









Cub Scout visit to CSUS: Agenda

5:00 Visit to Dr. Sergan's Liquid Crystal Laboratory
 Link to Dr. Vassili Sergan and Dr. Tatiana Sergan's web page:
http://www.csus.edu/physics/faculty/sergan_v.stm
http://www.csus.edu/physics/faculty/sergan_t.stm
 Link to Lab:
http://www.csus.edu/physics/facilities/electrooptic_slab.stm

5:15-6:15 Science Experiments with Electricity and Magnetism in the Lab
 Dr. Lynn Tashiro's Teaching Lab
 Link to Dr. Tashiro's web page:
<http://www.csus.edu/physics/faculty/tashiro.stm>

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Downloadable handouts below:

	<ul style="list-style-type: none"> • Hands on building electrical circuits
	<ul style="list-style-type: none"> • Virtual circuit experiments on the internet
	<ul style="list-style-type: none"> • Build a Flashlight
	<ul style="list-style-type: none"> • Floating Magnets 
	<ul style="list-style-type: none"> • Making a compass

Note:

- Make the graphics and the text both link to a downloadable pdf of the following lessons.

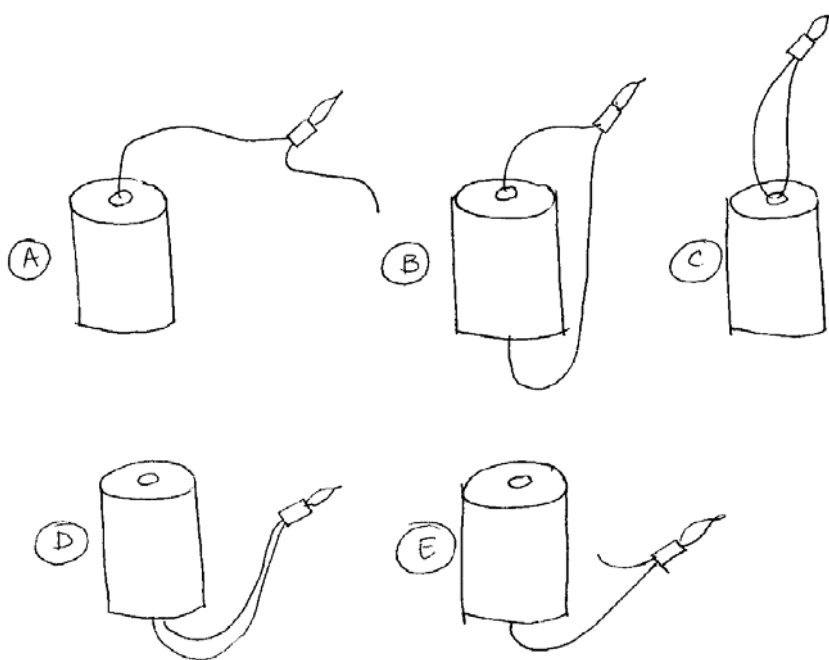
- Make sure the link names match the lesson names.

Station 1A:Electrical Circuits: Batteries & Bulbs

Activity A. What electrical paths between a battery and a holiday light will light the bulb?



1. **PREDICT:** Mark each drawing below with a check-mark if you think it describes a path that will light up the bulb.

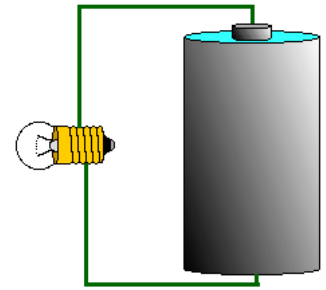
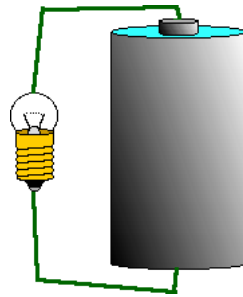
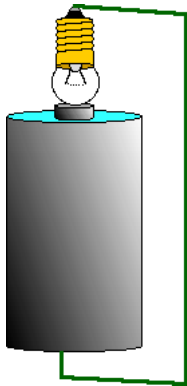


2.. **TEST:** Obtain a battery and a bulb and test your predictions.

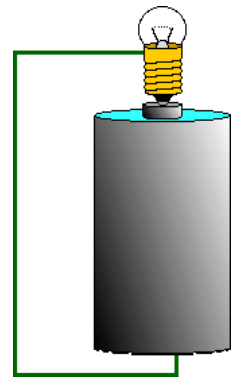
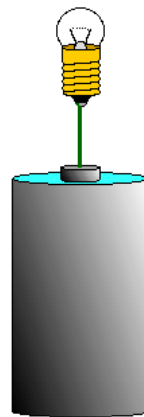
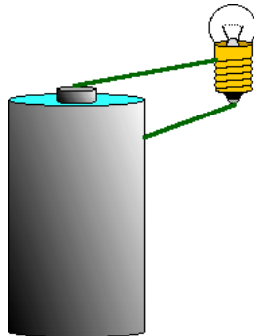
What is required to make the bulb light?

Activity B. Challenge: This is a bit harder....

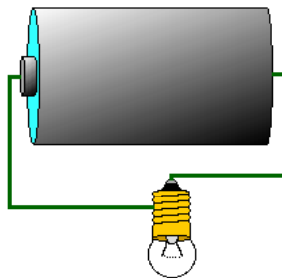
Predict: Put a checkmark by the ones you think will light up.



- ☐
- ☐
- ☐

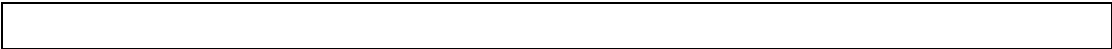


- ☐



Work with a partner to check which ones will light. Circle the ones that light up. **CAREFUL: DO NOT TOUCH THE BARE WIRE OR THE METAL PARTS OF THE BULB OR BATTERY WHEN DOING THIS EXPERIMENT: DIRECT CONTACT MAY RESULT IN A SKIN BURN.**

What connections are needed to make this bulb light?

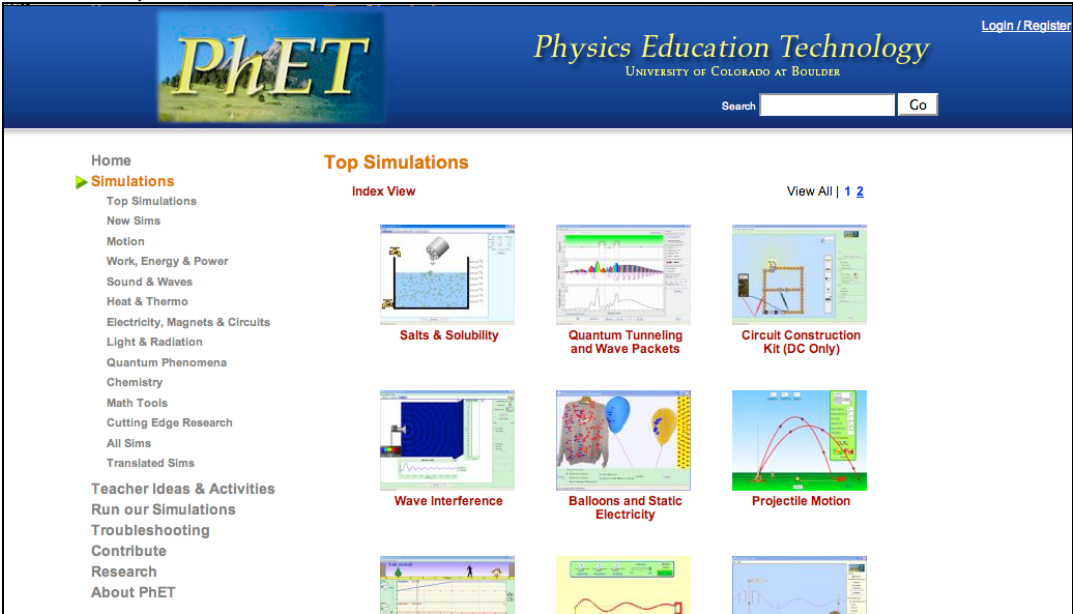


Station 1B: Virtual Electrical Circuits

For the following investigations you will use the PhET simulations at the University of Colorado Website:

<http://phet.colorado.edu/new/simulations/>

(You can also Google: “PhET” and click on “PhET simulations” to access the website)



1. Click on Circuit Kit Construction Icon.


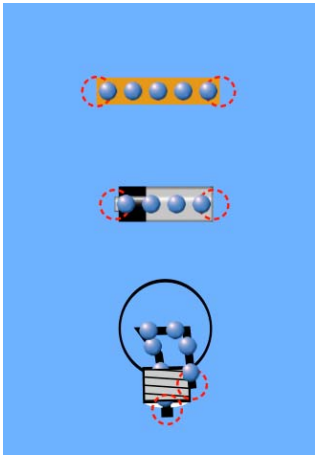
Then click on the button:

Run Now!




2. You should get a blank template like the one shown to the right



<p>3. Drag the icons on the side to build a simple circuit that will make the bulb light up.</p> 	<p>You can click and drag the objects to move them</p> 
<p>4. Carefully draw a diagram of the circuit you built that lit up the bulb:</p>	
<p>5. Where does the wire have to connect to the light bulb to make it light up?</p>	
<p>6. Challenge: If you incorrectly connect the circuit you can start a “fire”. Since this is a “virtual fire” and not a real one experiment with the virtual circuit connections to start a “fire”!</p>	

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Station 2: The Flashlight Challenge

	<ol style="list-style-type: none">1. Examine how a flashlight is built2. Use the following materials to make a homemade flashlight:<ul style="list-style-type: none">• two D cell batteries• paper towel tube• tape• wire• small bulb• paperclips
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Station 3: Floating Magnets

Materials:

- Collection of magnets with labeled N and S poles (at least 4)
- jar lid or piece of wood to float magnets on top of
- Pyrex baking dish and water

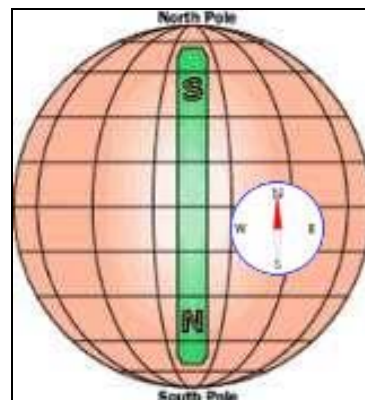
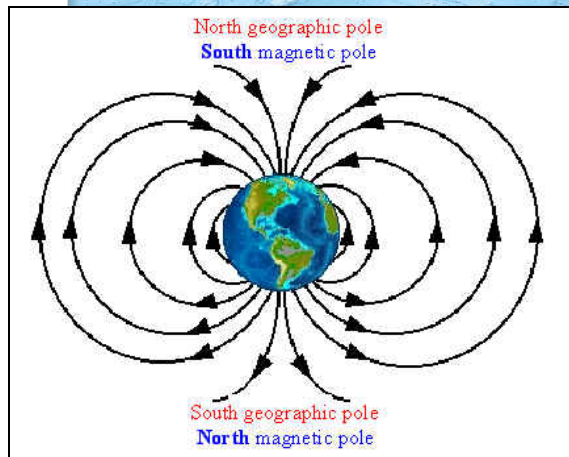
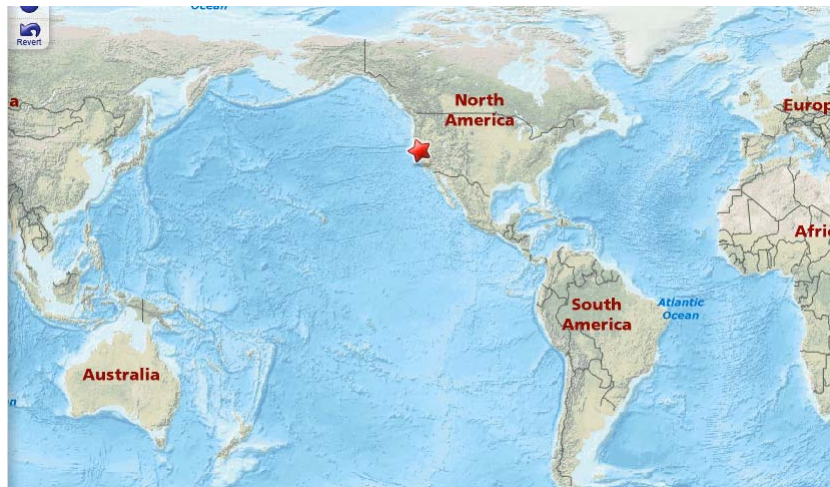
Directions:

1. Fill the pyrex baking dish with water and float a magnet lid so that it can rotate freely.



What do you notice about the direction that the magnets line up?

Why do the magnets all point the same direction?



Station 4: Making a Compass



Materials:

- small paper clip
- overhead transparency with compass design
- Pyrex baking dish and water

Directions:



Directions:

1. Cut out a circle around the compass design.
2. Unfold a paper clip so that it is a long straight wire
3. Stroke in one direction one end of the paperclip with the North pole of a magnet
4. Stroke in one direction, the other end of the paperclip with the South pole of the magnet. Color this end of the paperclip with a red Sharpie pen.
5. Fill the pyrex baking dish with water
6. Float your cut out compass transparency in the center of the pyrex dish
7. Set the paperclip on the transparency with the red end lined up with the North marking on the transparency.
8. Wait a bit until the transparency stops turning. Your compass should now be pointing North!

