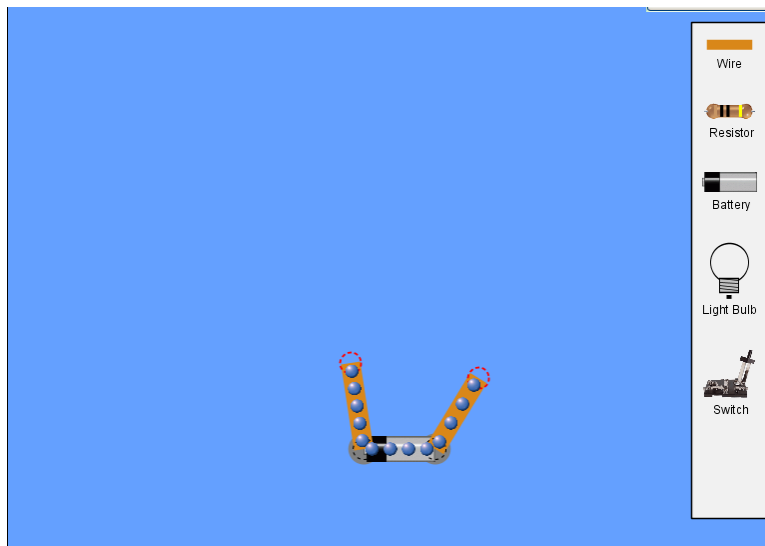
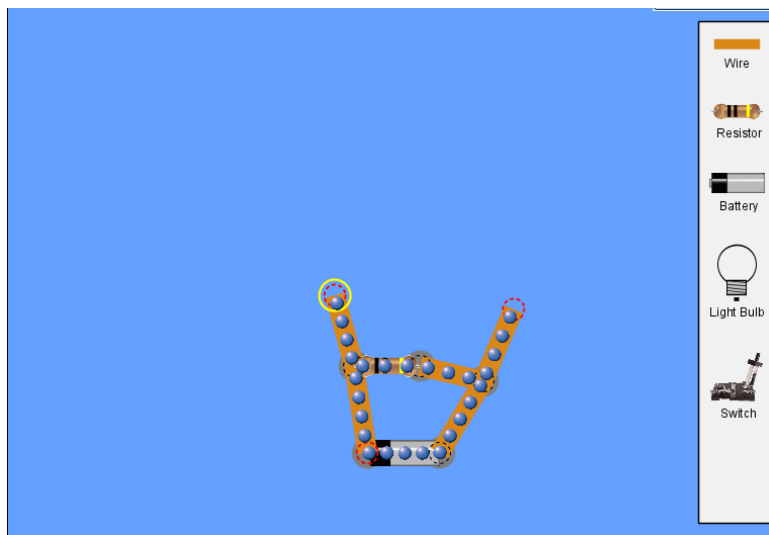


## Parallel Circuit Exploratory

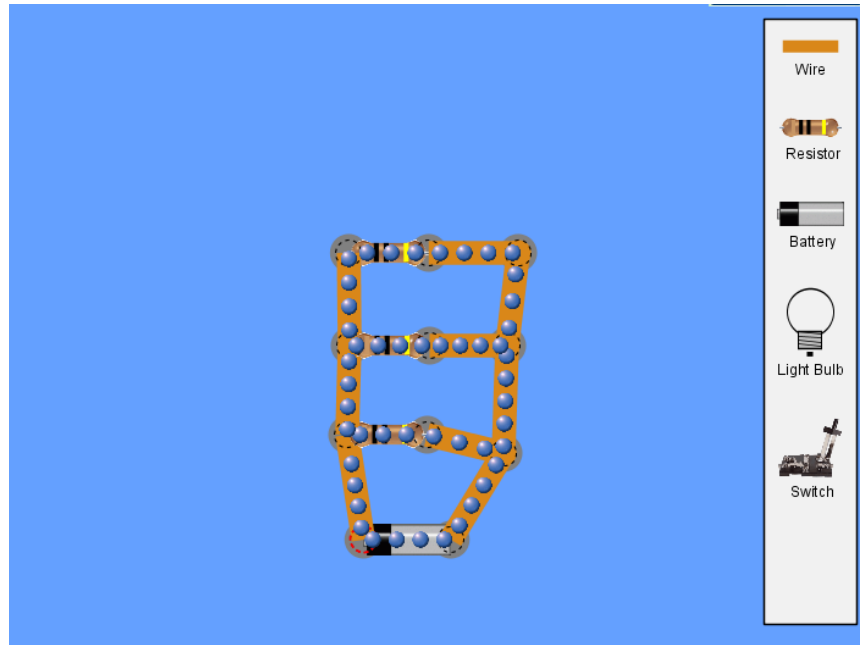
1. Go to <http://phet.colorado.edu/web-pages/index.html>.
2. Click on the “Play with sims...” button.
3. Click on the “Physics” link in the left frame of the page.
4. In the right frame, scroll down to find the Circuit Construction Kit (DC Only) and select it. You may select “Run Now!”
5. Begin by clicking on a “Battery” and dragging it into the blue working space.
6. Now click on the “Wire.” Drag it onto the working space. Link one side of it to the battery.
7. Now click on another “Wire.” Drag it onto the other side of the battery. It should now look like this:



8. When you add the resistors, make sure to add an extra segment of wire as shown below. This is needed so that you can measure the current through each resistor.

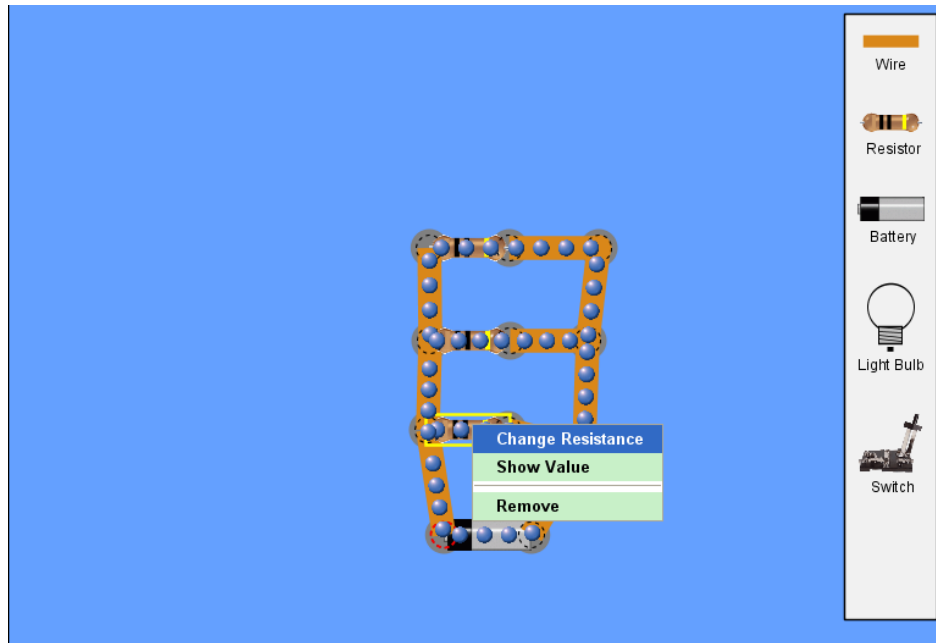


9. Add all three resistors “in parallel.” Do this by dragging a resistor to the end of the wire. Connect a piece of wire to its new end.

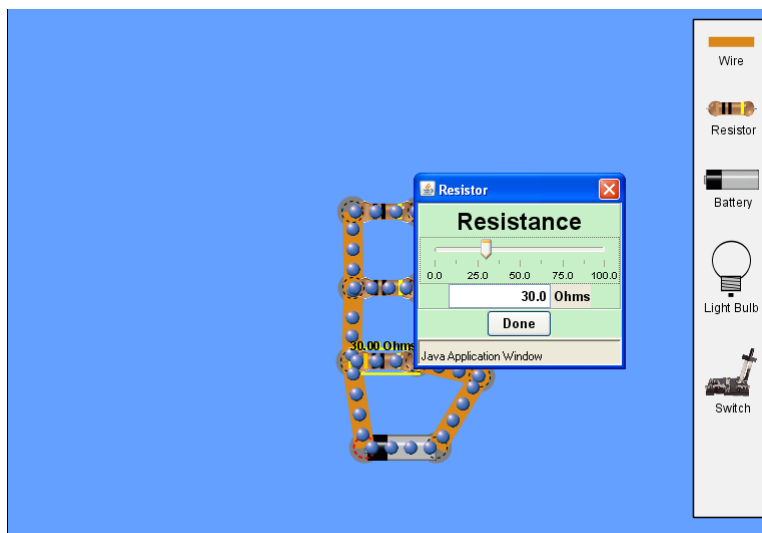


Current should start flowing through the circuit. Remember that real electrons do not move as simply as shown, but this model helps us focus on the most important parts of the circuit.

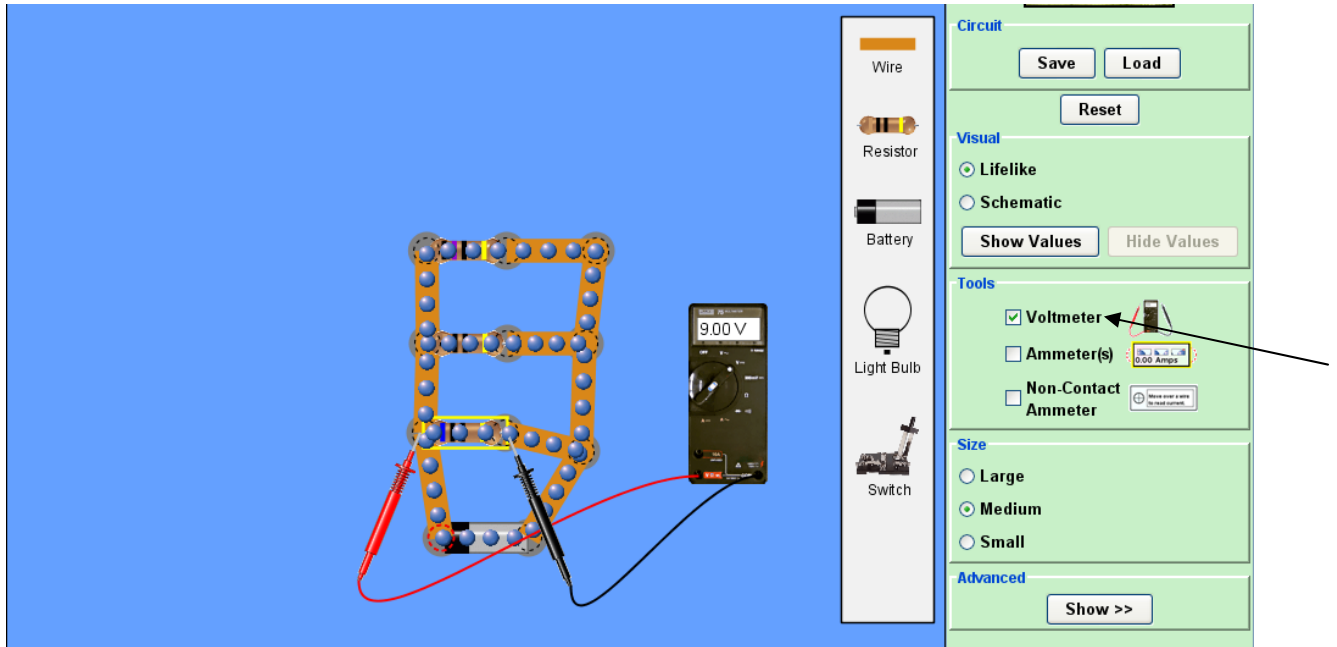
10. As you did in the series circuit exploratory, change the value of each resistor so that none are the same. Begin by right clicking on a “Resistor.”



11. After selecting “Change Resistance,” select a value using either the slide bar or the text box.

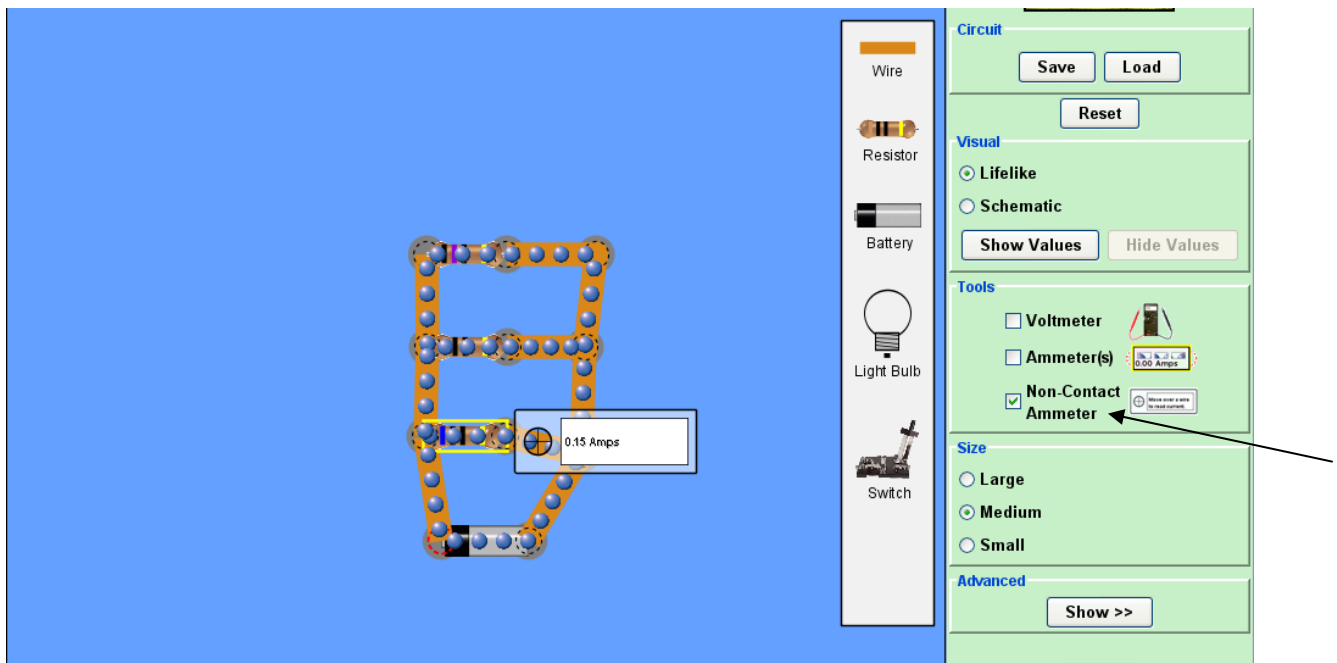


12. You need to make a chart to record your data. You should have rows for each of the resistors and the total circuit. You should also have columns to show the voltage, current, and resistance. Record all of the resistance values that you selected. Leave the total resistance empty; you will calculate this later.
13. Measure the voltage across each resistor by using the voltmeter. Click on the “Voltmeter” button on the right and the meter should appear. To measure the voltage across a resistor, place the red lead on one side and the black lead on the other.



14. Now measure the total voltage of the circuit. Do this by placing the leads across the battery.

15. Select the “Non-Contact Ammeter” and measure the current through each resistor and the total current.



Fill in the current values in your chart for the current through each resistor. The total current can be found by placing the “non-contact” ammeter over the wire right next to the battery.

Complete your data table by using Ohm’s law to find the total resistance.

- How are the voltages across the resistors related to the total voltage?
- How are the currents through resistors related to each other and the total current?
- How is the total resistance related to the individual resistance values? You might not see the mathematical relationship, so you can also describe the total resistance as larger, the same, or smaller than the individual resistances.