Electricity Lab Wiggle-Bot

Name: _____ Date: _____

The Lab

Let's have some fun and learn a little bit about *electricity*. You'll need parts from a disassembled Wiggle-Bot (or Super Wiggle-Bot) to complete this lab.

Components

Here's what you'll need to complete this part of the activity:

1 - Motor with Holder & Leads

3 - AA Batteries

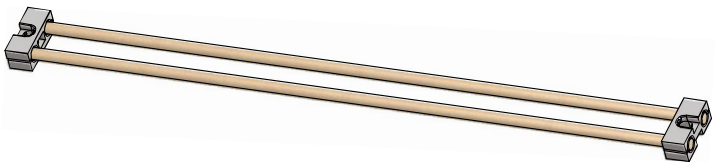
2 - Dowels
(each at least 15cm (6") long)

2 - Blocks

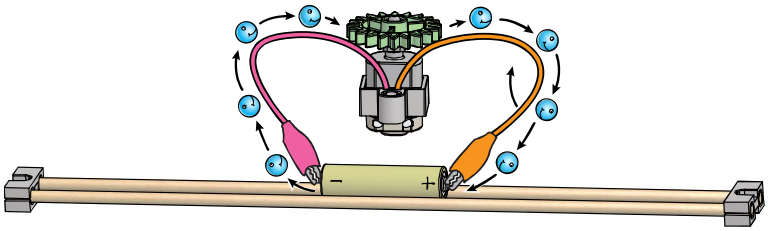
Other Materials
(such as a metal wire, paper clips, connector strips, metal screws, etc.)

Let's Get Started

1 Make a battery holder out of two **blocks** and two **dowels** as shown below.

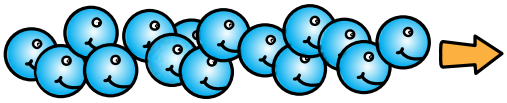


2 Run your **motor**. Touch your **motor leads** to the ends of a **AA battery**. The **motor** should turn on. Is it magic? Nope, it's *electricity*!



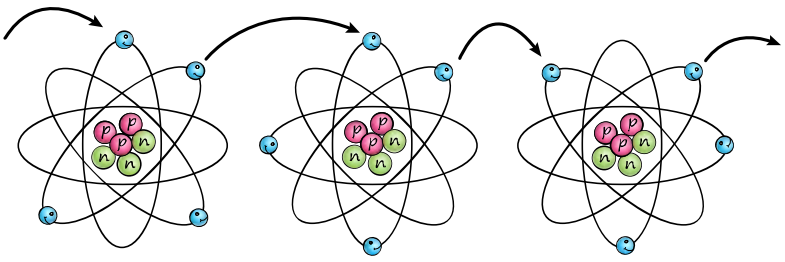
What is electricity?

Electricity is the flow of *electrons* from one place to another. *Electricity* flows through your motor to make it run.



Electrons can move?

Yes! *Electrons* can move by hopping from *atom* to *atom*. *Electrons* are flowing through you right now, allowing you to think, feel, and move your muscles.



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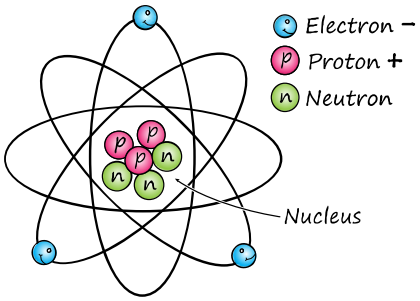
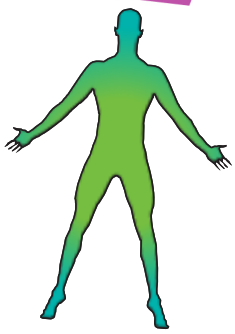
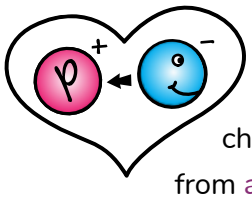


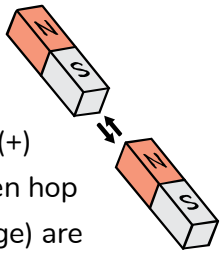
What is an atom?

Look around you. Every object is made of atoms. The average adult is made of around 7,000,000,000,000,000,000,000,000,000 atoms! How many atoms do you think you are made of?



Why do electrons move?





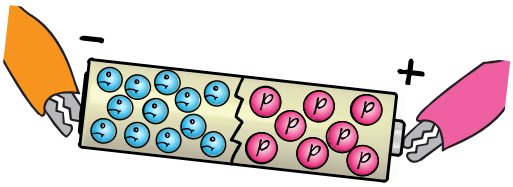
Have you ever heard the phrase "opposites attract"? Well, it's true. Electrons move because they are attracted to the oppositely charged Protons. Electrons have a negative (-) charge and Protons have a positive (+) charge. Electrons will do almost anything to move closer to a free Proton—even hop from atom to atom. Only Electrons can move. Protons and Neutrons (neutral charge) are stuck in the nucleus of the atom.

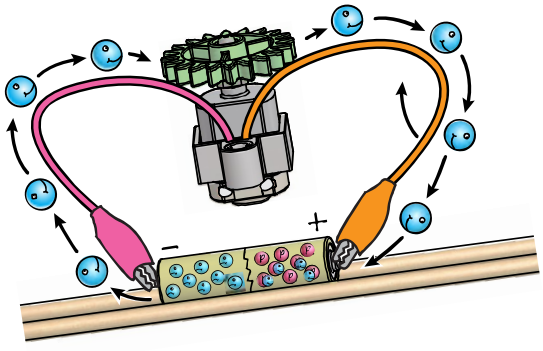
1. Fill in the blanks below with the parts of an atom.

An _____ has a negative (-) charge. A _____ has no charge. A _____ has a positive charge.

How does a battery work?

A chemical reaction inside a battery causes the Electrons to build up on one side of the battery (the negative side). A battery works because the Electrons want to get to the Protons on the positive side. However, the Electrons cannot travel inside the battery. They need an outside path to get to the Protons.





2. What makes the negative side of the battery negative?

_____

_____

3. What make the positive side of the battery positive?

_____

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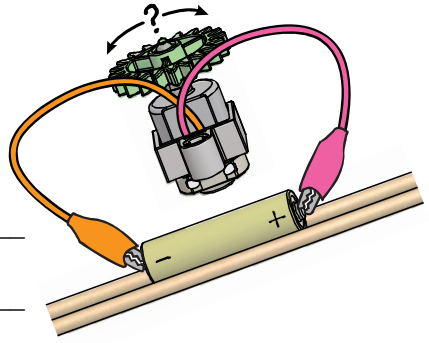
Where is the reverse?

4. Can you find a way to make your motor turn in the reverse direction? Does your solution have anything to do with the direction *electrons* flow? Explain how you turned the motor in different directions.



_____

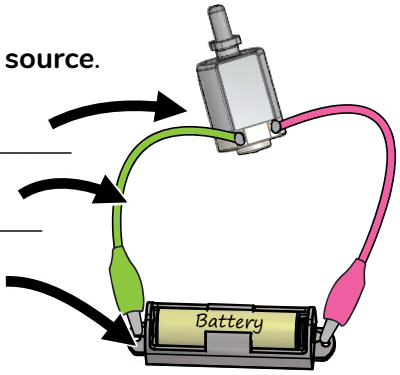
_____

5. Label the parts of the circuit.
Use the words **load**, **path**, and **source**.

_____

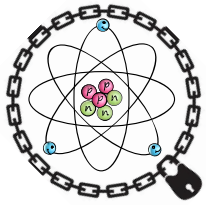
_____

_____



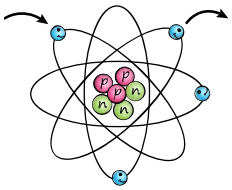
Circuit

A *circuit* is a complete path for *electricity* to flow. In fact, you created one when you connected both leads of your motor to the battery. In a *circuit*, *electricity* flows from the **source**, through a **load**, and back to the **source**.



Insulator

Insulators are materials that do not let Electrons easily flow through them.

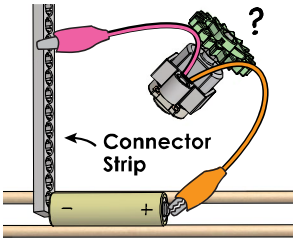


Conductor

Conductors are materials that let Electrons easily flow through them.

What can electricity flow through?

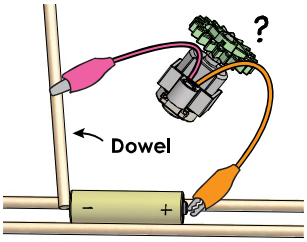
Test different materials to see if they are an *insulator* or a *conductor*. Put them between the battery and one of the motor leads. If the material is a *conductor*, then the *electricity* should flow through it and turn the motor on.



Is it a(n)... (mark your answer)

Insulator _____

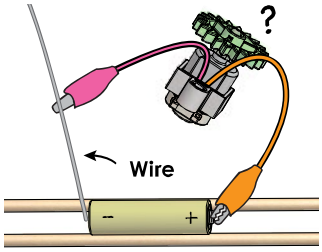
Conductor _____



Is it a(n)... (mark your answer)

Insulator _____

Conductor _____



Is it a(n)... (mark your answer)

Insulator _____

Conductor _____

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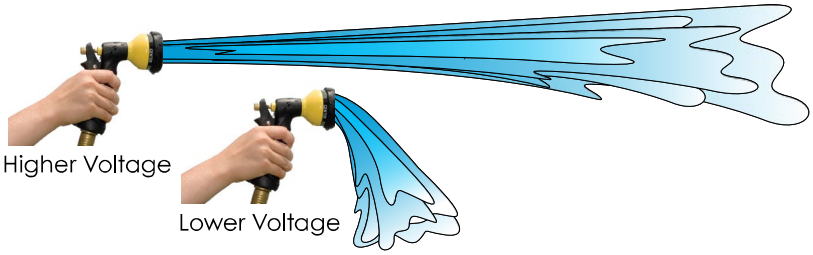
What is Voltage (v)?

Voltage is the pressure (or force) that pushes the Electrons and causes the flow of electricity. It's like water pressure. Look at the picture. The amount of water coming out of the nozzle is the same, but the pressure (or voltage) of the water is different. It is measured in volts.



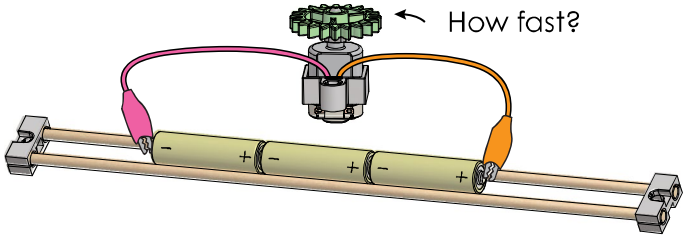
6. Look at your AA battery.
How many volts does it produce?

_____

7. Approximately how many volts does a 9-volt battery produce?

_____

8. Feel the power! Put 2 or 3 batteries together. Make sure they are all facing the same way. How does this change the speed of the motor?



_____

_____

9. Create your own electrical experiment. Describe it below. Here are some ideas...

a. The graphite (black stuff) in pencils slows down electricity (lowers the voltage). Can use it to slow down a motor? You will need to make the electricity flow through it.

b. What happens if you hook up more than one motor to a battery. Does it matter how they are hooked up?

_____

_____

_____

_____

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