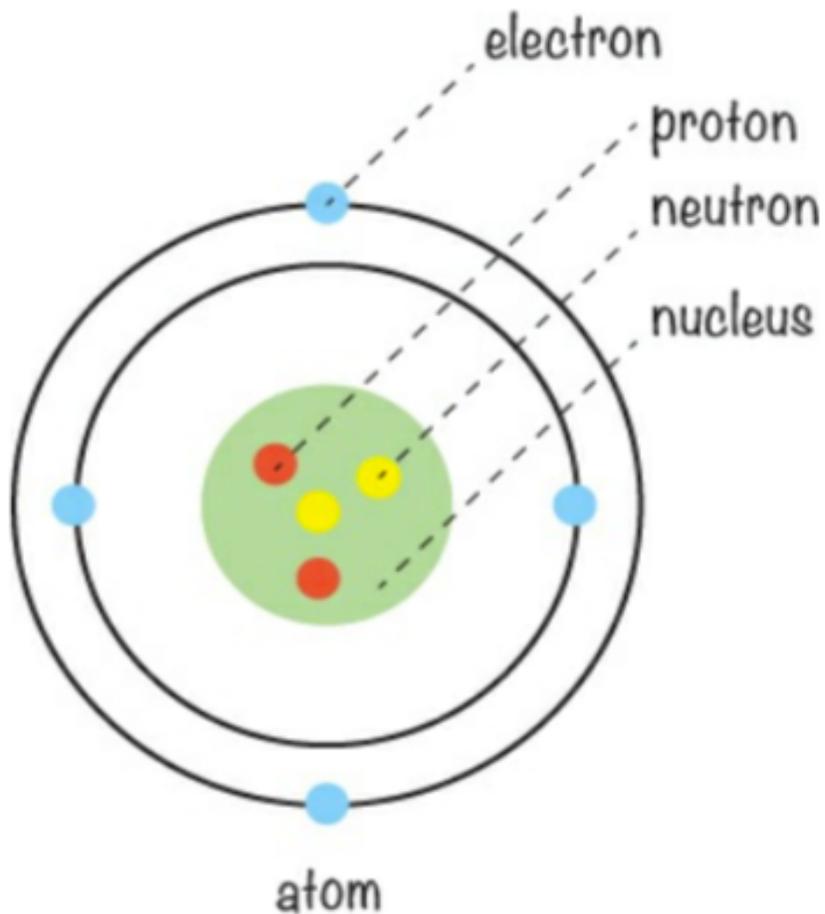


Week_5

Trinity Robotics

09/13/2022

Last week we learned a basics of electronics.

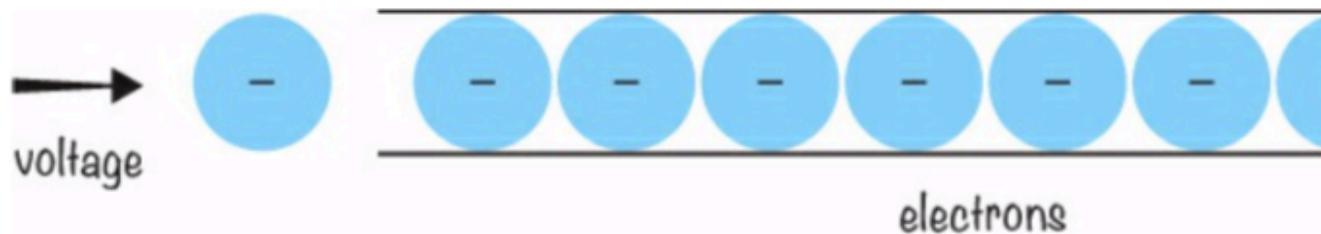


Voltage pushes electrons, and electrical current will flow

Voltage Pushes Electrons

When you attach a battery to the light bulb, you're applying a *voltage* across the circuit. Voltage pushes electrons through the wire and is measured in *volts* (V). The higher the voltage, the more electrons will flow through the wire.

Think of a wire like a tube filled with marbles: when you put a marble in on one side, it pops out on the other side at the exact same time, with no delay.

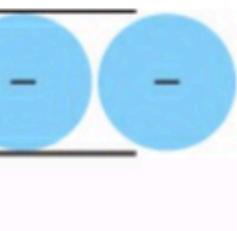


The more marbles you push in one side, the more pop out of the other. That's how electrons behave inside a wire, when a voltage is applied to them.

Resistance Reduces Current

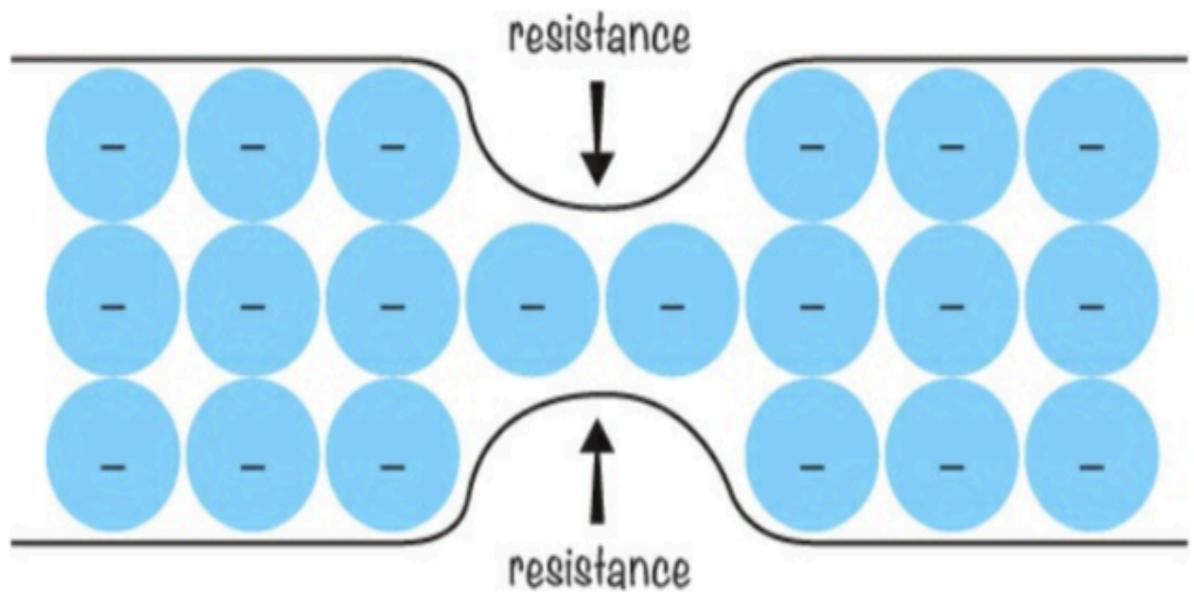
Voltage pushes electrons to form a current, and *resistance* restricts the current. It's like playing with a garden hose: if you squeeze the hose, you add resistance to the flow of water so that less water comes out. But if you turn the tap more (like increasing the voltage), the pressure increases, and more water flows even though you're still squeezing the hose in the same way. Resistance in electricity works just like this, and it's measured in *ohms* (Ω).

filament inside.
er the voltage, the
one side, a marble



how electrons

ying with a
ater comes
ore water
works



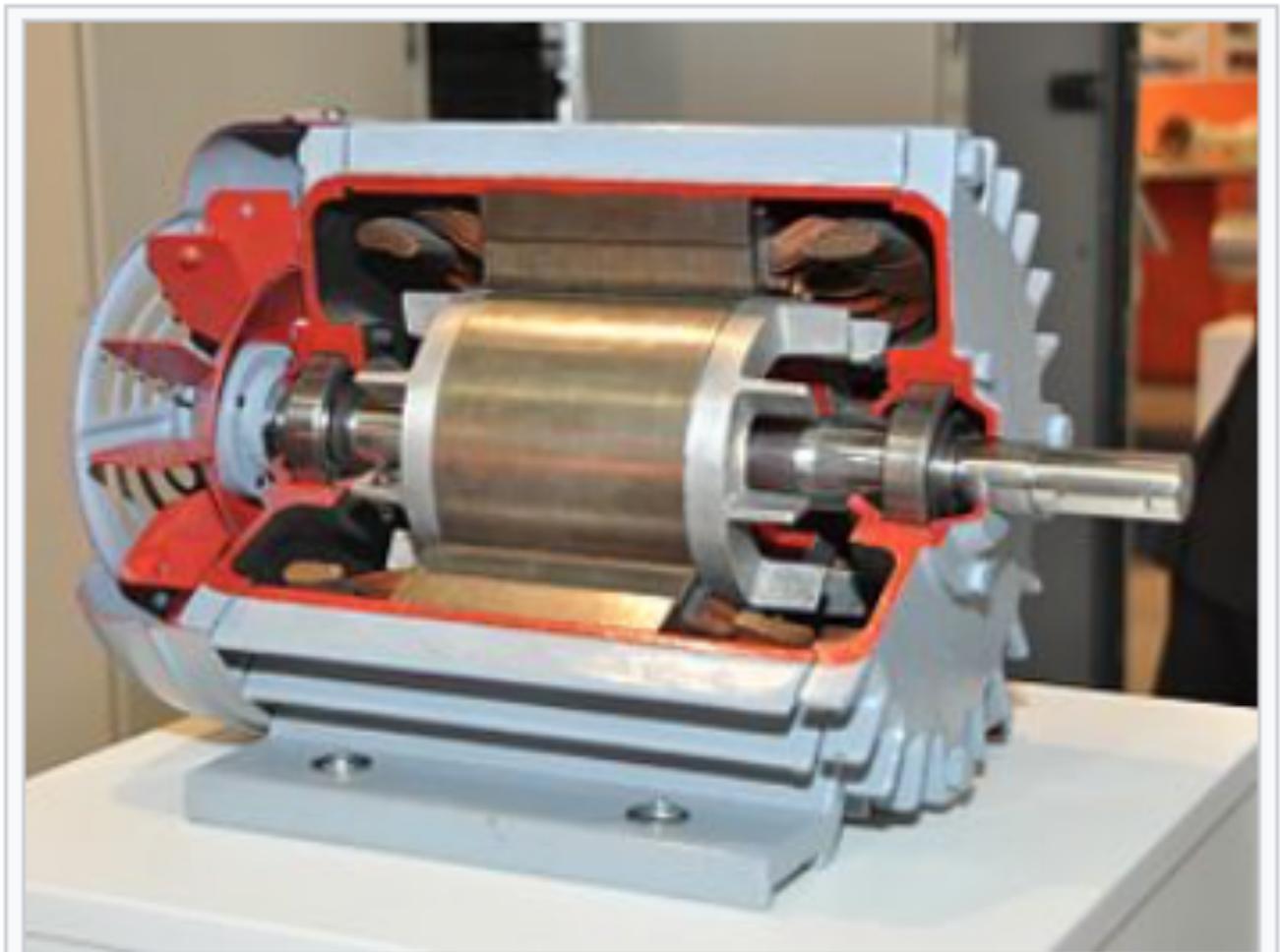
How can we use electricity.

What is an electric motor?

An electric motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor's magnetic field and electric current in a wire winding to generate force in the form of rotation of a shaft. Electric motors can be powered by direct current (DC) sources, such as from batteries, motor vehicles or rectifiers, or by

.. .. . (AC)

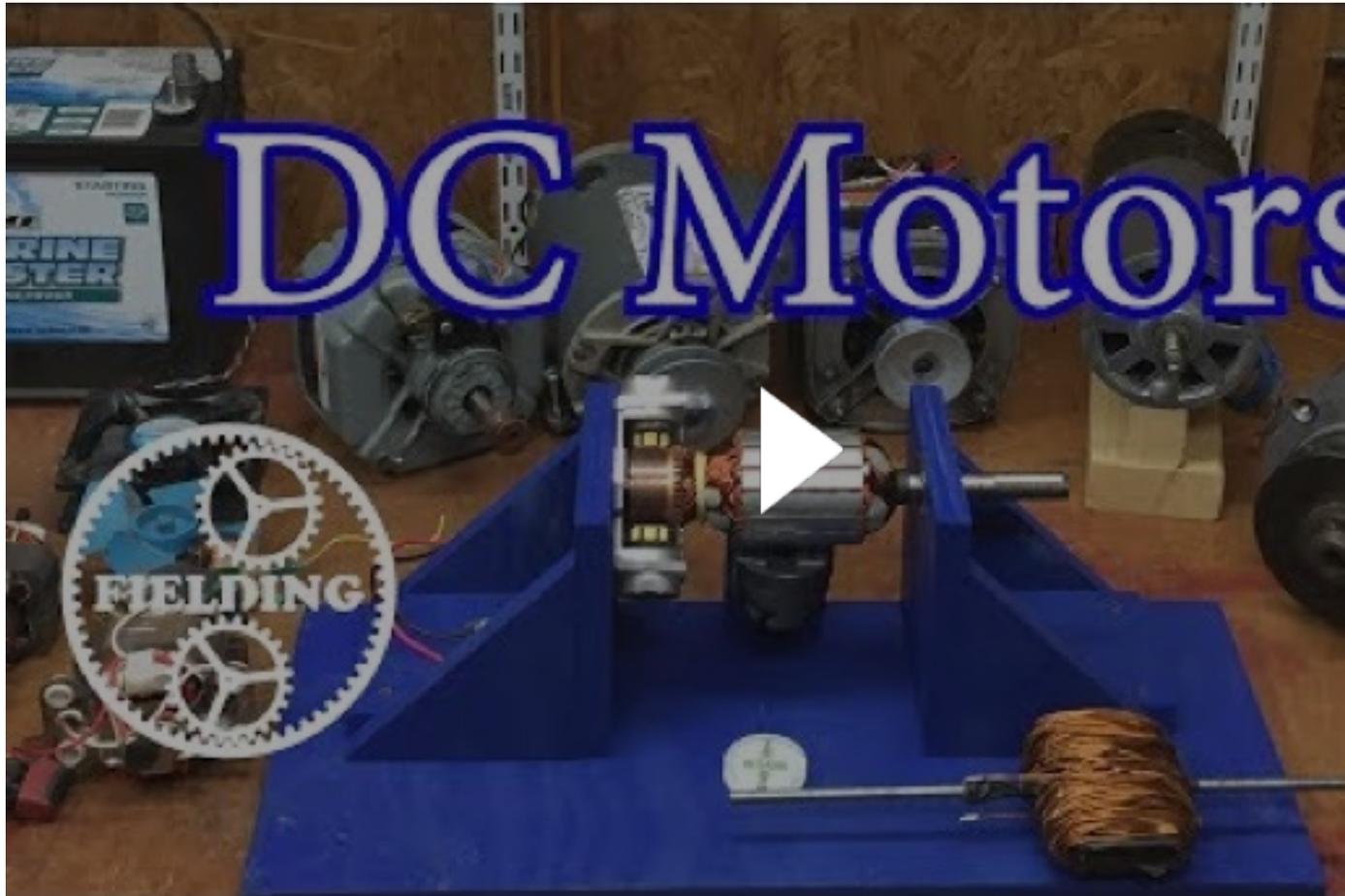
alternating current (AC) sources, such as a power grid, inverters or electrical generators. An electric generator is mechanically identical to an electric motor, but operates in the reverse direction, converting mechanical energy into electrical energy.



Cutaway view through stator of induction motor.



[How Motors Work For Beginners \(Episode 1\): The DC Motor: 032](#)



1https://youtu.be/onjFFoOC_yk

Multimeter -

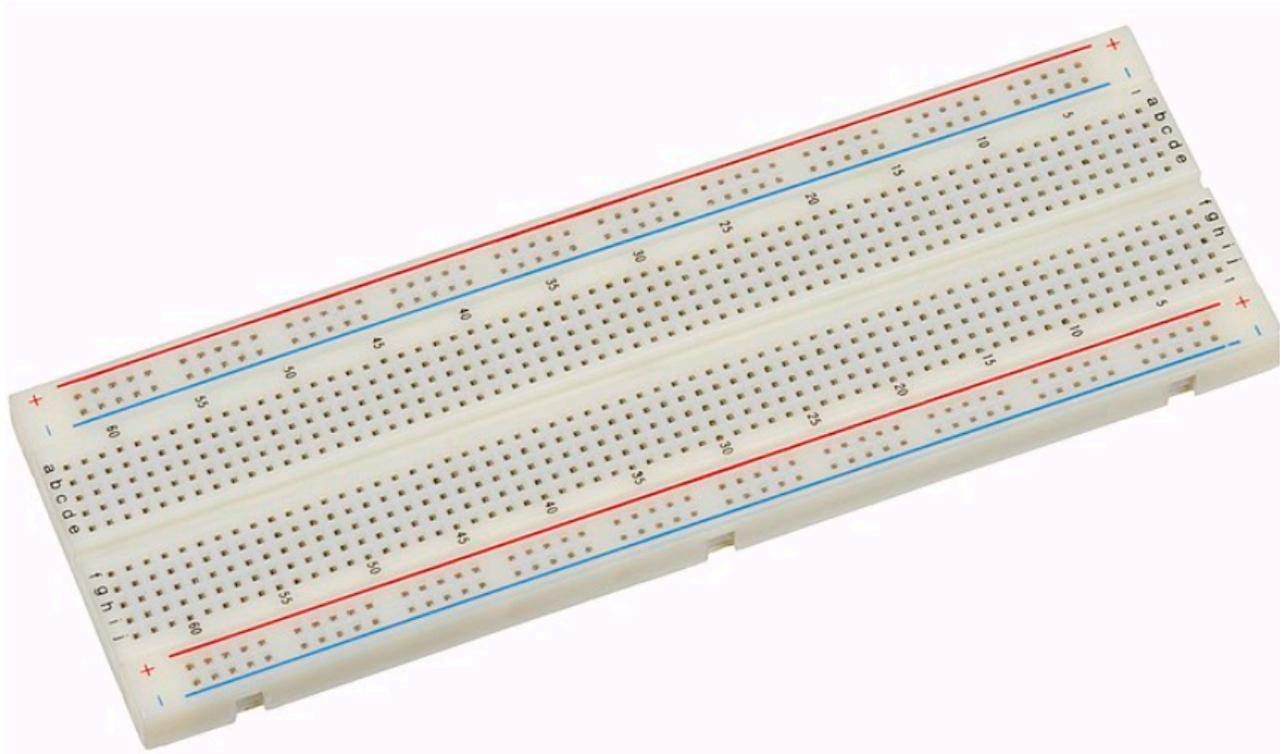
Electronics student tool

(Best in the trade)

1<https://www.youtube.com/watch?v=SLkPtmnglOI>

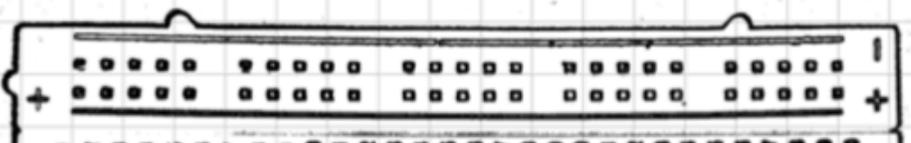


Experiment time First lets learn what a Bread Board is.

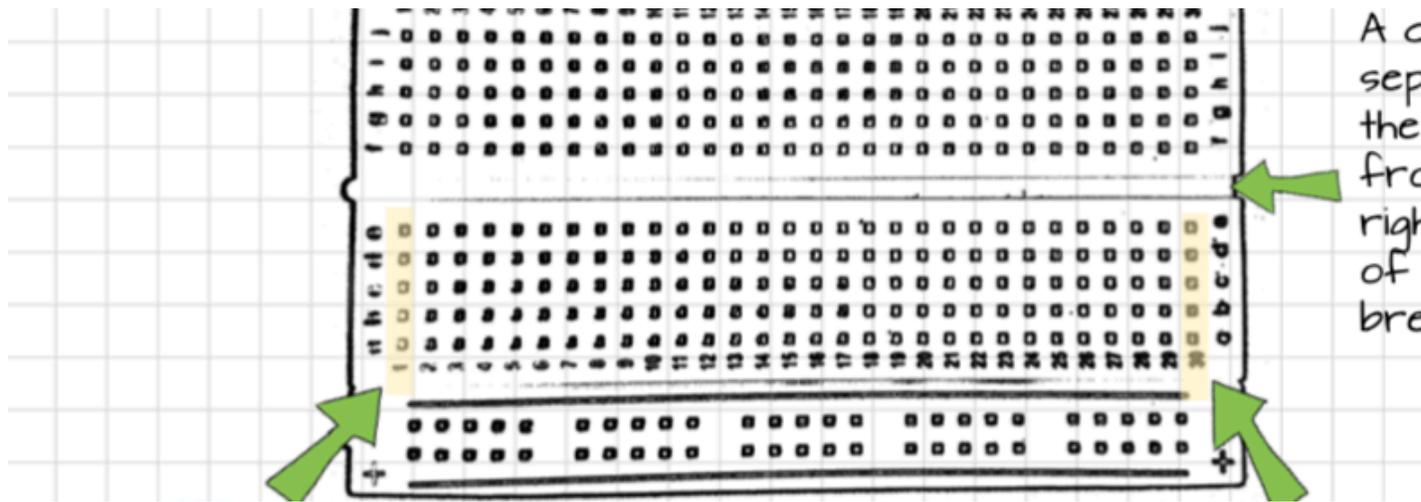


A **breadboard** is used to build and test circuits quickly before finalizing any circuit design. The **breadboard** has many holes into which circuit components like ICs and resistors can be inserted.

We use breadboards to experiment with wires and other devices. What cool about them is we can easily disconnect the wires and devices when we're done. Breadboards are very easy to understand. Each hole in a row is connected to every other hole in that row, but only in that row.



hat's
hen
a row

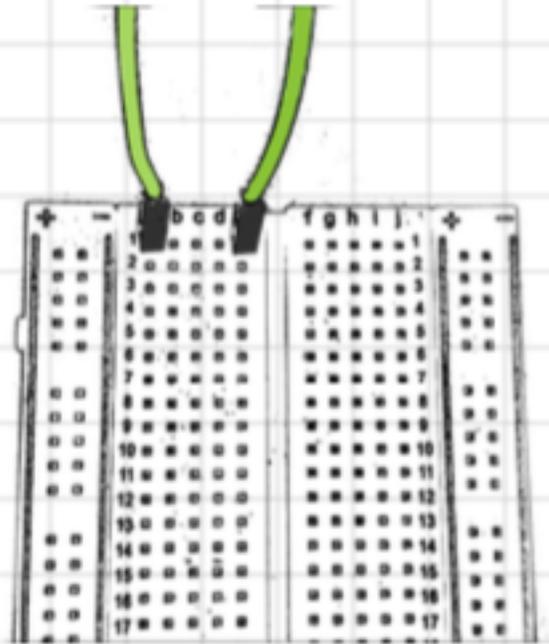


Before we had these plastic breadboards, wooden breadboards were used to mock up circuits by

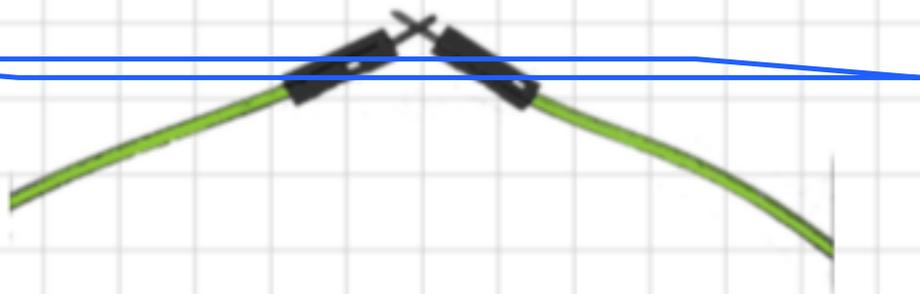
channel
separates
left
from the
right side
of the
headboard

screwing components to an actual breadboard used to cut bread on

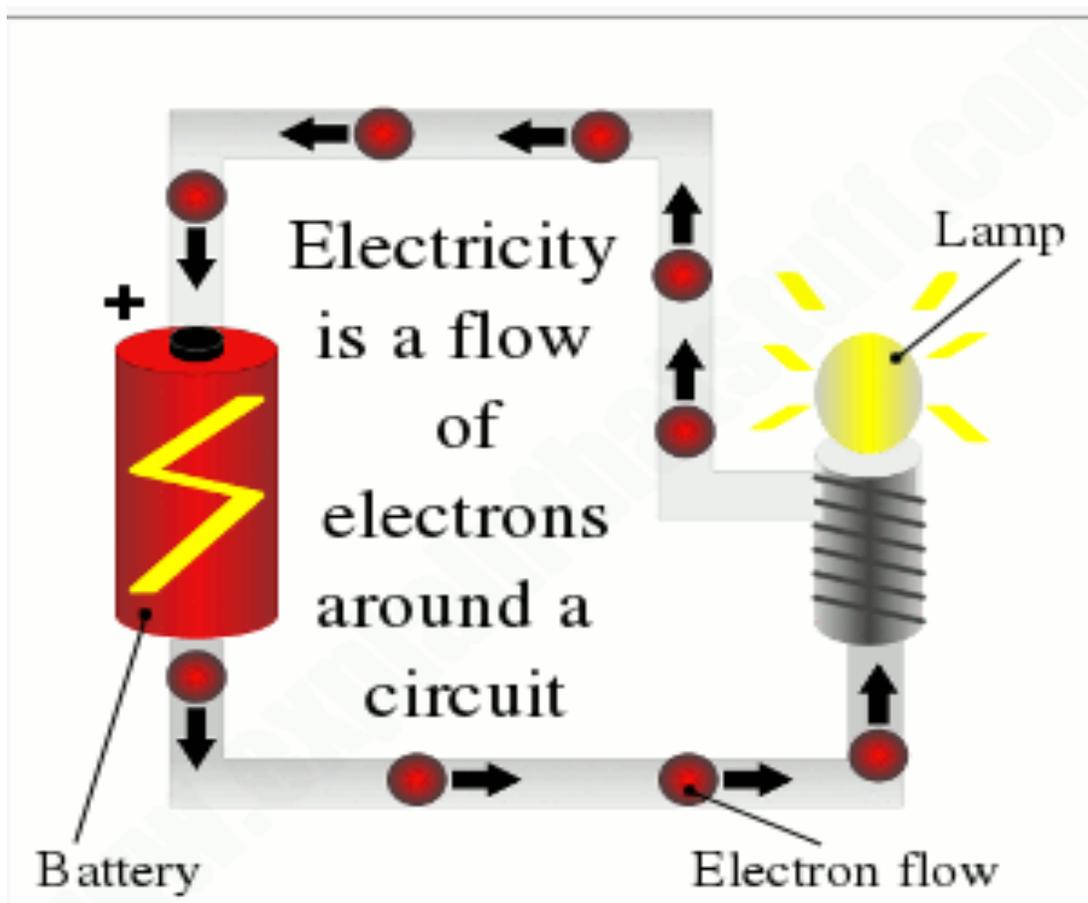
If we place wires into the same row, it's like they are touching each other.



==



But only if the wires are in the same row, on the same side of the breadboard.



Now,

Lets build a circuit on the breadboard.

Identify your battery pack + batteries, put your 4 batteries back; remember the spring is the negative side (opposite)

Please verify the switch is on OFF {0}.

series into the
ite of the notch).

Identify the breadboard rows 10 & 14,
Now identify the columns (a) - (j) along the top.

Connecting our circuit:

Connect the
battery : Red - 10(a)
 : Black - 14(a)

Resistor 1: 10(e) + 10(f)

Resistor 2: 14(e) + 14(f)

LED: Red-> 10(j)

 :Black->14(j)

