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## **MATERIAL CONDUCTIVITY - TESTING CONDUCTORS AND INSULATORS**

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*Written by Lucy Ikpesu*

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### **CLASS DESCRIPTION**

In this class, students will determine what classroom/household items are good conductors of electricity.

**TOTAL CLASS TIME:** 90 minutes

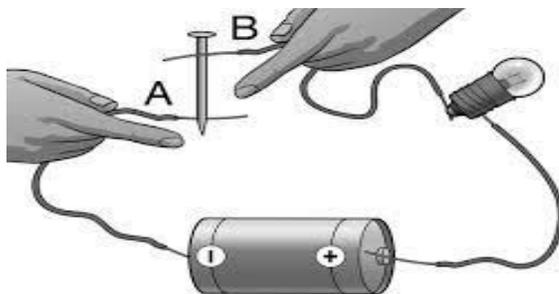
### **CLASS OUTCOME**

By the end of this class, students will identify conductors and insulators by using a simple circuit to test the conductivity of various materials.

### **INTRODUCTION**

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Have wondered why wire is coated in rubber, thick plastic, or another material? How is the light bulb able to receive power from the battery? How does the energy move from the battery to the light bulb? The energy moves through the metal wire, because metal is a good conductor of electricity. Some materials carry electricity better than others. These are called conductors, and things through which electricity cannot travel {or travel through poorly} are called insulators.

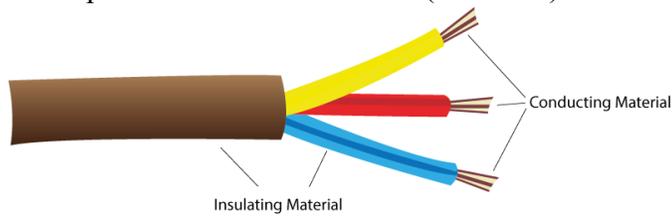


Cut a piece of wire for your student and strip the coating off the tip of it. Explain that the metal inside is a very good conductor of electricity and the coating is an insulator. It keeps the electricity flowing along the circuit within the wire.

### **MATERIALS NEEDED**

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1. Three pieces of coated electrical (insulated) wire



2. 9Volts Battery



3. Small light / LED bulb

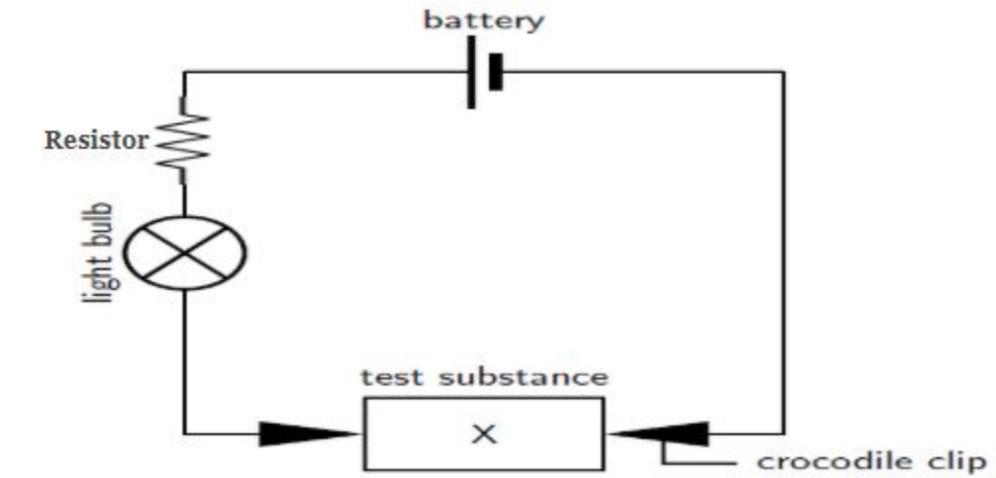


4. Various household items to test : paper clip, toothpick, glass, fabric, aluminium foil, banana, soda can, copper penny, key, wood etc.
5. Resistor (Optional)

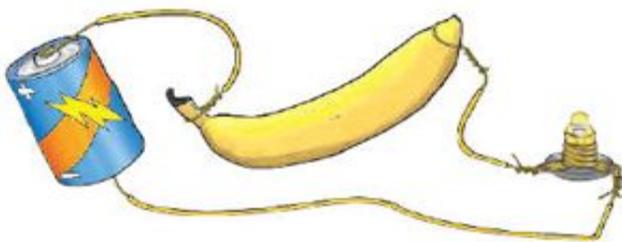


## PROCEDURE

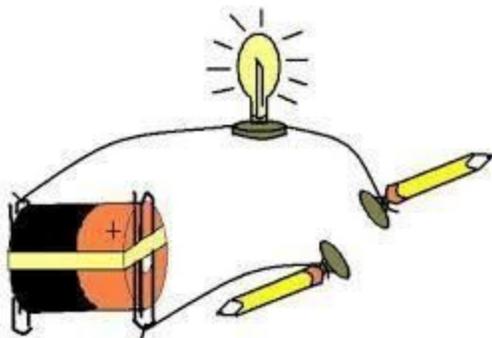
1. Create a simple closed circuit by connecting two wires to the battery and light bulb. See diagram for example using the circuit diagram.



2. Connect one end of the red wire to the positive end of the battery
3. Then, connect the other end of the red wire to one end of the resistor (If using a resistor)
4. Then, connect the other end of the red wire to one end of the resistor
5. Connect the other end of the resistor to one end of the LED bulb
6. Connect one end of the black wire to the LED bulb
7. Connect the other end of the black wire to the negative end of the battery.
8. Touch the open ends of the two wires to each other to form a circuit and test the bulb.
9. Touch the two open ends of the wire to each material you are testing, one at a time. If the bulb lights up, it is a good conductor. If it doesn't, it is an insulator.



Testing for insulator



Testing for conductors

10. Record your results on the note booking page below.

Household Item	Conductor	Insulator
1. Paper clip	X	
2. Wooden spoon		X
3. Penny		
4. Rubber spatula		
5. Straw		
6. Nail		
7. Key		
8. Water		
9. Salt water		
10. Friut juice		
11. Coca cola drink		

### **OBSERVATION**

When wires are connected to batteries and bulbs, the bulbs light because there is a good conductor making a path for that current. Insulators act as a barrier to the flow of electricity. In this activity, students can test different materials around the house/classroom to see what good insulators are and what good conductors are. The metal inside the wire is a very good conductor of electricity, It keeps the electricity flowing along the circuit within the wire.

Test for material in the able above, and mark by the red cross (connecting materials to the circuit with the metal part of the wire). If the material is a conductor, the bulb will light. If the bulb doesn't light, the material is an insulator.

### **DISCUSSION**

What happens when testing for each material. Student should state their observations and difficulties while testing the materials, especially the liquid test( water, salt water, fruit juice)



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