

Name: _____

Date: _____

Build your Own Flashlight!

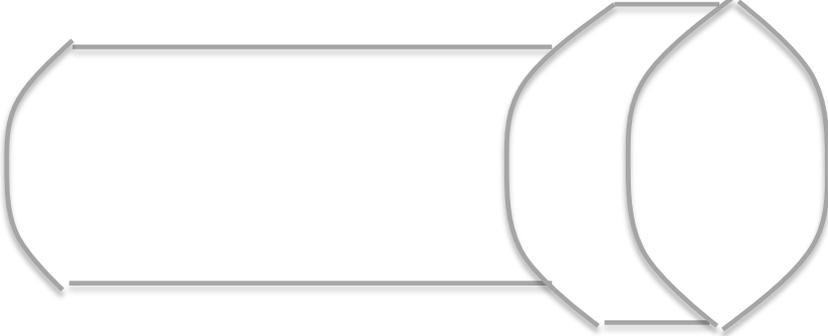
First, we'll look at a "store-bought" Flashlight....

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.

Box A

2. Draw a technical diagram of your flashlight. Label what you can.

Box B



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

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

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. Battery:** We use this as a power source for our flashlights.
- C. Battery Clip:** When we attach this to our battery, we can transfer the battery's chemical energy into the circuit as electrical energy for the flashlight.
- D. Switch:** Using this, we change the circuit from **open** to **closed** when we turn the flashlight on.
- 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 longer of the 2 wires is positive.
- 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. Solder:** We use this as a metal "glue" to hold the loose and less sturdy parts of the circuit together. It is made of melted tin/lead alloy to allow an easier transfer of the electrical energy from one part of the circuit to the next.
- C. 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!

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

Checklist of Parts:

- | | | | |
|--------------------------|----------|--------------------------|---------|
| <input type="checkbox"/> | Wire | <input type="checkbox"/> | Battery |
| <input type="checkbox"/> | Switch | <input type="checkbox"/> | LED |
| <input type="checkbox"/> | Resistor | | |



Check it when you're done drawing it!

MY FLASHLIGHT CIRCUIT:

5. Time to personalize your flashlight.

Though we all have the same circuit design, your flashlight can be one of a kind. Try drawing, or perhaps just use the tape to really make your flashlight look like it belongs to you! *Don't forget to put your name on it!*

Once you have a working circuit, and you have used electrical tape to cover all of 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. Just like your other technical drawing, you should be able to 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, without worrying about your drawing skills!

Schematic Symbols: The Language of Electronics!

Wire:	
Battery:	
Switch:	
LED:	
Resistor:	

MY CIRCUIT WRITTEN IN SCHEMATICS

