

# Electricity Study Guide

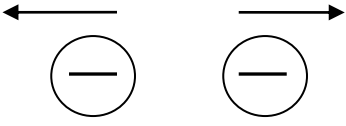
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## Electric Charge

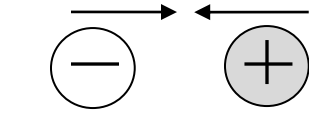
Charge is a fundamental property of matter, like mass.  
Objects are either positive, negative, or neutral.

Like the charges in an Atom !

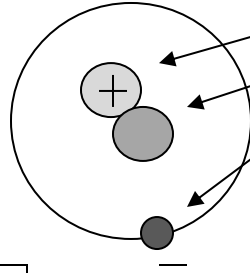
Electric Charges work like magnetic poles.



like charges repel



opposite charges attract



Protons have a + charge  
Neutrons have a - charge  
Electrons have a 0 charge

Which two go inside the house (nucleus)?

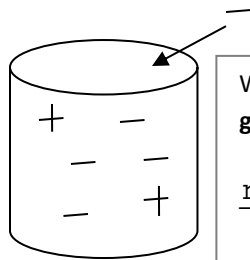
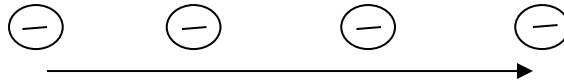
proton & neutron

**Electrical forces cause electrons to move.**  
*Electricity is moving electrons.*

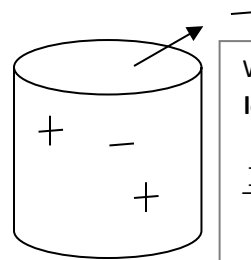
Atoms contain an equal number of protons and electrons, so they cancel each other out.

↓ BUT

Atoms can gain or lose electrons



When something **gains** electrons it becomes negatively charged.



When something **loses** electrons it becomes positively charged.

## Static Electricity

Electric charges (-) are building up in one place.

Static means **still**



Lightening is a huge build up of static **electricity** in the clouds, just like when you drag your feet across a carpet. When enough charge is built up to break through the air, lightening occurs, releasing the charge. You also **discharge** static electricity when you touch a doorknob.

*Charged objects try to discharge because all objects want to be electrically neutral.*

## Current Electricity

Electrons moving in a wire



**Current:** is the **flow** of electrons; just like water flows down a stream.

## Parts of a circuit

A **circuit** is the pathway that electrons travel through;  
(Think of a sidewalk)

### Load

Uses electricity



### Conductor

Pathway that gets electrons from energy source to load  
(wire)

### Energy Source

source of electrons

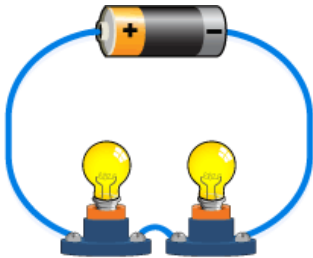


## 2 Types of Circuits

### Series

Has only one path for electrons to follow

The World **Series** is several games, one after the other



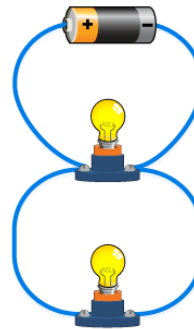
Turn one bulb off and they both go off

More bulbs in a series circuit means they get dimmer

### Parallel

Has multiple paths for electrons to follow

Like parallel lines



Your house is a parallel circuit

### Conductor

Let's electricity run through it

*Conductors of electricity also conduct heat, thermal energy.*

Examples:

copper wire  
paper clip

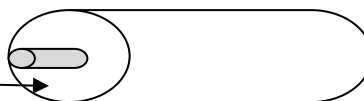
### Insulator

Doesn't let electricity run through it

Examples:

rubber glove  
wood handle

Electrical wires have a metal center to conduct electricity surrounded by insulation for protection.



### Matching !

Draw a line to connect the term to the meaning.

1. Insulator C
2. Conductor F
3. Positive E
4. Negative A
5. Electricity D
6. Electric charge G
7. Static electricity B
8. Electrically neutral H

- A. The charge that attracts protons.
- B. A buildup of charge on an object.
- C. A material that resists the flow of electricity.
- D. movement of electrons from one place to another
- E. The charge that attracts electrons.
- F. A material that does not resist electricity.
- G. The pushes and pulls that electric charges exert on each other
- H. An object that has equal amounts of positive and negative charges.

### Insulator? or Conductor?

- C Silver
- I Wood
- I Air
- I Glass
- C Copper
- I Pure water
- C Gold
- I Styrofoam
- C Aluminum

After you rub a balloon on your hair it might stick to a wall.

#### Why? Be specific.

Friction rubs off electrons which flow to your hair and leave the balloon positively charged. The balloon is an insulator so the charges stay where they are. When the balloon approaches the wall, it draws negative charge (electrons) to the surface. The wall is now "negative" and the balloon "positive" so they attract each other.

### Series or Parallel circuit?

- S Only one path for the electricity.
- S Dependent paths.
- P How your house is wired.
- P Independent current paths.
- P Can turn off one light without others turning off.
- S If you turn off one light, all the lights turn off.
- P More than one path for the electricity to flow.

List three things you MUST have for a complete circuit:

- 1) load
- 2) conductor (wires)
- 3) power source (battery or AC)

**NOTES:**



An atom that loses electrons becomes (negative/positive)? Circle one

An atom that gains electrons becomes (negative/positive)? Circle one

