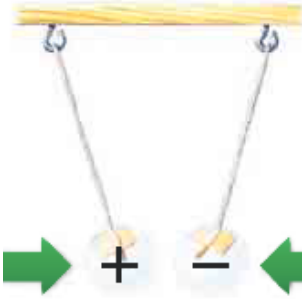
**********ELECTRICITY**********



I **ELECTRIC CHARGE:**

A. Electric Charge:

1. Charge is a _____ property.
2. Law of electric charges states that

   _____ charges _____, and opposite charges _____.
3. The size of the electric force depends on two things:

   a) the _____ of each charge

   b) the _____ between the charges
4. The electric field is the _____ around the charged object.

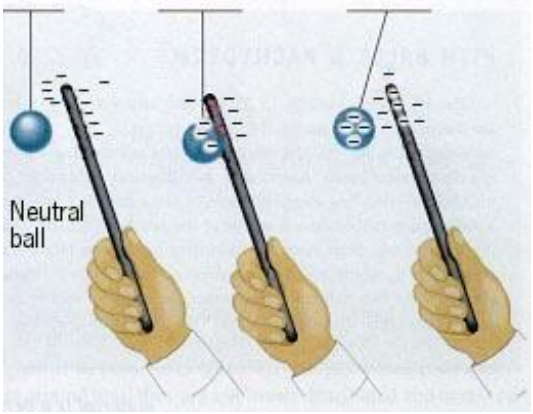
B. How Does an Object Become Charged?

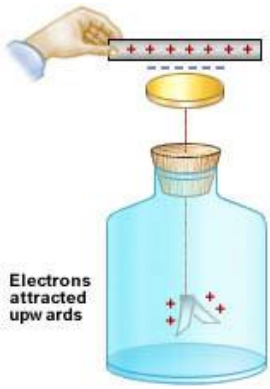
1. First remember: If an atom _____ electrons it has a _____ charge.

   If an atom _____electrons it has a _____ charge.
2. Three Ways to Charge an Object:

a) *Friction:* When electrons are _____ from one object to another.

b) *Conduction:* When electrons move from 1 object to another by _____ _____





c) *Induction:* When charges in an _____ object are rearranged _____ direct contact with a _____ object.

← An electroscope detects charges.

C. Electric Terms:

1. *Conductor:* A material in which _____ can move _____.

2. *Insulator:* A material in which charges _____ move easily.

II STATIC ELECTRICITY:

A. *Static…* means _____ moving.

1. *Static electricity* is when the _____ charge is at _____.

2. The charged object _____ its charge. (Example: static cling)

B. Electric Discharge:

1. Charges that _____ up as static electricity, eventually _____.

2. Sometimes, it happens _____. (like static socks)

3. Sometimes, it happens _____.

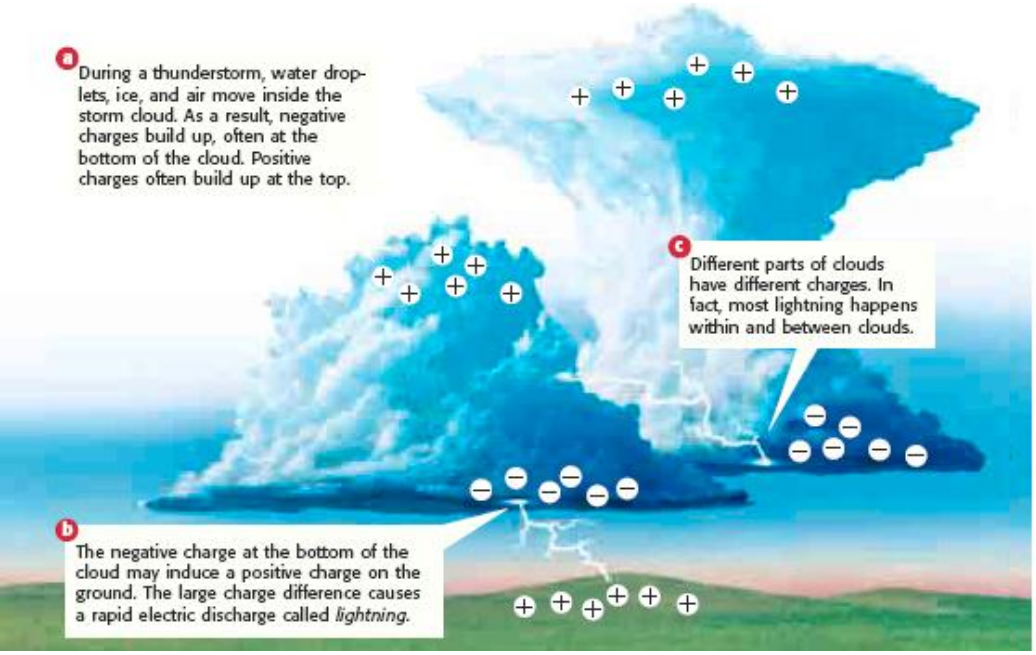
a) Rubbing your slippers on the carpet, and then touching a door knob.

4. *Lightning*: A giant _____ from _____ to _____

or from _____ to _____.

a) *Thunder*: The _____ causes intense _____ which

make the _____ expand rapidly causing _____.



b) Building Safety: *

_____

(a _____ for the

_____.)

c) Personal Safety:

* stay in your car
* don't stand under a tree.
* stay low, on toes.

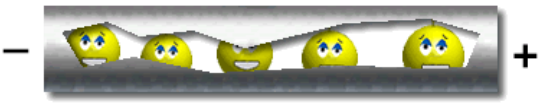
III ELECTRIC CURRENT:

A. TERMS:

1. *Electric current*: the _____ at which _____

pass a given _____. _____ are moving in a wire.

*** KEY WORD TO REMEMBER:_____



a) Unit used: _____

b) Alternating Current: (AC) (Used in our homes)

* Changes directions _____times a second (or _____ cycles/sec)

c) Direct Current: (DC) (Used in batteries)

* The charges always flow in the same _____.

2. *Voltage:* the _____ difference between _____

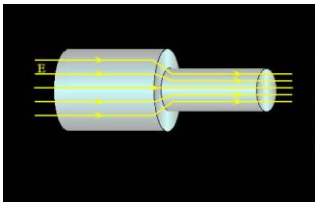
points in a circuit. ******KEY WORD:_____

a) Unit used:_____

b) The _____ the voltage is, the more_____ is released.

3. *Resistance:* the _____ to the _____ of electrons.

*********KEY WORD:_____



a) Unit used:_____

b) The _____ the resistance of a material is,

the _____ the current.

c) An object's resistance depends on four things:

_____ _____ _____ _____

d) The _____ the wire, the _____ the resistance.

The _____ the wire, the _____ the resistance.

e) The _____ the temperature, the _____the resistance.

Superconductors have _____ resistance due to _____ temperatures.

IV ELECTRICAL CALCULATIONS:

A. Ohm's Law:

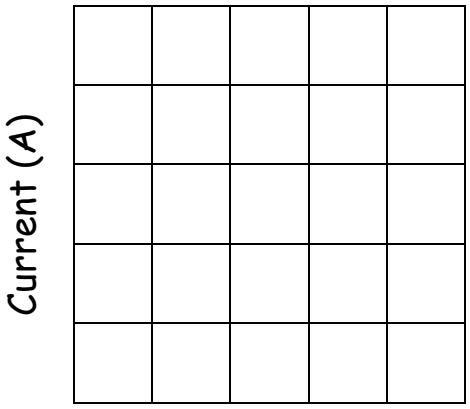
1. Ohm found that the _____ of _____ (V)

to _____(I) is a _____ for each material.

2. The equation below is Ohm's Law:

R = _____ or V = _____x_____

3. Current vs Resistance Graph:



As the resistance goes _____, the current goes _____.

4. Problems: (Use the Ohm's Triangle and show your equations!)

a) Find the *voltage* if the current is 0.3 A and the resistance is 4 ohms.Ω

_____

b) If a circuit has 8 volts, but 4 ohms, what is the *current*?

_____

c) What is the *resistance* of a circuit which has a current of 6 amps and a voltage of 72?

_____

B. Generating Electrical Energy:

1. Cells: change _____ or _____ energy into electrical energy.

2. *Wet Cell* consists of:

a) Solution (electrolyte) of _____, _____ or _____

b) Pair of _____, made from

_____ materials.

c) _____ changes between the

_____ and the _____

convert chemical energy into _____ energy.

d) Example: _____ _____

3. *Dry Cell* consists of:

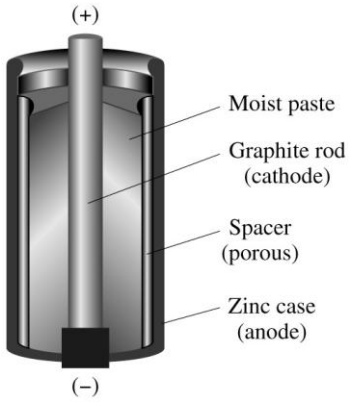
a) Chemical paste (electrolyte) that

is _____ or _____

b) Positive terminal (cathode) and

negative terminal (anode)

c) Example: _____ _____



4. *Photocell:*

a) Made of _____ atoms.

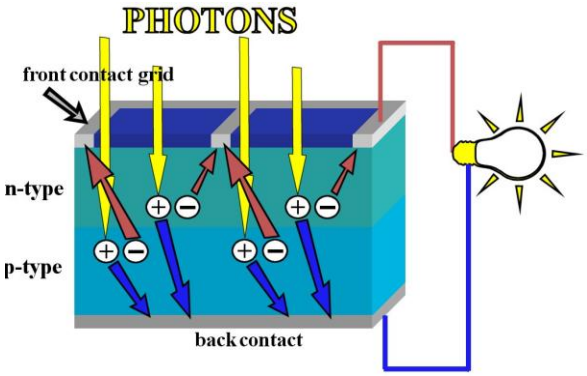
b) When _____ shines on the

photocell, _____ gain

enough _____ to move

between _____.

c) Example: _____



B. Electric Power:

1. Power is the _____ at which _____ energy is changed into other forms of _____. (light, sound, mechanical,heat)
2. Unit for power is _____(W). Symbol for power is _____
3. Power equation: _____=_____ x _____

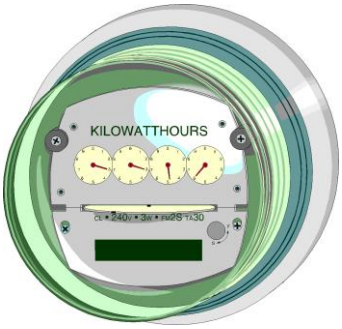
   Symbols:_____=_____ x _____
4. A 120 W bulb burns _____ than a 60 W bulb because it has more _____ energy.

5. If a computer monitor draws 1.2 A at a voltage of 120 V. What is the power rating of the monitor? (Show the power equation !)

_____

C. Measuring Electrical Energy:

1. Electric power companies determine the electric bill by the _____ of the devices used at the home and the length of _____ they are on.
2. They use _____ (kW) which is _____watts.
3. The power companies use _____ which measure in _____-_____
   (power) (time)



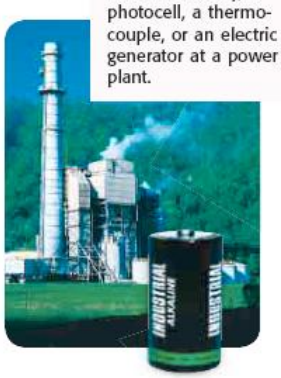
D. Saving Energy:

1. _____
2. _____
3. _____
4. _____

V ELECTRIC CIRCUITS:

A. Necessary Parts of a Circuit:

1. An electric circuit is a complete, _____ path through which _____ charges flow.
2. The 3 basic parts:_____source _____, and a _____.



The **energy source** can be a battery, a photocell, a thermocouple, or an electric generator at a power plant.

Wires connect the other parts of a circuit. Wires are made of conducting materials that have low resistance, such as copper.

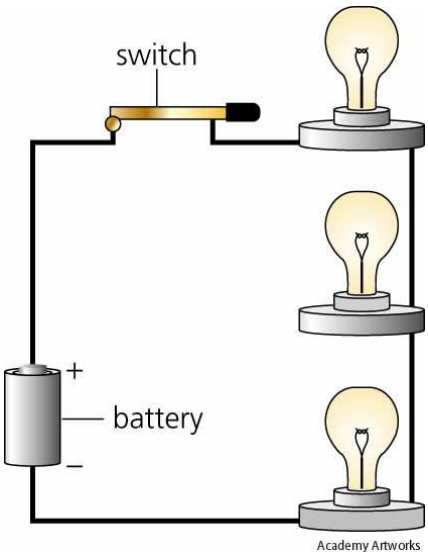
Examples of **loads** are light bulbs, appliances, televisions, and motors.

3. Sometimes a circuit has a _____ which can _____ or _____ a circuit.

B. Series Circuit:

1. It has only _____ pathway for the electric charges to flow.
2. If there is any _____ in the circuit, the charges will _____ flowing.
3. This type of circuit is used for:

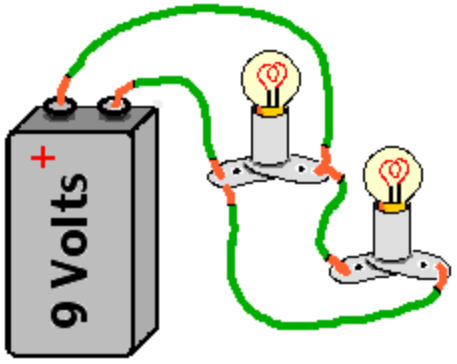
   a) _____ b)_____



Academy Artworks

C. Parallel Circuit:

1. It has more than one _____ for the electric charges to flow.
2. Each _____ uses the _____ voltage.
3. If 1 _____ goes out, the other will stay ___
4. This type of circuit is used in your _____.



D. Household Circuit Safety:

1. Short Circuit:

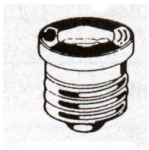
a) The current does _____ follow _____ but takes a shortcut.

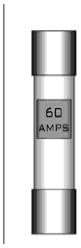
b) Caused by _____ wires or _____.

c) The _____ decreases so the _____ increases.

d) Wires might get _____ enough to cause a _____.

2. Fuse:



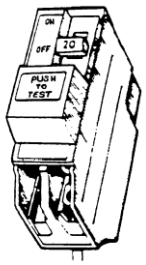


a) Has a _____ metal strip of metal.

b) If the current is too _____, the strip _____.

c) The circuit is _____ and the charges _____ flowing.

3. Circuit Breaker:



a) A _____ that automatically _____
if the current is too _____.

b) A strip of _____ in the breaker _____ _____
and _____ which _____ the switch.

c) An open breaker can be closed by _____ a switch.

4. Ground Fault Circuit Interupter: (GFCI)

a) A _____ circuit breaker.

b) Often found in _____ outlets.

5. Electrical Safety Tips:

a)_____

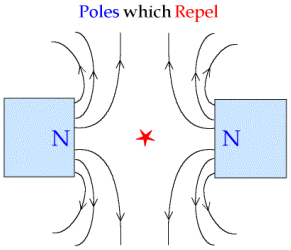
b)_____

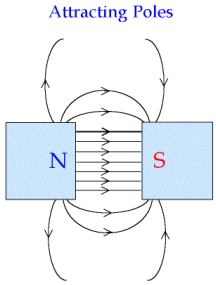
c)_____

VI MAGNETS AND MAGNETISM:

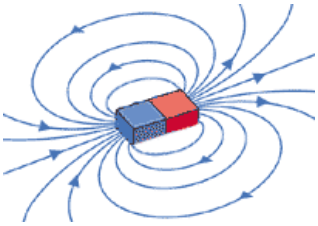
A. Properties of Magnets:

1. Stones that _____ each other. Name comes from _____
2. Most natural magnets contain _____ = _____
3. Strong natural magnets: _____ _____ _____
4. Magnetic Poles: the _____ of the magnet (North and South)
   a) The _____ of the magnet that points _____ is called the magnet's _____ pole.
   b) _____ poles repel each other
   c) _____ poles attract each other

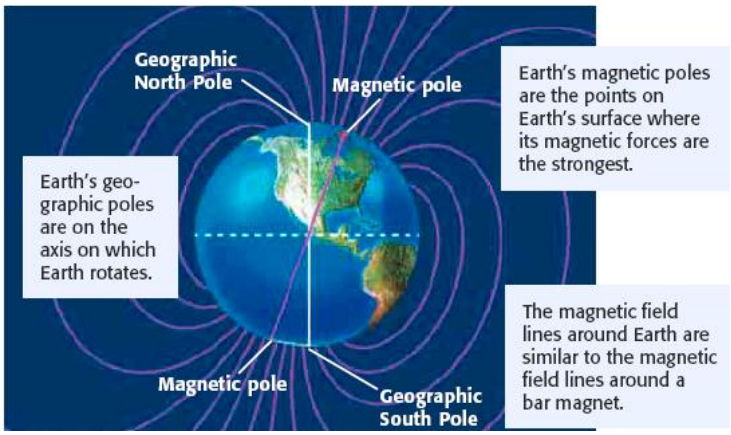




B. Magnetic Field:



1. The _____ force field around the magnet.
2. Earth's _____ field is due to its core which is made of _____ and _____.
3. A suspended _____ will line up with the _____ field.
4. Earth's _____ north pole is different from the _____ north pole.



C. The Cause of Magnetism:

1. Individual _____ can be magnetic due to electrons _____.

a) The electron _____ as it orbits the nucleus.

2. *Nonmagnetic substances*:

a) Have _____ electrons.

b) They spin in _____ directions.

c) They _____ each other out.

d) Examples: _____ _____

3. *Magnetic substances:*

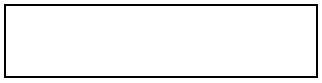
a) Have _____ electrons

b) Examples: _____ _____ _____

4. *Domains:*

a) Groups of _____ in tiny areas.

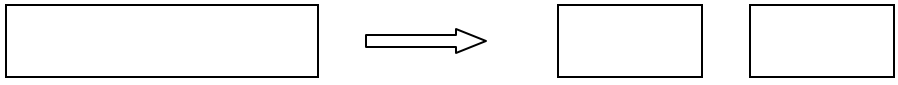
b) When domains are _____ arranged, it is _____.



c) When domains are _____, the object is _____

5. *Magnetic Evidence:*

a) If you _____ a magnet, the poles _____ lined up.



b) Metals can be _____.

c) Metals can _____ their magnetism by…

_____ or _____

D. Magnetizing Metals:

1. Metals remains in a _____ field for a _____ time.

2. _____ a metal and then _____ it in a magnetic field.

3. *Temporary Magnet:*

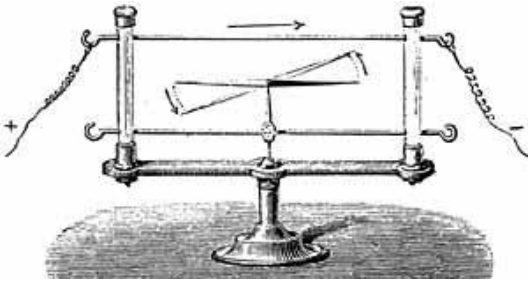
a) Can _____ its magnetism. Example:_____

4. *Permanent Magnet:*

a) Does _____ lose its magnetism.

b) Examples: _____ _____

VII ELECTROMAGNETISM:



A. Hans Oersted (1820):

1. When a _____ is held near curr

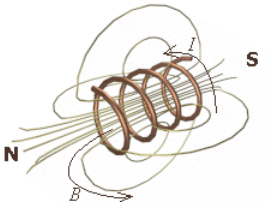
it does _____ point north.

2. An _____ current produces a _____ field.

3. Electromagnetism: the _____ between

_____ and _____.

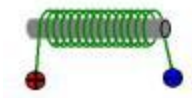
B. Solenoid:



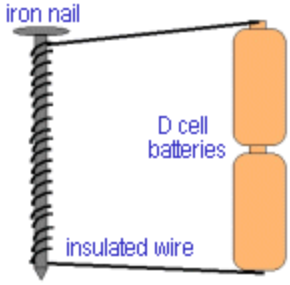
1. A _____ of wire that _____ a

_____ field when carrying a _____

C. Electromagnet:



1. A _____ wrapped around an _____ core.

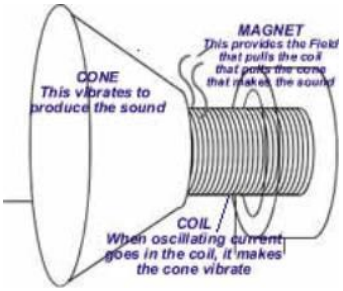


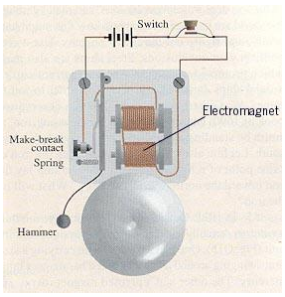
a) _____ than a solenoid

b) The more _____ the _____ it is.

c) It can be turned _____ or _____

2. Electromagnet examples:

a) 

b) 

c) 

_____ _____ _____

3. Magnetic Force on a Wire:

a) A _____ carrying wire can make a _____ move.

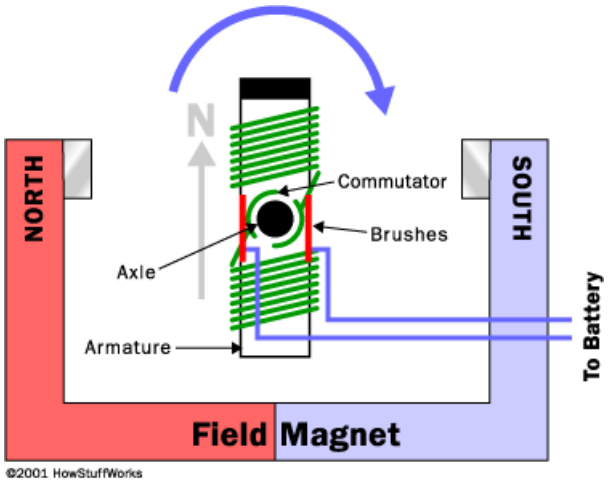
b) A _____ can make a current carrying wire _____.

D. Electric Motor:

1. Changes _____ energy into _____ energy.

a) *Armature:* a _____ of wire that can rotate.

b) Commutator: _____ the direction of current. Used when batteries power the motor.



2. Motors are found in..

_____ _____

_____ _____

VIII ELECTRICITY FROM MAGNETISM:

A. FARADAY:

1. He learned that you get an electric current if you…:

   a) move a _____in a coil of _____.

   b) move _____ in a _____ field.

2. He discovered electromagnetic induction.

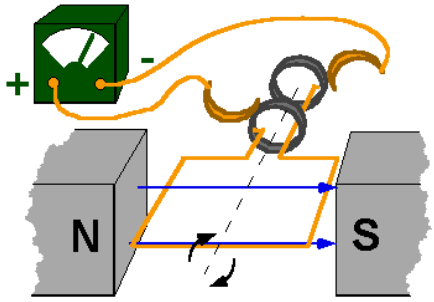
3. The electric current can be increased if….

   a) You move the magnet _____.

   b) You add more _____ of _____.

B. ELECTRIC GENERATORS:

1. An electric generator uses _____ induction to change _____ energy into _____ energy.



2. The electric current produced by a _____ changes _____ each time the _____ makes a _____ turn.

3. Generators make _____ current.

4. Large generators usually move the _____ instead of the _____.

4. Power Plants:

a) Steam generators:

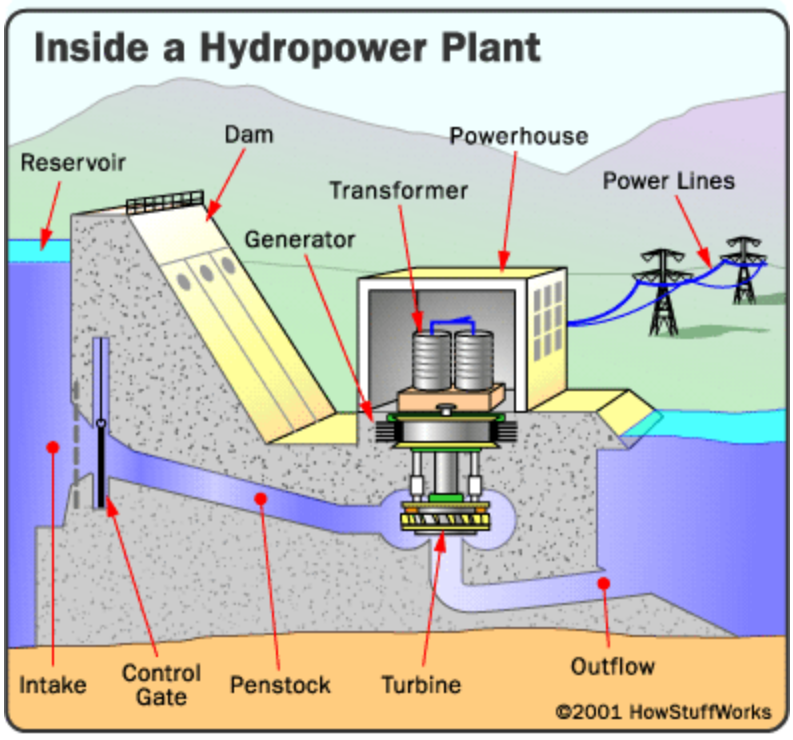
*_____ energy makes _____ which turns the _____ which turns the _____ of the generator.

* Nuclear plants use _____ as fuel.

* Fossil fuel plants use _____ , _____, or _____

b) Mechanical generators:

* use moving _____ or _____ to spin the _____



5. Transformers:

a) can _____ or _____ voltage

a) needed to _____ the voltage from the road wires before the current enters your house.