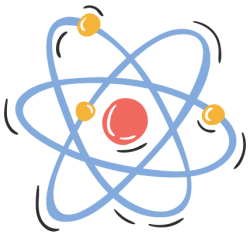
# Lesson 1 – What is a circuit?



## First… Electricity!

Everything is made of atoms. Atoms come in various shapes and sizes called elements. You'll learn a lot more about this when you get to study chemistry. Atoms have a nucleus, made up of at least one proton and one neutron, and at least one electron.

Electricity is the flow of charges (electrons) through something. We usually show electrons by writing a lowercase e with a negative sign next to it.

| Draw the symbol for electrons: |
| --- |
| |

Which of the following is electric?

## Where does electricity come from?

If we're going to learn how to use electricity…. first, we need electricity!  Where does electricity come from?

… a power plant, of course!

We can also get electricity from a BATTERY, which uses chemicals to store electricity.  It's much easier and safer than using the high voltage (DANGEROUS) electricity we get through the power lines. We will only be using batteries for our circuit-building projects, including 9 volt batteries, that look like this!



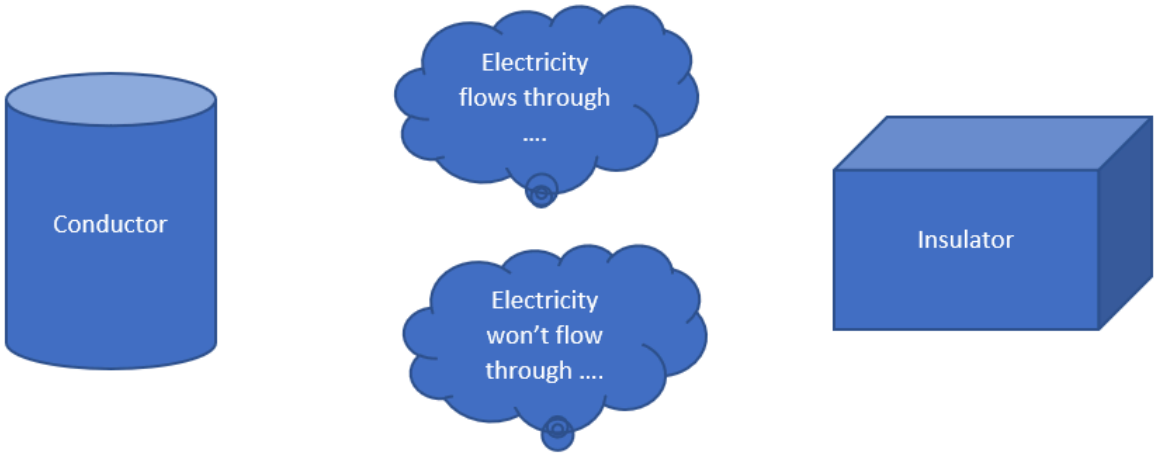
## Conductors and Insulators

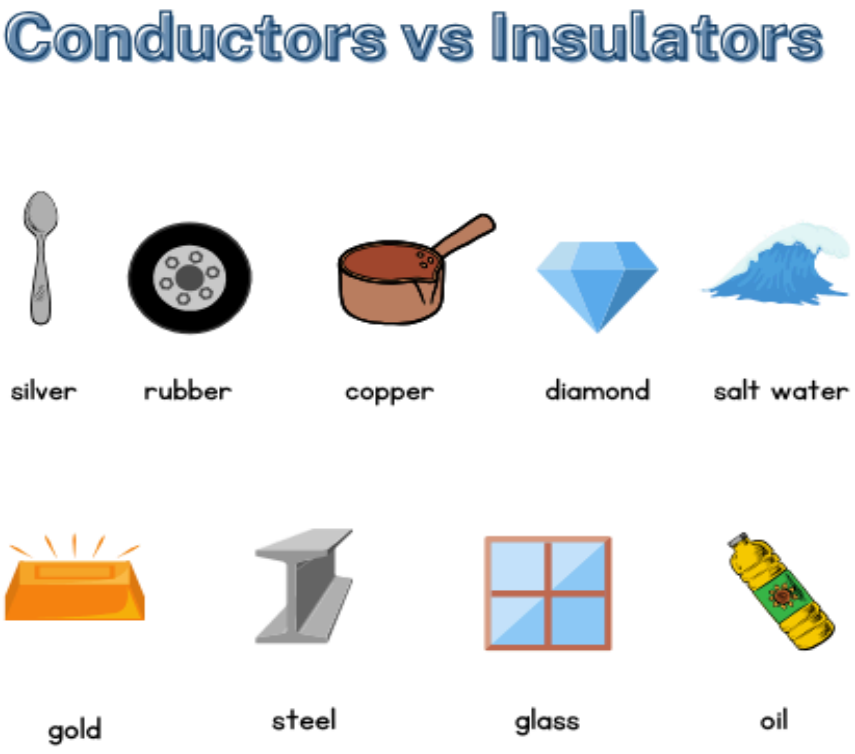
If we use insulators and conductors, we can tell the electricity where to go!

Each charge is like a super tiny drop of water. Electricity is also like heat, it wants to go from somewhere "hot" to somewhere "cold". For electricity, we call this plus/positive (+) and negative (-).

Electricity "flows" through some things and not through others.

Which do you think is which? Connect the word and the bubble that describes it





## Circuit Elements

But what can we do with electricity? Well, if we put the electricity through special things, we can turn electricity into LIGHT or HEAT or even MOVE THINGS!

We call these things that convert or change electricity ELEMENTS. We're going to use two elements to build our first circuit:

| | |
|---|---|
| Battery | Light Emitting Diode (LED) |
| Provides electricity | Turns electricity into light |

There's something special about the circuit element that we are using to produce light; it only makes light when electricity flows through it one way, but not the other. Remember positive and negative? Our special light is called a Light Emitting **Diode** (LED), and will turn only if they are placed in your circuit



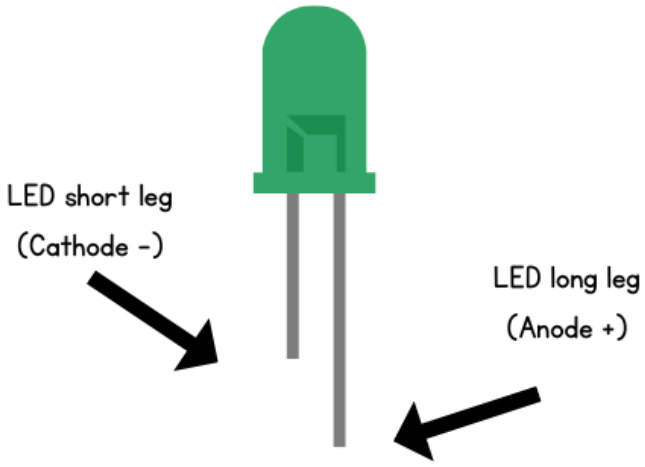
 

so that electricity flows from their  positive  leg to their  negative leg. This means we have to pay special attention to how we place them in our circuit.

## My first Circuit

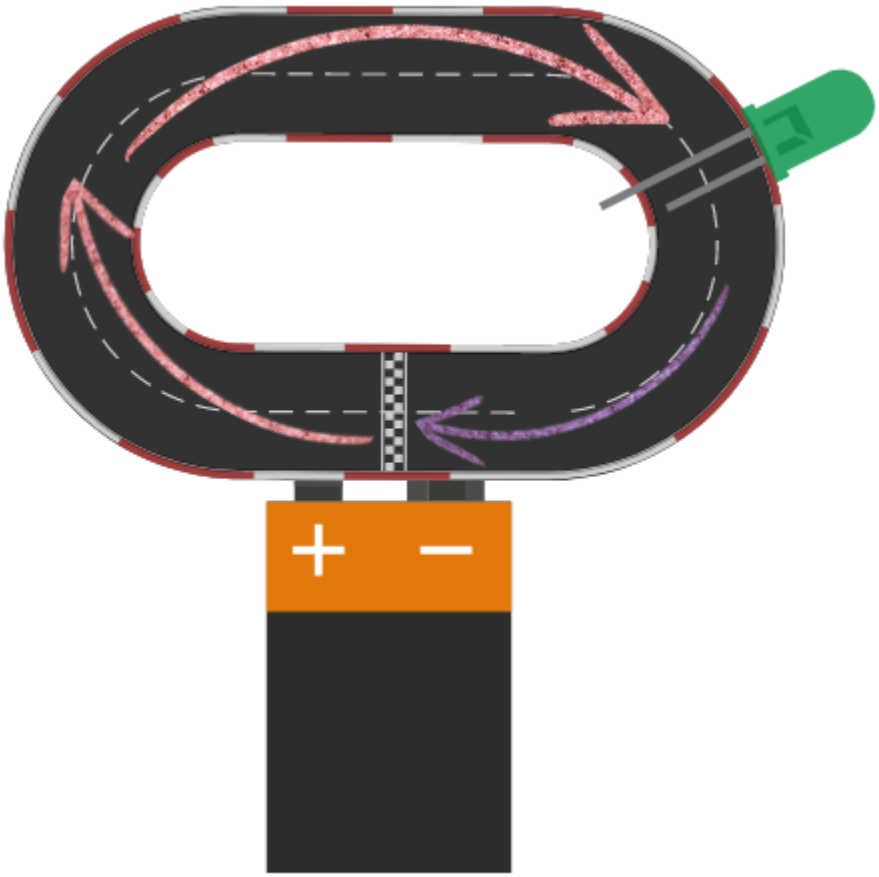
The things that electricity flows through are called CIRCUITS!  Kind of like a race track, for electrons! They are made of conductors, insulators and elements.

So, if I have a battery, conductor (wire) and a light, I can make a circuit that will light up!  The electricity goes from RED (positive), through the conductors (or wires) through the light, and then back to BLACK - or in this case, purple- (negative) of the battery.







## Activity #1: Which is a conductor, and which is an insulator?

Did you know pretty much anything is either a conductor or an insulator? Some things, like wires, let lots of electricity through. Other things, just a little bit, or even none (insulators).

Let's look at two things and figure out what each one is:

Play dough and Modeling Clay

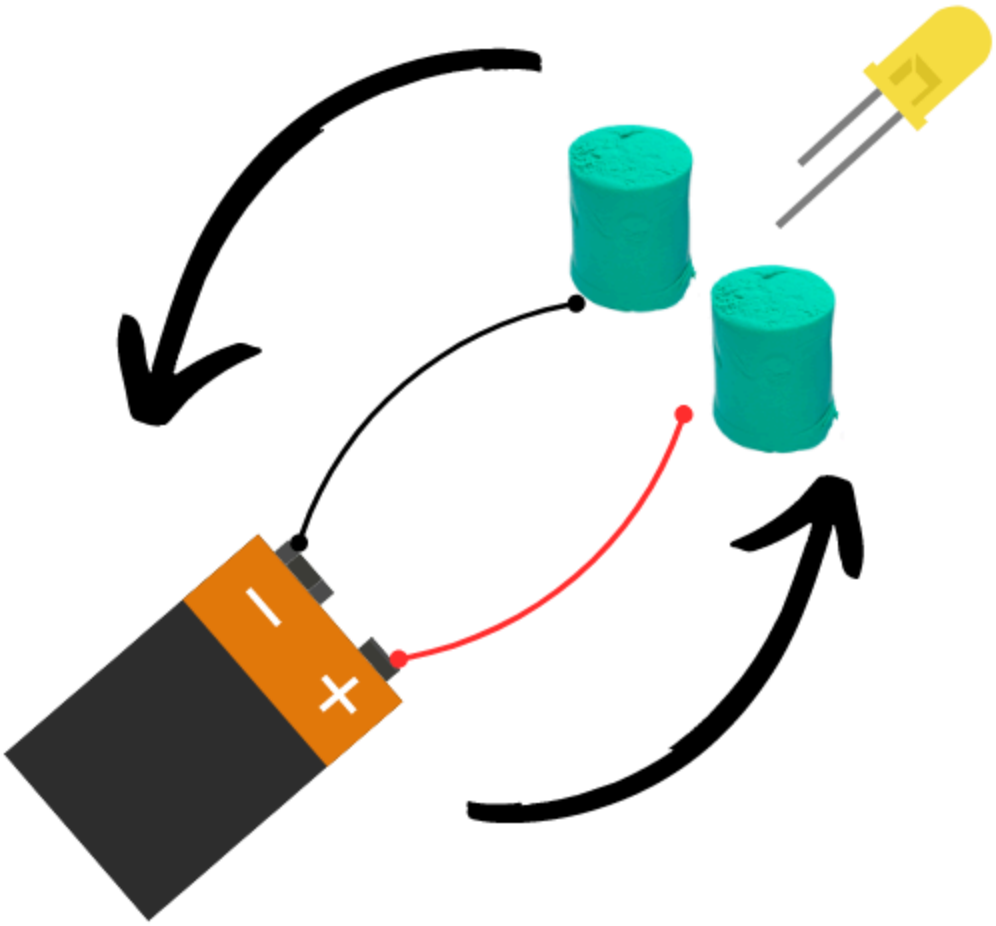
Circuit One: Conductor or Insulator ? Conductor or Insulator ?



For your first activity, use a battery (with black and red wires), and LED and either play dough or modeling clay to see if you can make a circuit. Which one is a conductor, and which one is an insulator?

?





## Activity #2: Make Something Fun!

Now that you know which is a conductor and which is an insulator, can you make something fun?