

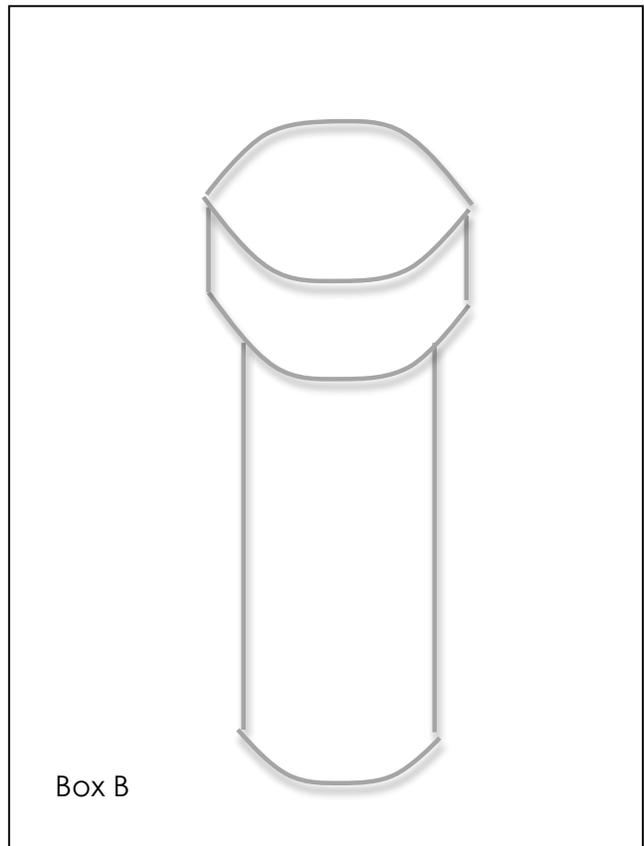
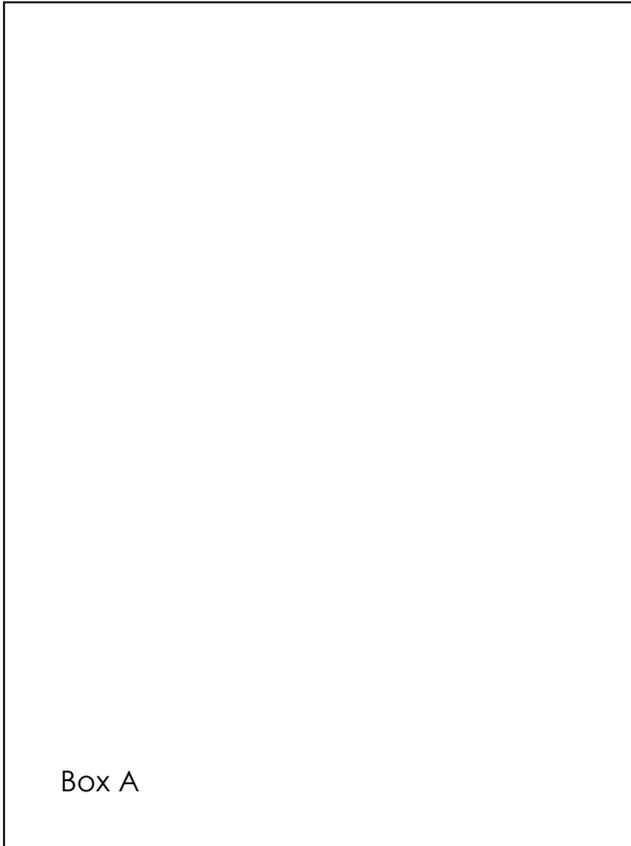
Name: _____

Date: _____

Build your Own Flashlight!

First, we'll look at a "store-bought" Flashlight....

1. Pick up a flashlight from the table in front of you. With your partners, take apart the flashlight. Can you make the light bulb glow using just a **battery**, the **bulb** and a piece of **wire**? EXPERIMENT! Draw in Box A.
2. Now, try to draw the whole circuit that is in our flashlight, use Box B (Hint: Are all the parts touching? If not, you might be missing a piece).



Please write down your observations of how you think the flashlight works (think about the circuit – which pieces are connected?):

Now you are ready to see what materials you will use to **BUILD Your Own Flashlight!**

3. Look at the list of electrical components below. Then, following the directions, build the circuit.

Parts for a Flashlight Circuit

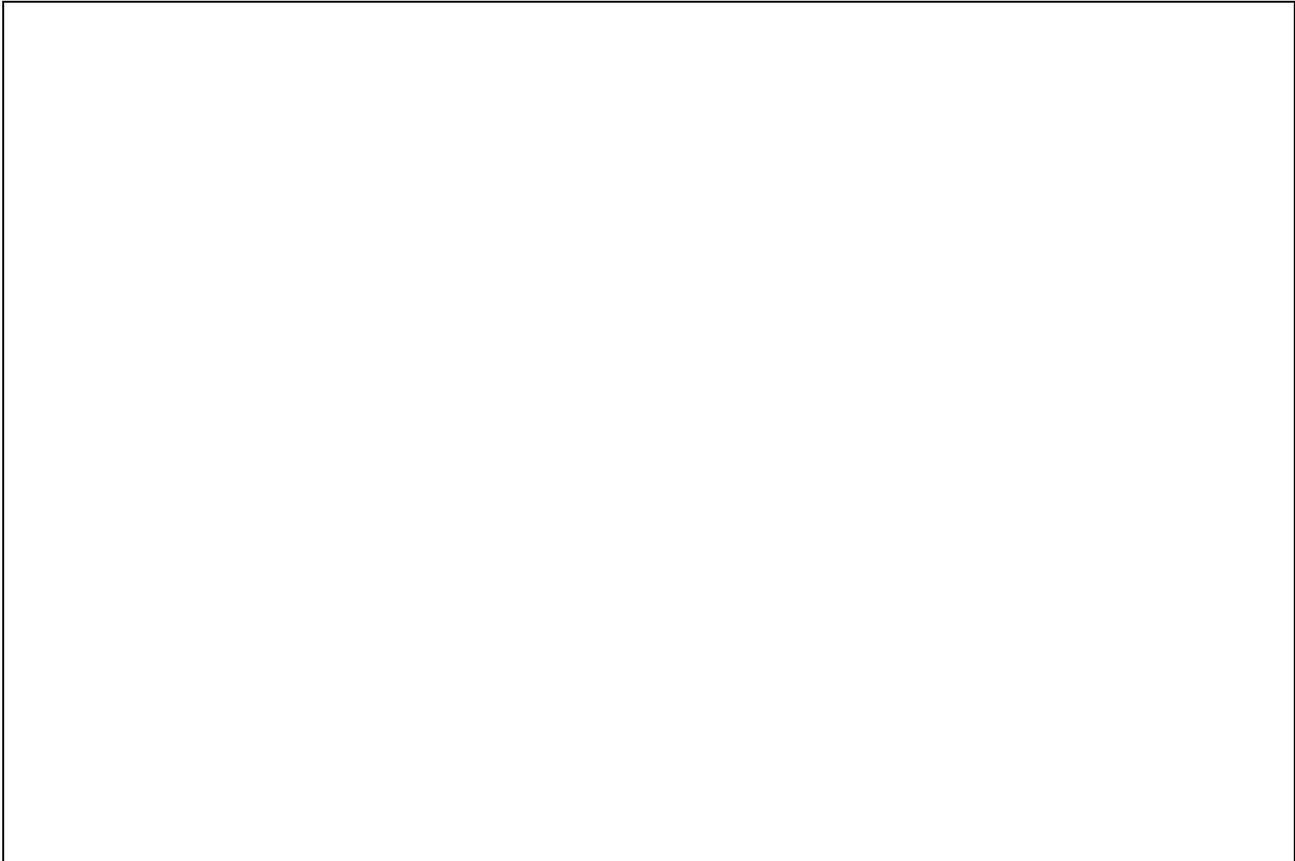
- A. Stranded or Solid Wire:** We will use this flexible wire to connect the different parts of our circuits.
- B. Switch:** Using this, we change the circuit from **open** to **closed** when we turn the flashlight on.
- C. Battery:** We use this as a power source for our flashlights. It has 9 Volts of power.
- D. Battery Clip:** When we attach this to our battery, we can connect our battery power into the circuit so that it connects to the rest of the flashlight.
- E. LED:** LED stands for Light Emitting Diode, an electrical component that lights up when current flows through in one direction, but not the other. The longest of the 4 wires is negative.
- F. Resistor:** We use this to reduce the electric current flowing through the circuit so it does not burn out the LED.

Tools for Building your Flashlight Circuit

- A. Wire Strippers:** We use the V-shaped notch in this tool to strip (or peel) the insulation off of wires.
- B. Needle-Nose Pliers:** We use this tool to work with small electronic parts.
- C. Solder:** We use this melted tin/lead alloy as a metal "glue" to hold the loose and less sturdy parts of the circuit together.
- D. Soldering Irons:** We use these tools to melt the solder so it can make a good connection with the other metal parts of the circuit. It is 800 degrees, so wear safety glasses and BE CAREFUL!

4. Draw a picture of the circuit for your flashlight. Label each component after you have drawn it below.

MY FLASHLIGHT CIRCUIT:



4. Now we move on to finishing your circuit. You may have to wait to solder your connections, so you can work on the body of your flashlight. You can use:

cardboard tubes
scissors
caps

markers
colored tape

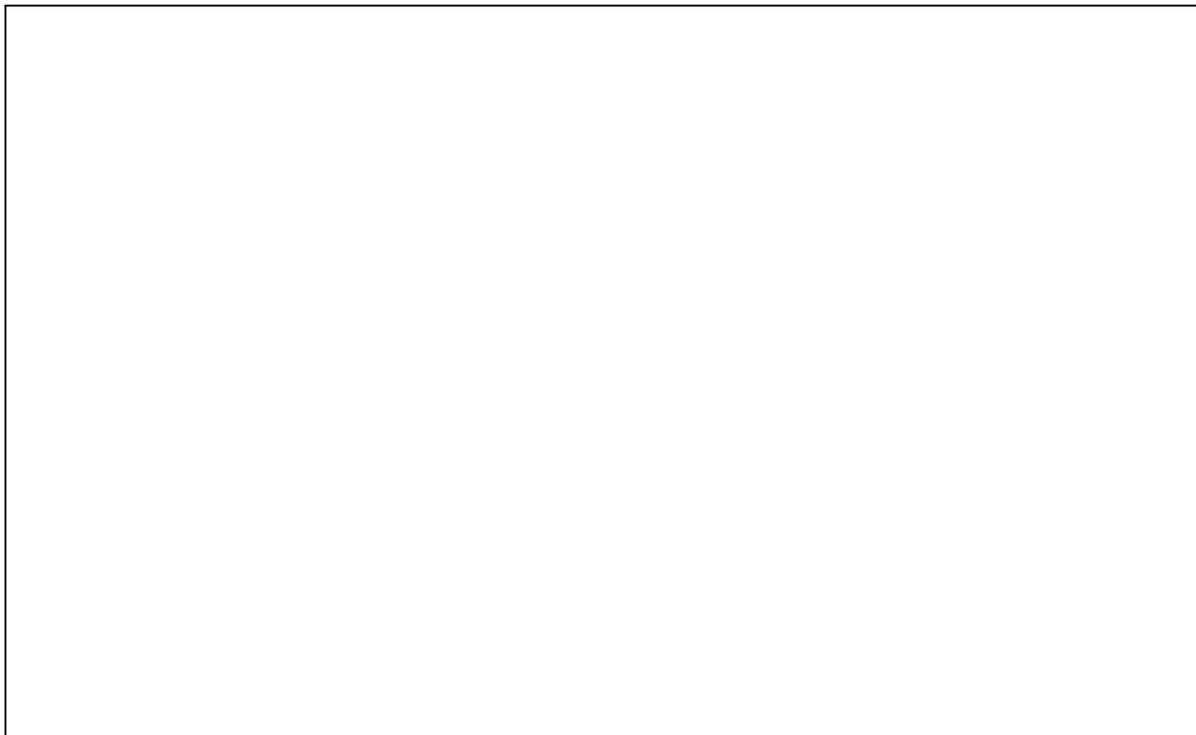
5. Re-attach the battery to the battery clip and try out your circuit. Once you have a working circuit, and you have soldered the connections, fit it all into your flashlight body tube. You're done!

6. Draw a picture of your circuit in a DIFFERENT LANGUAGE: schematic symbolism. If you have time, compare your schematic picture with anyone else who is sitting around you. You can communicate with them using these schematics just like electricians and electrical engineers communicate with each other.

Schematic Symbols: The Language of Electronics!

Wire:	
Battery:	
Switch:	
LED:	
Resistor:	

MY CIRCUIT WRITTEN IN SCHEMATICS



Time to go camping!!!