groups of three to four.
2. Give each group a bag of materials.
3. Tell the students to manipulate the materials until they can make the light bulb light up. (Synthesis)
4. Have each group draw all their methods they try and to write down which ones were successful. (Knowledge and Comprehension) Give students time to experiment.
5. Only give small hints to groups who are displaying frustration with the activity.
6. Challenge students to try and find as many ways as they can to make the light bulb light up. (Application and Analysis)
7. Gather the class for discussion.
8. Have groups draw their successful methods on the big poster Post-It notes. Then let each group present their methods to the class.

9. After each group presents allow students to ask questions and to make observations about why the group's methods worked. (Analysis and Application)

**Instruction (ENGAGE):**

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? (Knowledge and Comprehension)
- What kind of circuit was it when we broke hands? (Application)
- What kind of circuit was it when we were all holding hands? (Application)
- What kind of circuit did you make today with the battery, wire, and light bulb? (Comprehension, Application, and Analysis)

Handout the worksheet for students to complete. (Application, Analysis, and Evaluation)

**Closure:**

Have students hand in their materials and clean up their work area. Tell students to turn in their drawings and records along with their worksheets. Tell the students they made good scientific observations which are crucial for being a good scientist.

**Assessment:**

Was the student participating and staying on task? Check the students' drawings and records. When asked questions regarding their group's circuits, were they able to relevantly respond? Check their worksheets for an understanding of electrical circuits.

**Adaptations:**

\*Students who cannot draw or write due to poor fine motor development should be paired with a student who can draw write. Then drawings and notes can be copied so the disabled student can put the drawings in his or her records too.

\*Gifted students should be given metal paper clips and rubber bands after they get their light bulb to light with the general materials. Have them construct a variety circuits using the new materials. Remind them to record their findings.

**Gardner Intelligences:**

Visual: making the circuits with real materials and drawing the circuits.

Verbal: Class discussion and group discussions

Kinesthetic: Manipulating the circuits

Interpersonal: working in groups

**Bloom's Taxonomy:** provided in parentheses throughout the lesson.