

What we expect you to know already

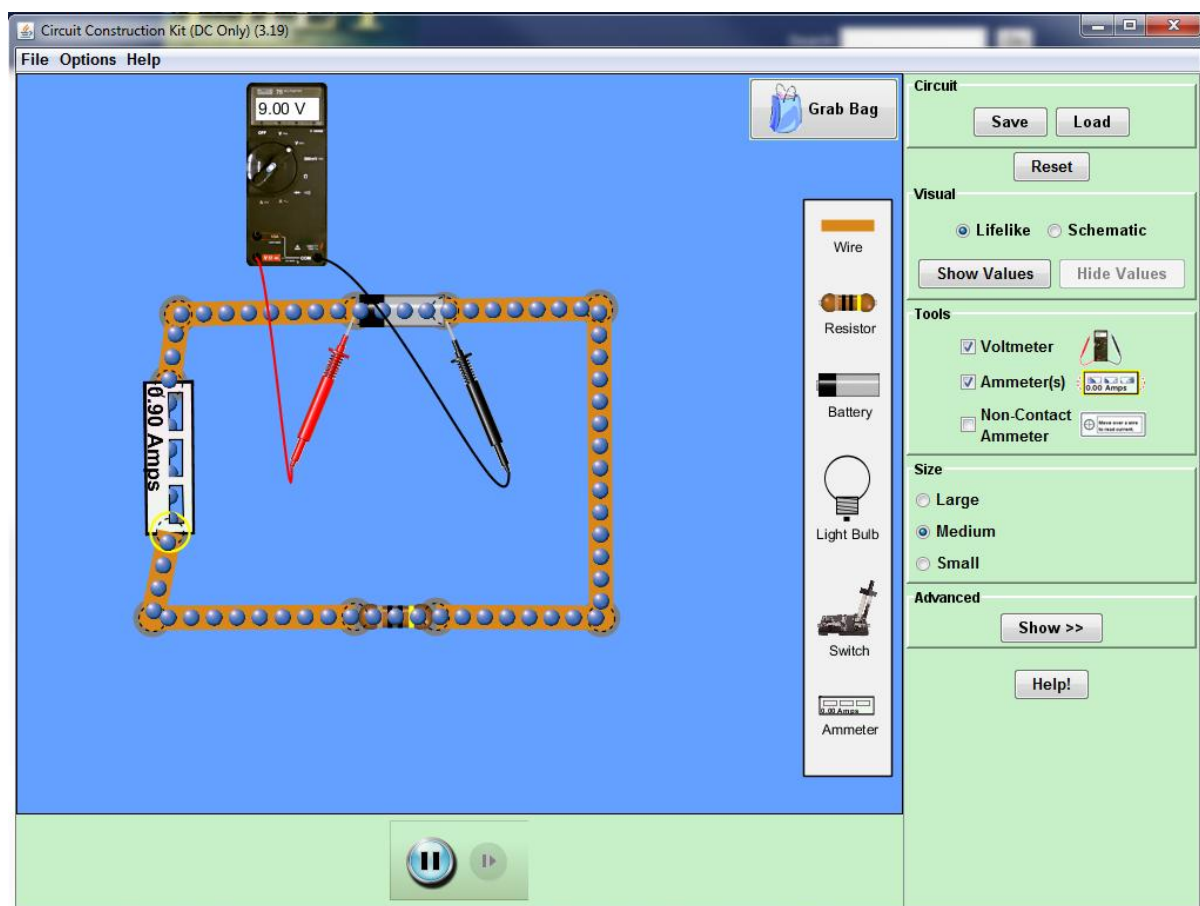
- An electric current in a circuit is the flow of electrons around the circuit, leaving the negative side of the battery and then returning to the battery on the positive side.

What we expect you to know and understand after doing this homework

- Currents will flow in circuits where a working battery is present because batteries provide a potential difference and a potential difference causes a current to flow.
- The amount of current that flows depends on both the resistance in the circuit and the potential difference being provided by the battery.
- If you keep the total resistance of the circuit the same then the greater the potential difference, the greater the current you will get in the circuit.
- If you keep the potential difference of the battery constant, then the greater the total resistance in the circuit, the smaller the current you will get in the circuit.

Task

1. Build the circuit pictured below



- Note that you have to check the boxes for the Ammeter and Voltmeter
 - Make sure that you have the same meter readings as the picture above before you proceed.
2. You can adjust the **potential difference** (p.d.) provided by the battery by right-clicking on it. To begin with the battery provides a potential difference of 9.00 Volts and as a result a

current of 0.90 Amps flows in the circuit. What do you think will happen if you DOUBLE p.d. provided by the bulb? Write down your prediction in your exercise book, then change the p.d.

3. What has happened to the **current**? Record the new **ammeter** reading in your book. Remember the unit which should be A for Amps.
4. How has the simulation changed in order to show that the current has increased? Write a full sentence answer in your book.
5. **Resistance** means *resistance to the flow of current*. At this stage in the simulation the only resistance in the circuit is provided by the resistor. This is not realistic. In reality, batteries, leads and ammeters all have a small resistance, though often it is small enough that we can ignore it. You can change the resistance of the resistor by right-clicking on it. What do you think will happen to the current in the circuit if you DOUBLE the resistance of the resistor? Record your prediction in your book then change the resistance.
6. What has happened to the current? Record the new ammeter reading in your book.
7. You should see that the current depends on the resistance in the circuit and the p.d. provided by the battery. If you double the p.d. again, and double the resistance again, the p.d. of the battery will be 36 V and the resistance of the resistor will be 40 Ohms – but what will the current be? Make a prediction in your head, then set the values for the battery and resistor. What is the current now? It should be the same as it was when we started. Write a couple of sentences in your book trying to explain why doubling the p.d. from the battery and the total resistance of the circuit causes no change in the current.