

Electrical Safety

- To avoid electrical shock, it is best to avoid bridging a connection between the positive and negative ends of a power source.
- Insulation, like rubber, is your best friend when it comes to safety.

What are ground, neutral, and hot wires?

- Electrical power runs through the hot and neutral wires, but not ground.
- The purpose of the hot and neutral wires is to provide power to a component
- The ground wire, under normal circumstances, will never be used. It is there to protect a person from an electrical shock by diverting the electricity to itself and delivering it to the source instead of having electricity pass through the person to deliver it to the source.
- Video to reinforce:

https://www.youtube.com/watch?v=P-W42tk-fWc&list=PLWv9VM947MKi_7yJ0_FCfzTBXpQU-Qd3K&index=18&t=0s&app=desktop

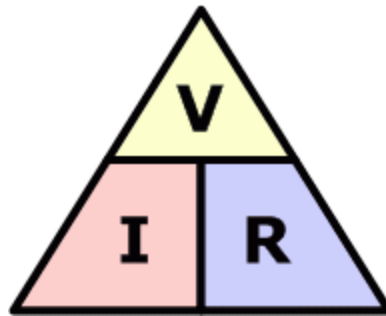
How to deal with a battery acid spill

- Tell the mentor of the spill
 - Wear protective gloves like Latex gloves, wear safety glasses/goggles to prevent acid from entering your eyes.
 - Put the battery in a non-metallic container, or a double layered bag (meaning use 2 bags overlapping each other) and sealing it. Only use the double layered bag incase there is no non-metallic container available.
3. AHS Safety quiz. Skill Pin: Safety 1

What is Ohm's law, how to use it, and practice.

1. Voltage = Current*Resistance

2. Ohm's law is a three variable equation used to calculate the different values (voltage, current, and resistance) in a circuit.



3. This is the Ohm's law triangle, and it helps with visualizing the equation, which is $V = I \cdot R$. This is one form of the equation that finds the voltage, it can be changed to find current, $I = V/R$, or resistance, $R = V/I$. This is possible because of algebra (dividing on both sides or multiplying). For example, let's say we want to find what amount of voltage we have if we only get the current and resistance values. We cover the V section, and see that I and R are right next to each other, which means we multiply ($I \cdot R$) to get the voltage. If you covered the R section to get the resistance, you would divide V/R , as you can see, V is above I and it looks like a fraction, which is another way to write division.

4. Practice (answers are at the bottom):

1. A circuit is connected to a battery with 5 volts, and there is a resistance of 2 ohms, what is the current going through the circuit?

2. A circuit has 2 amps of current through it, and it has a resistance of 10 ohms, what is the voltage?
3. A circuit has 3 amps going through it, and it has 2 ohms of resistance, what is the voltage?

Answers:

1. 2.5 amps because $5 \text{ volts} / 2 \text{ ohms} = 2.5 \text{ amps}$. For this one, you change around the formula so that it is $I = V/R$ using Algebra (dividing both sides by resistance to isolate current).
2. 20 volts because $2 \text{ amps} * 10 \text{ ohms} = 20 \text{ volts}$ (Voltage = Current*Resistance)
3. 6 volts because $3 \text{ amps} * 2 \text{ ohms} = 6 \text{ volts}$. We used $V=I*R$ to get this one.
5. Supplementary video: <https://www.youtube.com/watch?v=HsLLq6Rm5tU>

What is Direct Current, how it applies to sources like batteries used on the Robot.

1. Direct Current is a current that only allows electrons to flow in 1 direction, like a battery, because it has a set side with positive and negative.
2. The robot that the robotics team makes uses a battery that creates direct current.

What is Alternating Current, how it applies to your house outlet.

1. Alternating Current is a current that switches the direction in which the electrons flow in. It makes electrons flow in two directions, and does not have a set polarized side (positive or negative side). Power going to your house is AC because of how power is generated (with magnets rotating, causing the AC).