

# science circus

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Use the provided battery and alligator clips to make the light bulb light up. Next, experiment with the different materials at your station and see what can be used to complete the circuit and make your light bulb light up.

How do you know if electricity is conducted in this activity?

Which objects conducted electricity? Which objects didn't conduct electricity?

What are some of the similarities in the conductors?

List some other objects in the room that you could test. If time permits test some of those objects.

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Place a piece of plexiglass between two textbooks. The plexiglass should be about the same height as the bunnies standing up. Put the paper bunnies on the table under the plexiglass. Rub the top of the plexiglass with the wool glove. Keep rubbing for about two minutes and see what happens.

What happened to the bunnies during the activity?

Why do you think this happened?

Predict what you think will happen if you stop rubbing the plexiglass. What happens when you start rubbing again?

What other materials do you think would work? If you have time try them out.

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Rub the comb with a piece of felt. Turn the cold water on in the sink. Place the comb near the running water, without touching the water.

What did you see?

What did you think rubbing the comb with the felt did to the comb? What kind of electricity is being produced?

What effect did this have on the water?

Based on this activity, what do you think some of the properties of water that deal with electricity are?

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Fill your saucer with water. Lay the cork on the water so that it floats. Stroke the magnet gently along the whole length of the needle in the same direction 20 times. Lay the needle on the cork and watch what happens.

What happened to the needle? What direction do you think it is pointing to?

What do you think happened to the needle when you stroked it with the magnet?

Why do we need the needle to be floating on a piece of cork?

Take a post-it note and label it with the direction you think the needle is pointing. Place your post-it note on the wall where the needle is pointing. If you have time try and figure out some other directions and place post-it notes on the wall for those directions too.

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Use the battery, wire, and tape at the station to try and light up as many light bulbs as possible. Remember, in order to work, a circuit must be complete.

How many light bulbs do you think you can light up with one battery?

Why does the circuit have to be complete for the lights to work?

Can you find another way to light up the same number of light bulbs?

Diagram the circuit you made below:

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A battery is a storage unit full of acid. Some fruits have citric acid in them. So, we should be able to make a battery out of them, right? Use the materials provided to try and make a light bulb light up. Make sure you roll your fruit around first to get the acid flowing.

Do you think you will be able to make a battery from the lime? Why or why not?

What part of the lime do you think you need to use? Why?

Do you think you should use all the same materials in making the circuit, or different materials? Why?

Write a list of the different things you tried and whether or not they worked.

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## material lists



**PAPER bunny cut-outs**  
**thin piece of plexiglass**  
**two textbooks**  
**wool cloth or balloon**



**size D battery**  
**light bulb**  
**insulated wires**  
**alligator clips**  
**nail**  
**aluminum foil**  
**safety pins**  
**pencil**  
**cork**  
**straw**



**comb**  
**running tap water**



**Large needle**  
**small cork**  
**magnet**  
**saucer of water**



**size D battery**  
**insulated wires**  
**light bulbs**  
**electrical tape**



**Limes or lemons**  
**insulated wires**  
**copper screws**  
**zinc screws**  
**light bulb**

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# **resources**

**[http://www.earth.uni.edu/eecp/elem/mod2\\_scia.html](http://www.earth.uni.edu/eecp/elem/mod2_scia.html)**

**<http://www.mos.org/sin/toe/bunnies.html>**

**[http://www.scoutingresources.org/uk/badge\\_scienceexp05.html](http://www.scoutingresources.org/uk/badge_scienceexp05.html)**

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## Teacher notes



**Students will use the materials provided to test whether or not different materials conduct electricity.**

**anticipated results: Bulbs will light when using conductors such as wire, foil, nails, etc. Bulbs will not light when using insulators such as foam, plastic, wood, etc...**

**safety note: Do not allow students to test electrical appliances or outlets with their circuit.**



**The plexiglass will collect some electrons from the wool cloth when rubbed and become negatively charged. The paper bunnies which are neutrally charged become positively charged by induction and leap upward and cling to the plexiglass.**

**safety note: none**

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## Teacher notes



**Students will bend water using static electricity.**

**guiding questions:** When rubbing the comb: What do you think you are doing to the comb? What do you think will happen? Why do you think it bends that way? What kind of electricity do you think we are observing? Does this mean water has electricity in it? Why or why not?

**safety notes:** none



**Students will magnetize a needle and then use this as a compass.**

**guiding questions:** What do you think you are doing to the needle? What would happen if we rubbed the magnet on ourselves? What material is the needle made out of? Why do you think the needle swings a certain direction?

**safety notes:** a dull needle should be used for this activity.

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## Teacher notes



**Students will use the provided materials to create a circuit and light up as many light bulbs as possible.**

**Students should connect the wires from the positive and negative ends of the battery to the light bulbs with the insulated wires. The light bulbs must have a wire on the bottom and the side to light up. Students can build various types of circuits to create complete circuits.**

**Safety note: Batteries and light bulbs can become hot. Students should be encouraged to use electrical tape.**



**Students should use the provided material to light up the light bulb. Students should think about what makes a circuit and how a battery works. Students should be encouraged to experiment with different materials and different methods. Emphasis should be on scientific process rather than results.**

**Safety note: Students should be careful while inserting screws into the fruit.**

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## SOL Objectives

**4.3 The student will investigate and understand the characteristics of electricity. Key concepts include:**

- a. conductors and insulators**
- b. basic circuits**
- c. static electricity**
- d. ability of electrical energy to be transformed into heat, light, and mechanical energy**
- e. simple electromagnets and magnetism**
- f. historical contributions in understanding electricity.**



**4.3a**



**4.3c**



**4.3c**



**4.3e**



**4.3b**  
**4.3d**



**4.3b**  
**4.3d**

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**electricity**

**fourth grade**

**Chris Michaels**

**Kim Thorpe**

**Becca Puel**