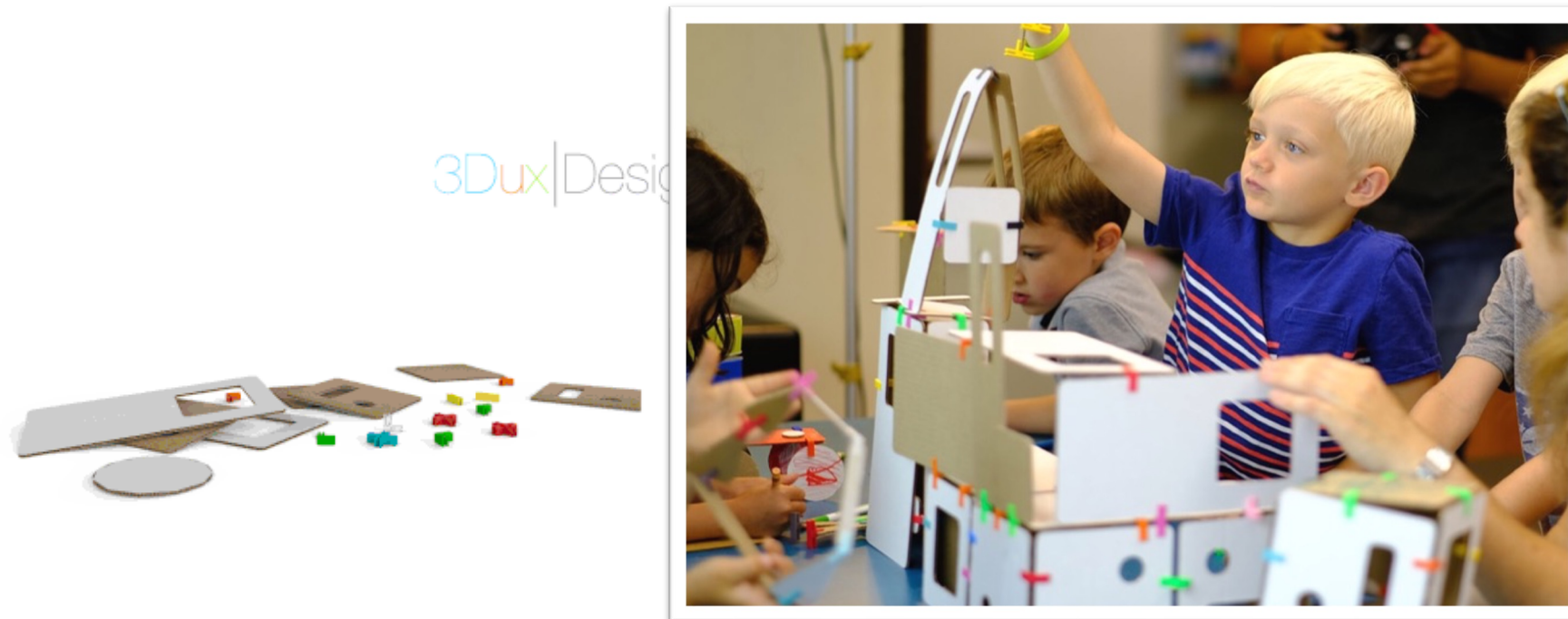
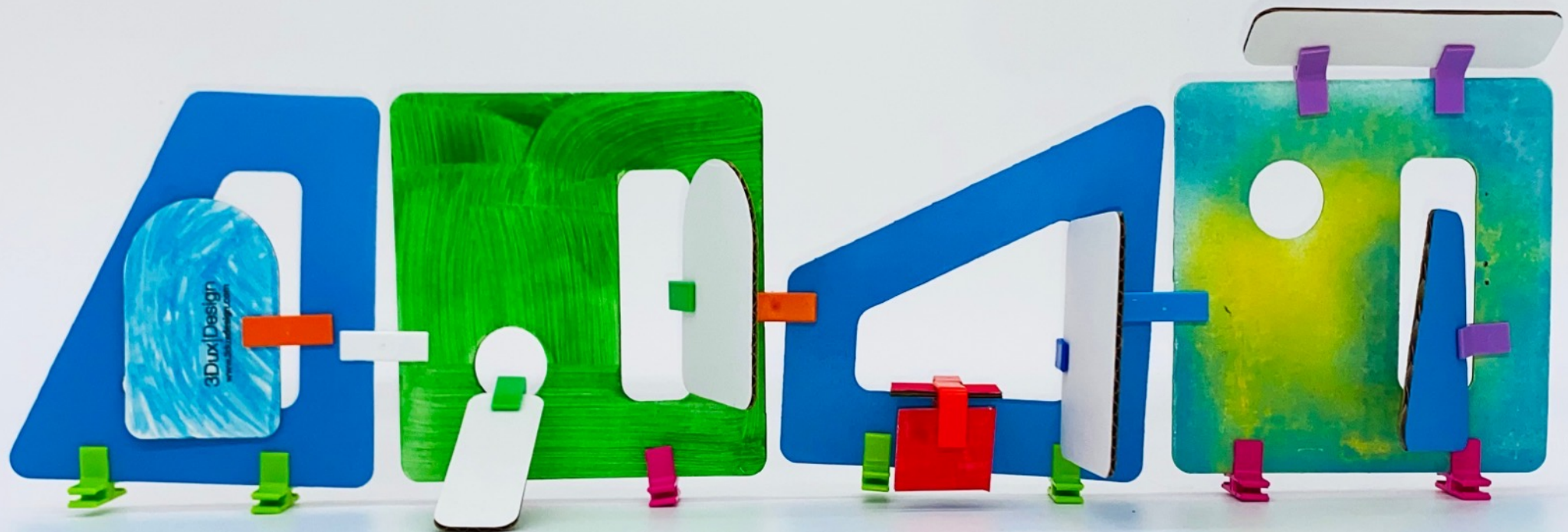


3Dux|Design

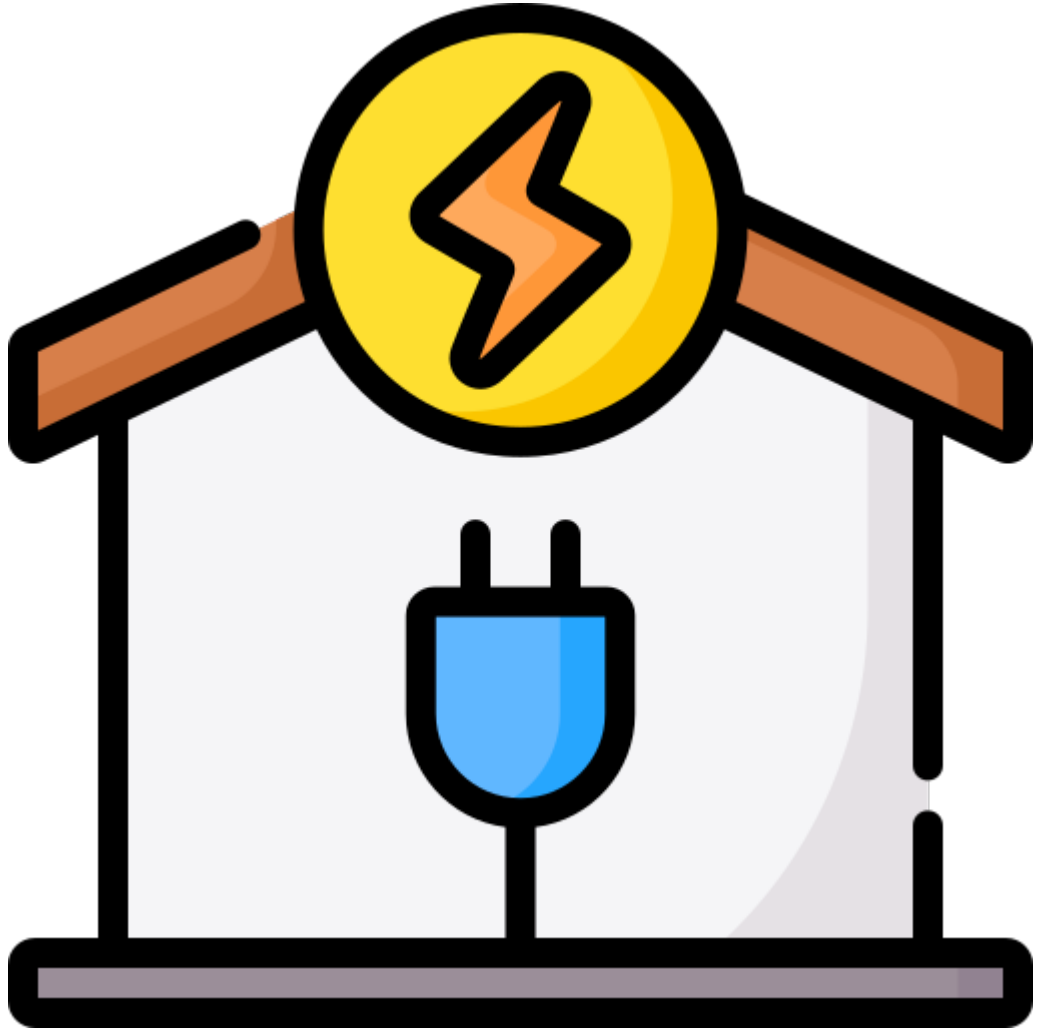
an interdisciplinary project-based learning approach
inspiring the next generation of change-makers.



Refresher: Learn angles with a Kooky Casa game



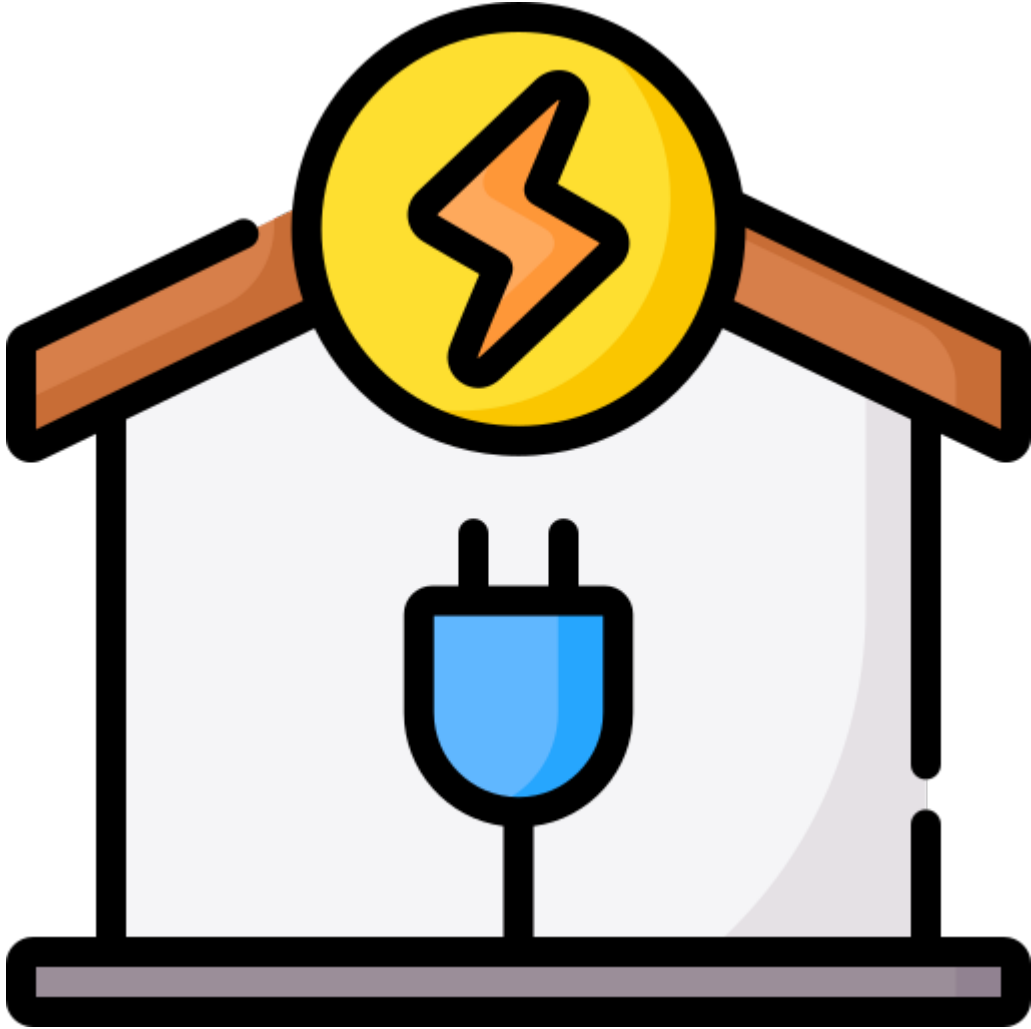
What electricity have you used today?



What electricity have you used today?

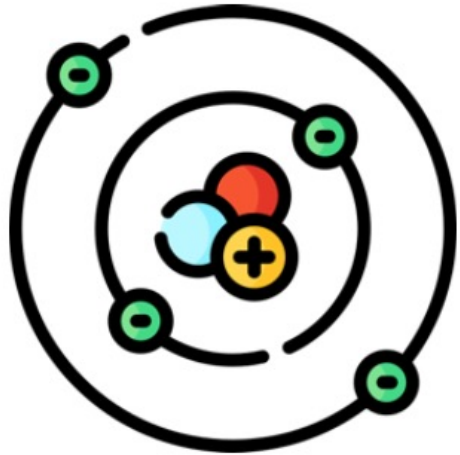
- turned on lights
- took a shower with hot water
- brushed my teeth with an electric toothbrush
- made coffee in a coffee maker
- added cold milk from my refrigerator
- microwaved hot cereal
- treadmill
- turned on my car (not electric but ignition needs a battery)

What is Electricity?



What is Electricity?

An atom is the tiniest particle of all matter (everything in the world from air to water, living things, earth etc). The middle



of the atom has protons with a positive charge and the outside has electrons with a negative charge. Electrons LOVE to stay close to the protons (opposites attract). If you pull an electron away from the proton, it will work hard to get close to it. The flow of electrons creates energy (electricity)

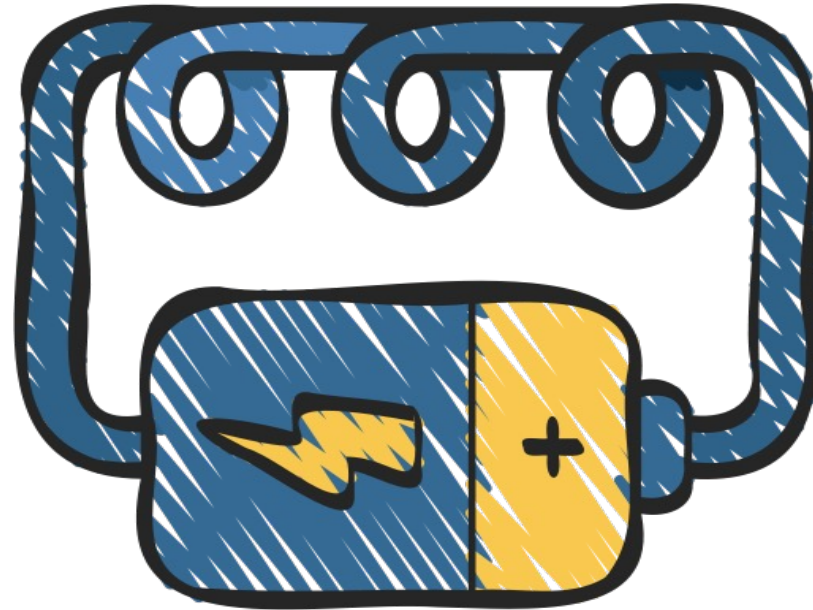
What is a Battery?

A battery is an object that has 2 separate sections; one with positive charge (like protons) and the other with electrons. The electrons are not able to get to the protons because they are separated.



What is a Battery?

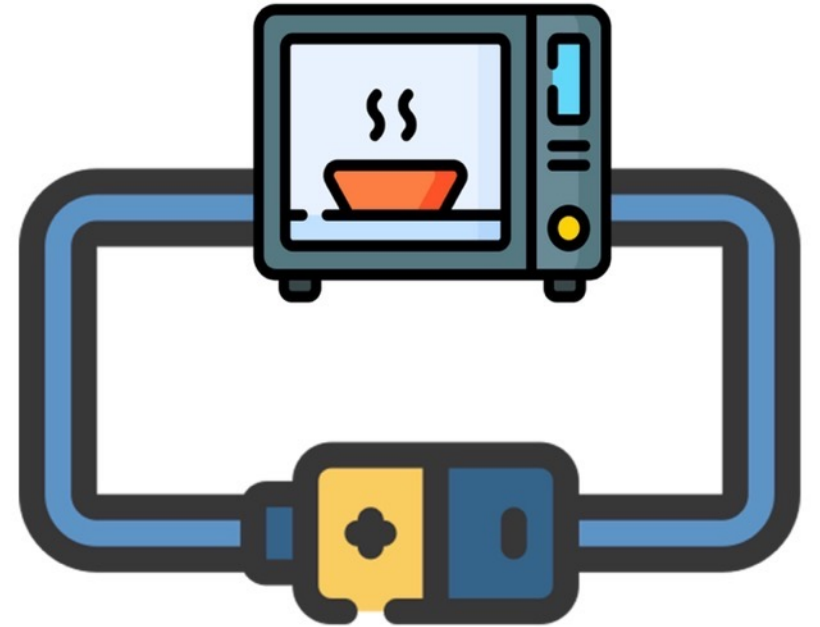
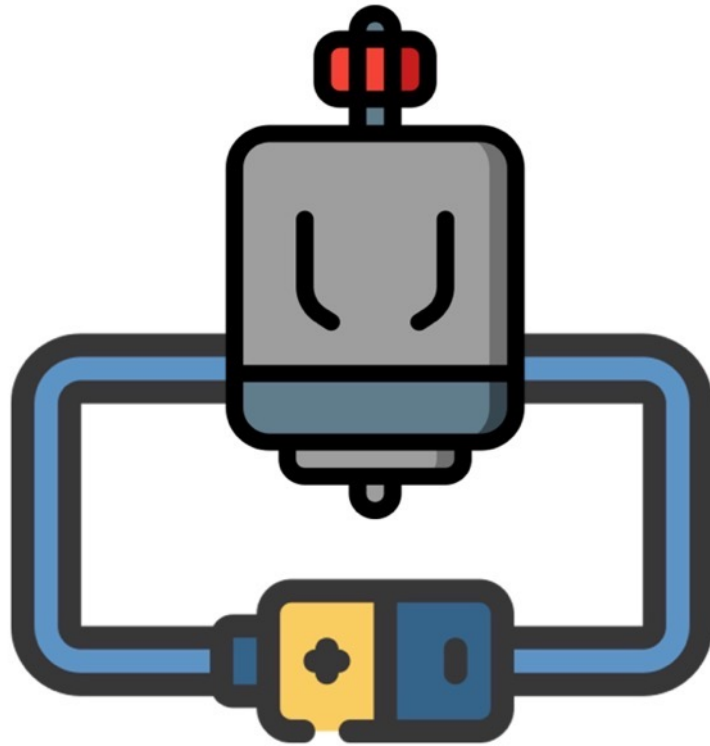
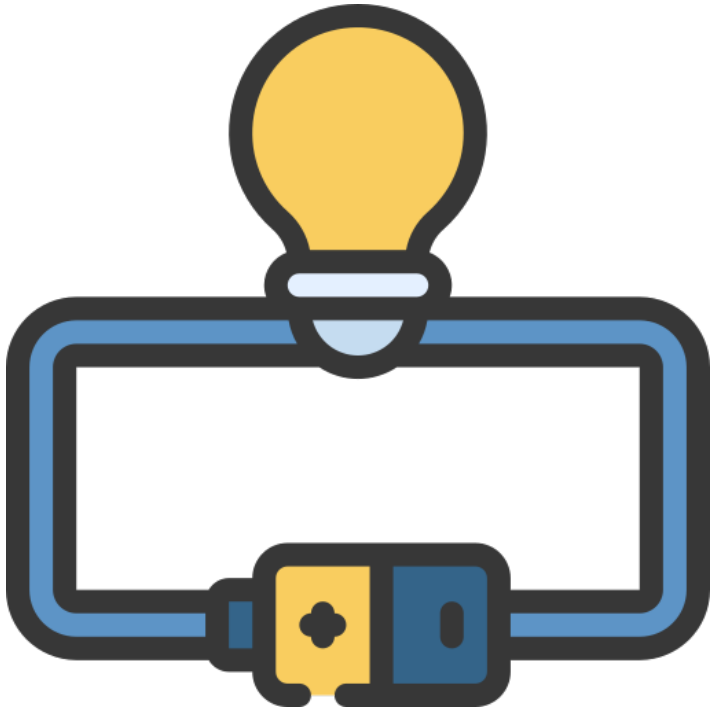
But if we give them a pathway (metal wire), they will flow along the wire to get to the side with protons. This creates electricity (or power). That power can be released as heat. This is a “short circuit” and can cause **severe burns**.



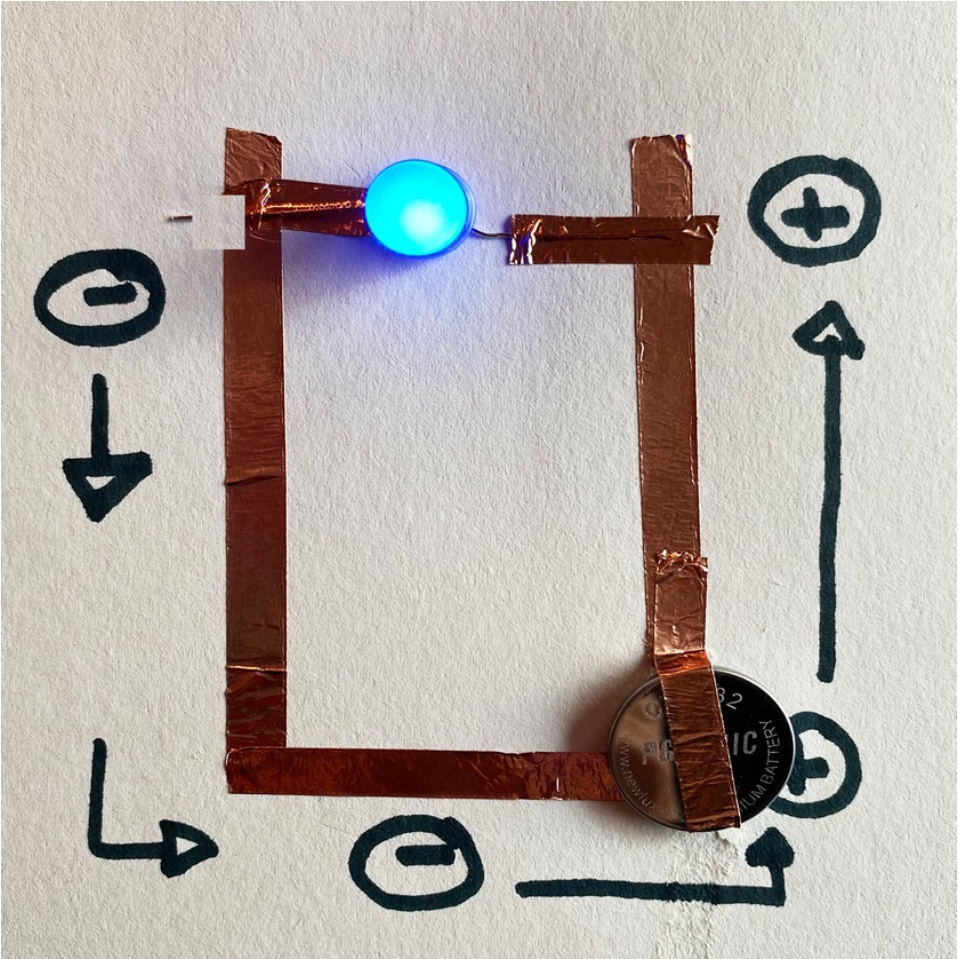
*****Never connect 2 sides of a battery with just a wire*****

What is a Battery?

If we add a “resistor” to the circuit, that power can be used to light a bulb, power a motor or heat something.

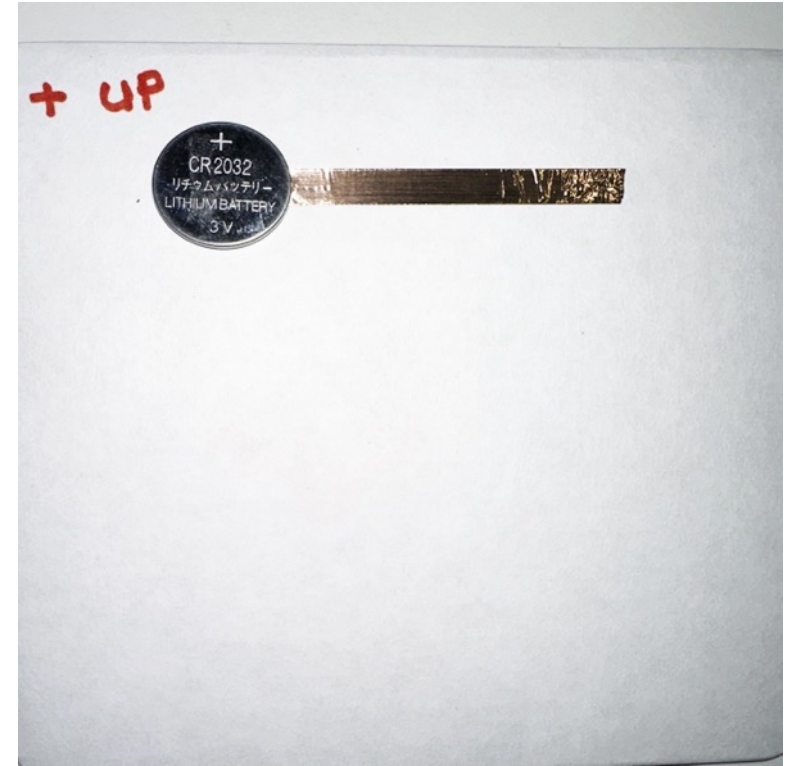
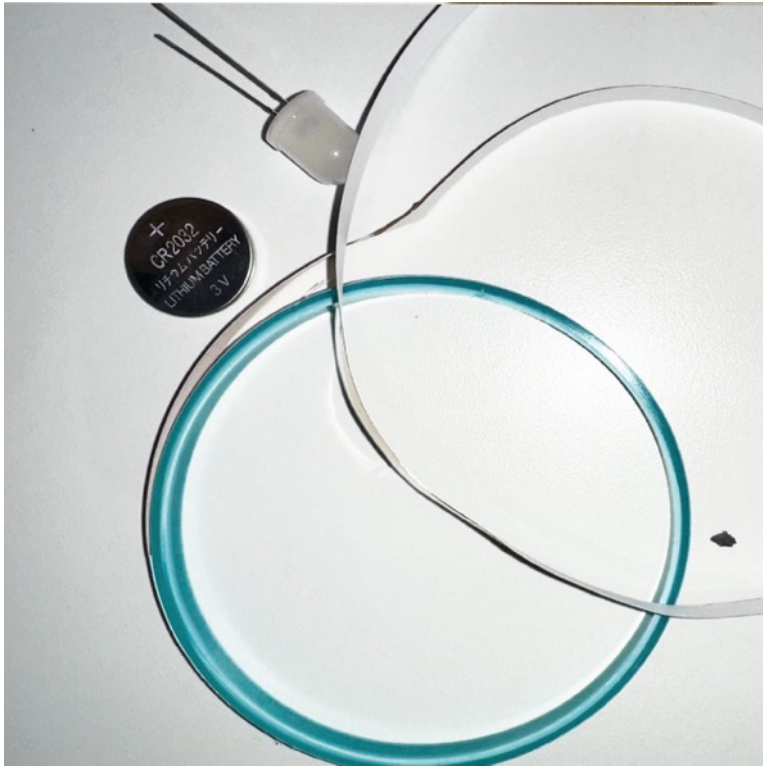


**Let's make a Simple Circuit: LED lights have a + and a - side
Just like a battery. The long prong is + and should connect
to the + side of the battery.**



The Simple Circuit materials:

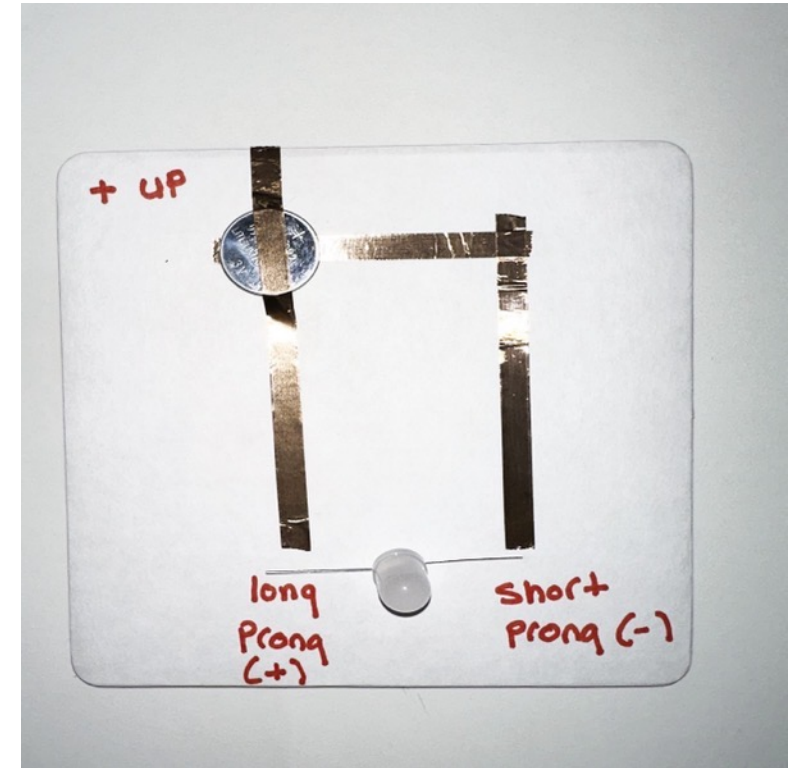
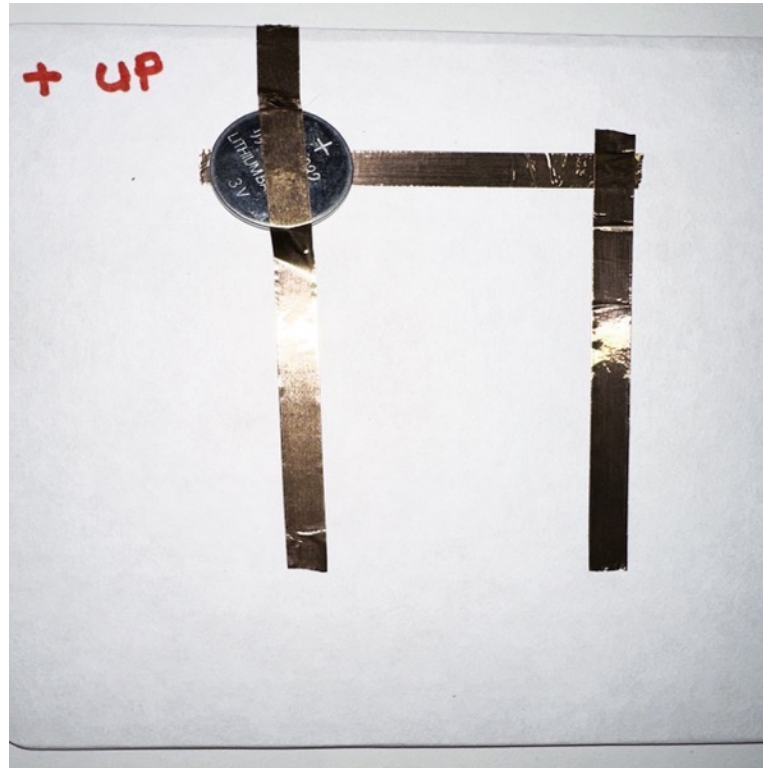
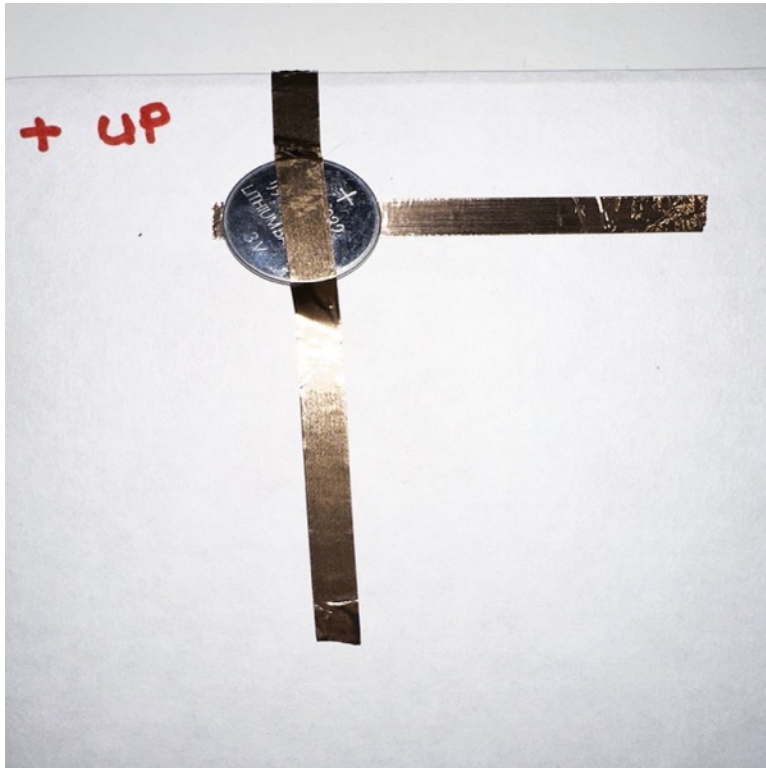
1. Cardboard
2. Lithium battery (or AA with battery holder)
3. Copper tape
4. LED light bulb



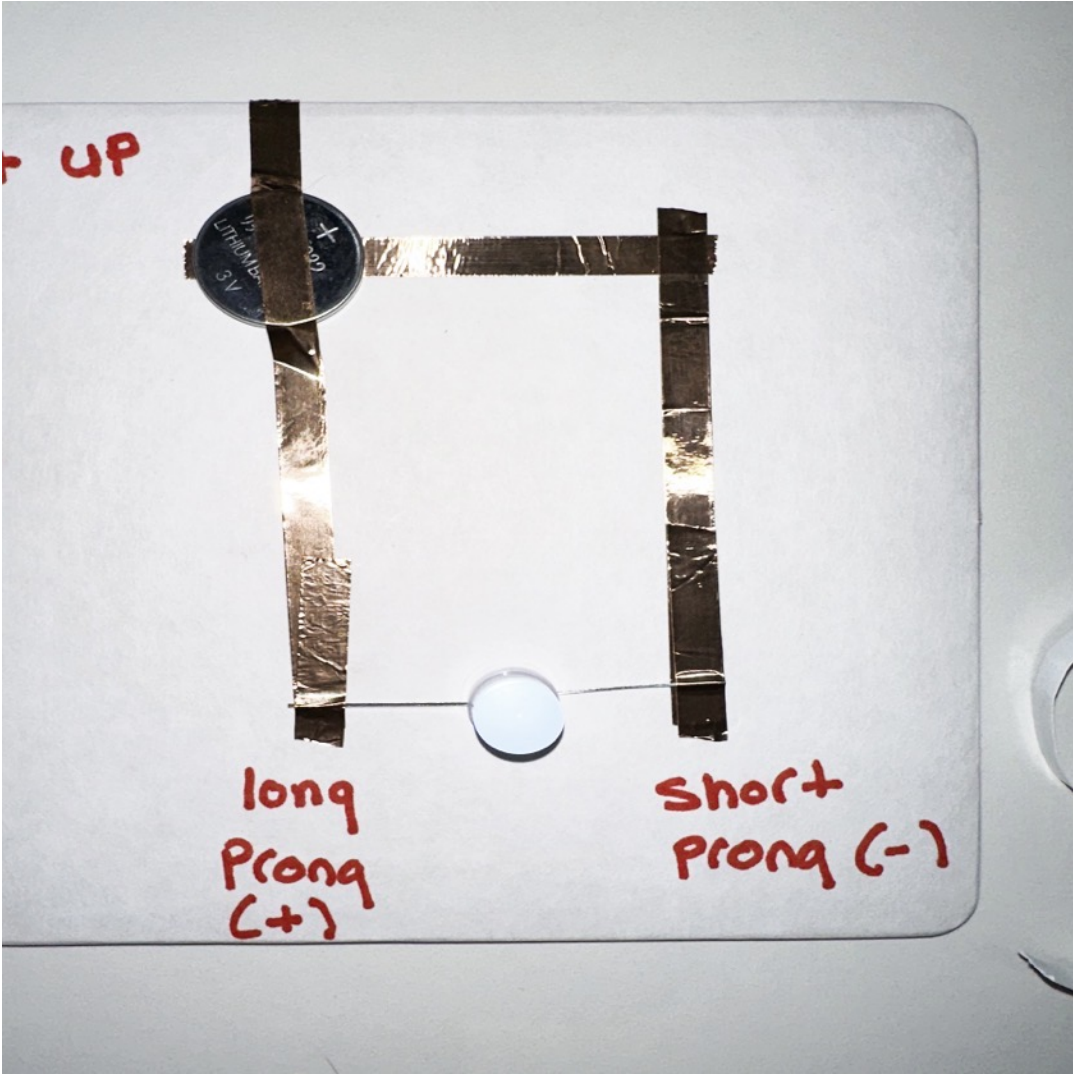
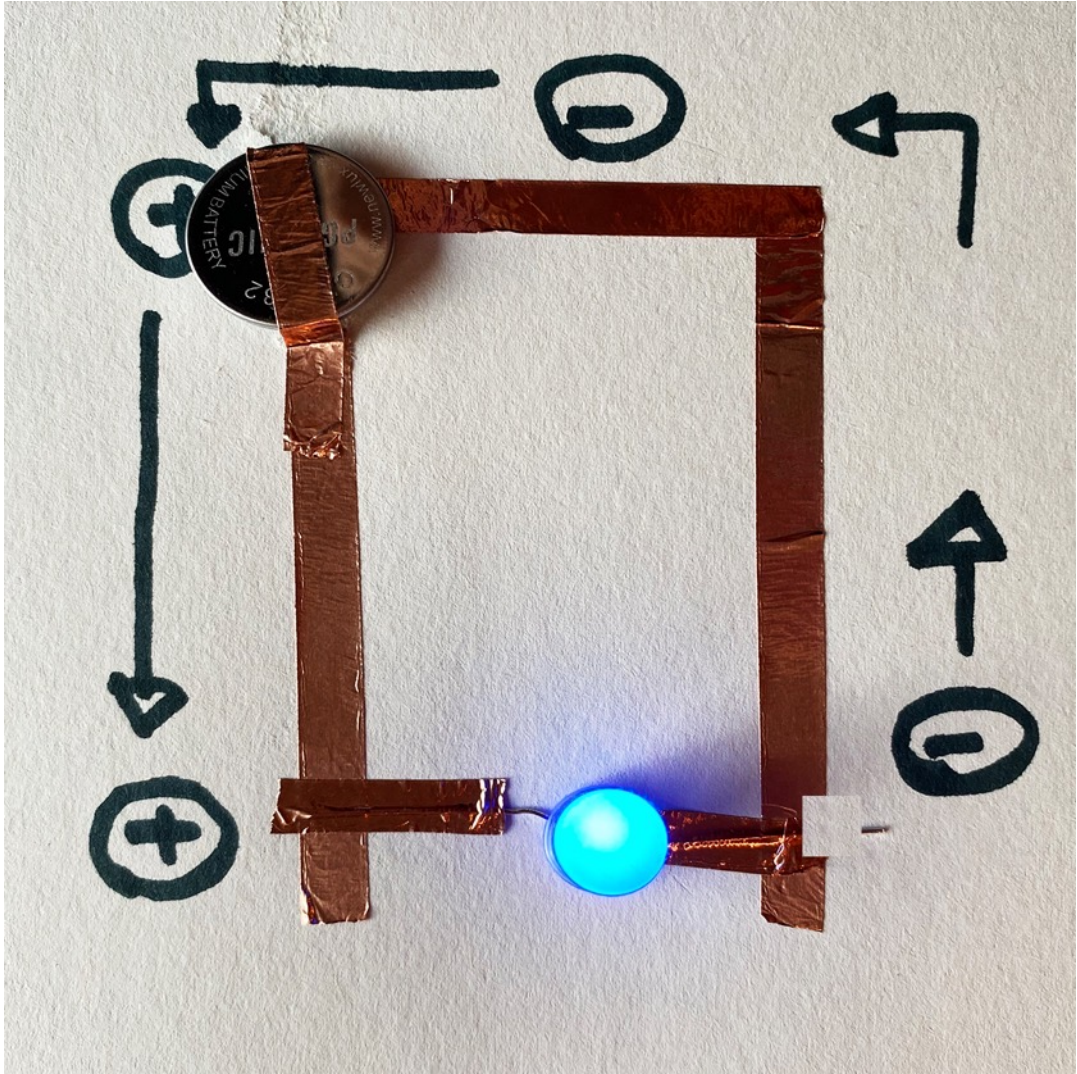
** when making a circuit with a lithium battery, the - side works better on the bottom. Look at the battery closely; can you guess why?

The Simple Circuit materials:

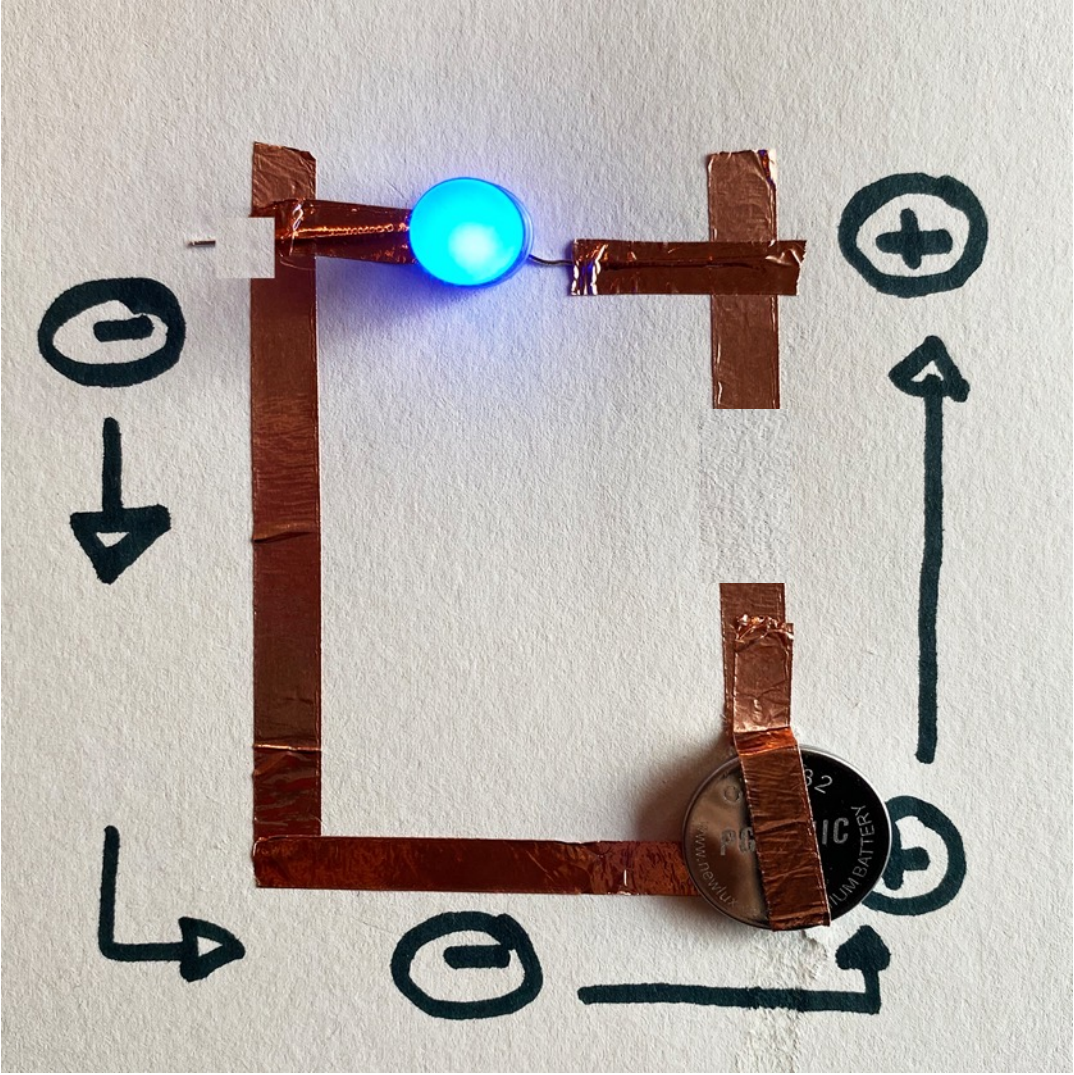
1. Cardboard
2. Lithium battery
3. Copper tape
4. LED light bulb



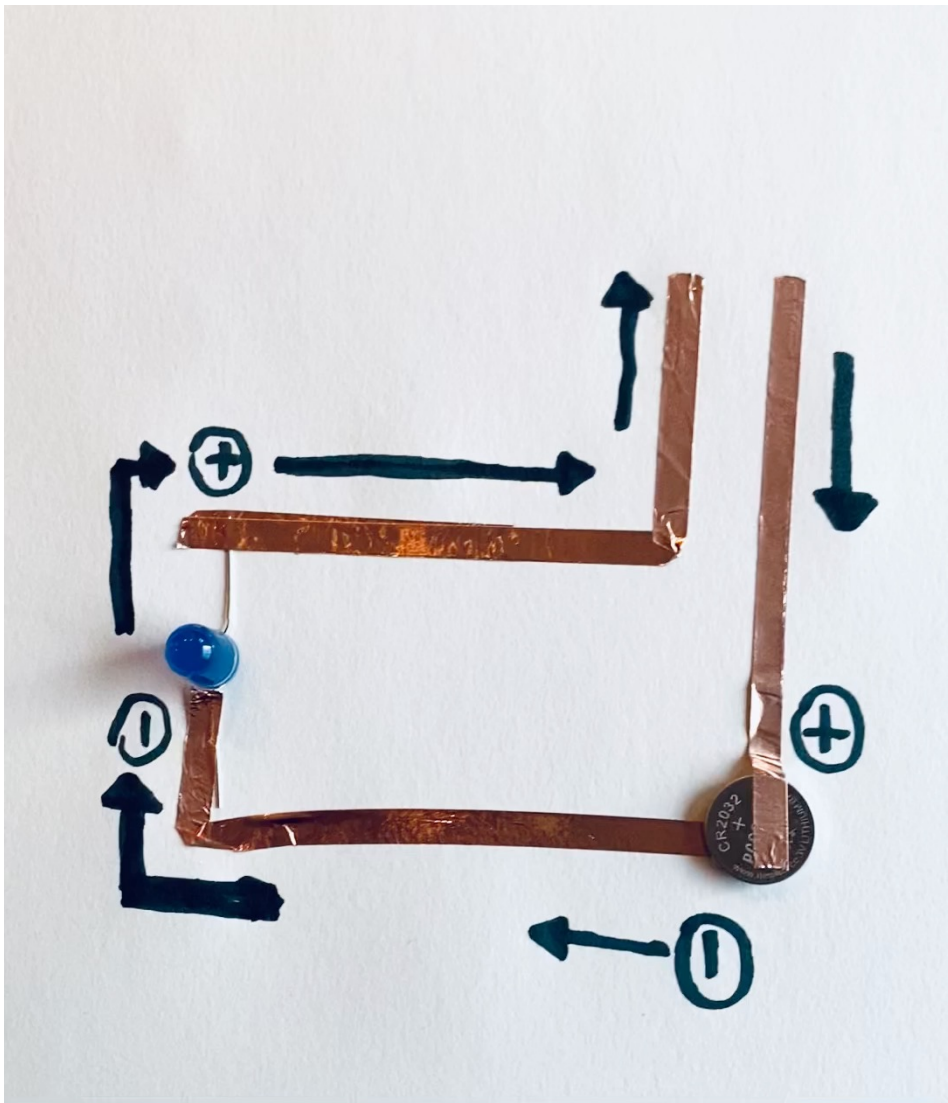
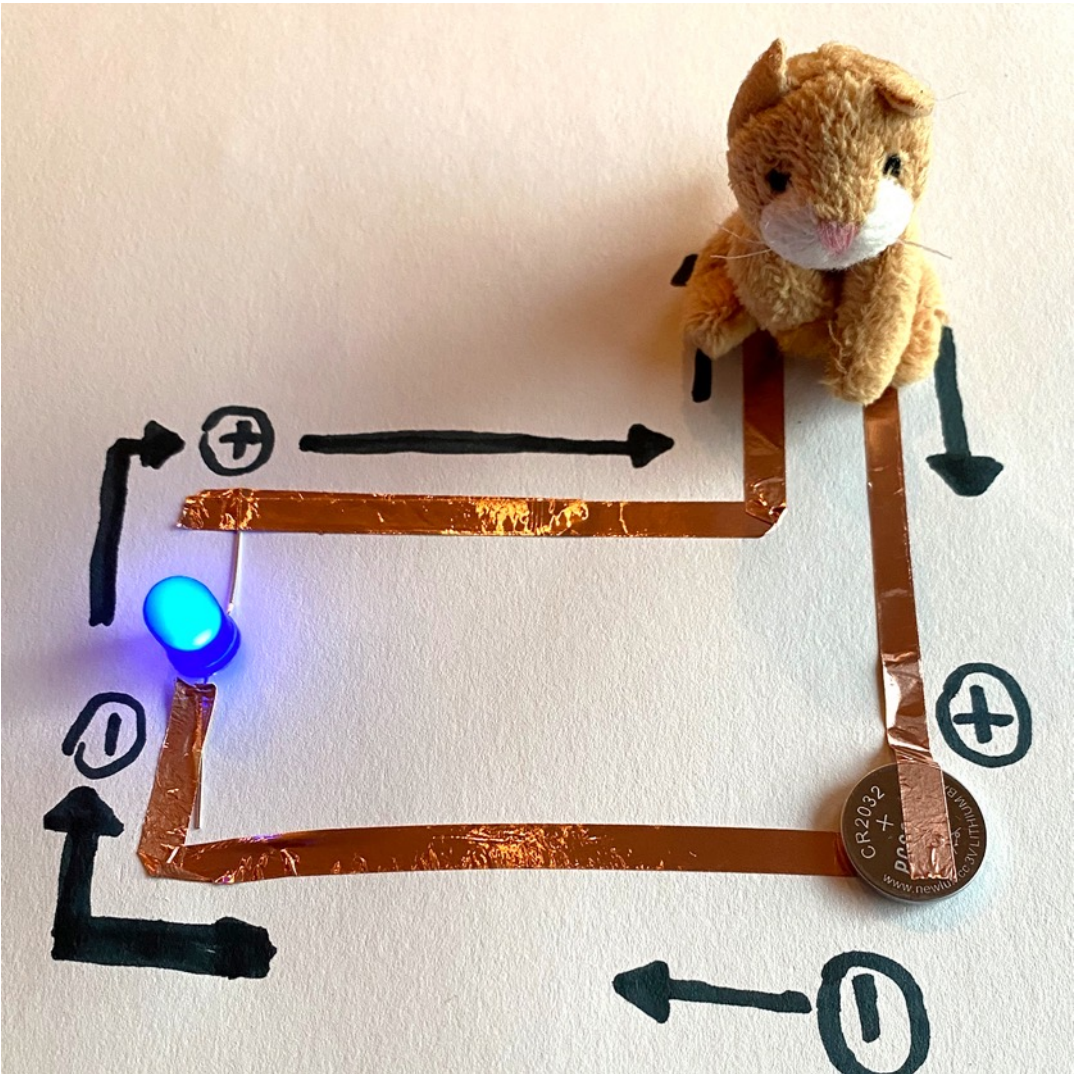
The Simple Circuit:



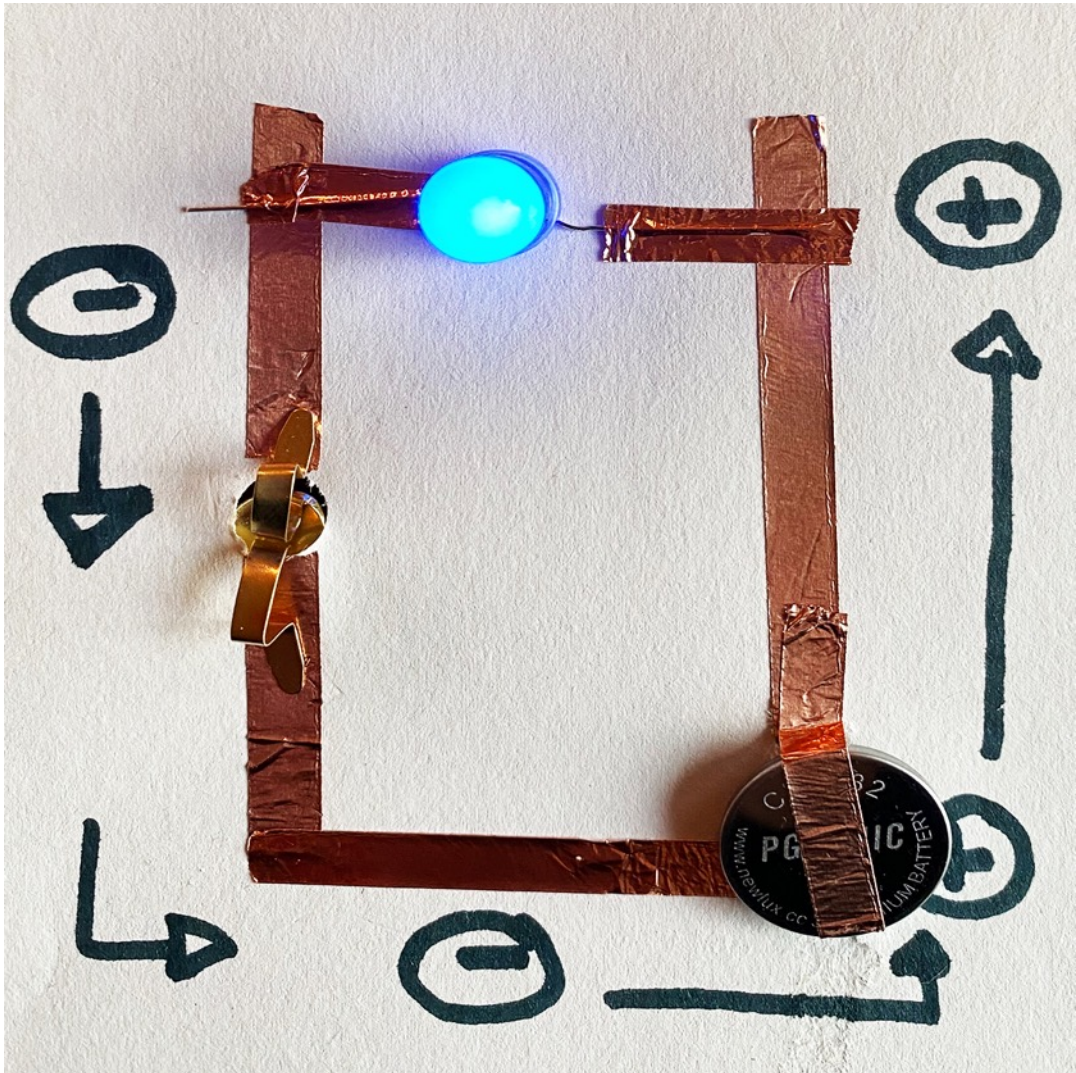
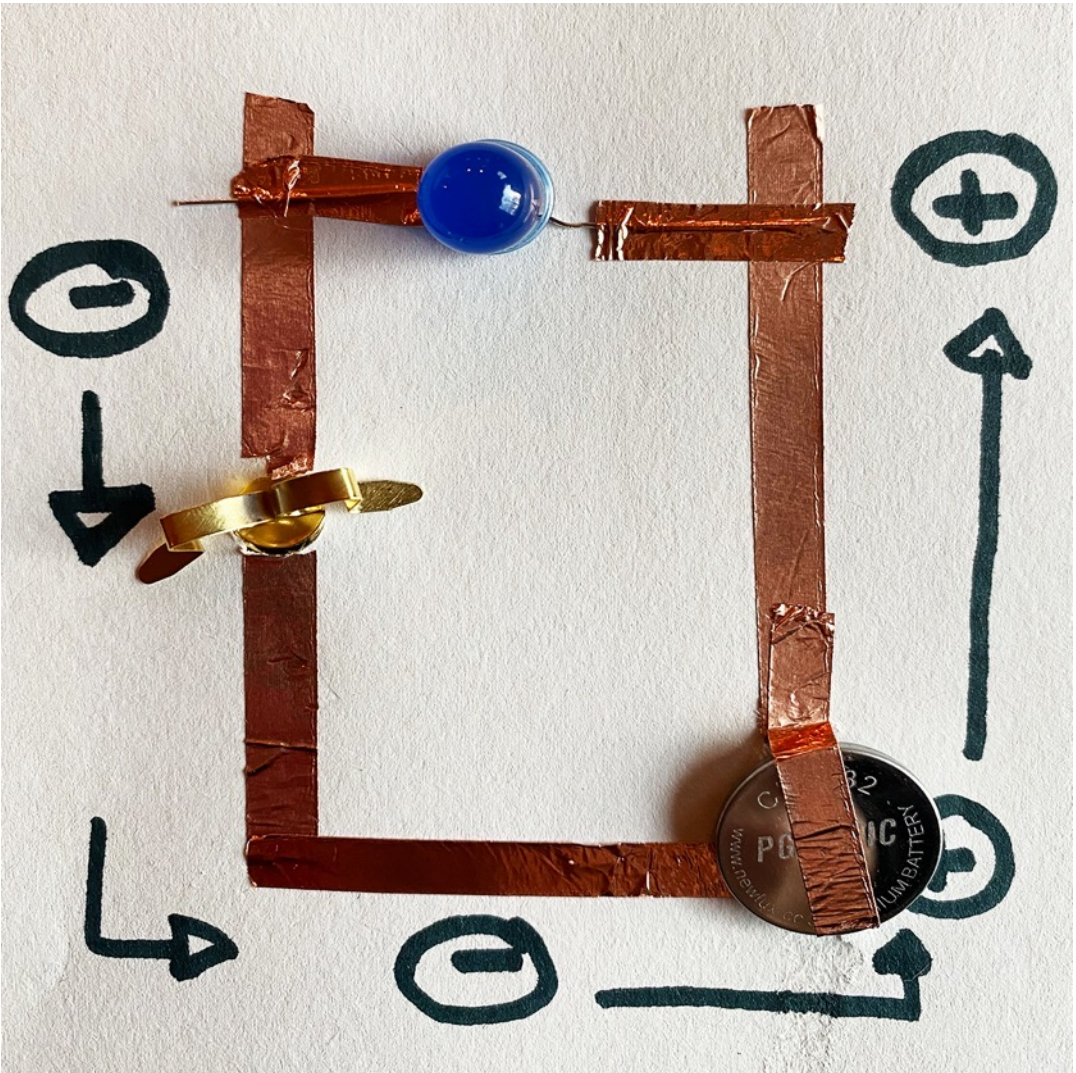
The Simple Circuit: interrupt for smart lighting



Automate it – low tech solutions for smart home living



Add a switch :
Save your energy by the side door

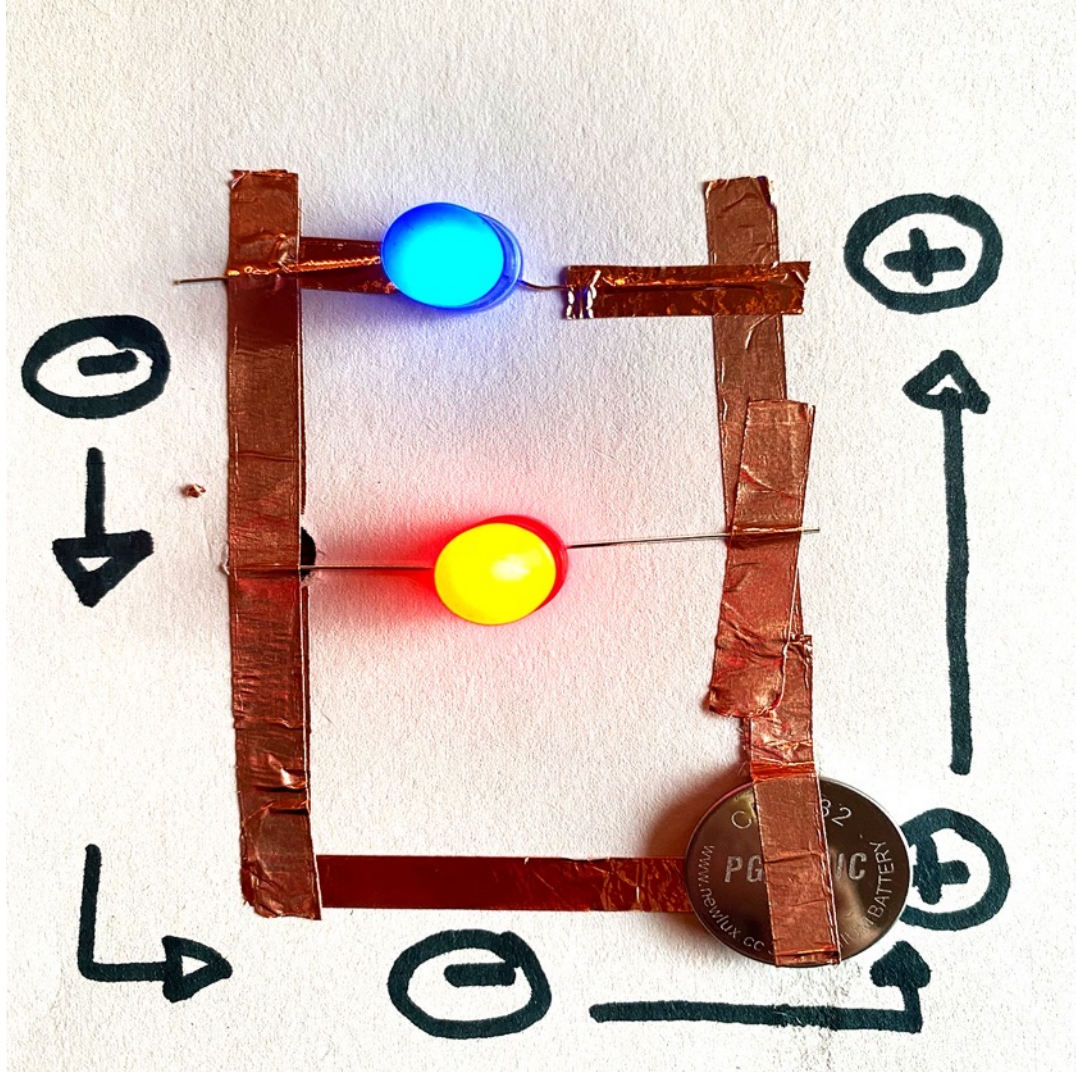


Add a switch :

Save your energy with visitor-activated lighting

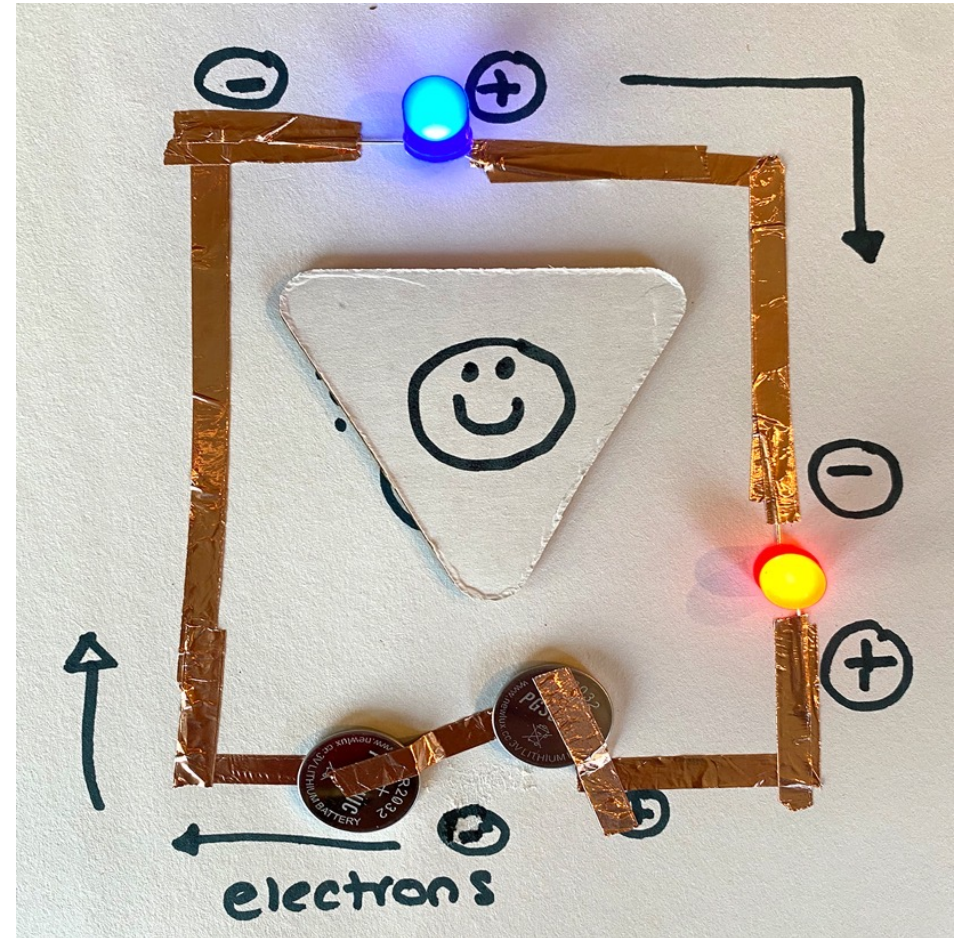
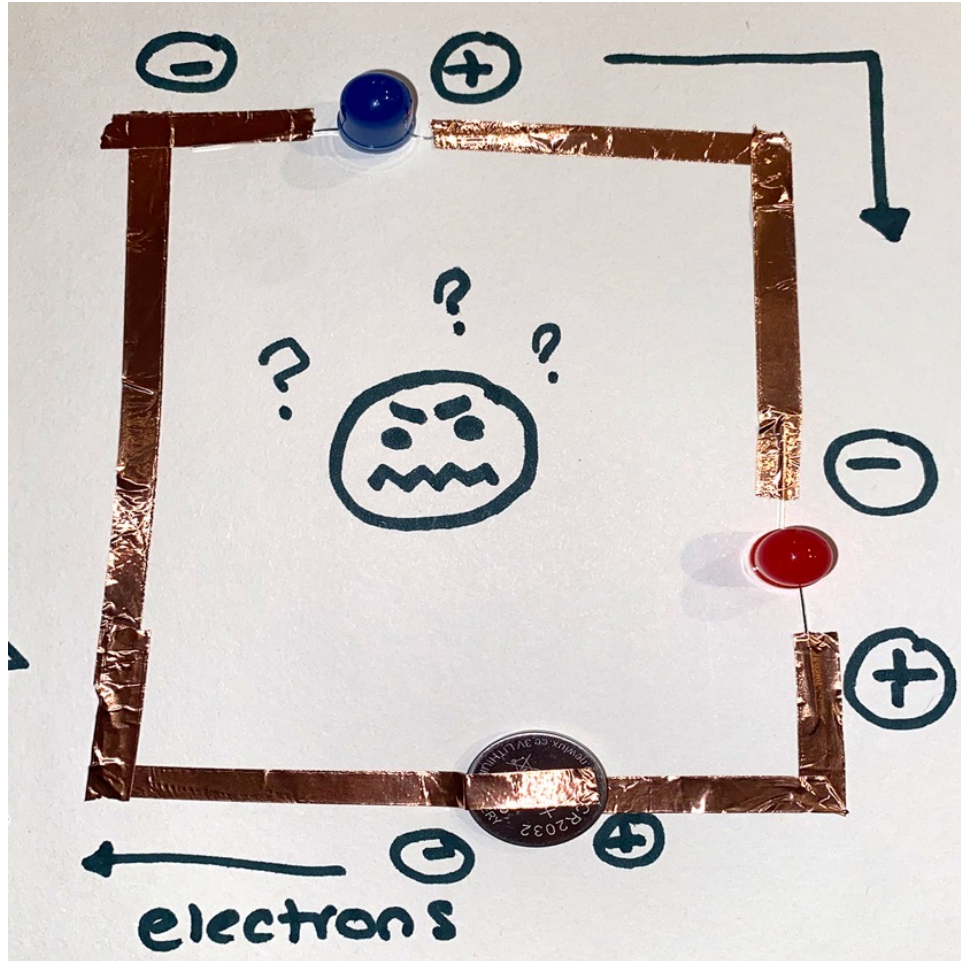


Need more light?
Parallel will do the trick.

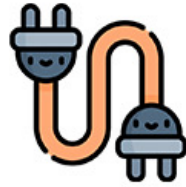


Need more light?

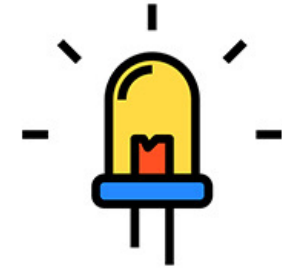
Series will do the trick but it's complicated! What's going on here?



Challenge 1



3Dux|Design



Let there be light!

Build a home with a single light inside with a hidden power source.



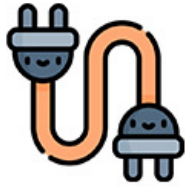
Challenge 2



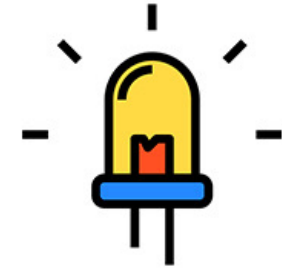
Smart-N-Safe Lighting Solutions.
Design a light for the front door that goes on automatically when guests arrive.



Challenge 3



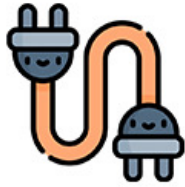
3Dux|Design



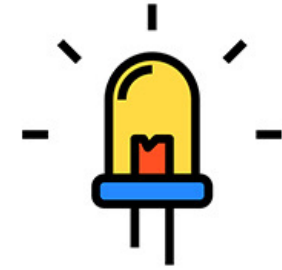
A Kennel for Critters.
Design a structure to keep 2-3 pets
separated with all spaces lit
simultaneously by a
single battery pack.



Challenge 4



3Dux|Design



Let's take this outside.

Design an outdoor space with lights. Add a switch that shuts off lights during the day.

