

Investigation Five – Conductors vs. Insulators

Standard IV Students will understand features of static and current electricity.
Objective 2 Analyze the behavior of current electricity.
Intended Learning Outcomes <ol style="list-style-type: none">1. Use science process and thinking skills3. Understand science concepts and principles

Standard IV

Objective 2

Background Information

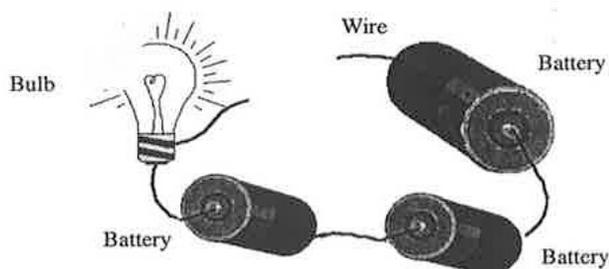
Solids, liquids, and gases can be conductors. Some items students may test are conductors, but do not conduct enough electricity to make the light bulb's filament glow.

Pre-Assessment/Invitation to Learn

Does anyone know what the wires are made of that carry electricity through our school? Why is copper a good choice? What do those wires look like?

Instructional Procedure

1. Assemble a circuit with the three batteries and bulb. Disconnect the wire attaching the bulb to one of the batteries. Add an extra wire on the bulb side of the gap. These two side-by-side wires will act like a switch. When the ends of the wires touch the bulb should light.



2. Take the penny out of the bag. Make a written prediction of whether it will conduct enough electricity to light the bulb. Using the two wires we just arranged, touch one to each side of the penny. The bulb should still light. The penny conducts electricity

Materials

Per group:

- At least 3 fresh D-size batteries
- 5 insulated wires
- Flashlight-sized bulb
- Kit #1 from previous lessons
- “Insulators and Conductors” data sheet

3. Take out the plastic spoon. Make a written prediction of whether it will conduct enough electricity that the bulb will light. Place one of those wires on each end of the plastic spoon. The wires should not touch each other; the spoon should be between them. The bulb should not light. The spoon is an insulator.
4. Continue to make predictions and to test the remainder of the items in the bag.
5. Allow students to try various items including items in their own desks.
6. Make a generalization about the types of materials that conducted enough electricity for the bulb to light.
7. Complete the “Conductor/Insulator” data sheet.

Curriculum Extensions

Science –

- Make a bag for each group with the following: one mini-size Kit Kat bar, a bulb, and a battery. Return to students with the challenge to light the bulb using only the items in the bag. The foil-coated inner wrapper will make a good wire to conduct the electricity. (ILOs 1, 2, 3)
- Adapt this lesson by changing the bagged items for cups of liquids. Salt water is an excellent conductor. Baking soda dissolved in water and sports drinks like Gatorade, are also fairly good conductors. Tomato juice works well due to the high salt content. Many other household liquids will conduct electricity but not enough to allow the bulb to light. You will probably need to use more than 5 D-size batteries to get visible results with liquids other than salt water. (ILOs 1, 2, 3)

Assessment Suggestions

- Check the “Conductor/Insulator” data sheet for accuracy.
- Write a list of conductors and insulators in your science journal.
- Homework: Make a list of conductors and insulators you find in your bedroom.

Reference to Assessment Section:

	Multiple Choice	Constructive Response	Performance Test
Unit Test	10		Does it Conduct?

Resources

Electricity by TOPS Learning Systems
 10970 S. Mulino Road
 Canby, OR, 97013

Books, Videos –

See Investigation Four Resources

