

Conductivity Hunters

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Unite/Theme: Distinctive Properties of Matter

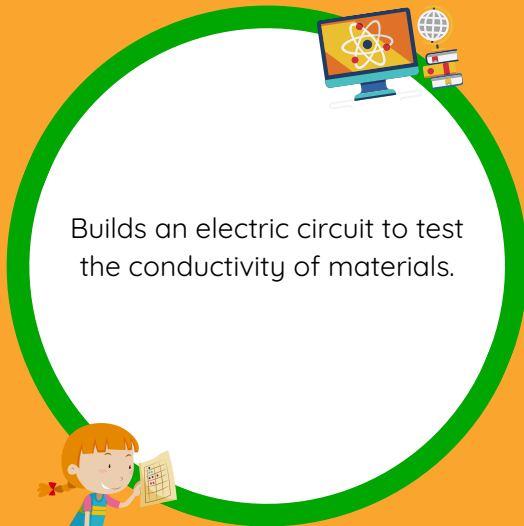
Purpose: To conduct an experiment demonstrating the electrical conductivity of substances.

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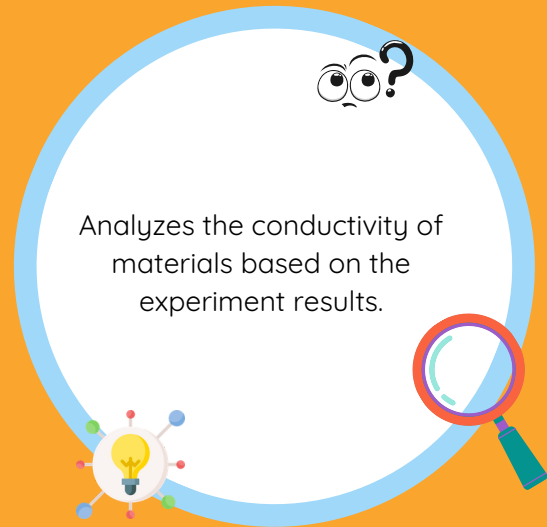
**CURIOUS
BOX** 



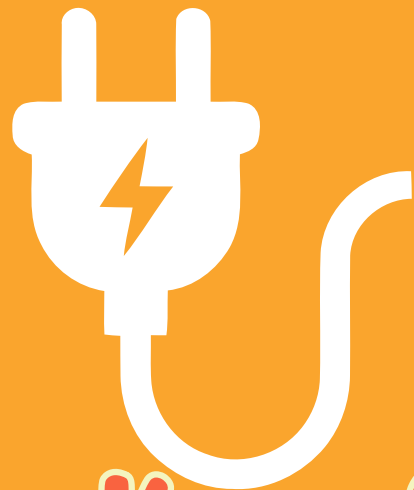
Learning Outcomes and Process Components



Builds an electric circuit to test the conductivity of materials.



Analyzes the conductivity of materials based on the experiment results.



What Do You Know?

- What is electrical energy?
- Can all materials conduct electricity?

**Explain
what you
know!**

Let's Spark Curiosity!



Come on, let's start exploring!

“Many everyday objects we use run on electricity. So why are some parts made of metal while others are covered in plastic? Do all materials conduct electricity the same way? Today, with the ‘Conductivity Hunters’ activity, we will set up an electric circuit to test which materials conduct electricity and which do not, and from our observations, we will explore the conductivity properties of different materials.”

Then, have the students take out the activity materials.



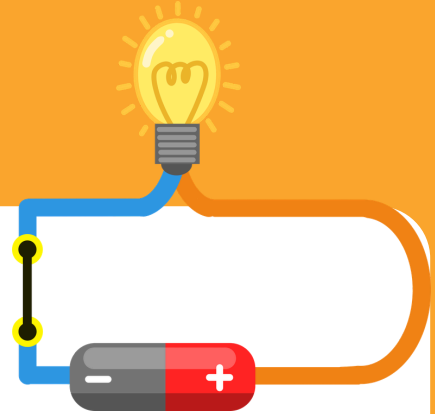
The activity video is watched by pausing at key steps. Before starting the activity, check the contents of the set. All caps and packages are opened simultaneously with the students.



Kit Contents

- | | |
|--------------------------------------------------------------|----------------------------------------------------------------|
| <input type="checkbox"/> Conductivity Hunters Template | <input type="checkbox"/> Conductive Fabric Tape |
| <input type="checkbox"/> Switch | <input type="checkbox"/> Toothpick |
| <input type="checkbox"/> Coin Battery | <input type="checkbox"/> Paper Clip |
| <input type="checkbox"/> LED | <input type="checkbox"/> Plastic Rod |
| | <input type="checkbox"/> “Conductivity Hunters” Activity |
| | Sheet |

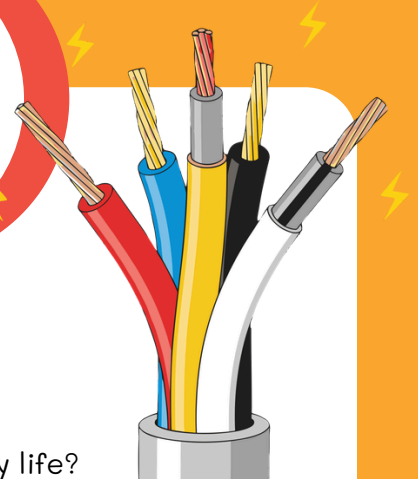
How do we do it?



1. Let's place the Conductivity Hunters template in front of us.
2. Secure the battery with conductive fabric tape, paying attention to the positive (+) and negative (-) terminals.
3. Connect the battery to the LED using conductive fabric tape.
4. Attach the positive terminal of the battery to the positive lead of the LED.
5. Complete the other connection paths in the circuit using conductive fabric tape.
6. Create the connection between the switch and the battery with conductive fabric tape.
7. Ensure that the switch terminals are firmly secured with conductive fabric tape.
8. Use the switch to check whether the circuit works.
9. Insert a paperclip between the connection points to test the circuit.
10. Insert a toothpick to observe whether the LED lights up.
11. Insert a plastic rod to compare conductive and insulating materials.

Carry out your task.
Mark it! ✓

What Should the Scientists of the Future Explore?



Here's the English translation of your text:

Questions for Students:

- Is a material made only of conductive substances?
- Why is it important to use insulating materials?
- Where are conductive and insulating materials used in daily life?
- Why are electrical cables covered with plastic?

Electrical Energy

City electricity is generated in hydroelectric, thermal, nuclear, wind, and solar power plants. The electrical energy produced in these plants is transmitted through power lines from the plants to residential areas and then to our homes.

The movement of electricity from one point to another through different materials is called electrical conductivity. Conversely, the prevention of electricity from passing through a material is called electrical insulation. Scientists classify materials into conductors and insulators. According to this classification:

- Materials that conduct electricity are called conductors.
- Materials that do not conduct electricity are called insulators.

Conductive Materials

These are materials that allow electricity to pass through them. Examples include:

- Metals: copper, iron, gold, silver, aluminum, lead, platinum, zinc, etc.
- Others: graphite, saltwater, acidic water, and the human body.

Insulating Materials

Insulators are used to control electricity and protect users from electric shock. Examples include:

- Solids: plastic, glass, wood, Teflon, porcelain, paper, ceramic, mica, rubber, bakelite
- Liquids: pure water, sugar water
- Gases

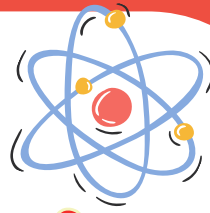
Where Conductors and Insulators Are Used

The conductive and insulating properties of materials are used in daily life for various purposes and make life easier.

- Parts of electrical devices that need electricity to operate are made from conductive materials.
- To control electricity and prevent harm, many parts of these devices are made from insulating materials.

For example, televisions, irons, and hair dryers are covered with insulating materials to ensure safety during use.

A SCIENTIFIC Explanation for the Curious



Students are asked the following questions:

- Does every material have the same electrical conductivity?
- Can an insulating material ever conduct electricity?
- What precautions should be taken to prevent electrical accidents?

Conductivity of Materials:

The conductivity levels of conductive and insulating materials vary. For example:

- Silver conducts better than copper, and copper conducts better than aluminum.
- Insulating materials are normally non-conductive, but under certain conditions, they can conduct electricity.

Examples:

- Oil can become conductive under high voltage.
- Dry air is normally an insulator but becomes conductive during lightning.
- Moisture increases the conductivity of materials like wood or air.
- Pure water is normally non-conductive, but tap water conducts due to dissolved minerals.

Some gases in lamps or advertising boards are made conductive for lighting purposes.

Precautions to Avoid Electric Shock:

1. Do not use worn-out plugs, cables, or sockets.
2. Avoid plugging multiple devices into one socket.
3. Do not insert objects into electrical outlets.
4. Do not climb electrical poles.
5. Avoid using electrical devices in wet areas like bathrooms.
6. Keep electrical cables away from heat sources.
7. Ensure electrical devices have proper certification (e.g., TSE).
8. Install covers on sockets.
9. Electrical devices should have a grounding wire.

**CURIOUS
BOX**



What Did We Discover?



“Today, we set up an electric circuit and discovered which materials are conductors and which are insulators. How did that make you feel?”

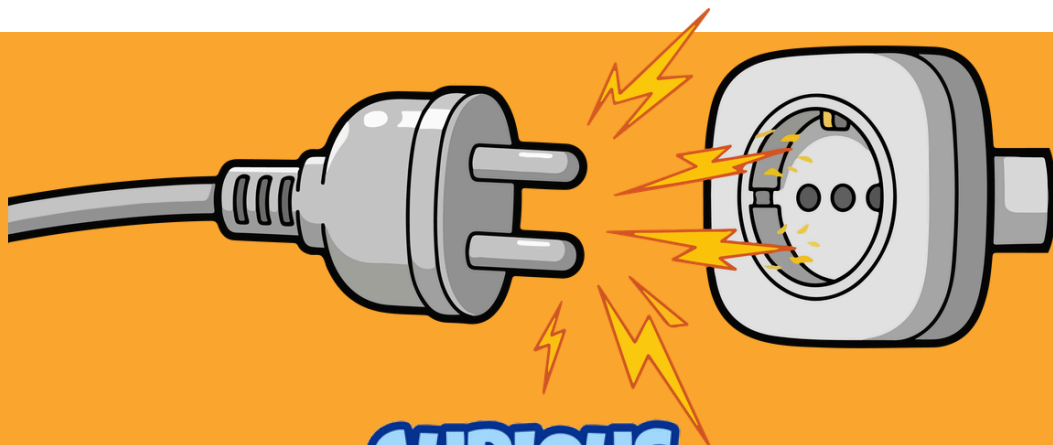
What Else Can We Do?



Dear Teacher,

Together with your students, you explored the conductivity and insulation properties of materials by setting up an electric circuit.

You can also carry out the “Conductivity of Different Materials” experiment.



Materials



Come on, you
try it too!

- Crocodile clips
- Small electric circuit kit (battery and bulb)
- Different materials: playdough, lemon, apple, pencil lead, metal spoon, plastic fork, wooden stick, etc.
- Observation notebook and pen

Procedure



- Set up the electric circuit and check whether the bulb lights up.
- Add different materials to the circuit one by one: use crocodile clips to connect a material between the two ends.
- If the bulb lights up, the material is conductive; if it does not, the material is an insulator.
- Test each material and record your observations in a table.

Are there semiconductors?

Question of
the Day



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