

Magnetism and Electricity Notes

I. Magnets

A. Properties of Magnets (read properties of magnets Pearson, page 7)

1. A magnet is any material that attracts iron and materials that contain iron.
 - a. They attract or repel other magnets.
 - b. One part of a magnet will always point north when allowed to swing freely.

B. Magnetic Poles

1. Any magnet, no matter its shape, has two ends. Each one is called a magnetic pole.
 - a. The pole that points north is the north pole. The other is the south pole.
 - b. The magnetic effect of a magnet is strongest at the poles.
2. Like poles repel and opposite poles attract
 - a. The attraction or repulsion between magnetic poles is magnetic force.
 - b. A force is a push or pull that can cause an object to move.

C. Magnetic Fields

1. The area of magnetic force around a magnet is known as its magnetic field.
2. Magnetic field lines are invisible lines that map out the magnetic field.
 - a. They spread out from one pole, curve around the magnet, and return to the other pole. (draw picture from page 9, Pearson)
3. Compass - A compass is a device that detects the magnetic field around a magnet and the Earth. Earth's magnetic field is caused by the circulating electric fields that surround the molten core.

Magnetism and electricity are related effects.

II. Electricity (there are two types) Current and Static

A. Current electricity is the flow of electric charges.

1. There are 2 types of electric charges – positive and negative.
2. Objects become positively charged when they lose electrons, and objects become negatively charged when they gain electrons. Like charges repel and unlike charges attract.

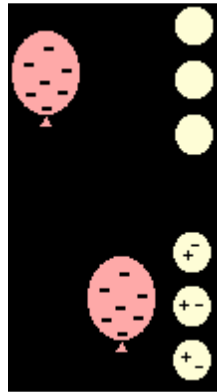
+ → ← -
- ← → -
+ ← → +

3. The attractive or repulsive force between charged objects is called electric force.
4. The greater the charges and the closer together the charged objects are, the greater the electric force between them.

B. Static Electricity - The buildup of electric charges (electrons). Static means still or not moving.

1. Lightning or a shock is an example of the discharge of static electricity.

Static Electricity Balloon Experiment



The balloon is negatively charged and is attracted to positively charged materials.

III. Circuit

- A. A circuit is a complete, unbroken path through which electric charges can flow.
- B. Circuits must be closed in order for the current to flow.
- C. There are 3 necessary components to a circuit.
 1. wire
 2. energy source – such as a battery
 3. load – the thing you are wanting to power or turn on
 4. Optional - switch – isn't necessary but most circuits have a switch (why?)

IV. Types of Circuits

A. 2 main ways of connecting multiple loads in a circuit.

1. series circuit – components/loads are in 1 loop; each load is connected and is dependent on the next.

2. parallel circuit – electricity splits up; each load is its own circuit with the energy source.

a. the advantage of parallel circuits is that, if one load stops working, (1 light burns out) the rest will stay lit; in a series circuit, they all do.

series

parallel

V. Conductors and Insulators

A. Electric charges don't flow through every material.

B. 2 main categories

1. Conductors –

a. transfer electric charges well

b. examples: copper, silver, aluminum, iron, people, water

2. Insulators –

a. don't transfer electric charge well

b. examples: plastic, rubber, wood, paper, sand

VI. Electromagnetism

A. The name of the relationship between electricity and magnetism.

B. It is magnetism that results from electric charge in motion – when electricity flows, a magnetic field is created