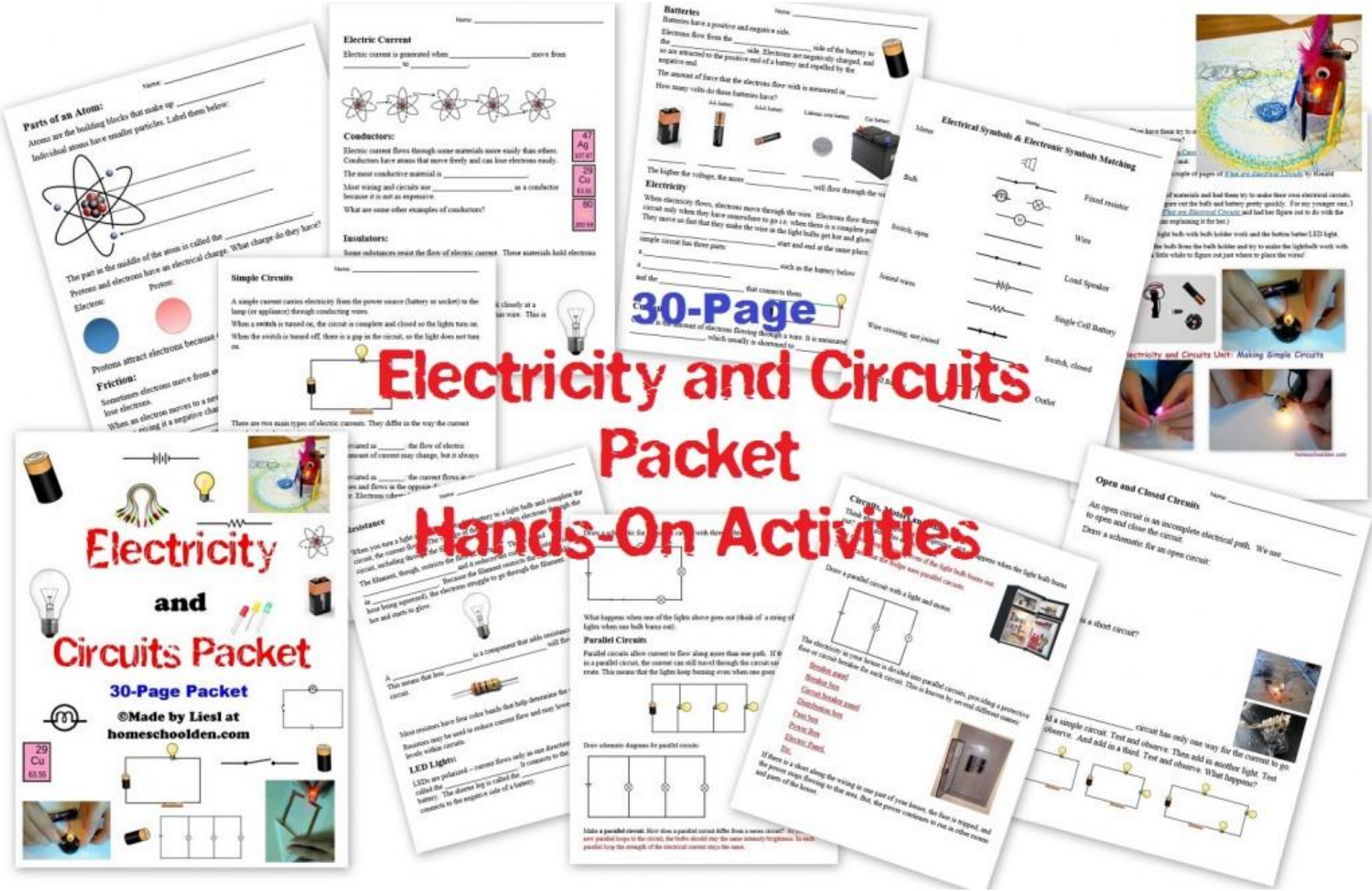
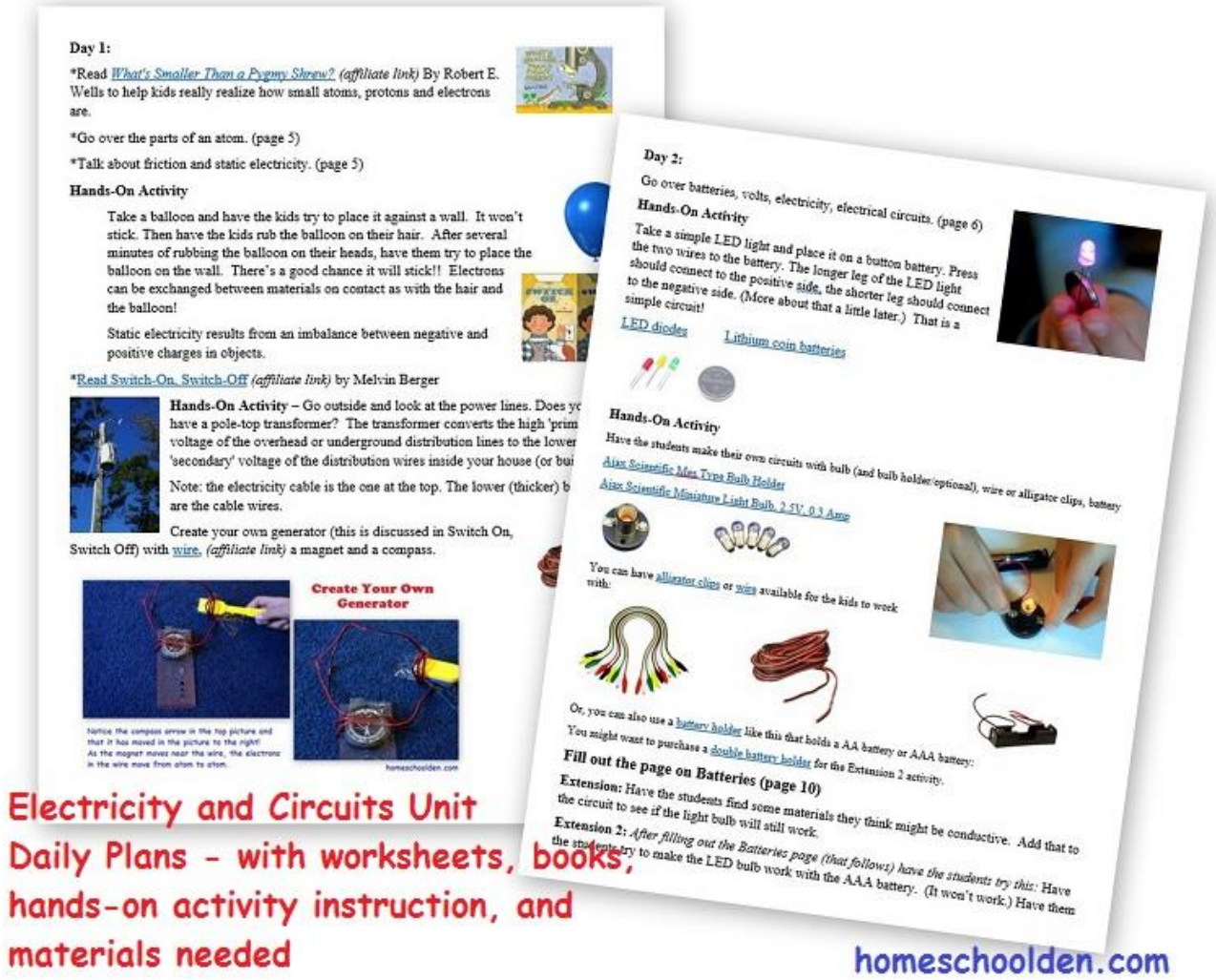
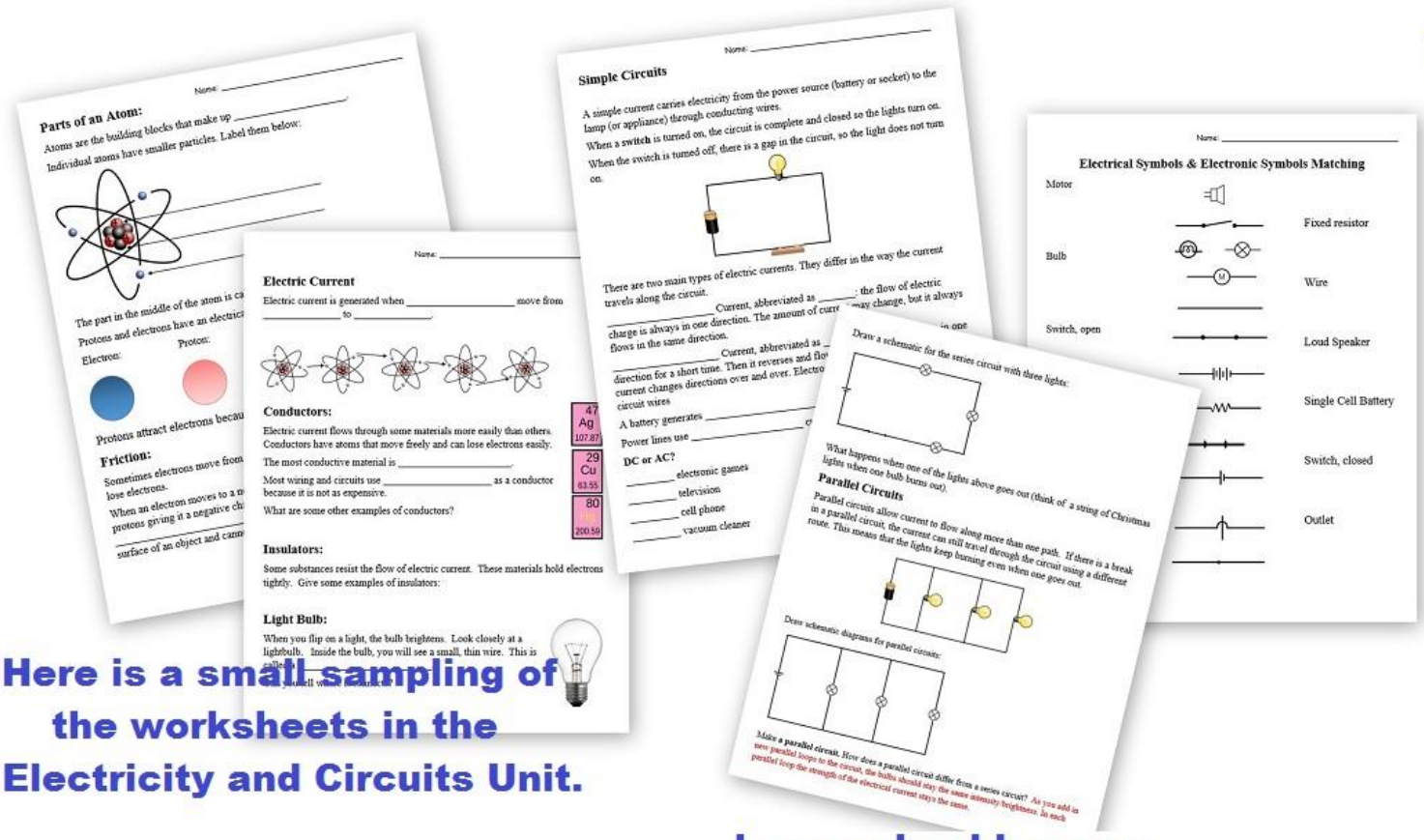
Electricity and Circuits STEM Unit!



In this unit, I organized things into daily plans. **Each day has the worksheets, suggested hands-on activities and materials needed** as well as any books we used. Below is a picture of Day 1 (left) and Day 2, (right). There are 10 suggested days (though to be honest, sometimes we took a little longer than just one day.) There are **10 Days of suggested activities and worksheets**.





Here is a small sampling of the worksheets in the Electricity and Circuits Unit.

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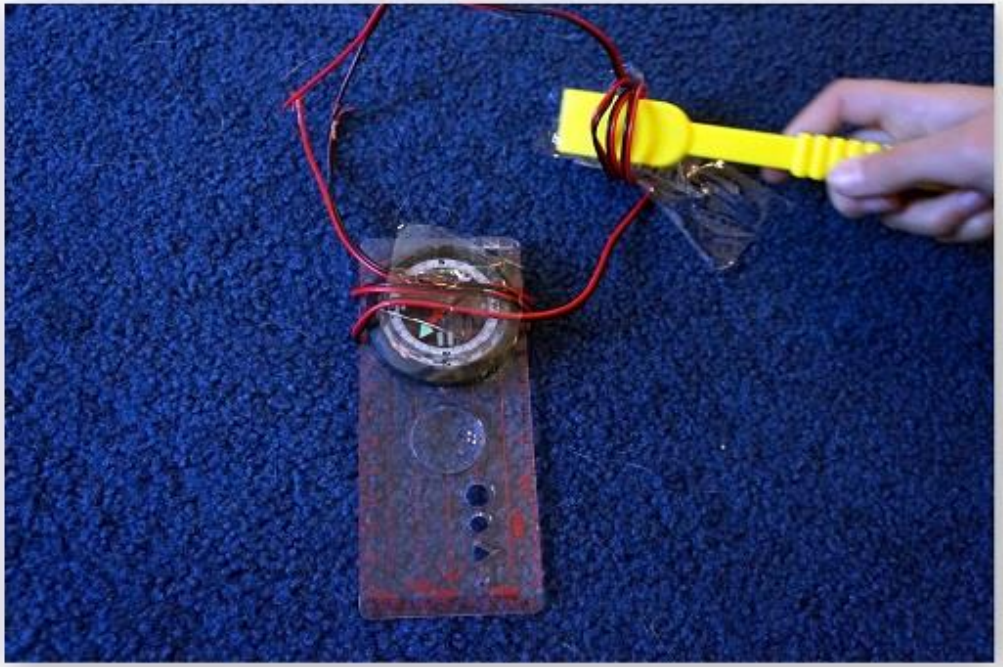
Topics in this 30-page Unit

- The parts of an atom
- Electric currents
- Conductors and insulators
- Parts of a light bulb
- Batteries
- Volts, amps, ohms
- Electrical circuits: Power source, load, conductor
- Simple Circuits
- Direct and Alternating Current (DC and AC)
- Resistance, Resistors and How they work.
- Anode, cathode
- Electrical Symbols
- Open and closed circuits
- Short circuits
- How to draw basic electrical schematics
- Series circuits
- Parallel circuits
- Motors
- Circuit breakers and the power grid

Create Your Own Generator



Notice the compass arrow in the top picture and that it has moved in the picture to the right!
As the magnet moves near the wire, the electrons in the wire move from atom to atom.

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Day 1:

*Read *What's Smaller Than a Pygmy Shrew? (affiliate link)* By Robert E. Wells to help kids really realize how small atoms, protons and electrons are.

*Go over the parts of an atom. (page 5)

*Talk about friction and static electricity. (page 5)

Hands-On Activity

Take a balloon and have the kids try to place it against a wall. It won't stick. Then have the kids rub the balloon on their hair. After several minutes of rubbing the balloon on their heads, have them try to place the balloon on the wall. There's a good chance it will stick!! Electrons can be exchanged between materials on contact as with the hair and the balloon!

Static electricity results from an imbalance between negative and positive charges in objects.

*Read Switch On, Switch Off *(affiliate link)* by Melvin Berger

Hands-On Activity – Go outside and look at the power lines. Does yo have a pole-top transformer? The transformer converts the high 'prim voltage of the overhead or underground distribution lines to the lower 'secondary' voltage of the distribution wires inside your house (or bui

Note: the electricity cable is the one at the top. The lower (thicker) b are the cable wires.

Create your own generator (this is discussed in Switch On, Switch Off) with wire, *(affiliate link)* a magnet and a compass.

Notice the compass arrow in the top picture and that it has moved in the picture to the right! As the magnet moves near the wire, the electrons in the wire move from atom to atom.

Create Your Own Generator

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Day 2:

Go over batteries, volts, electricity, electrical circuits. (page 6)

Hands-On Activity

Take a simple LED light and place it on a button battery. Press the two wires to the battery. The longer leg of the LED light should connect to the positive side, the shorter leg should connect to the negative side. (More about that a little later.) That is a simple circuit!

LED diodes Lithium coin batteries

Hands-On Activity

Have the students make their own circuits with bulb (and bulb holder/optional), wire or alligator clips, battery

Ajax Scientific Mes Type Bulb Holder

Ajax Scientific Miniature Light Bulb, 2.5V, 0.3 Amp

You can have alligator clips or wire available for the kids to work with:

Or, you can also use a battery holder like this that holds a AA battery or AAA battery:

You might want to purchase a double battery holder for the Extension 2 activity.

Fill out the page on Batteries (page 10)

Extension: Have the students find some materials they think might be conductive. Add that to the circuit to see if the light bulb will still work.

Extension 2: *After filling out the Batteries page (that follows) have the students try this:* Have the students try to make the LED bulb work with the AAA battery. (It won't work.) Have them

Electricity and Circuits Unit Daily Plans - with worksheets, books, hands-on activity instruction, and materials needed

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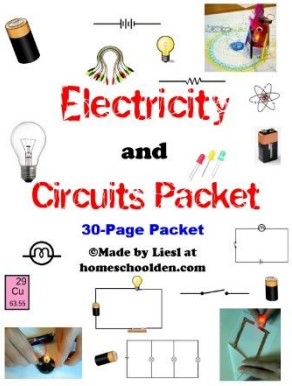
Electricity and Circuits Unit - Hands On Projects!



Electricity and Circuits Unit: Making Simple Circuits

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Hands-On Activities in our Electricity and Circuits Unit

speculate why. Then have them try to make the battery work with a battery holder that uses 2 AAA batteries. What happens now?

We started our unit with What is a Circuit? By Ethan Weingarten It's simple, but goes over a lot of terms we'll be learning in this unit.

The next day, we read the first couple of pages of *What are Electrical Circuits* by Ronald Monroe.

I gave each of the kids a pile of materials and had them try to make their own electrical circuits. My older two were able to figure out the bulb and battery pretty quickly. For my younger one, I opened to pages 6 and 7 of *What are Electrical Circuits* and had her figure out to do with the diagram provided (rather than explaining it for her.)

I had them make both the light bulb with bulb holder work and the button batter/LED light.

The I had them unscrew the bulb from the bulb holder and try to make the lightbulb work with just wires. It took them a little while to figure out just where to place the wires!

Electricity and Circuits Unit: Making Simple Circuits

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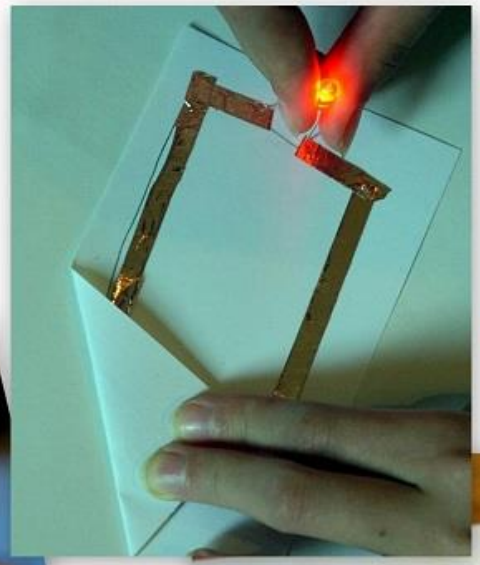

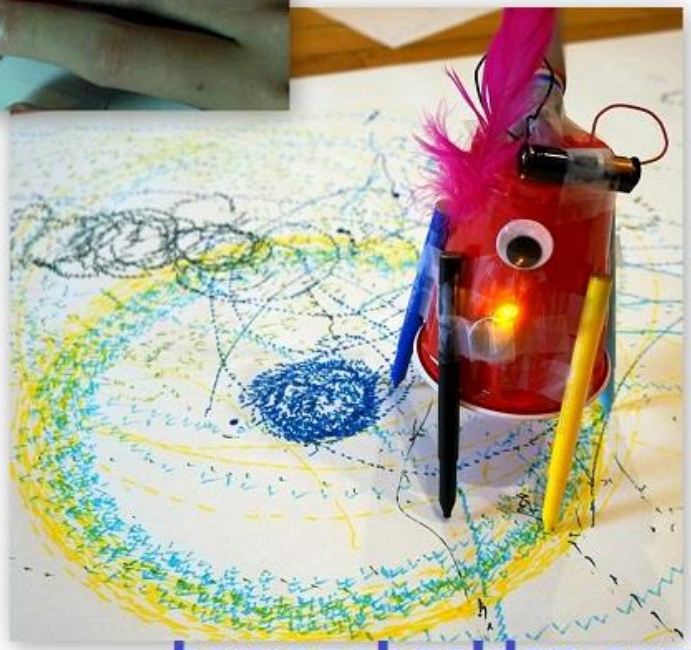

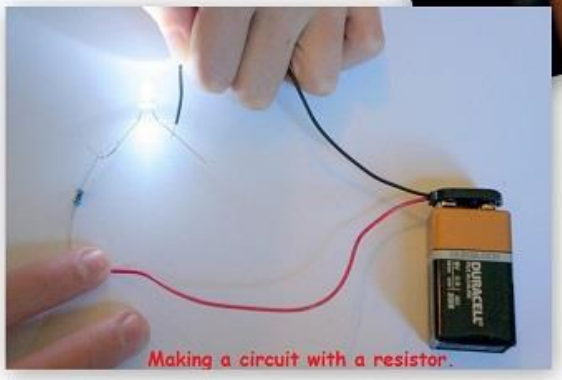

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Some of the topics and terms we talked about included:

- The parts of an atom
- Electric currents
- Conductors and insulators
- Parts of a light bulb
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My kids loved this unit because it was so hands-on!!