



## WHO CAN RESIST?

This exploration can be played online or adapted for use as a classroom activity. It teaches students how to build a simple electric circuit and lets them test a number of common objects to see if they are conductors or insulators.

### MATERIALS

- 3 pieces of coated wire (18-22 gauge) with the ends stripped
- 1-6-volt battery
- 1-6.3-volt screw-base light bulb with matching base
- objects to test, such as a banana, pennies, paper clips, erasers, etc.

### SAFETY FIRST

- If doing this activity in the classroom or at home, students should be supervised by an adult. A teacher or other adult should be responsible for stripping insulation from the pieces of wire.
- Explain to students that electricity can be dangerous if it is not handled correctly, and emphasize that they should never experiment with the electricity that comes from a wall outlet. It's much more powerful than the electricity made by small batteries and could seriously injure or even kill someone.
- Also explain that under certain conditions, even materials that behave like insulators can act as conductors. This is why you should never contact a power line or an electrical circuit with any object.

### SETUP

If you wish to do this activity in the classroom, print the pages from the online version and use them as handouts.

Connect the wire, light bulb, and base as shown in the exploration. (In lieu of the light bulb and base, you can cut up a string of holiday mini-lights and connect them to the battery, but be sure to discard the remaining lights when done for safety reasons.)

Have each student bring in at least one object they think is a conductor and one they think is an insulator. Students are likely to know that metals are good conductors, but they may be unaware that things with a lot of liquid in them also conduct. Some things to have on hand include lemons, pickles, and potatoes. (When testing these, make sure students stick wires into the wet part of the item.) An Altoids box is an interesting object: the painted outside is an insulator, but the metallic inside is a conductor!

### OBJECTIVE

Students will learn the difference between conductors and insulators. They will understand the properties that conductors have in common (their electrons detach easily), and the properties shared by insulators (their electrons are more tightly bound).