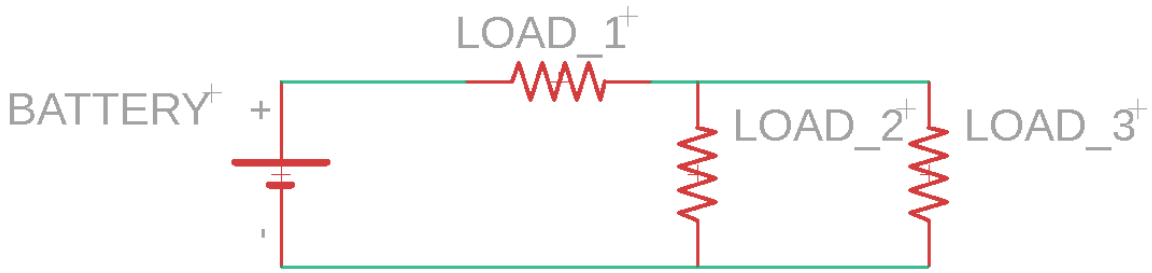
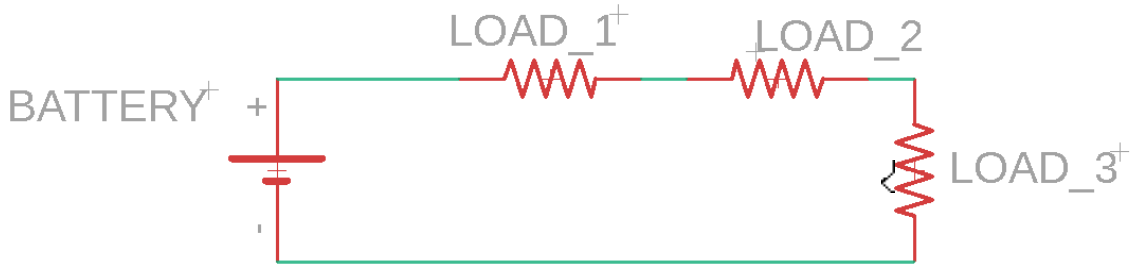
Ohm's Law

Before starting this worksheet, make sure you have read the Drone Physics handout and the Multimeter worksheet to understand Ohm's law and your multimeter. Use your knowledge to solve the following problems!

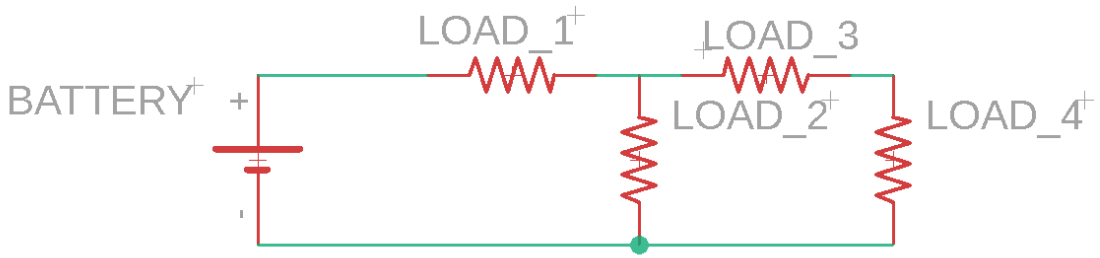
1. Label each connection as series or parallel. (There might be both on a circuit!)
   - Example: Load_2 and Load_3 are in parallel. Load_1 is in series with the parallel combination of Load_2 and Load_3.



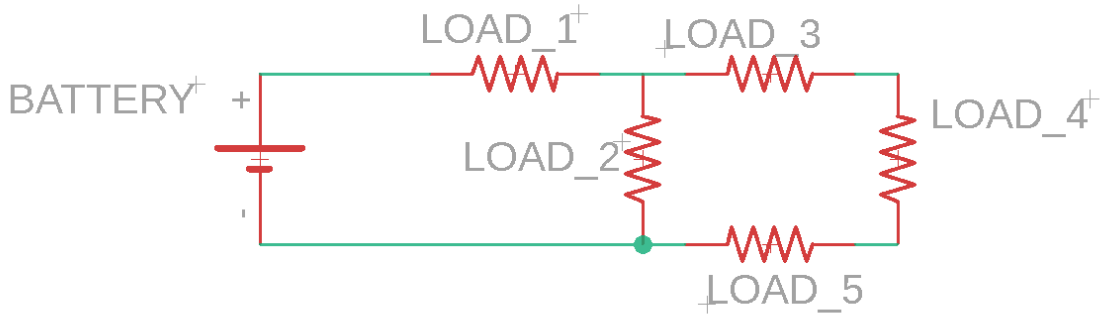
a. Load_1 Load_2 and Load_3 are all in series



b. Load_3 series with Load_4; Load_1 in series with parallel combination of Load_2 and series combination of Load_3 and Load_4



c. Load_3 series with Load_4 and Load_5; Load_1 in series with parallel combination of Load_2 and series combination of Load_3, Load_4 and Load_5



2. Answer each question about Ohm's law and circuit theory.
    a. Explain why you never want to connect a wire between two terminals on a 9 V battery.
        i. This creates a short and can damage the battery due to the infinite flow of current. In this system, there is not enough resistance to drop the electrical energy of the battery to 0 V.
    b. Explain why your series circuit won't work if you removed a load. Do you think a parallel circuit would still work if you removed a load? Why or why not?
        i. If you remove a load in a series circuit you have an open circuit, if you remove a load in a parallel circuit, you still have a normal, closed circuit.
    c. How does a multimeter work?
        i. The multimeter reads resistance by sending a small constant current through your circuit and causing a voltage drop. The multimeter reads the voltage drop and can calculate the amount resistance using Ohm's law.
    d. If you add more silver ink to your drawing will the resistance go up or down, explain your reasoning?
        i. This depends on how much ink you are adding. More ink usually means less resistance, but, if you add more ink and more distance to the line you are drawing, then it would increase the resistance!