

Interactive Notes-“Electricity”

Materials (per group of 4 students):

Demo 1	1-balloon- already blown up 1-ping pong ball
Demo 2	1-fluorescent light bulb
Demo 3	1-set of Density Blocks (item #WW46065M00 at sciencekit.com) 1-bowl or beaker- to put ice cubes in 1-towel
Demo 4	3-“gator clip” wires (item #WW47889M00 at sciencekit.com) 1- 9-volt battery 1-mini light bulb- cut from strand of Christmas lights (see demo #4) 1-250 mL beaker half full of distilled water (distilled preferred, but tap water will also work) 1-50 mL beaker with about 10 mL of table salt 1-plastic spoon/stirring rod
...and	4-note sheets

Additional Materials for Teacher:

PowerPoint

1-cooler of ice

1-box or can of table salt

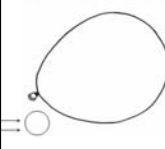
All-purpose spray cleaner (something with ammonia) - to clean balloons in between classes where it was rubbed on hair

Beforehand:

- At least a week before this, ask students to bring in Christmas lights that don't work any more. Cut and strip the lights as described in demo #4.
- Ask the custodian in your building to borrow the fluorescent light tubes needed for demo #2.
- Fill a cooler with ice.
- Close all blinds and cover windows with plastic (if you have it) in preparation for demo #2. The darker the better.
- Masking tape the fluorescent light tubes to tabletops to keep them from rolling off.
- Set out all materials *the day before*. Leave yourself time to realize you're missing something, and to practice a new demonstration, research something or even make a change. In the morning read through the slides and notes one last time. Relax and have fun along with your students.
- Insert page and paragraph numbers from relevant pages in your textbook at the bottom of slides 1 and 2 if you choose to have the class read from it together. This is a good way to connect with your textbook as well as transition into the next demo. You can also delete these page inserts, or Copy and Paste them onto later slides if needed.
- Print extra copies of the notes pages on paper for yourself, students that are slow writers or can't see well, and for absentees. Click “File” → “Print” → then where it says “Print what:” select “Handouts” → and then “OK”.
- As with any other demonstration, try these out ahead of time for yourself so you know how they work best and so you know what to expect. Practicing will also help you decide what to say and how to say it.

1.

Interactive Notes: Electricity



Do: Rubbed a balloon on hair.

See: "Something" transferred, which caused the balloon to attract a ping pong ball.

What's Happening: Electrons, with a negative charge, were rubbed onto the balloon. They attracted the positively charged protons in the ball. **Electric charge** is both positive and negative, and works off of the attraction and repulsion between these charges.

Read p. ¶ together

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Ask student #1 (of the 4) if they're having a good hair day so far today. Tell them to put the balloon next to the ping pong ball sitting on the table and observe what happens (nothing). Now have them rub the balloon on their hair and then bring that charged spot up close to a ping pong ball, and observe the ball move towards the balloon! Then see if they can spin the ball.

Use a marker to put a black dot on each balloon so students know where to charge the balloons, and to help them keep track of where those electrons are. Even better- if the tables in your room are numbered, write table numbers that correspond with balloons.

A "charged-up" balloon will move around many things- pepper, salt, styrofoam, puffed rice cereal, paper, and even bubbles. But pings pong balls are used here because they're the most surprising and amusing to watch. And the least messy (we thought you'd appreciate that).

An alternative to rubbing balloon on head is rubbing on arm hair.

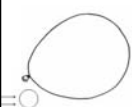
The notes were carefully worded to not suggest that the ping pong ball had an overall positive charge. When you rub the balloon on your hair, electrons transfer to the balloon. That gives that little spot on the balloon an overall negative charge (and your hair, having just lost electrons, now has a positive charge, which is why the balloon and your hair attract). When the balloon is put next to the ping pong ball, the negative charge repels away the electrons in the ball, but attracts the protons, and so it rolls. Cool, huh?

(end of Teacher Notes preview)

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Interactive Notes: Electricity



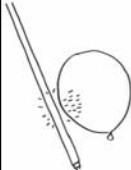
Do: Rubbed a balloon on hair.

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Read p. 1 together

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Do: Touched a charged balloon to a fluorescent tube.

See: The tube lit up!

What's Happening: **Static Charge** occurs when electrons transfer from one object to another. The charge excited the gases in the tube, making it flicker.

Read p. 1 together

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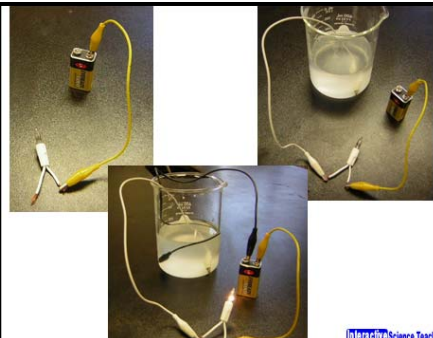


Do: Put an ice cube on different kinds of blocks.


See: The ice melted quicker on the metal blocks and slower on the woods and plastics.

What's Happening: **Conductors** are materials that move energy through them quickly. **Insulators** don't move energy as well.

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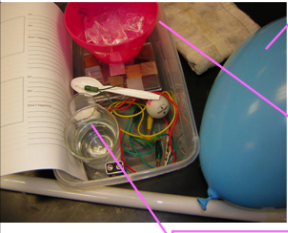
Do: Hooked up a light using wire, a battery, and water.

See: The bulb lit after adding salt.

What's Happening: A **circuit** is a continuous loop that takes electric current from the source, in this case a battery, to the device, and back to it.

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Clean Up



- Person 1**
 - Spray balloon with cleaner and wipe
- Person 2**
 - Count 4 new note sheets
- Person 3**
 - Empty your bowl in sink
 - Wipe off blocks and table with towel
- Person 4**
 - Unhook wires
 - Pour out and rinse beaker, refill halfway with water
 - Put 10ml salt in small beaker

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◆ Student Handout

◆ Drawings & Pictures

◆ Special Doc-How to make your room completely black

Topic: _____ Date: _____

Do: _____










See: _____

What's happening: _____

Do: _____

See: _____

What's happening: _____

 Hooking Up Current Through Water	 Drawing-Balloon & Light Tube	 Drawing-Blocks And Ice	 Drawing-Current Through Water
 Drawing-Static Balloon	 Pic-Additional Teacher Materials	 Pic-Balloon & Light Tube	 Pic-Blocks & Ice
 Pic-Circuit Through Water	 Pic-Light Bulb	 Pic-Static Balloon	 Pic-students Materials

Black Plastic Window Covers

Having black plastic covers for your windows may seem like a luxury, but is cheaper than you may think (\$15), easy to make, and will become a re-usable system you'll likely end up using several times a year.

The covering you see pictured to the right is 6-mil black plastic fastened to the window using industrial velcro. Both are available at your local hardware store. Make sure the velcro you buy has the adhesive side that sticks to things.

To make: measure your windows then cut the plastic to those measurements using a box cutter or utility knife along a straight edge (like a meter stick). Cut in a bit over-sized-1 inch extra on each side, to help cover that loose area along the edge where light likes to seep in. If there's too much, you can always trim it down more.

Then cut and stick on the two matching pieces of velcro to the corners of the plastic and window where they meet. A one inch by one inch set of velcro squares is big enough to hold up the plastic, but not so much that it sticks too much and risks tearing the plastic when you pull it off.

As you finish each piece of plastic, stick a masking tape label to the inside top of the plastic (the side facing the window) reminding you which window it goes with. Keep track of which goes with which even if all your windows are the exact same size, since the velcro on each set of plastic/window will be slightly different.

If your coverings ever tear or puncture, patch with black electrical tape or black duct tape.

Caution-when hanging up and taking down your window coverings on windows higher than your reach, use a ladder or step stool so you keep your balance. Never stand on a chair, desk, or counter.

Expect great things every time the plastic goes up- not only cool demonstrations that everyone will enjoy more because of the total darkness, but also the curiosity from students (and staff) when they enter your room and wonder what's going on this time.

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