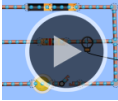


Lab

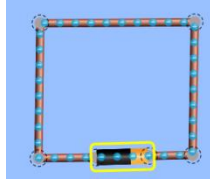
Go to google. Type: "PHET DC CIRCUIT"

Select → [Circuit Construction Kit: DC - Series Circuit | Parallel Circuit ... - PhET](https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc)
<https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc>
 Experiment with an electronics kit! Build circuits with batteries, resistors, light bulbs, and switches. Determine if everyday objects are conductors or insulators, and take measurements with an ammeter.

Click on play → 

Select Lab

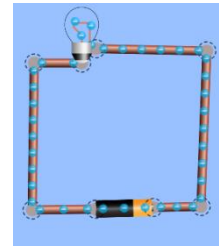
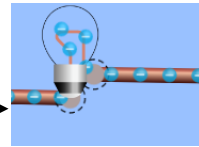
1. Create a battery and wires as seen to the right →



What happens?

Why do you think this happens?

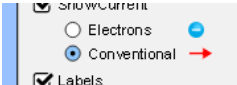
2. Un-attach the top wires and connect a light bulb as seen to right & below →



What happens?

Examine inside the light bulb, what is happening?

Which way are the electrons flowing?

Click on Conventional Current → 

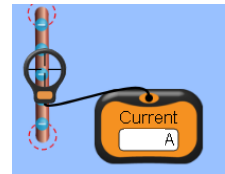
Which way does the current flow?

Place Current setting back to electrons. 

3. Notice the brightness of the light.

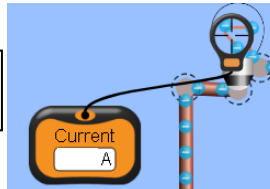
Take the ammeter from the right and PLACE THE SCOPE ANYWHERE ALONG THE CIRCUIT WIRE

What does the AMMETER read? A



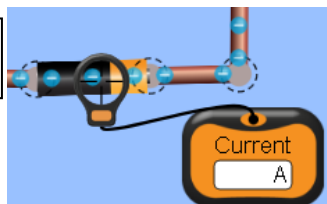
Now place the ammeter scope on the BULB.

What does the AMMETER read? A



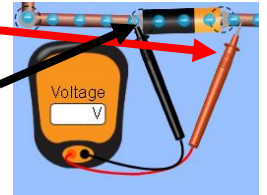
Now place the ammeter scope on the BATTERY.

What does the AMMETER read? A



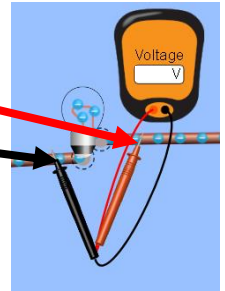
What can you say about the current (ampere) of the circuit?

Take the voltmeter from the right and **PLACE THE RED PRONG on the POSITIVE SIDE OF BATTERY**
and **PLACE THE BLACK PRONG on the NEGATIVE SIDE OF BATTERY**



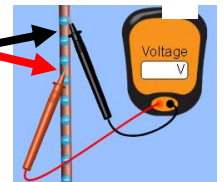
What Does the VOLTMETER READ?

Take the voltmeter from the right and **PLACE THE RED PRONG on the POSITIVE SIDE OF LIGHT BULB**
and **PLACE THE BLACK PRONG on the NEGATIVE SIDE OF LIGHT BULB**



What Does the VOLTMETER READ?

Take the voltmeter from the right and **PLACE THE RED PRONG anywhere along on the wire**
and **PLACE THE BLACK PRONG anywhere along on the wire**



What Does the VOLTMETER READ?

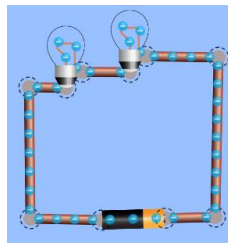
Using Ohm's Law, $I=V/R$ and $V=I \cdot R$ and $R=V/I$

Determine the light bulb resistance

$$R=V/I \quad R= \underline{\quad} / \underline{\quad}$$

$$R= \underline{\quad} \Omega$$

4. Add another bulb to the circuit as seen to the right. →



What do you notice about the brightness of the light?

Using your data from above, determine the current of the circuit now (The resistance will be doubled, The V_T will be the same.)

$$I=V_T/R_T \quad I= \underline{\quad} / \underline{\quad} \quad I= \underline{\quad} \text{ A}$$

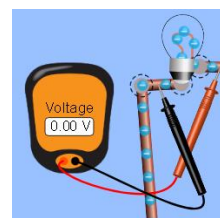
Now take your ammeter and aim scope anywhere along circuit,

What does it read? A

Now take your voltmeter, determine the voltage drop across each bulb

Bulb 1

Bulb 2



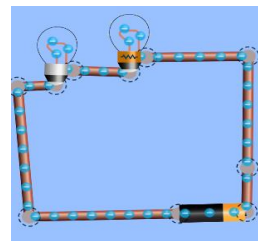
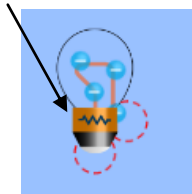
Add the Voltage drops of bulb1 and bulb2.

V

Total Voltage dropped

How does the total voltage dropped compare to the V_T ?

5. Change the 2nd bulb to a bulb with a resistor (located further down the list)

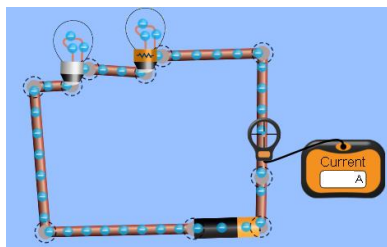


What do you notice about the brightness of the light?

What do you notice about the movement of the electrons?

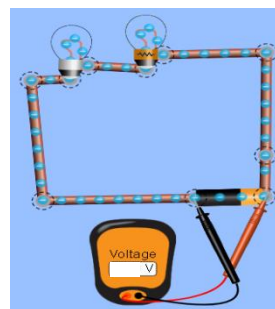
Use your ammeter to determine the current of the circuit now.

A



Use your voltmeter to determine the total voltage of the circuit now.

V



Using Ohm's Law, Determine the R_T

$R_T = V_T / I$ $R_T = \underline{\hspace{1cm}} \text{ V} / \underline{\hspace{1cm}} \text{ A}$

Knowing the resistance of the regular light bulb, Determine the resistance of the bulb with A resistor

$R_T - R_{\text{reg bulb}} = \underline{\hspace{2cm}}$ Resistance of bulb with resistor

6. **Create Circuit as seen in the picture to the right:**

What kind of circuit is this?

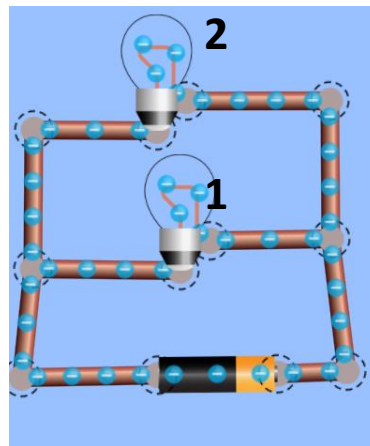
Click on the battery, change voltage of battery to 10V

Using the voltmeter, determine the voltage of:

The battery: _____

Lightbulb 1: _____

Lightbulb 2: _____



What can you determine about the voltage on parallel circuits?

Using the ammeter, determine the current through:

The battery: _____

Lightbulb 1: _____

Lightbulb 2: _____

What can you determine about the current on parallel circuits?

CONCLUSION: