

Activity Name: It's Electric! : Which Items Conduct Electricity?

Activity Description: In this activity, students and parents will construct and use a circuit tester to determine if materials such as PlayDough, a penny, a book, and an aluminum can will conduct electricity. Students will also use switches to model opening and closing (completing) circuits to see how that affects electricity.

Suggested Grade Level / Age Range: 2nd - 3rd grade

Science Content Covered: *electricity, complete/ incomplete circuits*

Time needed to complete the activity:

Set Up: 20 minutes

Time needed to experiment: 15- 20 minutes

Materials to make pretest poster-

-1 poster board titled "Which Will Conduct Electricity"
and separated into two columns

1. Will conduct
2. Won't conduct

- 1 picture of each of the following:

book
penny
soda can
pencil
Playdough
nail
scissors
eraser

Materials Required (per student):

1 Circuit Tester:	Materials to Test:	1 Incomplete/ Complete Circuit
<ul style="list-style-type: none"> Flashlight Bulb 	<ul style="list-style-type: none"> 1 book of any size 	<ul style="list-style-type: none"> Flashlight Bulb
<ul style="list-style-type: none"> 2 Insulated Wires 	<ul style="list-style-type: none"> 1 penny 	<ul style="list-style-type: none"> Socket for bulb
<ul style="list-style-type: none"> Socket 	<ul style="list-style-type: none"> 1 soda can 	<ul style="list-style-type: none"> 2 Insulated Wires
<ul style="list-style-type: none"> 2-6 Paper Clips 	<ul style="list-style-type: none"> 1 pencil 	<ul style="list-style-type: none"> 1 D Battery
<ul style="list-style-type: none"> 1 D Battery 	<ul style="list-style-type: none"> Playdough 	<ul style="list-style-type: none"> Switch, with two alligator clips
<ul style="list-style-type: none"> Pliers 	<ul style="list-style-type: none"> nail 	<ul style="list-style-type: none"> Electrical Tape
<ul style="list-style-type: none"> Electrical Tape 	<ul style="list-style-type: none"> scissors 	
	<ul style="list-style-type: none"> eraser 	

Directions as well as Activity Success Tips for Parents:

Set Up: (Parent)

Poster:

1. Title poster board “Which Will Conduct Electricity”
2. Separate into two columns: “Will Conduct” and “Won’t Conduct”
3. Print pictures of each of the objects listed in the materials.

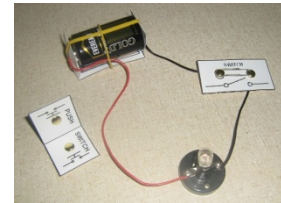
Which Will Conduct Electricity?	
Will Conduct	Won’t Conduct

Circuit Tester:

1. With the pliers strip the insulation from the ends of the socket wires so the bare copper wire shows
2. Tape the end of one socket wire to the top of the batter, or positive end, and twist the other wire to the end of a paper clip.
3. Strip the insulation from both ends of a piece of wire. Twist one end around another paper clips and tape one end to the bottom, or negative end of the battery.
4. Attach light bulb to socket

Incomplete/ Complete Circuit

1. Screw light bulb into the socket.
2. Tape insulated wire to opposite ends of the D battery using electrical tape.
3. Connect one of the insulated wires to the light bulb holder.
4. Connect one alligator clip from the switch to the other side of the light bulb holder.
5. Connect the remaining alligator clip to the free wire from the battery.



Preparing your child for the experiment:

Direct your child to poster board of “What Do You Think Will Conduct Electricity?” and ask your child to sort the Velcro objects under the columns “Will Conduct Electricity” or “Won’t Conduct Electricity” based on his/her prior knowledge.

Procedure:

1. Demonstrate how to properly use the circuit tester by showing the students how to hold the tester (one paper clip in each hand) by the paper clips and touch both paper clips to the object being tested, a soda can, for electricity.
2. Your child will observe the light bulb to see if it lights up.
3. Allow your child to choose the next object to test.
4. Your child will test the chosen object.
5. Repeat steps 2&3 for each of the 6 remaining objects (book, Playdough, penny, pencil, nail, scissors, eraser)
6. Have your child self-check his/her original predictions of whether or not the items conduct electricity by looking at the poster.

*You can also encourage your child to test other materials to see if they will conduct electricity. Be sure you are supervising and helping your child make wise decisions on what to test. For example, do not let your child test an electrical outlet.

7. Show your child the complete/incomplete circuit (with the switch up in the air)
8. Ask your child what needs to happen in order for the light bulb to light up?
 - Questions that may help your child reach an answer:
 - Such as: What will it take for the electricity to flow from the battery to the light bulb?
9. Have your child put the switch down in order to complete the circuit.
10. Observe whether or not the light bulb lit up.
11. Discuss with your child that the circuit needs to be completed in order for the electricity to flow completely through the system.

Closure to activity:

1. Discuss with your child if his/her predictions were correct. If your child is at a level to understand, you can explain that only certain things conduct electricity because in order to make electricity electrons must move from one place to another. Also, in order for the electricity to pass through the entire system and produce light, the circuit must be complete. If your child is not at a level to understand the passing of electrons, you can simply explain that certain objects can conduct electricity and certain objects cannot conduct electricity, it depends on what the object is made of.

Changing the activity based on the age of your child:

1. For young children/ students who don't want to touch the objects: you may have to model more, rather than letting the child experiment.
2. Closure- Explain the reason for conducting electricity based on the age of the child as stated in the closure.

*This activity could easily be adapted for use in a classroom.

Insert Any Images / Photos / Drawings needed to help describe or explain the activity:

Possible follow-up, extension activities or ideas for children and parents to explore

If your child wants to find out more about electricity check out:

- ✎ http://www.sciencekids.co.nz/gamesactivities/circuit_sconductors.html
- ✎ <http://www.eia.doe.gov/kids/energy>
- ✎ <http://www.historyforkids.org/scienceforkids/physics/electricity/>
- ✎ http://scifiles.larc.nasa.gov/text/kids/D_Lab/acts_electric.html
- ✎ <http://library.thinkquest.org/06aug/00442/whatsupelctricity.html>

Safety comments / considerations:

Batteries, paper clips, and light bulbs may get hot!

- Have extras to avoid overuse
- Always have teacher handle objects first to test temperature
- Use electrical tape to cover exposed metal and wires

ALWAYS SUPERVISE USE OF EQUIPMENT!

Resources used:

Bardhan-Quallen, Sudipta. (2006). *Last Minute Science Fair Projects*.
New York, NY: Sterling Publishing Co.

Jarvis, Miles. (2002). *Real Science Made Easy: Electricity Workbook*.
San Diego, CA: Silver Dolphin Books.

Time-life Books. (1994). *Simple Experiments*. Alexandria, VA:
Time-Life Books.

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