

Conductors and Insulators

Lesson Concept Students identify conductors and insulators by using a simple circuit to test the conductivity of various materials.

Link In the previous lesson students learned that a simple circuit is a path by which electricity can travel. In this lesson students learn how conductors allow electricity to flow and how insulators do not allow electricity to flow.

Time 45 minutes

Materials Whole class

R1 Sentence Frames

Per groups of 2

1 Simple circuit from previous lesson (add 1 wire and a bulb holder)

1 Plastic zip-top bag

1 Copy of Insulators and Conductors Activity Sheet

1 Colored pencil

Items to be tested:

1 Eraser

1 Metal pen

1 Paper envelope

1 Paper clip

1 Pencil

1 Piece of chalk (small)

1 Penny

1 Spoon

1 Nail

Individual

Science Notebook

**Advance
Preparation**

1. Place the items to be tested in a plastic zip-top bag.

Procedure:

Engage (10 minutes) *Some materials conduct electricity; these are called conductors. Most conductors are metal. Some materials do not conduct electricity: these are called insulators.*

1. Have students refer to the previous lesson in their science notebooks to recall how they were able to light the bulb. Facilitate a class discussion that leads students to recall that in order to light the bulb metal must touch metal.
2. Distribute a copy of the **Insulators and Conductors Activity Sheet** to each group. Have students make a prediction about whether an item given on the sheet will allow electricity to flow, i.e., a conductor; or will not allow electricity to flow, i.e., an insulator. Have students circle their predictions.

Explore (20 minutes) *A simple circuit is used to test each item to determine which is a conductor and which is an insulator.*

3. Distribute the materials for construction of a simple circuit to each group of 2 students. Demonstrate how to use the bulb holder and second wire to make a complete circuit.
4. Distribute a plastic zip-top bag with the items to be tested to each group of 2 students. Model how to place items to be tested in the circuit. Have students test each of the items by using the simple circuit to see which of the items light the bulb.
5. Have students use a different colored pencil to circle their actual results on the **Insulators and Conductors Activity Sheet**. Share results. Ask students to examine their observations to find out what the conductors/insulators have in common. (Expected Student Response (ESR): Conductors are made of metal. Insulators are not made of metal.)
6. Ask student to think about how they found out whether an item was a conductor or an insulator. (ESR): Conductors lit the bulb. Insulators did not light the bulb.
7. Display **R1 Sentence Frames**. Have students work with a partner to orally rehearse the following responses: "The _____ is a conductor because _____ flows through it. I can tell that _____ is a conductor because _____. The _____ is an insulator because _____ does not flow through it. I can tell that _____ is an insulator because _____."

Extend/Evaluate (10 minutes extend 5 minutes evaluate)

Teacher note: Remind students to be safe and not to test electrical outlets or anything that is plugged in to an outlet.

8. Extend. Have students think about other materials they would like to test to find out if they are conductors or insulators. Have students construct a “T-chart” in their science notebooks labeled: Insulators and Conductors.
9. Have students use their simple circuit to test other materials in the classroom. Remind students to record their observations on chart in their science notebooks.
10. Optional Extend. Have students name some conductors in their homes. Have the students name some insulators from home.
11. Evaluate. Have students look closely at the insulated wire they have been using in their simple circuits. Ask students, “What do you notice about the wire?” (ESR); The wire is made of plastic and metal.
12. Have students list other items in their science notebook that are made of both an insulator and a conductor.

Insulators and Conductors Activity Sheet

Which of the following items are more likely conductors or insulators? Circle your prediction.

 <p>Eraser</p> <p>Conductor Insulator</p>	 <p>Metal Pen</p> <p>Conductor Insulator</p>	 <p>Paper Envelope</p> <p>Conductor Insulator</p>
 <p>Pencil</p> <p>Conductor Insulator</p>	 <p>Paper clip</p> <p>Conductor Insulator</p>	 <p>Chalk</p> <p>Conductor Insulator</p>
 <p>Penny</p> <p>Conductor Insulator</p>	 <p>Metal Spoon</p> <p>Conductor Insulator</p>	 <p>Nail</p> <p>Conductor Insulator</p>

Sentence Frames

**The _____ is a conductor
because _____ flows through it.**

**I can tell that _____ is a conductor
because _____.**

**The _____ is an insulator
because _____ does not flow through
it.**

**I can tell that _____ is an insulator
because _____.**