

i3 STC Kit Extension Activities

North Carolina

| | |
|---|---|
| Grade: 4th | |
| Kit Name: <i>Electrical Circuits</i> | |
| Essential Standard(s): (List number, standard, clarifying objectives where appropriate) 4.P.1 → Explain how various forces affect the motion of an object. 4.P.1.1 Explain how magnets interact with all things made of iron and with other magnets to produce motion without touching them. 4.P.1.2 Explain how electrically charged objects push or pull on other electrically charged objects and produce motion. 4.P.3 → Recognize that energy takes various forms that may be grouped based on their interaction with matter. 4.P.3.1 Recognize the basic forms of energy (light, sound, heat, electrical, and magnetic) as the ability to cause motion or create change. 4.P.3.2 Recognize that light travels in a straight line until it strikes an object or travels from one medium to another, and that light can be reflected, refracted, and absorbed. 3.P.3 → Recognize how energy can be transferred from one object to another. 3.P.3.1 Recognize that energy can be transferred from one object to another by rubbing them against each other. | |
| Unpack the Standard (What does it mean?? What is the "Big Idea"?): 4.P.1 → Magnets and electricity can produce motion. 4.P.3 → Energy has lots of different forms and it can make things move or change. 3.P.3 → Energy can move from one thing to another. | |
| What is the Engaging (will get the student interesting) Essential Question that the students will be trying to answer as a result of this Extension? What are the different types of energy? What do they do? | |
| Which activities in the kit touch on the Standard(s) and how can they be adjusted to better address the Standard(s)? * In the kit, lesson 8 (Making a Filament) fits under Subconcept 3: Electricity flowing through a circuit may produce heat and light. This extension activity could be placed there, but it doesn't flow smoothly. It would fit better at the end of the unit as a culminating activity showing what electrical energy compared to other types of energy can do. | |
| Kit Activity (Lesson 8 or end of kit) | Extension Suggestions (See lesson below.) |
| *Before the lesson, have the students put together mini-booklets for copying down their observations. Students title the outside, "My Energy Observation Booklet". | |

Teacher prep for stations:

| <i>Station</i> | <i>Description</i> |
|--------------------------|---|
| <i>Electrical Energy</i> | <ul style="list-style-type: none">• <i>Have materials for a circuit at this center. This circuit will include a small motor and a plastic disc that will rotate. Students will make observations about what happens with the motor and disc once the circuit is completed.</i> |
| <i>Magnetic Energy</i> | <ul style="list-style-type: none">• <i>At this center, set up plastic wand magnets at a table, along with miscellaneous magnetic/non-magnetic objects. Students will make observations about magnetic/non-magnetic objects, and the pulling movement that can take place when the magnet is placed under the table.</i> |
| <i>Energy Transfer</i> | <ul style="list-style-type: none">• <i>At this center, have several balloons blown up. Students should rub a balloon on their head and records what happens when they hold it near their hair. They should also record what happens when they touch it to the wall. They can test it with other things as well.</i> |

*At this center, you will be making observations about what happens when a circuit is completed.

Step 1: Place the cell inside the cell holder.

Step 2: Attach the red wire to the Fahnestock clip.

Step 3: Place the green butterfly disc on the long silver post on the white and black object.

Step 4: Attach one end of the white wire to the other Fahnestock clip.

Step 5: Observe what happens.

- Write down what you observed happening once you completed the circuit.
- What do you think the white and black object is?
- Where else might you see the black and white object being used?

Light Station:

Vocabulary to know and understand: **Reflecting** means the light bounces off of an object. **Light absorption** means the light does not reflect off the object, it is almost as if the light is captured in the object. **Refraction** means that light goes through an object and spreads out on the other side.

*At this center, you will be making observations about what happens when light is shined on different objects.

Step 1: Turn on the flashlight. Shine the light on each object and make observations on whether the light reflects, absorbs, or refracts from the object.

Step 2: Make an H-chart. Fill in the chart with the names of the objects that reflected, absorbed, or refracted light.

| Reflected | Absorbed | Refracted |
|-----------|----------|-----------|
| | | |

Step

3: Think about your parents' car or truck. Discuss items on a car or truck that reflect, absorb, or refract light. At the very bottom of your chart, draw a horizontal line; list the items you discussed that are found on cars or trucks.

Sound Station:

Information to know and understand: Sound is a form of energy. All sound is caused by vibrations.

*At this center, you will be making observations about different sounds. You will try to guess which vibrations are coming from which objects inside the mystery tubes.

Step 1: Shake each mystery tube and try to figure out what is inside just by the vibrations you hear.

Make a chart like this on your paper.

| Buttons | Rocks | Toothpicks | Coins | Paper clips |
|--|-------|------------|-------|-------------|
| Step 2: When do you think it would come in handy to recognize certain sounds? Discuss this, and write down what you discussed on your paper. | | | | |
| | | | | |

| | | | | |
|--|--|--|--|--|
| | | | | |
|--|--|--|--|--|

Step 2: When do you think it would come in handy to recognize certain sounds? *Discuss this, and write down what you discussed on your paper.*

Magnetism Station:

**At this center, you will be making observations about magnetic and non-magnetic items. (Items that are attracted to magnets and items that are not attracted to magnets.) You will also be making observations about what magnets can do from a distance.*

Step 1: Make a T-chart. Label one side "magnetic." Label the other side "non-magnetic."

Step 2: Choose a magnet. Hold it by the handle.

Step 3: Pick an object to focus on first. Place the objects on top of the table

Step 4: Place magnet wand underneath the table. Move your wand around under the table.

Step 5: Observe the objects to see what happens. Write down what happens to the objects when you move your wand around.

Step 6: Each time you complete step 3-6, fill in the T-chart with the object name.

Step 7: Once all objects have been tested by each group member, discuss what all of the magnetic objects have in common.

Heat Station:

**At this station, you will explore what heat is able to do.*

**Each person in the group will race against each other to see who can melt their ice cube first. You can try different methods like holding it in your hands, blowing on it, rubbing it in your hands, or whatever else you think might work! Do not take your ice cube out of the bag. Keep it in the bag the entire time!*

Step 1: Take a plastic bag out of the cooler.

*Step 2: Race your group mates to see who can melt their ice cube first. *Use the stop watch to time it!*

Step 3: Write down what method(s) you used and if these methods worked or not. Write down what time it took to melt your ice cube.

Step 4: One the game is over, discuss different ways heat energy is used in your home. At the bottom of your booklet, list the ways heat energy is used in your home.

Energy Transfer Station:

**At this station, you will explore how energy moves from one thing to another just by rubbing them against each other.*

Each person in the group should pick up a balloon. Touch it to your head, but don't move it. **Record what happens. Next, rub the balloon on your hair. (Do not pop the balloon!) **Record what happens to your hair.** Rub it on your hair again. Then, touch it to the wall. What happens?*

This is called Static Electricity. The energy moves just by rubbing the balloon on your hair! Try rubbing and sticking the balloon on other objects, but be careful not to pop the balloon!

Additional Suggestions (Literature connections; online resources):

<http://www.sciencekids.co.nz/experiments/staticelectricity.html> --> extension activity for static electricity

<http://www.ducksters.com/science/light.php> --> explains things about light (including refraction through a prism)

http://www.eia.gov/KIDS/energy.cfm?page=about_forms_of_energy-basics → This site would be good for an advanced student. It discusses heat (thermal), motion, electrical, and sound energy, as well as several other types that we did not explore in this activity.