Circuit Wizardry Workshop #1

Presented by:
Optics Society at the University of Michigan

Safety

Electricity is really cool but can be dangerous. We are going to be working with small amounts of electricity. At home, your electronic devices and the wall use MUCH bigger amounts of electricity.

Number 1 Rule: *At home, experiment with your parent's supervision.*

Where do we start?

What is electricity?

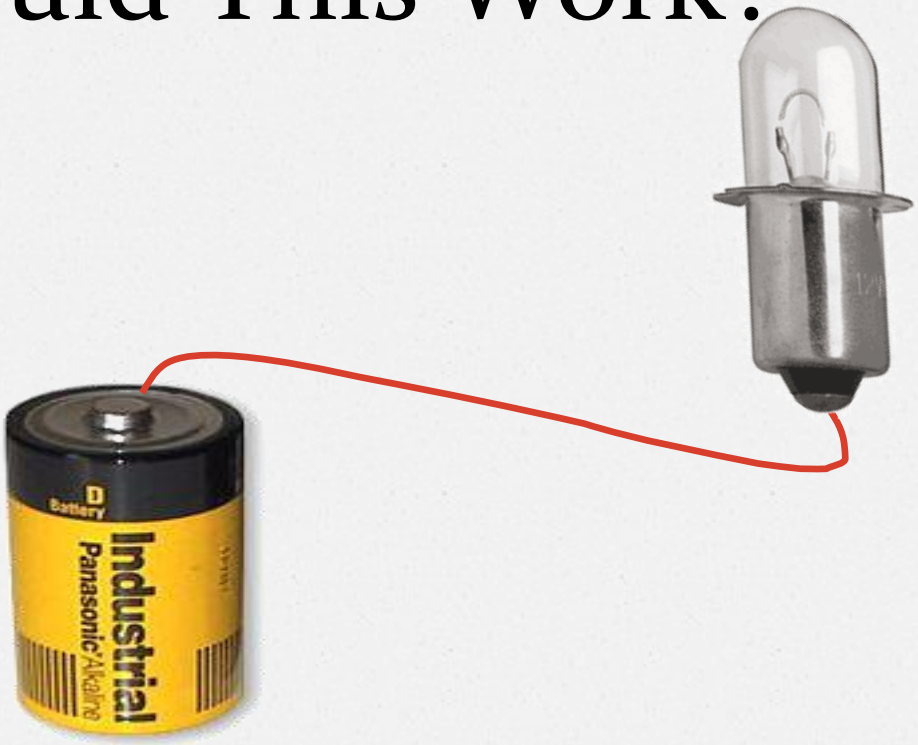
Is electricity manmade? In nature? Or both?
(is lightning a form of electricity? How a about static shock?)

Where does power come from?

Can a circuit be made from any material?

What do you know about electrons?

Would This Work?



Would This Work?

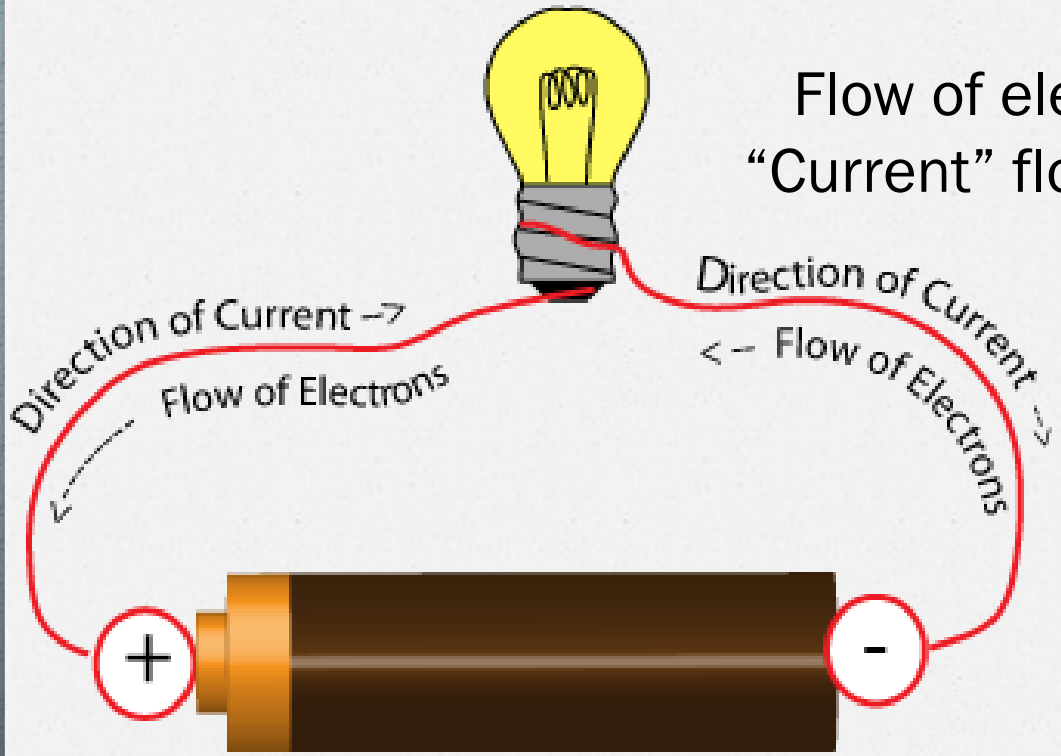
Would this Work?

Watch:
https://www.youtube.com/watch?v=Ww6xYGu3O10

Discuss!

The Central Concept: Closed Circuit

Current



Flow of electrons (like a river)

"Current" flows from (+) side of battery to (-) side

Electrons go the other way

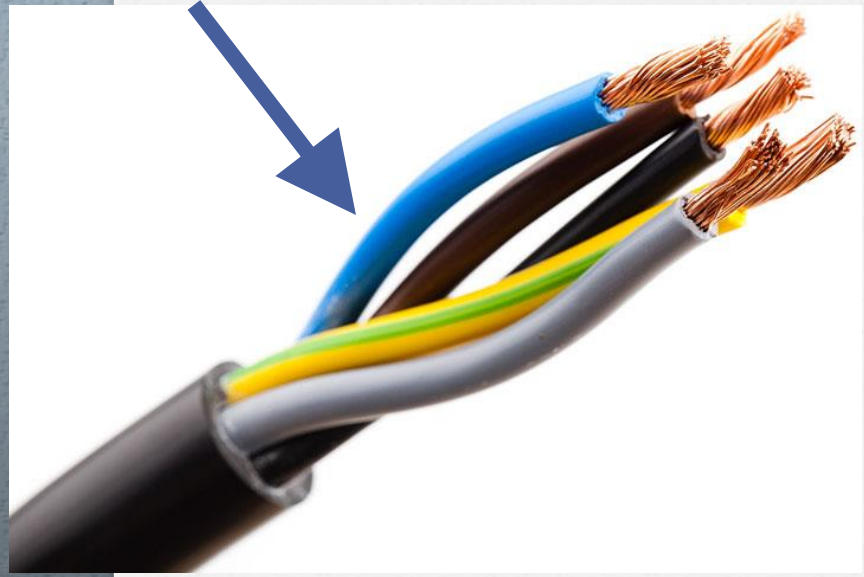
Conductor

Allows easy flow of electrons

Examples: Copper wire(shown in picture), paper clip, any metal

Skin is a “weak” conductor

Insulator

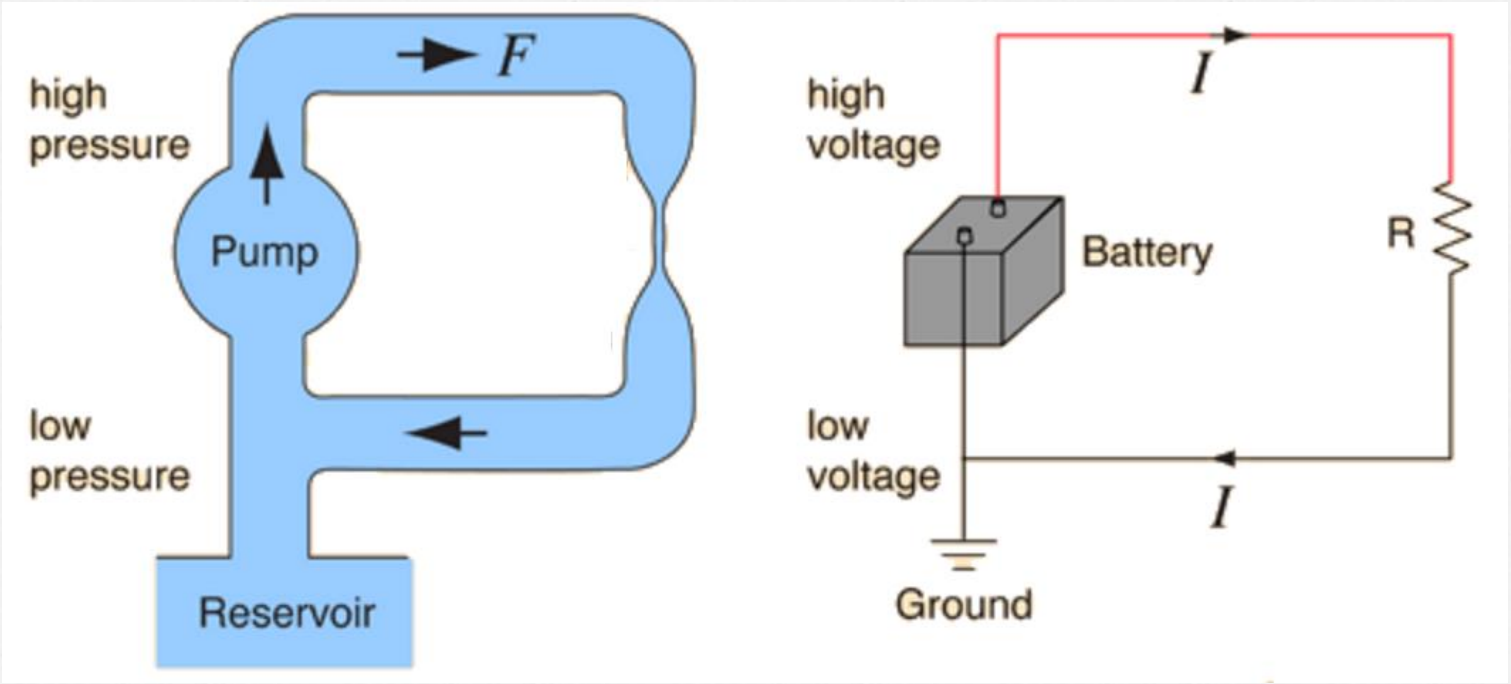


Does NOT allow electrons to flow at all. (No conduction)

Examples: Rubber (shown in picture), wood, cloth, plastic, cardboard

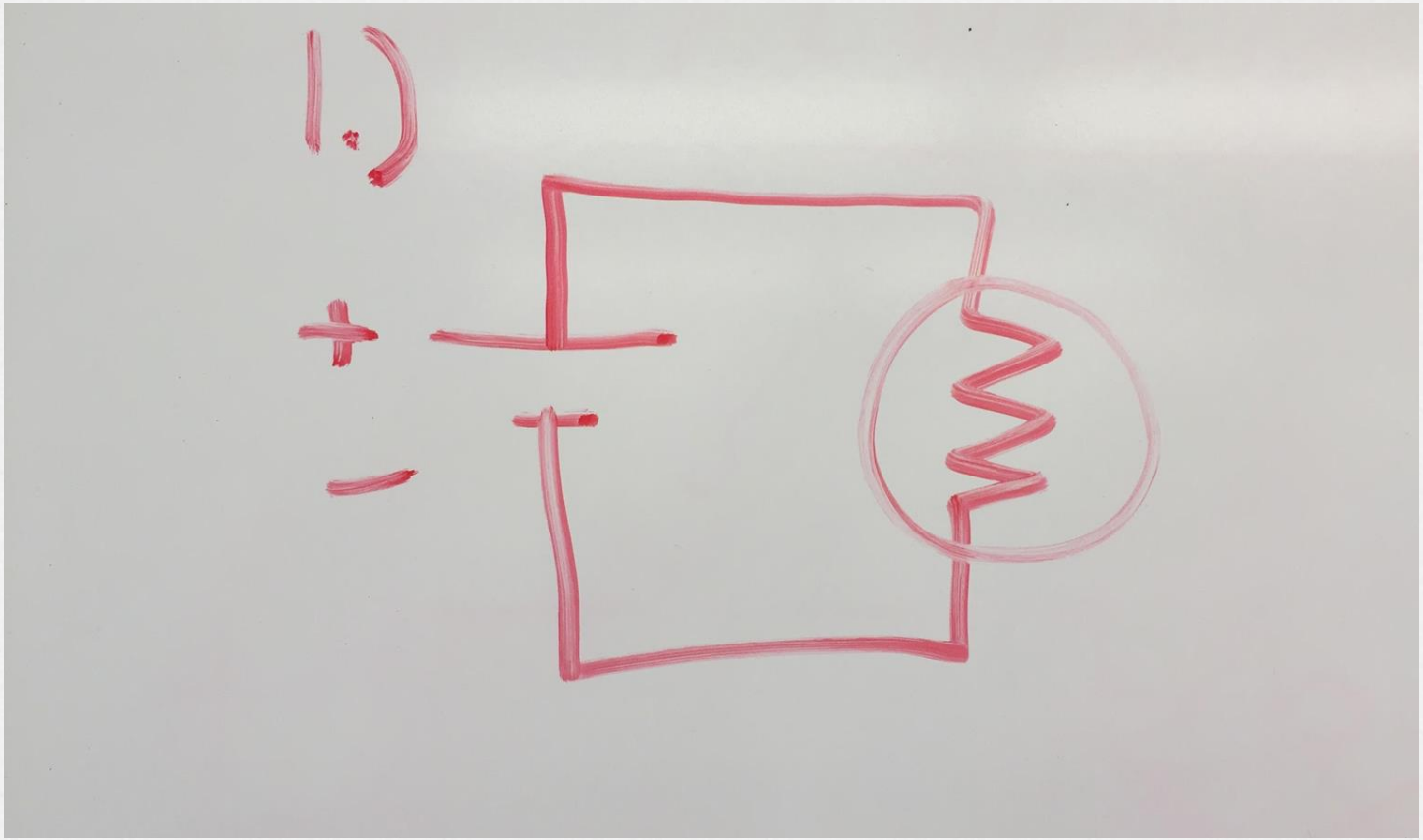
Voltage

Voltage is like pressure (sort of)



You Be the Electron!

Practice Practice Practice…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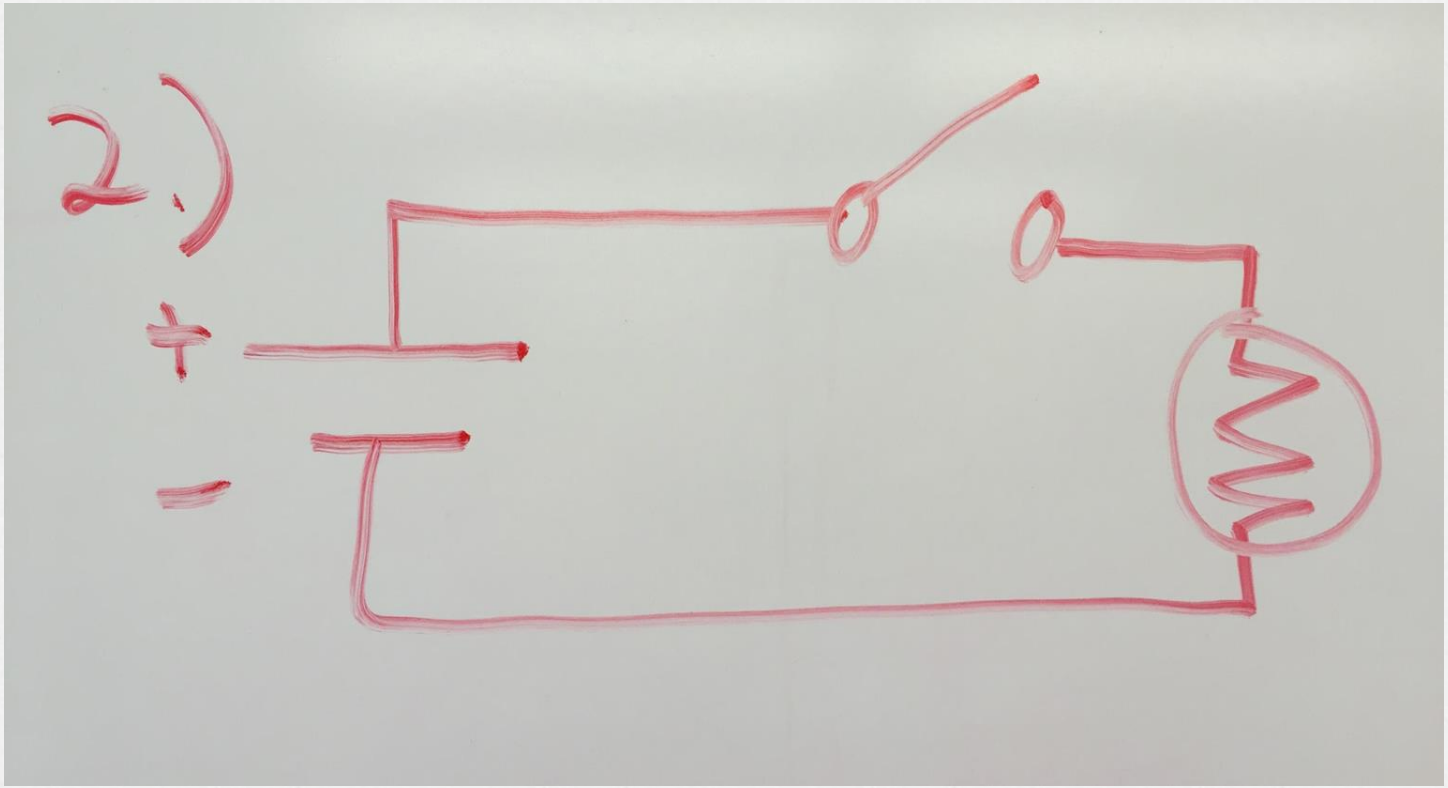
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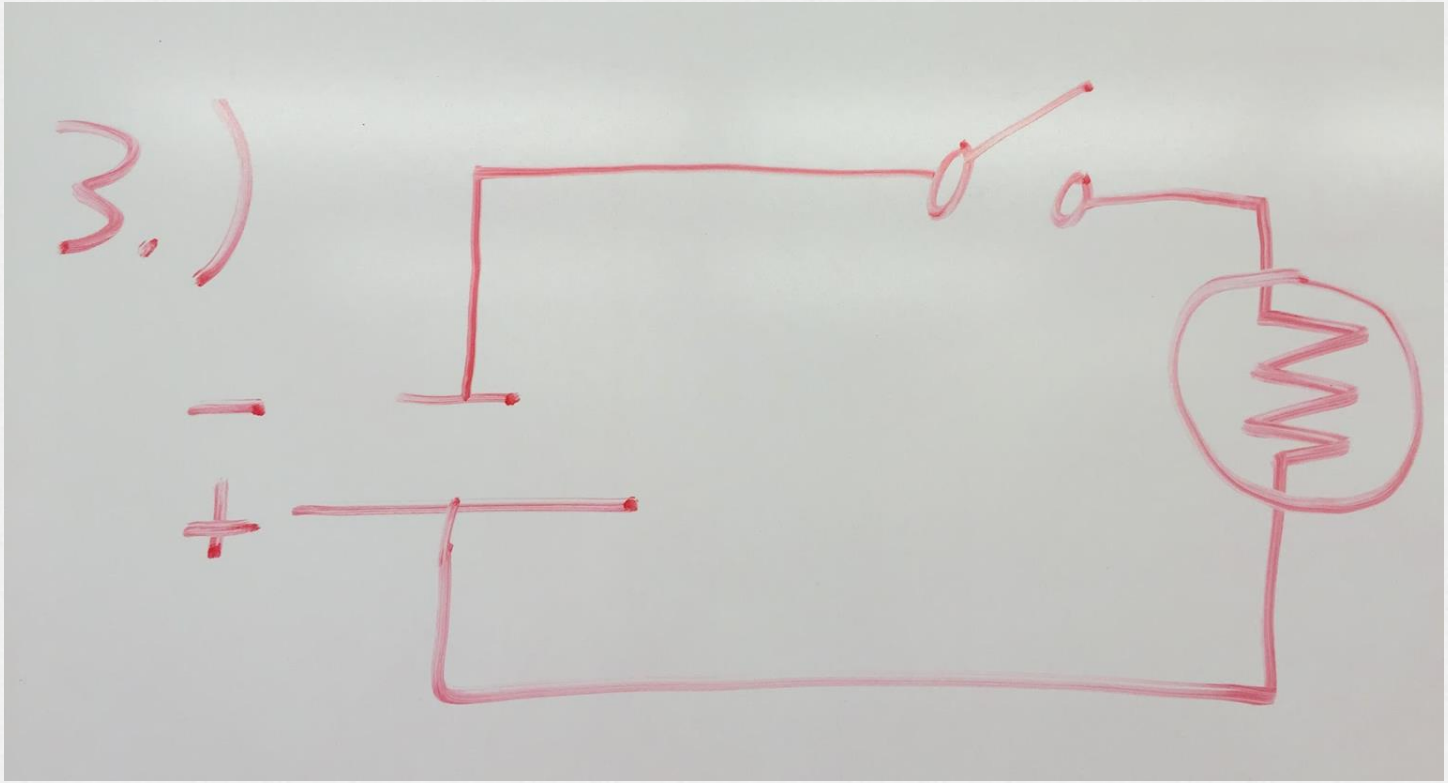
3.)
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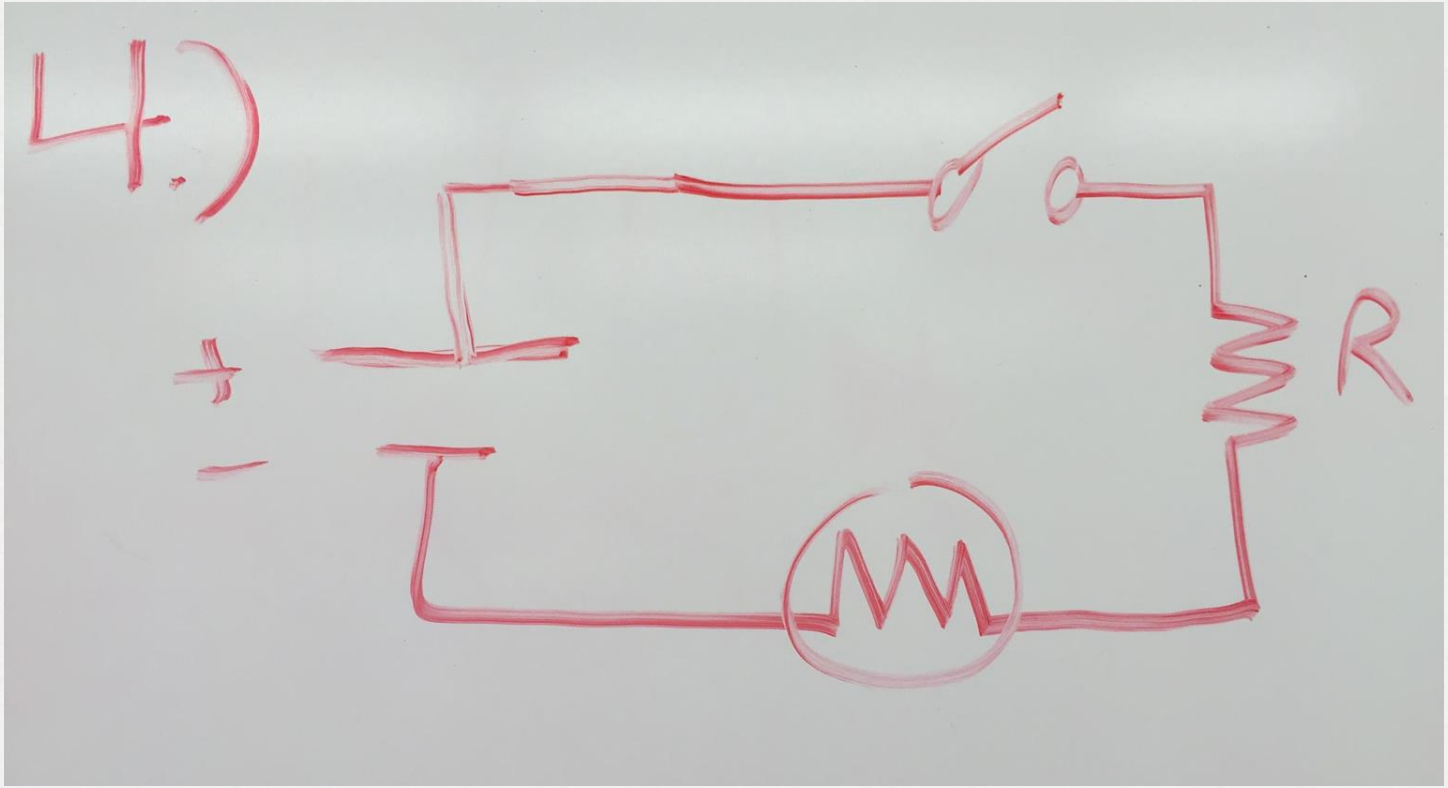
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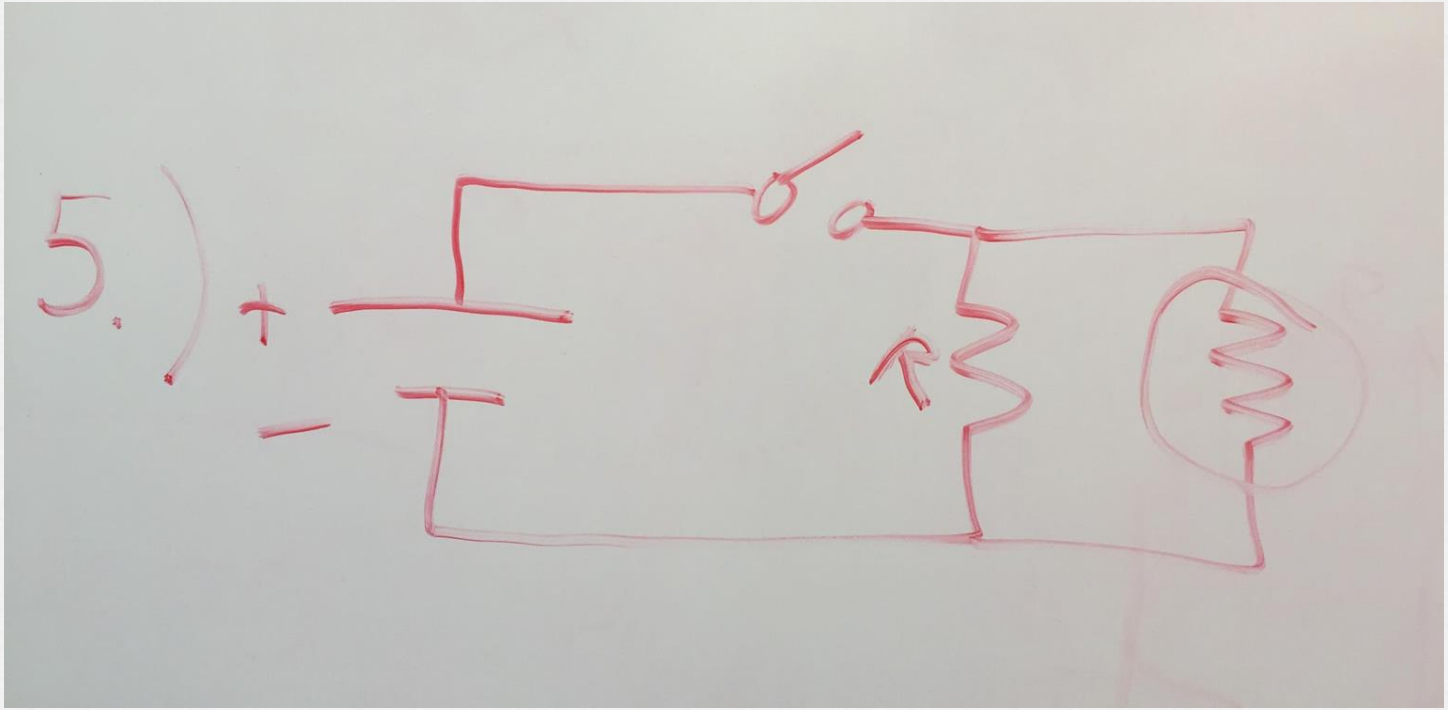
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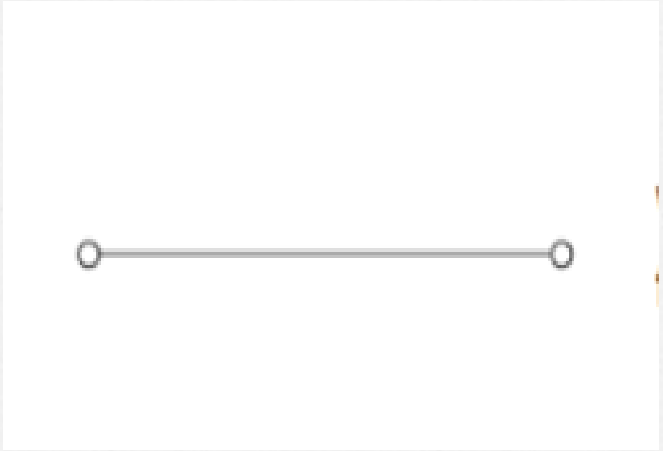
Flashcards

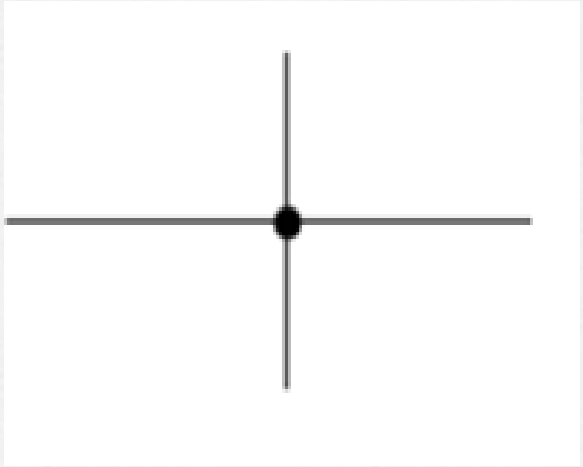
Wire with terminals



A wire must be a *conductor*

It may or may not connect to anything.

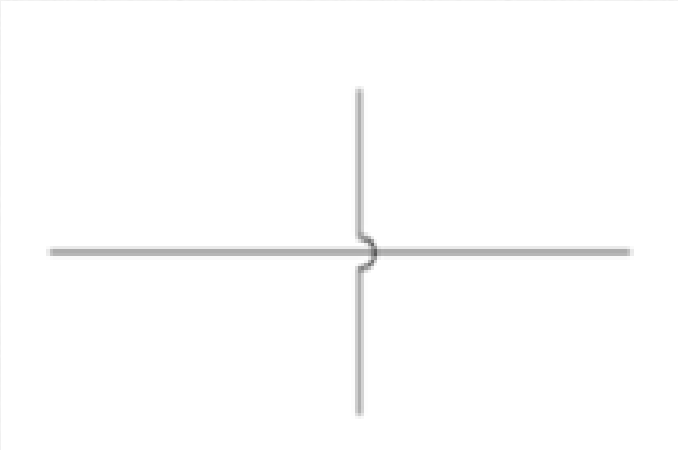
Junction



These two wires are connected.
They act as one single wire

Wire crossing (no connection)

Two completely separate wires - not touching.



Battery

Provides energy to circuit.

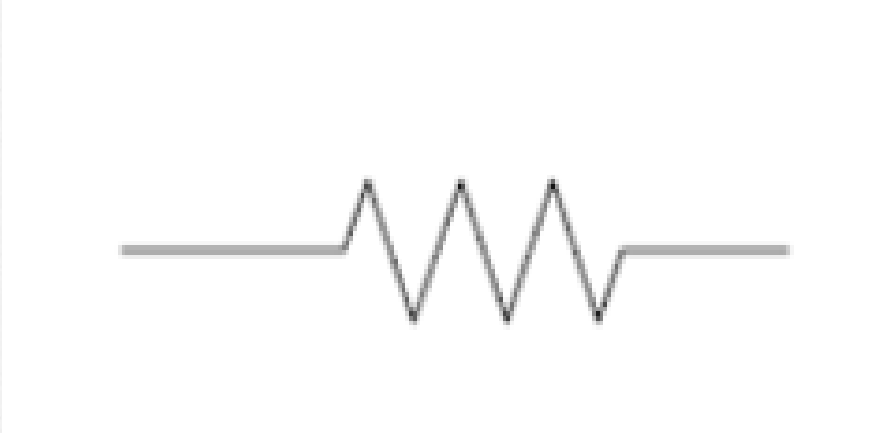
It's the "starting line" and "finish line" for electrons.

The longer line is positive (+) side

The shorter line is negative (-) side

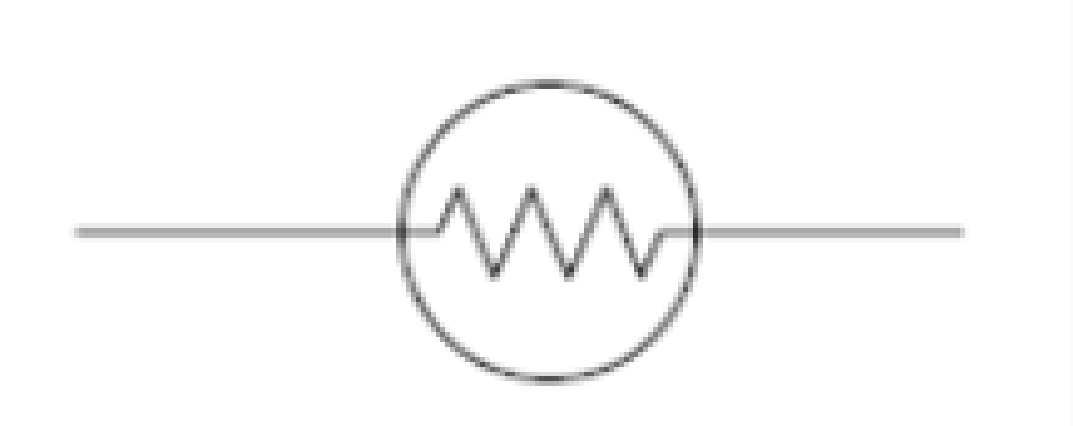
Resistor

Slows down current
Releases energy



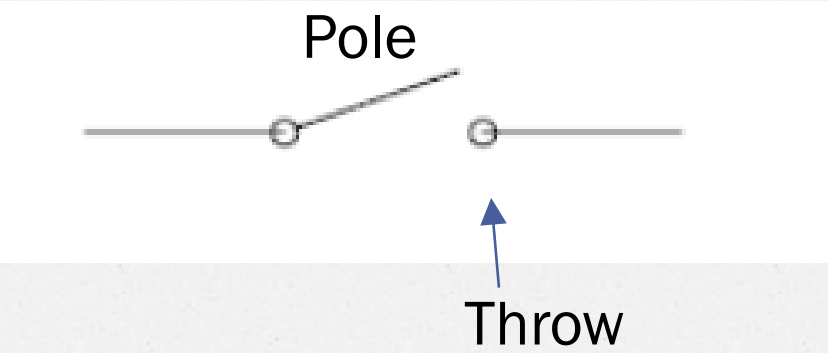
Lamp

Releases energy (as light and heat)



SPST switch

Single **P**ole **S**ingle **T**hrow
Pole is moving part in middle
Throw is a place for the pole to connect



Used for simple
ON/OFF switch

HOMEWORK! :)

Make sure to:

Memorize flashcards

Build more circuits (start with the ones in this slideshow then be creative and build your own)

Check out these cool videos/apps:

Link #1 – BBC app on circuit basics

Link #2 – PBS video on circuit basics

Link #3 – B is for Battery video

Link #4 – A is for Ampere video

Link #5 – Circuit Builder (fairly advanced, it will make more sense after each workshop)