

**Guiding Question: How can you measure values for electricity?**

**Learning Goal:**

**1. Use a multimeter to measure the resistance, Voltage, and current in a circuit**

**Agenda**

**1) Daily Science Review**

**2) Review parallel and series circuits**

**3) Variables and Units-Making Flashcards**

**3) Measurement and using the Millimeter**

**4) Circuits and Measurements activity**

**5) Exit Ticket**

**Words of the day**

**Resistance**

**Voltage/Volt**

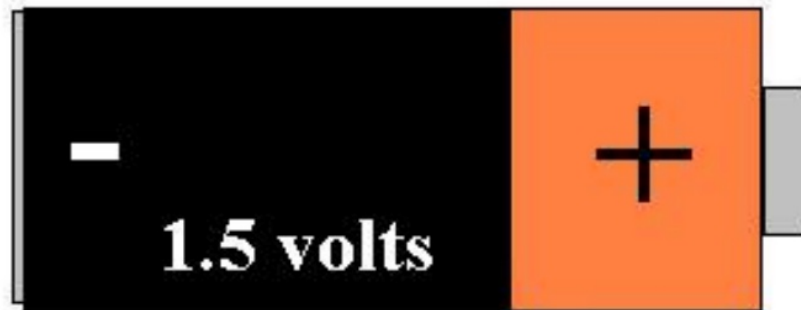
**Amps**

WOD

# Voltage

The amount of electrical potential energy. Often times found in a Battery. Measured in **Volts**.

AA Battery



WOD

# Resistance

a material's opposition to the flow of electric current; measured in **ohms**.



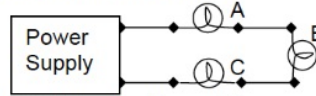
## Reduce Phantom Load

Unplug items like these when not in use



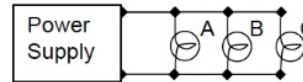
**WORKSHEET SERIES AND PARALLEL**

For questions 1 – 3 consider this circuit



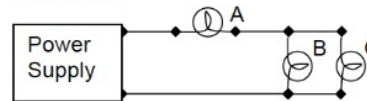
1. How many pathways are there for electricity to flow through?
2. Is this a series or parallel circuit?
3. If light bulb A was removed would light bulb B still work? Light bulb C?

For questions 4 through 7 consider this circuit



4. How many pathways are there for electricity to flow through?
5. Is this a series or parallel circuit?
6. If a light bulb A was removed would light bulb B still work? Light bulb C?
7. Would the removal of any light bulb affect the other two?

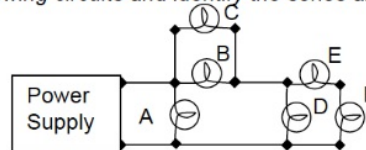
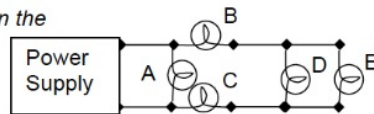
For questions 8 through 11 consider this circuit



8. How many pathways are there for electricity to flow through?
9. Is this a series or parallel circuit?
10. If a light bulb A was removed would light bulb B still work? Light bulb C?
11. What would happen if light bulb B. was removed?

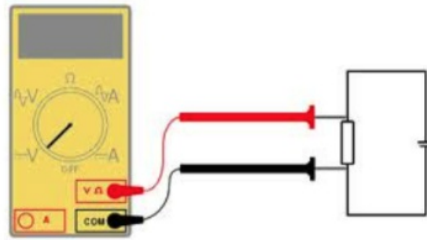
Trace the path electricity could take in the following circuits and identify the series and parallel parts

In the

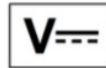


## MEASURING VOLTAGE

VOLTAGE is a difference **between** 2 points in the circuit

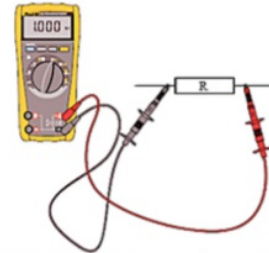


Your dial should be on a symbol that looks like this:



- The number should be 2 or 20 V
- The black probe is in the COM spot
- The red is in the V spot or VΩ spot

## MASURING RESISTANCE



RESISTANCE is how much something slows the flow of electricity.

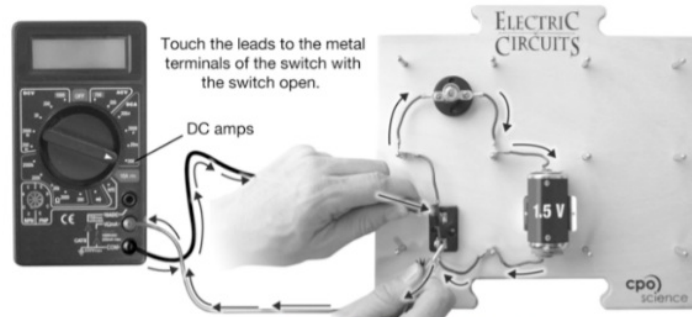
200Ω

The dial should look like:

- Dial is at 200 Ω or just Ω.
- The black probe is in the COM spot and the red is in the VΩ spot.
- Circuit should be open.

## MEASURING CURRENT

CURRENT is the amount of electricity flowing **through** 1 point in the circuit.

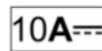


Touch the leads to the metal terminals of the switch with the switch open.

DC amps

The switch is open in this picture

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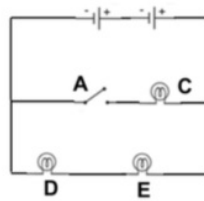


- The dial is at 10 Amps or 20 Amps
- The black probe is in the COM spot
- The red is in the A or 10A or 10A DC spot

**Circuit 1: Build a circuit with a battery, a light bulb, and a switch.**  
 Draw the Circuit diagram here, with an OPEN and CLOSED switch

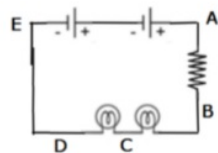
1. **Measure the Voltage of just the battery:** Put the red and black leads on each end of the battery before putting it in your circuit \_\_\_\_\_
2. **PREDICT:** Before lighting the bulb, predict the battery's voltage while the bulb is on: \_\_\_\_\_
3. **Explain** why you made that prediction.
4. Put the battery in the circuit and turn on the light. Measure, what is the actual difference between voltage when the light is on/off?
5. Now **measure** the current with a switch OPEN. The current is \_\_\_\_\_
6. What is the current if you unscrew the light bulb? \_\_\_\_\_
7. Measure the resistance of the light bulb. \_\_\_\_\_

**Circuit 2**



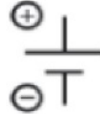

7. **PREDICT:** Which bulb will have the greatest voltage (C, D, or E)?
8. Close switches A. **Measure** the voltage across light bulb C, write it on your circuit diagram.
9. **Measure** the voltage across bulb D, write it by the bulb in your diagram.
10. **Measure** the voltage across bulb E, write it by the bulb in your diagram.
11. **Measure** the Voltage across bulb C
12. Open Switch A Measure the Voltage for  
 Light bulb B:  
 Light bulb E

**Circuit 3** Make this circuit below Measure the resistance for 3 different resistors. Make observations of the light bulb brightness. Change the resistance and measure the resistance for each of the 3 colors

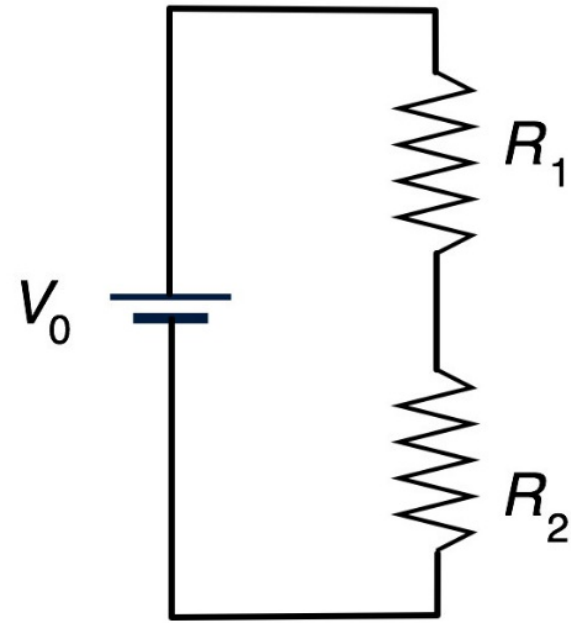
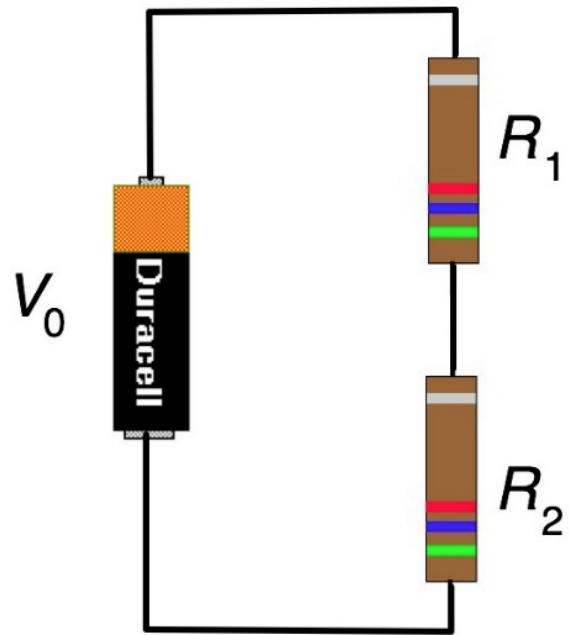




**Draw this table in your notes  
(do not use the whole page)**

Word	Variable	Circuit Diagram	Units	Unit Symbol
Current	I		Amps	A
Voltage	V	Battery 	Volts	V
Resistance	R		Ohms	$\Omega$





Start Studying for the test NOW!

Make flash cards for the following Words of the day in Quizlet

-Everything in the table of Page 86

-Current

-Resistance

-Voltage

-Open Circuit

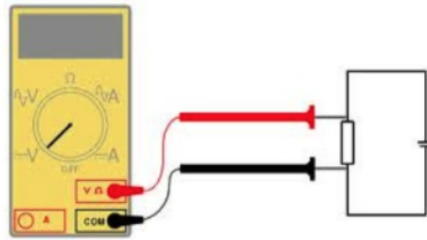
-Closed Circuit

-Parallel Circuit

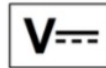
-Series Circuit

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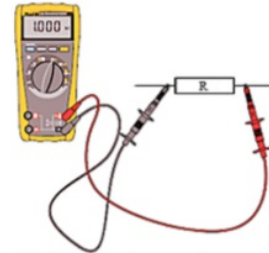


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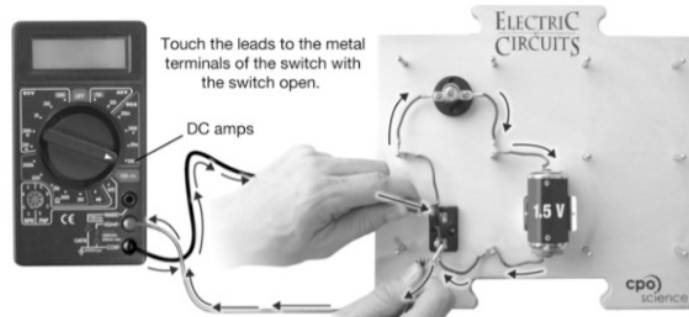
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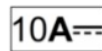


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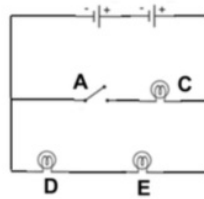
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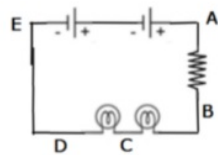
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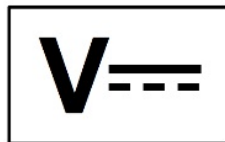
# Digital Multimeters!



# Digital Multimeters!

It can measure....

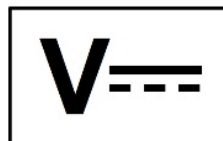
Voltage (volts)



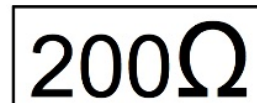
# Digital Multimeters!

It can measure....

Voltage (volts)



Resistance (ohms)



# Digital Multimeters!

It can measure....

Voltage (volts)

$V_{\sim}$

Resistance (ohms)

$200\Omega$

Current (amps)

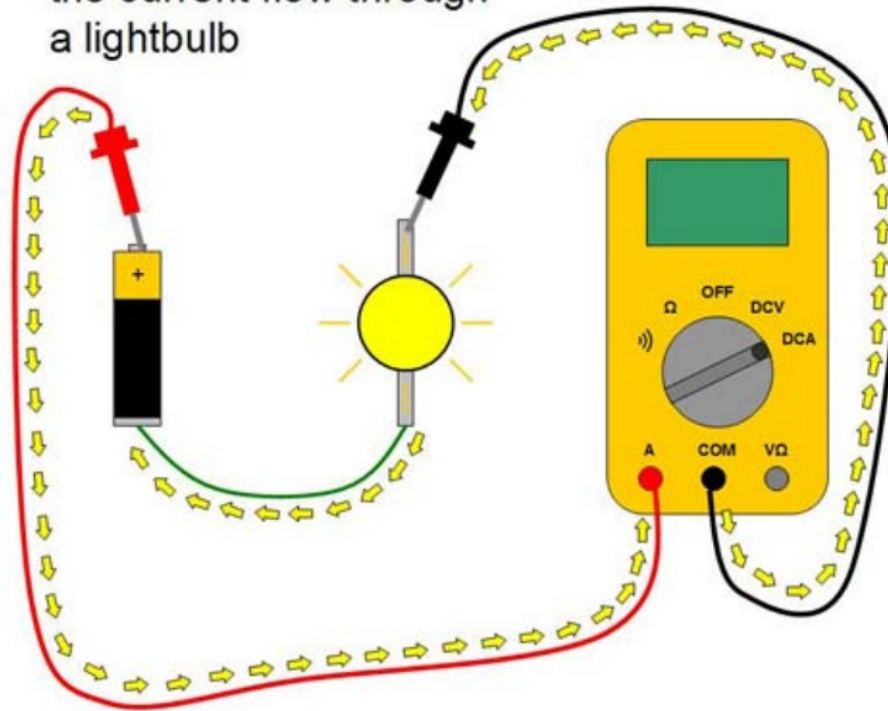
$10A_{\sim}$





To measure current, the multimeter must be part of the path the electricity flows through

Connect a multimeter in **series** to measure the current flow through a lightbulb





To measure current,  
plug the red cable  
in here

To measure voltage  
or resistance, plug  
the red cable in here

The black cable  
never moves from  
the slot marked  
"COM"

# Exit Ticket