Science 9

Physics III

Name:
Date:
Block:

1. **Electrochemical Cells**
2. **Voltage, Current, Resistance**
3. **Insulator vs Conductor**

Electrochemical Cell

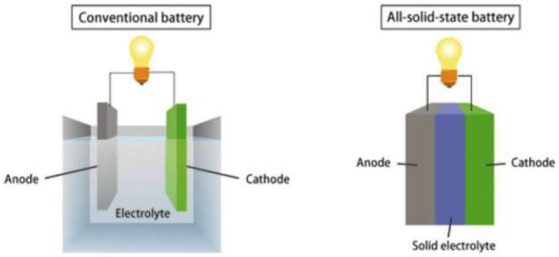
Electrochemical cell:

- Transforms _____ energy into _____ energy
- An AA "_____" is an electrochemical cell (even though it is commonly known as a "battery")

Battery:

- A _____ of two or more cells

We can consider electrochemical cells and batteries as _____. A source is anything that _____ electrical energy. An _____ _____ would also be considered a source.



An electrochemical cell is made up of three major parts:

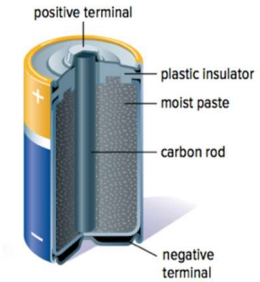
- _____: negative side of the cell
- _____: positive side of the cell
- _____: a catalyst (helps to speed up reactions) that helps to promote the movement of _____ from the cathode to the anode when the cell is being charged

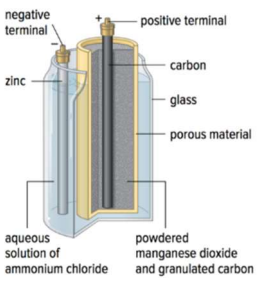
How does an electrochemical cell work?

- _____ _____occur on the surface of _____ (a metal conductor which allows electricity to enter and leave)
- The electrodes are placed in a solution called _____
- The chemical reactions that occur causes one electrode to be _____ _____ (cathode) and one electrode to be _____ _____ (anode)
- The electrodes are then placed in contact with the _____ of the cell
- When we connect the terminals to an electrical _____, charges flow through it

There are two main types of cells: a _____ _____, and a _____ _____

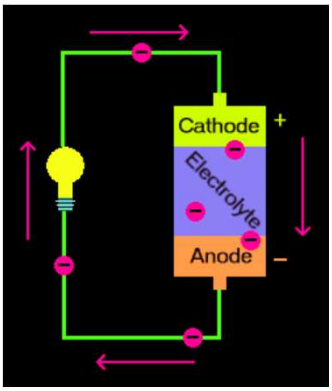
- Wet cell: the electrolyte is a _____ solution
- Dry cell: the electrolyte is a _____ paste





The chemical reactions that occur within the electrochemical cell causes a buildup of _____ on the _____. As negative charges want to repel each other, the electrons want to move around so that there is no difference between the anode and the cathode.

- The _____ prevents the electrons from moving within the electrochemical cell



When we connect the cell into a circuit, the electrons will be able to leave the anode and travel through the circuit before returning to the cathode.

Voltage, Current, Resistance

An electrical circuit is a _____ that allows electrons to flow. Within a circuit, we are able to describe quantities such as _____, _____, and _____

What is voltage?

Voltage (also known as an electrical potential difference) is the amount of _____ _____ between two points of a cell. It is the difference in charge between two points.

- A unit of charge (called a coulomb) is able to gain voltage when it passes through a source.

We can measure the amount of voltage in _____ ( )
The symbol to represent voltage is *V.*

What is current?

Electric current is the _____ where _____ _____ flows past a certain point in an electric circuit. It can be described as the movement of electrons through a wire.

We can measure the amount of current in _____ ( )
The symbol to represent current is I.

What is resistance?

Resistance is described as the degree to which the flow of current is _____ by a load. A load is an object that is able to _____ the flow of current. Loads are able to _____ electrical energy into another form of energy.

- Example: a lightbulb is a load that converts electrical energy into light and thermal energy
- Example: a radio is a load that converts electrical energy into sound energy

We can measure the amount of resistance in _____ ( )
The symbol to represent resistance is R.

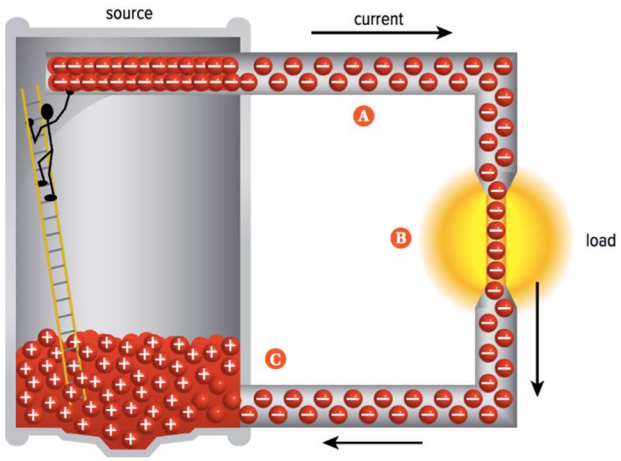
Variable	Symbol	Unit
Voltage	V	Volts (V)
Current	I	Amperes (A)
Resistance	R	Ohms (Ω)

Circuits

An electrical circuit always contains a _____, a _____, and _____ that are connected in a closed _____. Electrical circuits allow current to flow through each component.

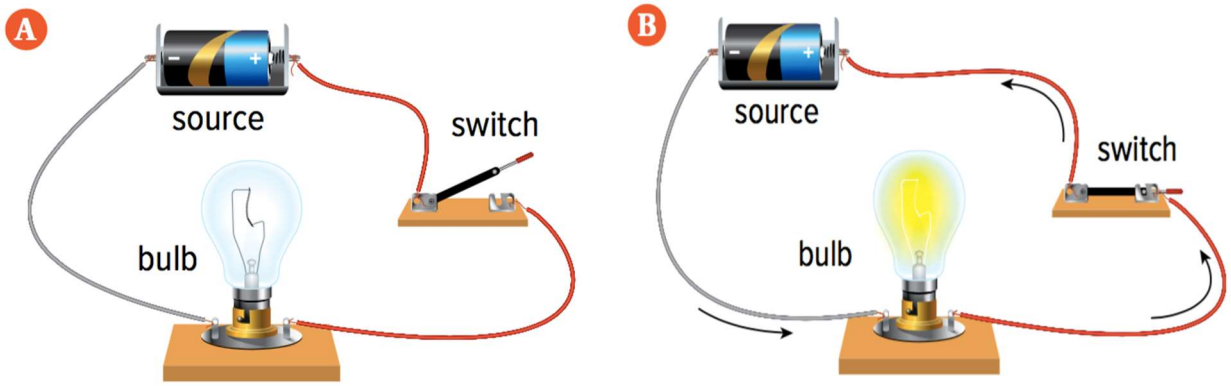
How does current flow through a circuit?

- Electrons will leave the _____ _____of the electrochemical cell due to the repulsion between the charges and the attraction to the positive charges in the positive terminal
- The electrons leaving the electrochemical cell will carry _____ provided by the cell
- The electrons will pass through the _____ and transfer some of its energy to the load
- The electrons will leave the load and return to the cell



We can control the flow of current with a _____.

- If the switch is _____, the circuit is open and current _____ flow
- If the switch is _____, the circuit is closed and current _____ travel



It is also possible to create a short circuit. A short circuit results when the resistance within the circuit is too low, making the _____ _____ _____ that it becomes dangerous.

- Example: If there wasn't a load (light bulb) to resist the flow of current, the current would be so large that the conductor would get very hot and start a fire

Conductor vs. Insulator

When creating a circuit, it is important to understand what materials are insulators and what materials are conductors. Electrons are able to either stay on the surface of an object or travel through it.

- _____ : A material charges cannot travel through
- _____: A material charges can travel through

We can describe how easily charges are able to travel through a material as conductivity.

- The higher the conductivity of a material, the easier electrons are able to travel through it
- Example: metals tend to be good conductors whereas plastics are insulators

Brain Break:
Complete the following image…