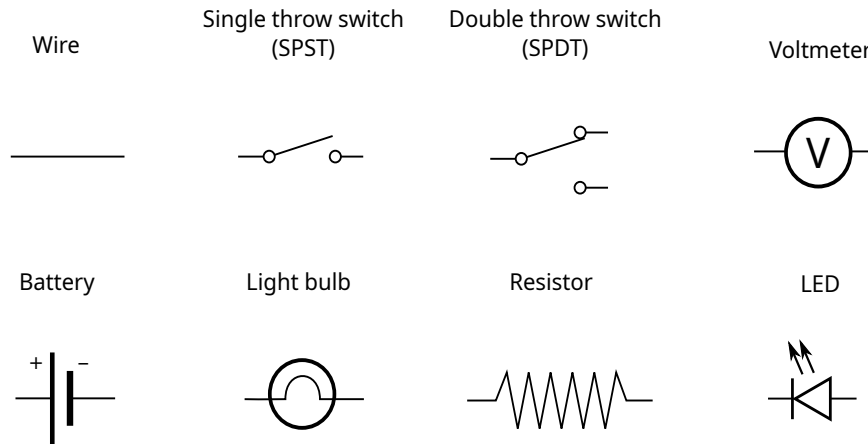


# Worksheet: Electrical Circuits II

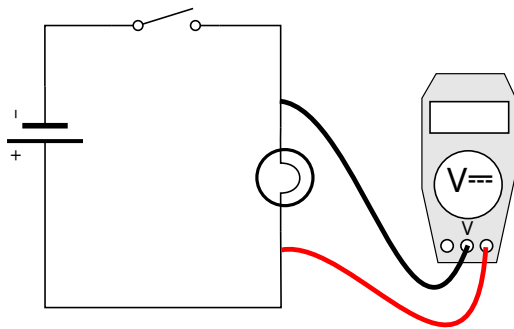
Name: \_\_\_\_\_ Group name: \_\_\_\_\_

In this lab you will build circuits and draw the associated **circuit diagrams**. In circuit diagrams, each device is represented by a symbol. Circuit diagrams are not to scale, they just specify in a clear way which component is connected to which. Here is a list of symbols commonly used:

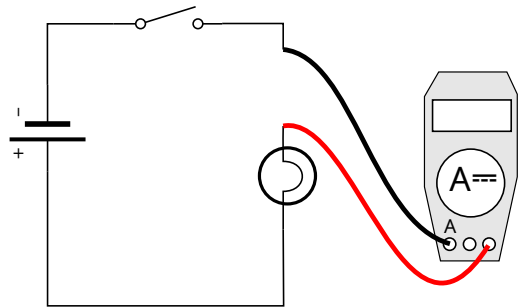


You will also measure **voltage** and **current**. Remember that you measure voltage **between** two points in the circuit (the difference in energy per charge between two points), while you measure current **through** a piece of circuit. **Never measure current without either a resistor or a lightbulb in series**, you can damage the multimeter!

Measuring Voltage

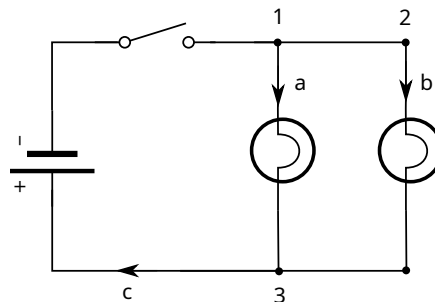


Measuring Current





2. Build the circuit shown, with parallel bulbs and measure the current and voltages given below.



- $V_{12} = \text{_____}$  ,  $V_{23} = \text{_____}$  ,  $V_{13} = \text{_____}$

- $I_a = \text{_____}$  ,  $I_b = \text{_____}$  ,  $I_c = \text{_____}$

- What is the total power provided by the battery?

$P = \text{_____}$  .

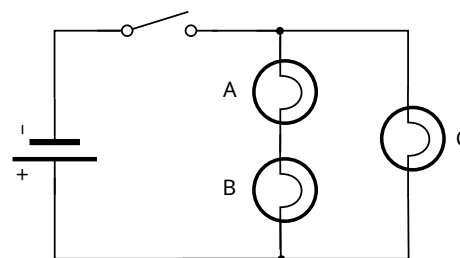
- Compare the different voltages. Find an explanation using the water analogy.

- Complete: For **any** two circuit elements in parallel, the voltage across each is \_\_\_\_\_ .

- Compare currents. Find an explanation using the water analogy, where current is the amount of water per time flowing through a slide.

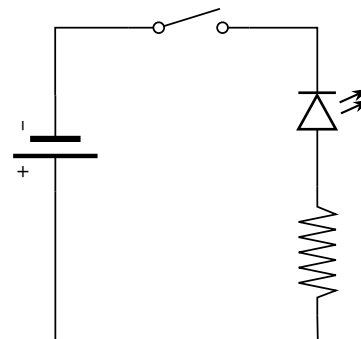
- Complete: For two circuit elements in **parallel**, \_\_\_\_\_ of the **current** through each element is the same as the current before or after the elements.

3. For the circuit shown, predict which bulb(s) be brighter (a brighter bulb has more current and power). Why?



- Confirm your prediction by designing the experiment

4. The LED is on a “board” with a circuit element called a resistor, which we will study next time. Hook up the LED with a switch as shown. Start with 1.5 V battery and increase to 3V, 4.5 V and 6 V. (If the LED does not shine, try reverse the two leads and try again.)



- At what point does the LED shine? \_\_\_\_\_ V.
- What is different about the LED and lightbulb? Fill in the blanks.

Voltage needed: \_\_\_\_\_

Current needed: \_\_\_\_\_

Polarity (which lead is +): \_\_\_\_\_

Other (power etc.): \_\_\_\_\_