

Ages:

10 to 13

Activity 2:

Testing Conductors & Insulators

(Adapted from *4-H Electrical Science Program -- Electrical Projects and Idea Sheets*. See “More Great Resources for Grab and Go with Science Activities” for more information.)

Contributor: Tim Davis, Ontario County Cooperative Extension

Main idea: Conductors are materials which will pass electrons easily. Insulators are materials that resist the flow of electrons and protect you from electrical shock.

Objective: Identify materials that are conductors or insulators.

Materials: For each pair:

- q Circuit board (see handout distributed at session)
- q Conductor wire
- q D-cell batteries (4 four each circuit board)

- q Materials used as conductors (e.g. paper clip, coins, nails, cup of water)
- q Materials used as insulators (rubber, plastic, paper, cloth, wood)

Motivator: Use the questions below to pique interest.

Questions:

- q Which of the collected materials do you think will conduct electricity? Why?
- q Which of the collected materials do you think will not conduct electricity? Why?

Activity:

1. Have the youth hypothesize what collected objects will be conductors and which will be insulators.
2. Using the open circuit you made at the end of Activity 1, touch the two free ends of the wire to opposite ends of different objects (e.g. paper clips, a penny, rubber, wood, plastic, etc.) to see if they are conductors or insulators.
3. Cover the bottom of a cup with water and insert the two ends of the wire in the water. Did the water make the light glow? Remember it is considered a conductor although not as good as metal.
4. Add some salt to the water and see if the light will begin to glow. Also try to hold the ends of the

wires closer together in the water to see if that makes any difference.

Learning checks: After the activity, the youth are able to:

- q Explain conductors in terms of electrons passing through an object to make a closed circuit.
- q Explain insulators in terms of objects which do not allow electrons to pass through resulting in an open circuit.
- q Name two good conductors (e.g. copper, aluminum, water) and two good insulators (e.g. rubber, plastic, glass).

Vocabulary:

Conductors: Materials which will pass electrons easily.

Insulators: Materials what resist the flow of electrons and protect you from electrical shock.

Background: No additional background needed. See Activity #1 for previous background.

Extensions:

- q Allow youth to test additional objects of their choosing to see if they are conductors or insulators.
- q Challenge youth to devise a test to determine which object is the best conductor.
- q Continue with Activity 3, Build a Switched Circuit.