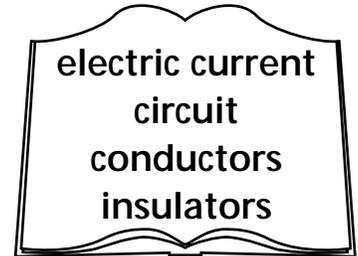


Circuit Testing



Why do electricians use rubber handled tools? In this experiment you will determine which substances are conductors and which are insulators.

An **electric current** is a flow of electrons in a definite direction. Electrons move from a point in which there is an excess of electrons to one in which there is a deficit. We say that electrons are moving from a point with a positive charge to a point with a negative charge. The path along which an electric current moves is called a **circuit**. To make a complete electric circuit, electricity must be able to travel through every one of the objects on the path. Not all objects carry electricity. **Conductors** are materials that allow electricity to flow easily through them. **Insulators** stop the flow of electricity.



Words to Know



Safety Precautions

Adult supervision necessary. Please click on the whistle to view the safety guidelines.

WHAT YOU NEED

- adult partner
- 6-volt dry cell
- flashlight bulb
- 2 8-inch bell wires
- 2 paper clips
- wire strippers
- masking tape
- cellophane tape
- objects such as paper clips, coins, crayons, pencils, cotton, foil, paper, plastic, etc.

WHAT YOU DO

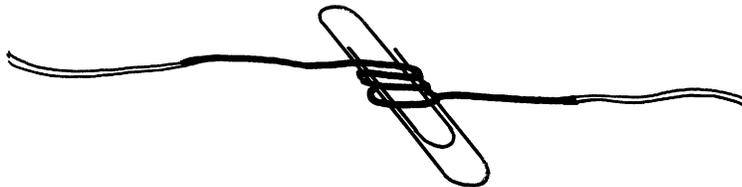
Predict which of your objects are conductors and which are insulators.

ADULT PREPARATION

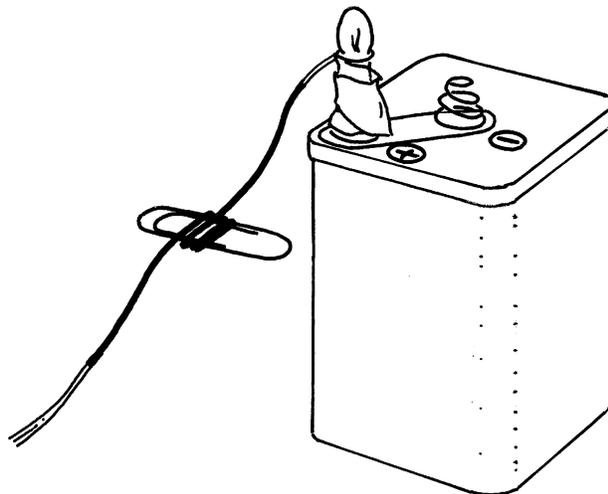
Strip 1ft inches from the ends of each of the wires.

ACTIVITY

1. **Wrap** each of the wires around a paper clip. Be sure to leave the stripped ends of the wires free.



2. **Wrap** one piece of wire around the bottom of the flashlight bulb. **Attach** the flashlight bulb to the positive poll of the battery using masking tape. (The battery will have plus sign near the positive terminal.)



3. **Attach** one end of the other piece of wire at the other to the negative end of the battery using masking tape.

4. **Test** the circuit by touching the 2 wires in the middle as shown below. If everything is working properly, the bulb will light.



5. **Test** whether an object is a conductor or an insulator by touching both wires to the object. See if the bulb lights. **Record** your observations in the data table.

OBSERVATIONS

1. Which objects were conductors?
2. Which objects were insulators?

OUR FINDINGS

Click on the above link to see what we found.

CIRCUIT TESTING DATA TABLE			
	Prediction	Experiment	
Object	Insulator (I) or Conductor (C)	Did bulb light? Yes/No (Y/N)	Conductor? (C) Insulator? (I)

Our Findings

4. PHYSICAL SCIENCES

4.20 CIRCUIT TESTING

1. Results will vary.
2. Results will vary.

SAFETY GUIDELINES

Special Safety Note To Experimenters

Some activities in this book have special safety rules to follow. The special rules are on the page with that activity. But even if every safety rule in the world is included with an experiment, you have to know how to be safe when doing it. So it's very important that you read, copy, and follow the Everyday Safety Rules that follow.

Sometimes science experiments can be dangerous. Things can spill, break, or even catch fire. You have to know what to do. . . fast. So be prepared. Read the directions for each experiment carefully, and follow any special safety rules listed with it, then be careful.

Always follow common-sense safety rules like NEVER RUN WITH SCISSORS IN YOUR HAND or BE CAREFUL WITH HOT THINGS! You already know a lot of common-sense safety rules. . . so remember to follow them, and have fun!

Everyday Safety Rules

PREPARE

- Clear off your work space.
- Read all directions.
- Know what problems might happen, and be prepared.

PROTECT YOURSELF

- Follow directions step-by-step.
- Do just one experiment at a time.
- Locate exits, fire extinguisher, eye wash, and first-aid kit before you start. Ask an adult to show you how to use a fire extinguisher.
- Be sure there's fresh air in the room.
- Wear an apron and safety goggles.
- Don't wear contact lenses, have bare feet, or wear very loose clothing.
- Keep work space and floor clean.
- Clean up spills immediately,

- Don't drink or eat around the experiment work space.
- Don't eat or drink any stuff tested, unless a grown-up says it's OK.

USE EQUIPMENT CAREFULLY

- Don't set up equipment too near the edge of your work space.
- Be cautious when using pointed or sharp instruments, like scissors, screwdrivers, or knives.
- Unplug any electric device by pulling out the plug, not pulling on the cord.
- Use only low-voltage batteries, like those used in flashlights or smaller.
- Be careful when using chairs or step-stools.

USING CHEMICALS

- Have an adult help you with all experiments requiring chemicals.
- Don't inhale or taste chemicals.
- Read all labels carefully.
- Label all chemicals.
- Wear goggles, apron, and gloves so chemicals don't touch your skin.
- Wash hands before and after using solutions.
- Wipe up spills thoroughly.

HEATING THINGS

- Wear goggles, apron, and gloves when boiling water.
- Use safety tongs and heat-resistant mitten or hot pads.
- Never leave heated things unattended.
- Turn off hot plates and oven burners when you're finished.
- Keep flammable things away from heat and flames.
- Have a fire extinguisher ready.

IN THE FIELD

- Never go on a field trip alone: follow the Buddy System.
- Tell a responsible grown-up where you're going.
- Know the area and be aware of dangers, like poisonous plants and deep water
- Dress for the weather conditions.