Electricity Notes

All matter is made up of very small particles called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

* The center nucleus of the atom is made of particles called\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Protons =
* Neutrons =
* Electrons swarm around the outside and have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ charge

Most atoms by themselves are **\_\_\_\_\_\_\_\_\_\_\_\_\_**

* The # of **\_\_\_\_\_\_\_\_\_\_\_\_\_** = the # of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are held **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and can be **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** making the atom have a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** charge or a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** charge

Charged objects exert a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** on other charged objects

Law of electric charge –

The force between charged objects is an **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Determined by 2 things**:**

*
*

Electric field – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in which other objects can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 An object becomes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**charged when it **\_\_\_\_\_\_\_\_\_\_\_\_** electrons, and an object becomes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** charged when it **\_\_\_\_\_\_\_\_\_\_\_** electrons

3 ways to charge an object:

1. Friction –
2. Conduction –
3. Induction –

Conservation of Charge - charges aren’t **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, they are only **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |
| --- | --- |
| Electroscope – a device used to see if something is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* Not charged –
* Charged –

\*Cannot tell if the charge is \_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | http://www.school-for-champions.com/science/images/static_detection-simple_electroscope.gif |

Conductor - A material in which charges can **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Examples:

Insulator - A material in which charges **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 Examples:

Static Electricity –

Electric Discharge - The **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** stored in an object

 How lightning works:

1. As water droplets, ice, and air move inside the cloud, **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – **\_\_\_\_\_\_\_\_\_\_\_\_** on bottom and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** on top
2. Negative charge on bottom can **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** on ground
3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of charge differences causes a rapid **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Lightning rod - Rod connected to the **\_\_\_\_\_\_\_\_\_\_\_** by a wire, provides a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to Earth

Electric Current –

 Measured in units called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Two kinds of Electric Currents:

Direct Current (DC) - Electrons flow **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 Example:

Alternating Current (AC) - Electrons flow **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Example:

Voltage - Potential **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** between **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in a circuit

 Measured in units called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The **\_\_\_\_\_\_\_\_\_\_\_\_\_** the voltage, the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is released per electron

The greater the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, the greater the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is

Resistance - **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** to the flow of electrons by a material or device

 Measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Depends on:

* Materials - Good conductors have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** while poor conductors have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Thickness - Thick wire has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because there is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for the current to go through
* Length - Short wire has **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** because there is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** to work through
* Temperature - Resistance of metals **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** as temperature **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Ohm’s Law –

 I (A) = V (V)

 R (Ω)

Generating Electrical Energy

 Generators turn **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** into electrical energy

 Cells – change **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** or **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** energy into electrical energy

Parts of a cell

 Electrolyte – mixture of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that allow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to flow

 Electrode – pair of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ through which electrons \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between the electrolyte and the electrodes convert \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy

Two kinds of Cells

 Wet cells -

 Example:

 Dry cells –

 Example:

Thermocouple - A device that converts **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** energy into **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** energy

* The greater the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,** the greater the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Photocell - A device that converts **\_\_\_\_\_\_\_\_\_\_\_\_**  energy into **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** energy

Electric Power – rate at which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is changed into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of energy

 Measured in \_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Equation for electric power:

 Light bulbs have different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ so they use different amounts of \_\_\_\_\_\_\_\_\_\_\_\_\_

* The \_\_\_\_\_\_\_\_\_\_\_\_\_ the number, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ it glows because it is receiving more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Electric Energy

 Depends on:

1.
2.

 Equation for Electric Energy:

 Power needs to be expressed in \_\_\_\_\_\_\_\_\_\_\_\_\_

* The unit for electrical energy is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ( )
* 1 kWh =

Reading an electricity meter

1. Always read from **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. If the pointer is **\_\_\_\_\_\_\_\_\_\_\_\_** two numbers, record the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
3. Always record **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** than the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** if the pointer on the dial to the **\_\_\_\_\_\_\_\_\_\_\_** is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**



 \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_

Electric circuit – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ path that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ flow through

Circuits need three basic parts:

1. Energy source –
2. Load – something that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by changing it into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Wires –

A \_\_\_\_\_\_\_\_\_\_\_ can be used to \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ a circuit

 “on” = circuit is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and electrons \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 “off” = circuit is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and electrons \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Common Circuit Symbols

 Connecting wire

Resistor

 Lamp or light globe

 Ammeter

 Battery

 Voltmeter

 Switch

Two main types of circuits:

1. Series circuit – all parts are connected in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* A break in the circuit **\_\_\_\_\_\_\_\_\_\_\_** the flow of electricity to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of the circuit
* Multiple light bulbs (loads) **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and make the bulbs **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Useful in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
1. Parallel circuit – parts are connected \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ path to travel through
* A break in the circuit **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** the flow to the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** devices
* Multiple light bulbs will **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* The \_\_\_\_\_\_\_\_\_\_ paths the \_\_\_\_\_\_\_\_\_\_\_\_ resistance
* Each pathway can be **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** w/out affecting the others

Household Circuit Safety

 Fuses – contain a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that \_\_\_\_\_\_\_ if current is too high, \_\_\_\_\_\_\_\_\_\_\_\_\_ the

 circuit

* Has to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to complete the circuit again

Circuit breaker – piece of metal \_\_\_\_\_\_\_\_\_\_ when it gets too hot which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and

 \_\_\_\_\_\_\_\_\_\_\_ the circuit

* Has to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_to complete the circuit again
* GFCI - found in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and acts like a small \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_