Start with quick presentations we didn’t get to yesterday

Basic Electronics

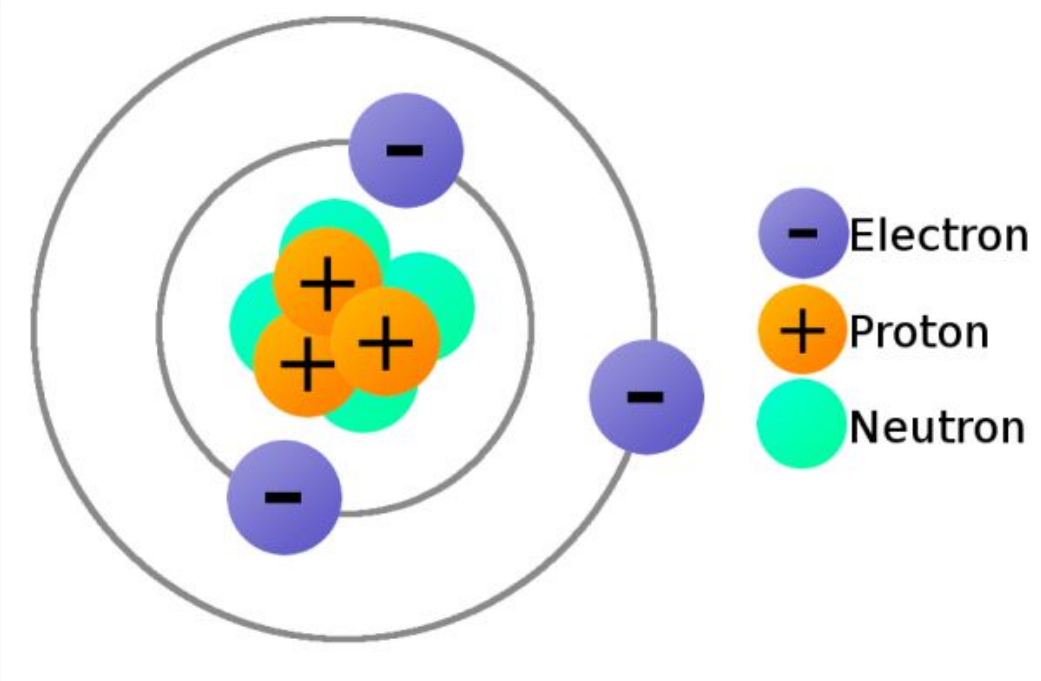
Samuel Bechara, PhD

What do you use electricity for?

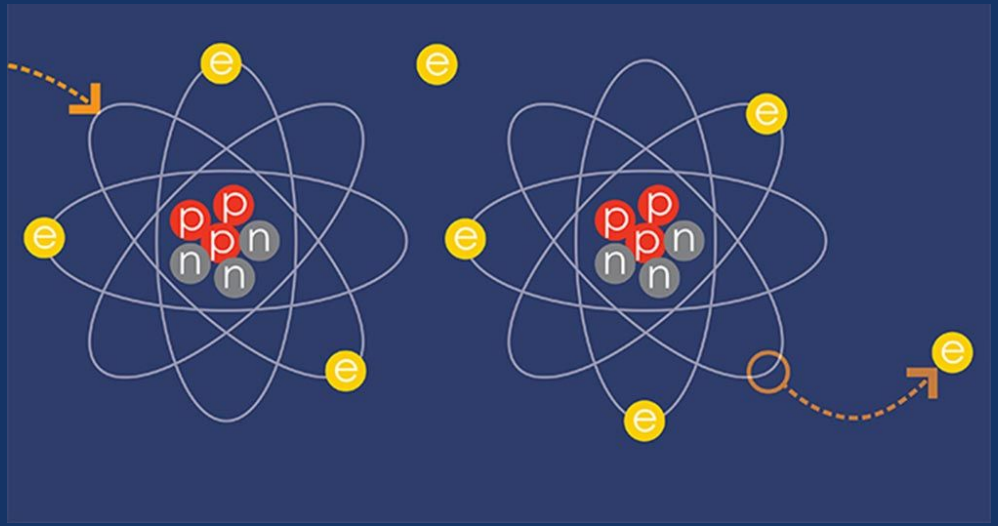
What is electricity?

THE ATOM

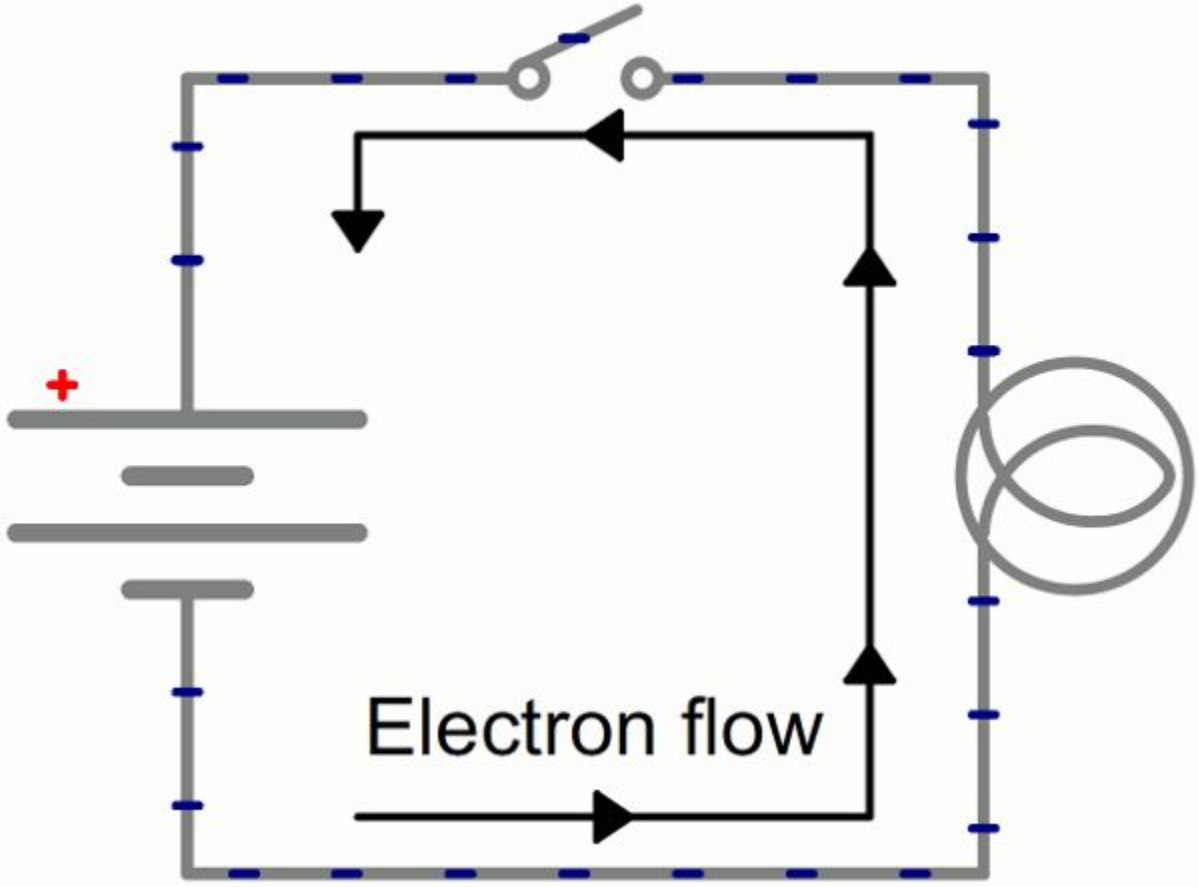
To understand, we have to dive deep into one of the smallest units of matter in the universe!



Electricity is the flow of electrons

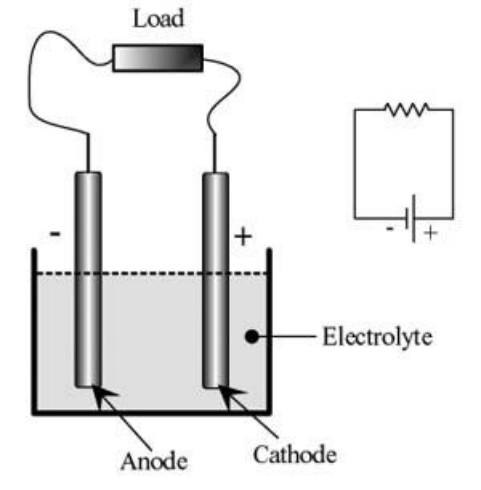


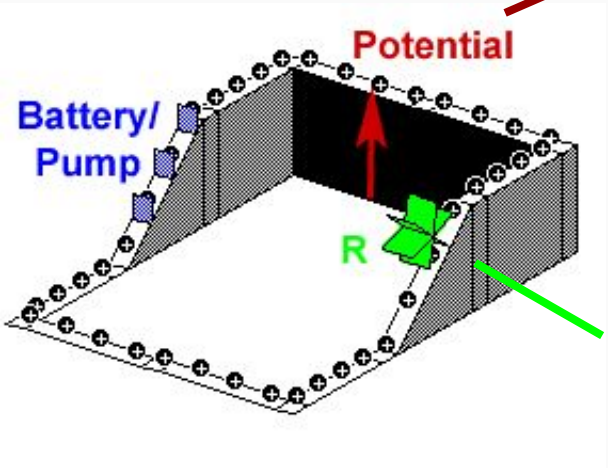
In order for electrons to flow, there needs to be a “circuit”



What do you use batteries for?

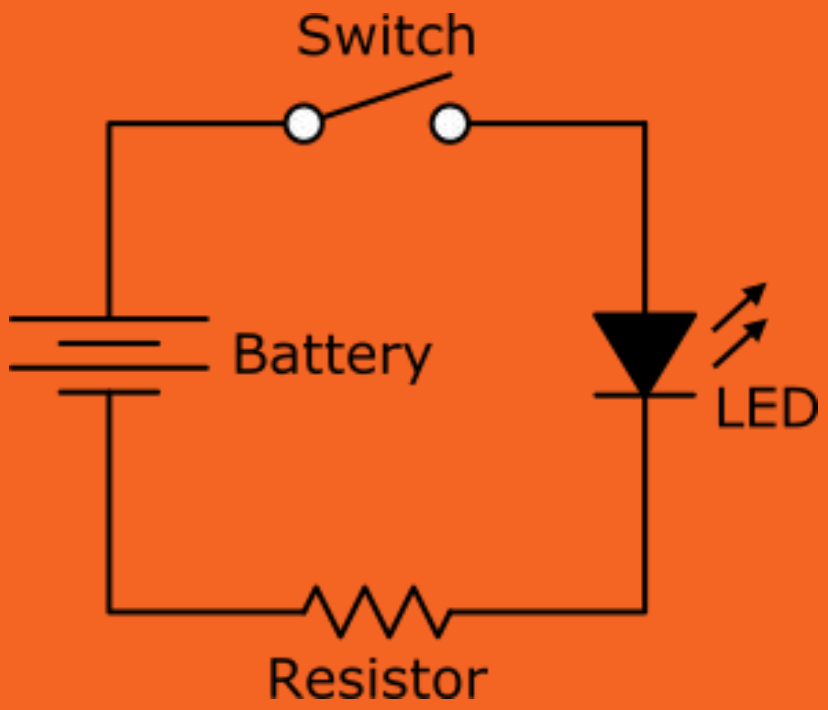
What does a battery do?





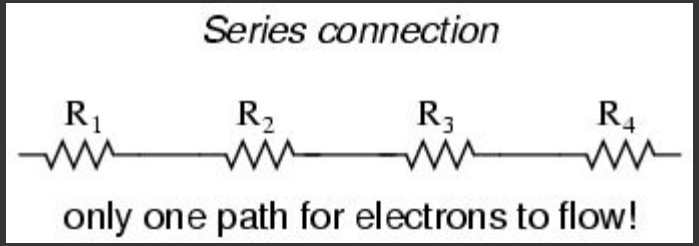
aka Voltage

Could be ANYTHING that is powered by the battery.

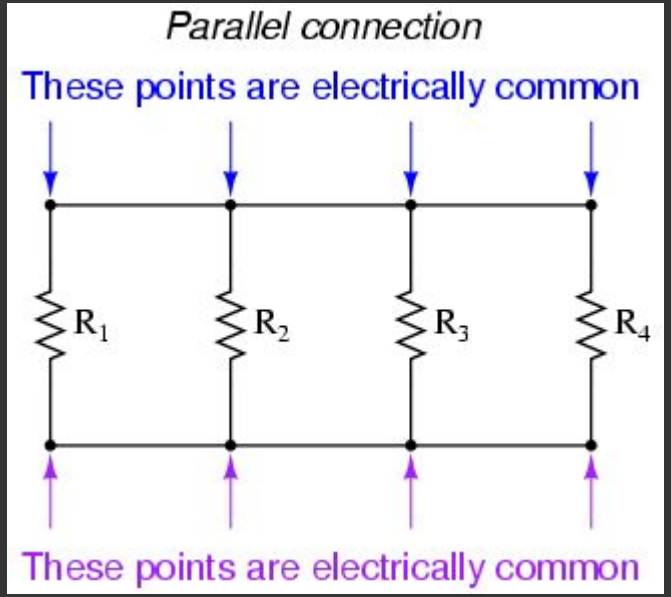


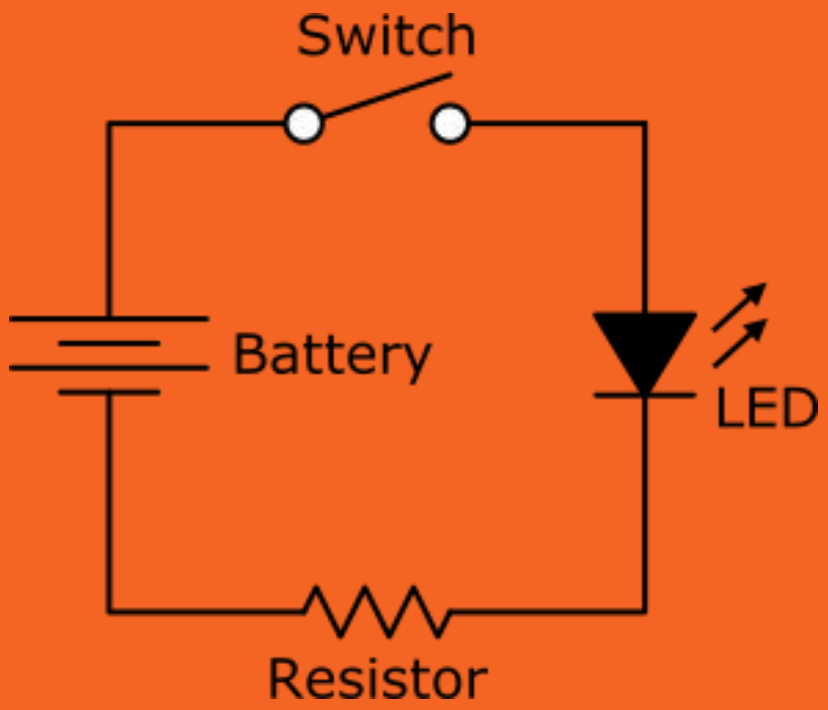
Circuit Drawing Basics

Series Connection

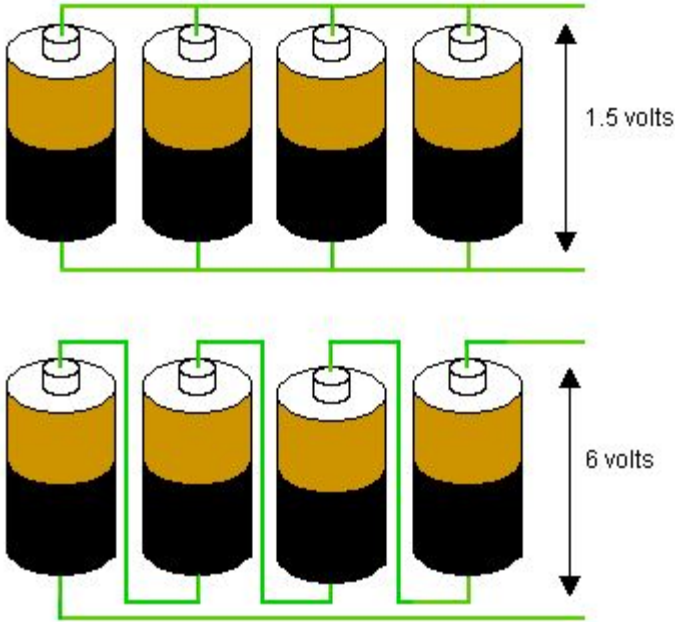


Parallel Connection





Let's look at this again...



Which is which?

Why put batteries in series or in parallel?

Could be any load…
like a l t bulb

HINT

c
so ion

Dis ilar Met s

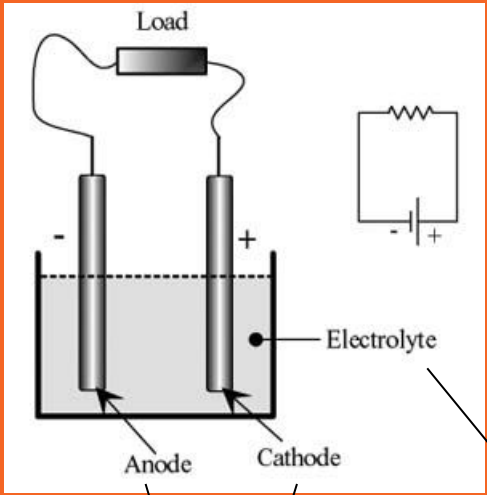
Make a battery

Now you are going to be given everything you need to make a battery

- ➔ Lemons
- ➔ Nails
- ➔ Pennies
- ➔ Wires
- ➔ LED

Be sure to draw the circuit diagram of your lemon battery circuit when you are done!

Could be any load...like an LED



Acidic solution

Dissimilar Metals

Make a battery

Now you are going to be given everything you need to make a battery

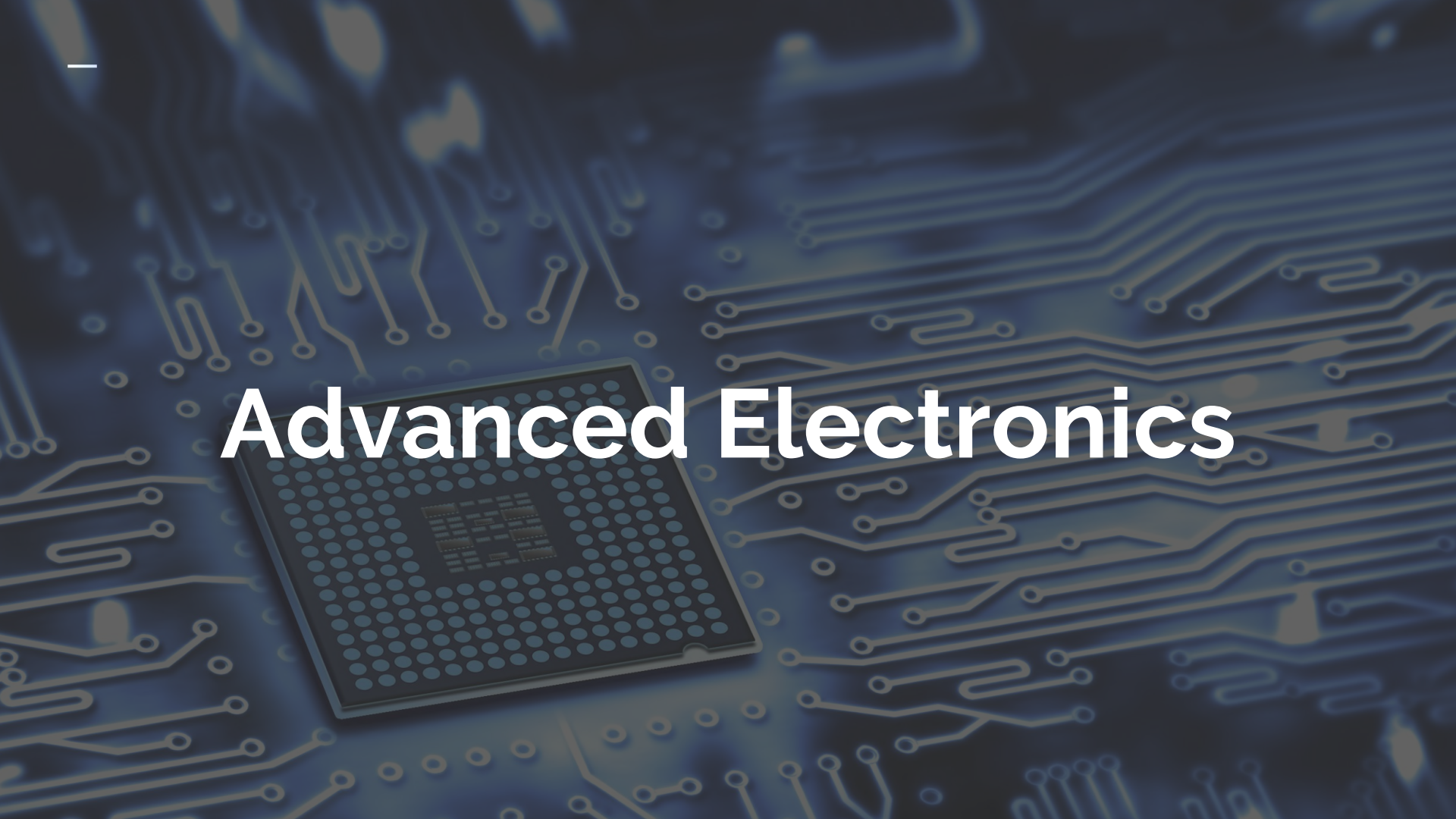
- ➔ **Lemons**
- ➔ **Nails**
- ➔ **Pennies**
- ➔ **Wires**
- ➔ **LED**

Be sure to draw the circuit diagram of your lemon battery circuit when you are done!


SUPER
BATTERY
LIGHT BULB
DEMO!!!!!

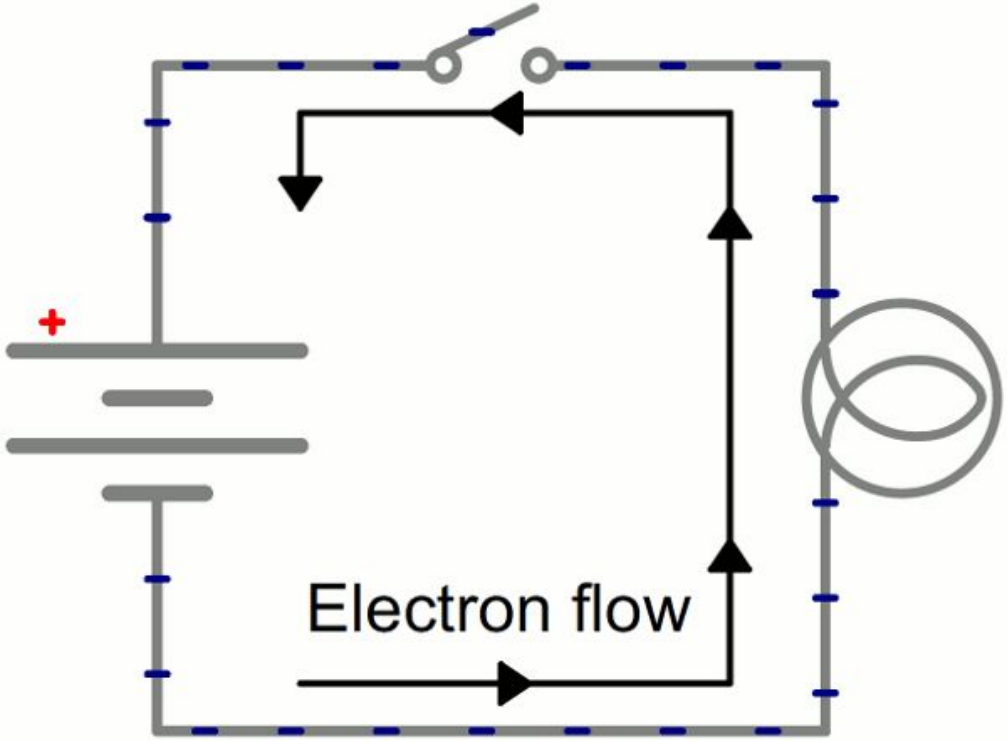
What did we learn?

Advanced Electronics

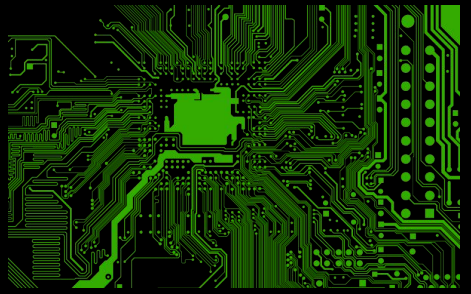


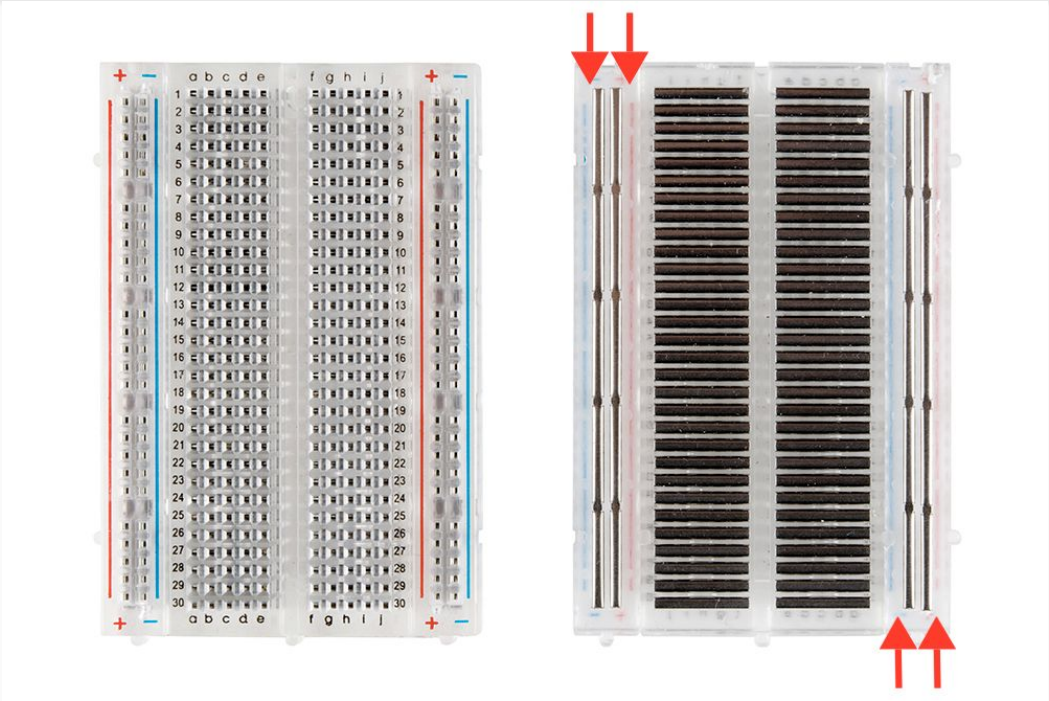
CIRCUIT!

What do we need to have electrons flow?



Breadboards can help!





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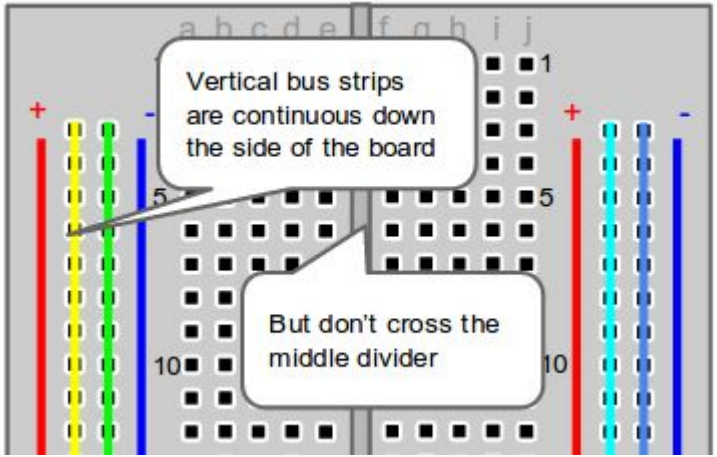
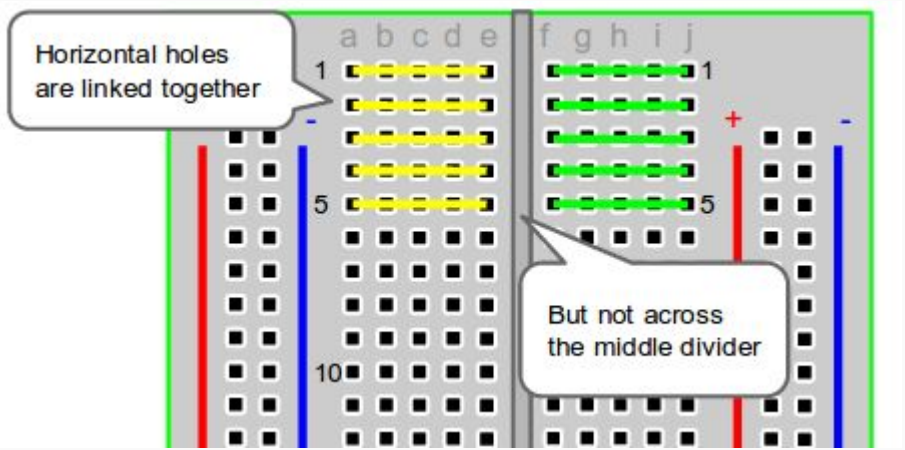
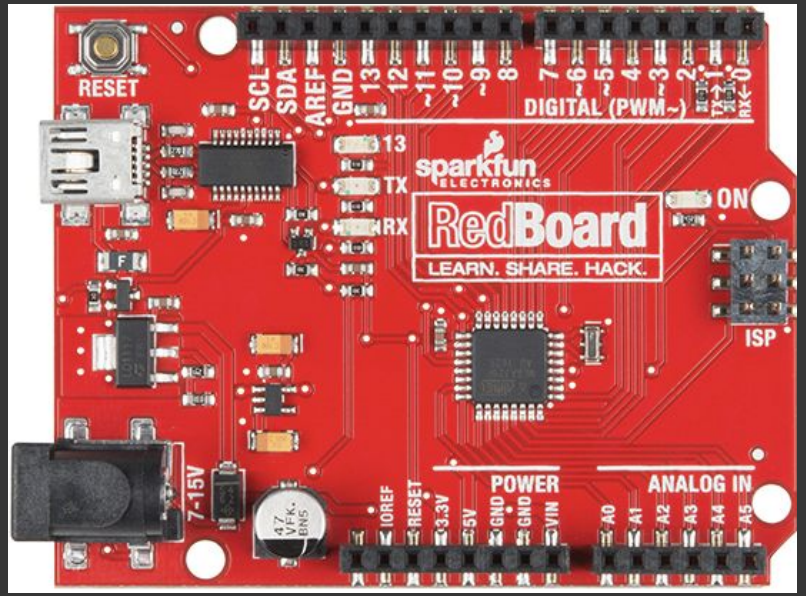
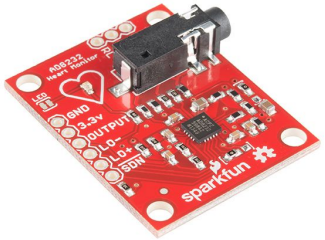


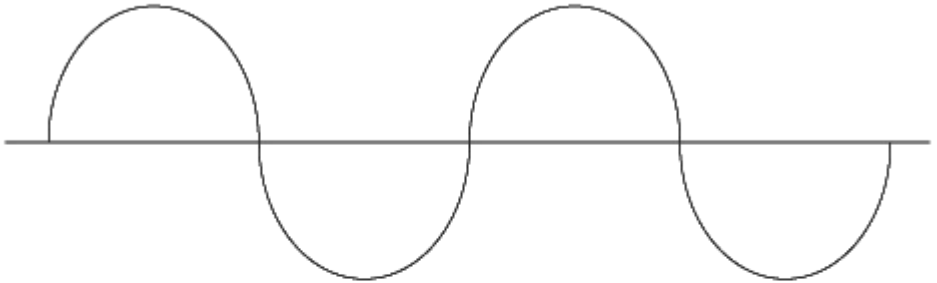


What do you need the arduino for?

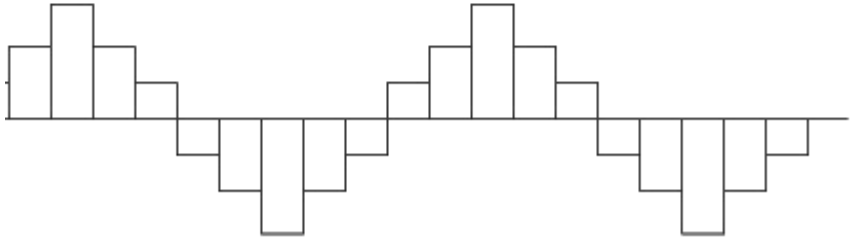




Analog

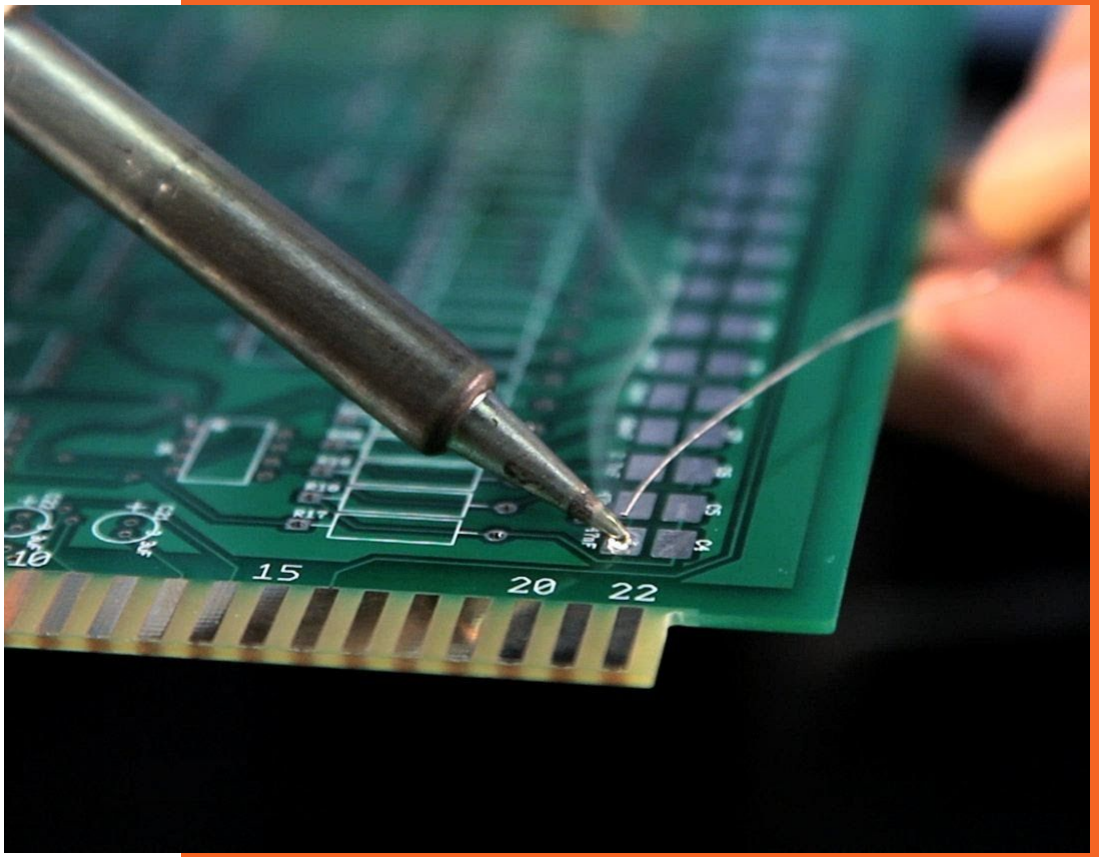


Digital



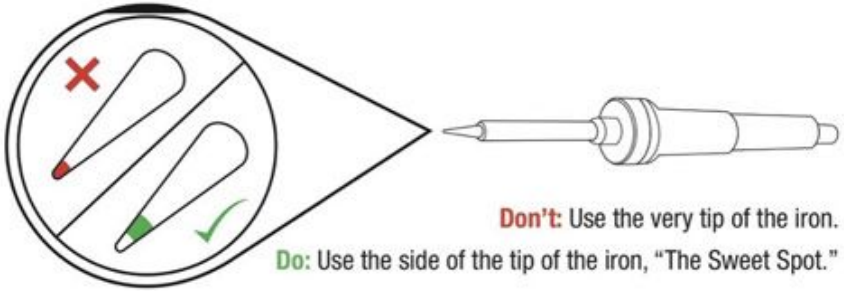
Soldering

What is it for?



Solder Safety

- Always use **safety glasses** and **gloves**.
- Always place a hot soldering iron in its holder.
- Never solder near flammables.
- Report any burns immediately.



Don't: Use the very tip of the iron.

Do: Use the side of the tip of the iron, "The Sweet Spot."

Do: Touch the iron to the component leg and metal ring at the same time.

Do: While continuing to hold the iron in contact with the leg and metal ring, feed solder into the joint.

Don't: Glob the solder straight onto the iron and try to apply the solder with the iron.

Do: Use a sponge to clean your iron whenever black oxidization builds up on the tip.

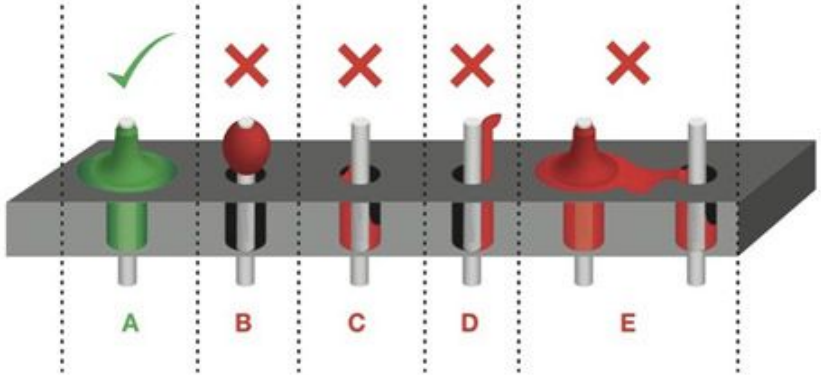
A Solder flows around the leg and fills the hole - forming a volcano-shaped mound of solder.

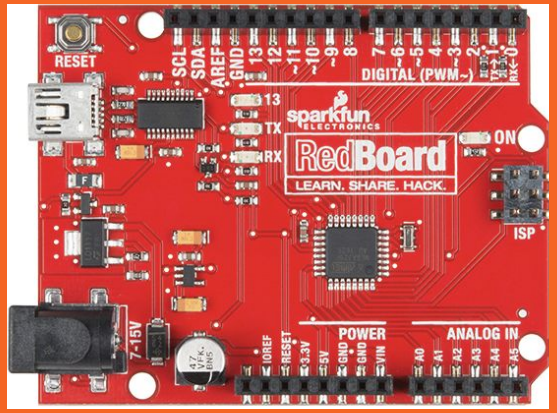
B Error: Solder balls up on the leg, not connecting the leg to the metal ring.
Solution: Add flux, then touch up with iron.

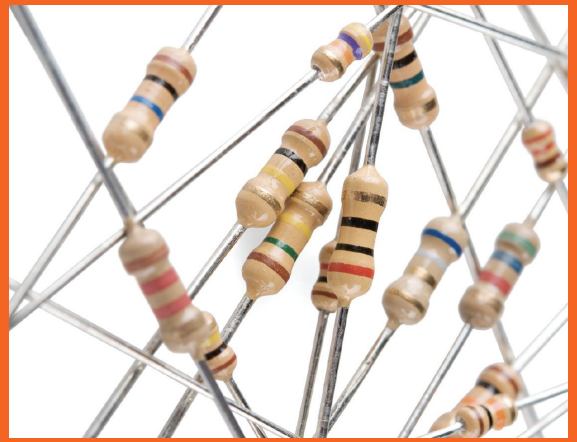
C Error: Bad Connection (i.e. it doesn't look like a volcano)
Solution: Flux then add solder.

D Error: Bad Connection...and ugly...oh so ugly.
Solution: Flux then add solder.

E Error: Too much solder connecting adjacent legs (aka a solder jumper).
Solution: Wick off excess solder.



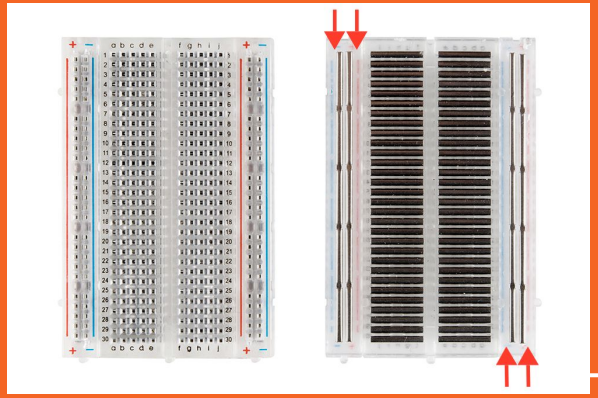




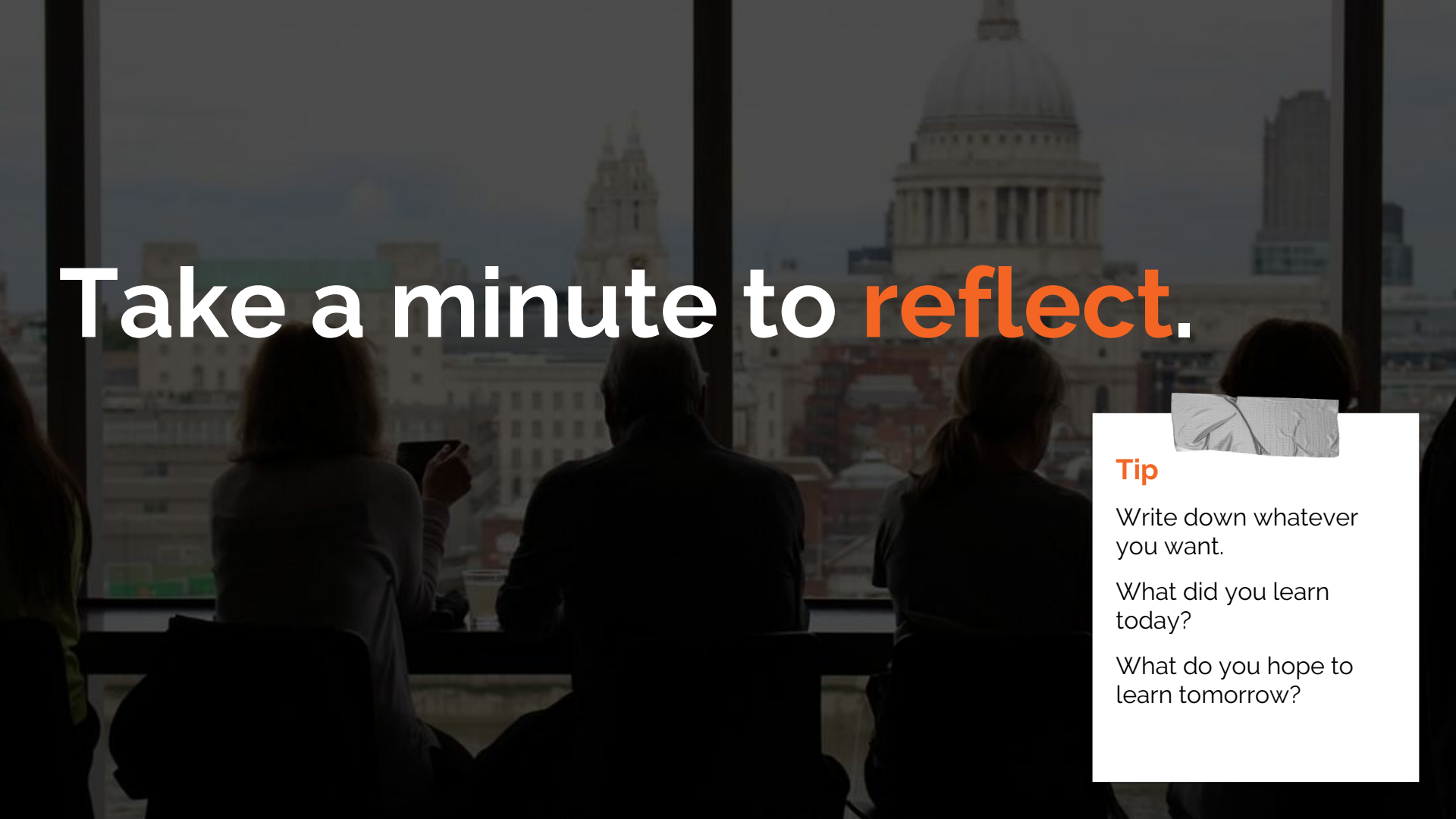
How are we going to connect?

Why do we need resistors?

Draw Diagram



Take a minute to reflect.



Tip

Write down whatever you want.

What did you learn today?

What do you hope to learn tomorrow?