

Conductors and Insulators

INTRODUCTION

Electricity flows into our homes through metal wires. What else can it flow through? Conductors are materials through which electricity can flow and insulators are materials through which it cannot. A variety of materials found in the classroom or around the house can be tested for their ability to conduct electricity.

MATERIALS

1 battery	Cork
1 battery holder	Thumbtacks
1 bulb	Buttons
1 bulb holder	Fabric
3 alligator clips	Screws
Cardboard	Marbles
Metal thumbtacks or paper fasteners	Plastic
Coins	String
Keys	

WHAT TO DO

1. Place the battery in the holder and attach an alligator clip to each of the leads on the battery holder.
2. Connect the light bulb, in its holder, to one of the wires that is attached to the battery. Connect another alligator clip to the other lead on the light bulb holder.
3. Cut a piece of cardboard roughly 2 inches by 2 inches. In the center of the cardboard insert two metal thumbtacks or paper fasteners about $\frac{1}{2}$ inch away from each other. Connect one of the remaining alligator clips, one leading from the battery and one leading from the light bulb, to each of the thumbtacks. An open circuit has been created, with the gap between the thumbtacks serving as the break in the circuit.
4. Test various materials for their conducting ability by using them to bridge the gap between the thumbtacks. Conductors, such as coins, lying across the gap in contact with the thumbtacks should make the light bulb light. Insulators will not because they do not complete the circuit.

QUESTIONS TO ASK STUDENTS

1. Why does the bulb light when some materials are used to connect the tacks, but not others?
2. What materials made the bulb light? Could you guess which other materials would be conductors or insulators?

SUMMARY

Electricity can only flow through complete circuits. In this experiment different materials are used to bridge the gap in the circuit. Only conductors, those materials through which electricity can flow will complete the circuit and allow the light bulb to light up. By testing all the materials to discover which are conductors, and which are insulators (the materials through which electricity cannot flow), students should be able to make a generalization about the types of materials in each category. Students will find out that the metal objects allow electricity to pass through them and the non-metal objects do not. Metals are good conductors of electricity because their atomic structure allows them to pass electrons from one atom to the next.

SOURCES

“The Science Book of Electricity.” Neil Ardley, Harcourt Brace and Company: London, 1991, p.20-21

“Science Experiments with Electricity.” Sally Nankivell-Aston and Dorothy Jackson, Franklin Watts: New York, 2000 p. 16-17.