**1.1 Science Lab Safety**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_ the safety rules.
* Know what to do in an \_\_\_\_\_\_\_\_\_\_\_\_\_.

**Science Lab Rules. General.**

* All \_\_\_\_\_\_\_\_\_\_\_, written and verbal, about laboratory procedures MUST be followed.
* Know the location and proper use of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Equipment or supplies should NOT be handled without \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. UNAUTHORIZED EXPERIMENTS ARE FORBIDDEN.
* Act \_\_\_\_\_\_\_\_\_\_\_\_\_. Failure to do so will result in your permanent removal from science labs.
* Safety equipment, including \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_, must be worn during every lab.
* Hair and loose clothing must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Each lab station must be kept \_\_\_\_\_ and \_\_\_\_\_\_\_\_ at all times.
* There is absolutely NO \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_ allowed during labs.
* Never use \_\_\_\_\_\_\_\_\_\_\_ glassware.

**Science Lab Rules. Chemicals.**

* Wash any affected areas immediately with water and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* If you get anything in your eyes, wash them continuously for \_\_\_\_ minutes.
* Never \_\_\_\_\_\_\_\_ a substance directly, waft the fumes towards your nose.
* Hold containers away from \_\_\_\_\_\_\_\_ when pouring liquids.
* Never put any chemical back into its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Only put chemicals down the \_\_\_\_\_\_\_\_ or into the \_\_\_\_\_\_\_\_\_ with permission.

**Science Lab Rules. Hot Plates.**

* Use \_\_\_\_\_\_\_\_\_\_\_\_ containers only.
* Do not allow a container to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Be careful with a hot plate that looks as though it has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Science Lab Rules. Open Flames.**

* Wear \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Tie back long hair and loose clothing.
* Handle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_carefully (they may look cool).
* Point the open end of container that is being heated away from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Turn off \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as soon as you are finished using them.
* Apply \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to burns.

**Science Lab Rules. Electrical Equipment.**

* Make sure your hands are \_\_\_\_\_\_\_ when touching electrical cords, plugs or sockets.
* Pull the \_\_\_\_\_\_\_\_, not the cord.
* Report \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to your teacher.
* Place electrical cords where people will not \_\_\_\_\_\_\_\_\_ over them.

**Science Lab Rules. WHMIS Symbols.**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (WHMIS)
* A method of ensuring everyone has access to appropriate safety information about any substance they may encounter that is manufactured or sold.
* WHMIS is a system of \_\_\_ symbols.



**Science Lab Rules. Other Safety Symbols.**

* Hazard symbols can be found on a variety of commercial products.
* There are two kinds of warnings:

Hazards.

Boarders.

dangercontainExplosiveFlam

Flammable

Dangerous Container

Explosive

Corrospoisondangerprod

Corrosive

Dangerous Product

Poisonous

**1.2 Investigating Matter.**

* Matter is anything that has ­­­­­\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_.
  + Mass is the \_\_\_\_\_\_\_ of \_\_\_\_\_\_ in a substance or object.
  + Mass is often measured in \_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_.
  + Volume is the \_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_ a substance or an object occupies.
  + Volume is often measured in \_\_\_\_\_\_\_\_\_.

**Chemical Change.**

* A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a change in matter that occurs when substances combine to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



Salt

NaCl

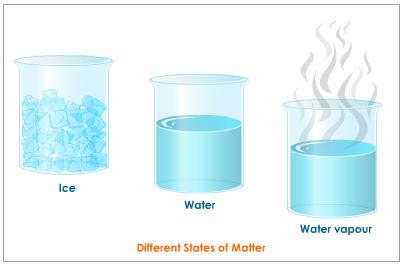
Chlorine

Cl­2 (Gas)

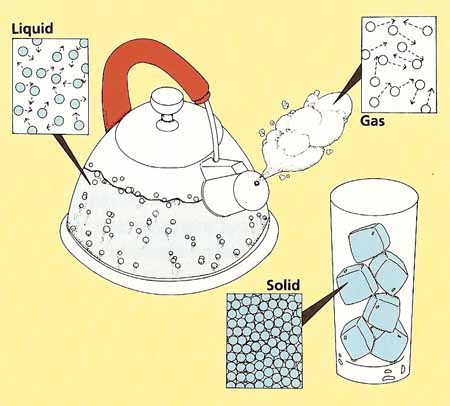
Sodium

Na (Solid)

**Physical Change and Changes of State.**

* When a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurs, there may be a change in appearance, but \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are formed.
* For example, when ice or snow melts to water, this physical change is a change of state. No new substances are formed.

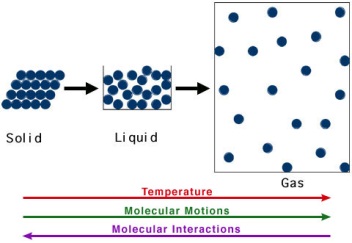
**The Particle Model of Matter.**

* Describes the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Matter is made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + There are \_\_\_\_\_\_\_\_\_\_\_ between the particles.
    - \_\_\_\_\_\_\_\_ have more space than \_\_\_\_\_\_\_. \_\_\_\_\_\_\_ have more space that \_\_\_\_\_\_\_\_\_\_.
* Particles are always \_\_\_\_\_\_\_\_\_\_.
* Particles are \_\_\_\_\_\_\_\_\_\_ to each other. The \_\_\_\_\_\_\_\_\_ of

attraction depends on the \_\_\_\_\_\_\_\_\_\_\_ of particle.

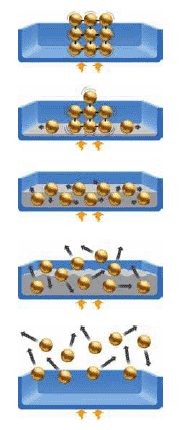
**The Kinetic Molecular Theory.**

* Describes what happens to matter when the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of particles changes.

****The main points in the theory are:

* Matter is made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* There is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ between particles.
* Particles are constantly \_\_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_\_ makes particles move.
* \_\_\_\_\_\_\_\_\_ particles are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and cannot move freely. They can only \_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_ particles are \_\_\_\_\_\_\_\_\_\_\_\_\_ and can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_ particles are far apart and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**\_\_\_\_\_\_\_\_\_\_\_**

* Particles are close together, fixed in position and vibrating.

**\_\_\_\_\_\_\_\_\_\_\_**

* As temperature increases, particles’ kinetic energy increases.

**\_\_\_\_\_\_\_\_\_\_\_**

* Particles are still close, but slide past one another.

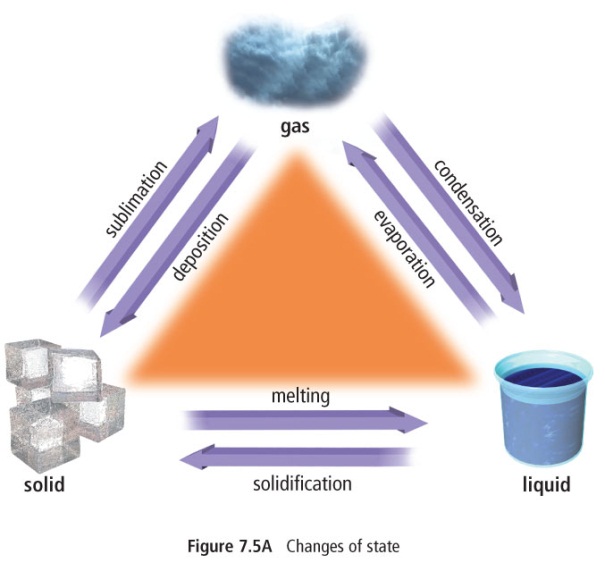
**\_\_\_\_\_\_\_\_\_\_\_**

* As temperature increases, particles’ kinetic energy continues to increase,

creating more space.

**\_\_\_\_\_\_\_\_\_\_\_**

* Particles are highly energetic and moving freely.

**Temperature and Changes of State.**

* When \_\_\_\_\_\_\_\_is \_\_\_\_\_\_\_\_\_\_\_\_ to a substance, it’s particles gain kinetic energy and vibrate faster. This causes them to move farther apart.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is the change of state from a **\_\_\_\_\_\_\_\_\_\_\_** to \_\_\_\_\_\_\_\_ (popsicle melting)
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (freezing) is the change of state from a\_\_\_\_\_\_\_\_\_\_\_\_ to a **\_\_\_\_\_\_\_\_\_\_\_\_** (pond freezing)
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is the change of state from a **\_\_\_\_\_\_\_\_\_\_\_\_** to a **\_\_\_\_\_\_\_** (sweating)
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is the change of state from a **\_\_\_\_\_\_\_\_** to a

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_** ( dew forming on lawn)

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is the change of state from a

 **\_\_\_\_\_\_\_\_\_** to a **\_\_\_\_\_\_\_\_\_\_\_** (dry ice)

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is the change of state from

a **\_\_\_\_\_\_\_\_** to a **\_\_\_\_\_\_\_\_\_\_\_\_** (frost forming)

**Describing Matter.**

* Physical Properties
  + Qualitative – non-numerical
    - state, colour, malleability
  + Quantitative – numerical
    - conductivity, viscosity,

density

**Qualitative Properties.**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the physical state the

matter is in: SOLID, LIQUID or GAS.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the COLOUR

of the matter.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the SHAPE and

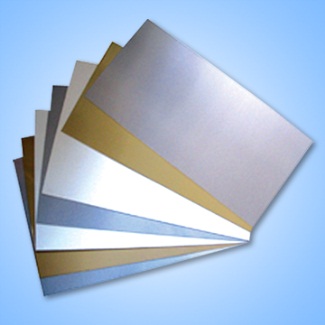
STRUCTURE (soft, hard, rough, smooth).

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the ability for light to

 pass through matter (opaque, translucent, transparent).

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the SHAPE or

APPEARANCE of CRYSTALS.

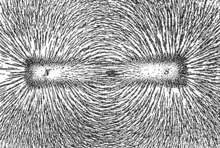
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the ability of the matter

to be BEATEN into SHEETS.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the ability to be

DRAWN into WIRES. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the

REFLECTIVENESS of an object.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the tendency of

matter to be ATTRACTED to a MAGNET.

**Quantitative Properties.**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the ability

to DISSOLVE in WATER.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the ability

to CONDUCT ELECTRICITY or HEAT.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the RESISTANCE of FLOW.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the RATIO of the object’s MASS to its VOLUME.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the TEMPERATURE at which melting/freezing will occur.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the TEMPERATURE at which boiling/condensing will occur.

****

**Two Categories of Matter.**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are substances that

MATTER

are made up of only \_\_\_\_\_\_ type of matter.

(Ex. oxygen, water, gold)

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are substances that are

Mixtures

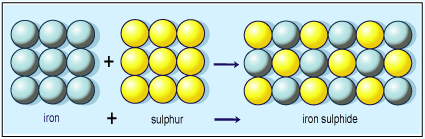
Pure Substances

made up of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ types of matter

 which are mixed but not combined

chemically. (Ex. breakfast cereal)

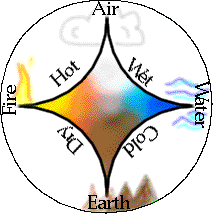
**Pure Substances.**

* There are \_\_\_\_\_\_\_\_\_\_ types of Pure Substances:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ are pure substances that \_\_\_\_\_\_\_\_\_\_\_\_\_ be separated into simpler substances. (Ex. carbon, nitrogen)
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ are composed of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ elements that are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (Ex. water, ethanol)

**Mixtures.**

* **There are \_\_\_\_\_\_\_\_\_\_ types of Mixtures:**
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are when one substance is **\_\_\_\_\_\_\_\_\_\_\_\_\_** in another substance. (Ex. sugar-water, salt-water)
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are when a fluid contains **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** that will **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (**Ex. milk, orange juice)
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are when the parts of the substance can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ out again. (Ex. raisin Bran, munchie mix)



**1.3 Atomic Theory.**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ believed that matter was made of

*\_\_\_\_\_\_\_\_\_\_\_\_\_\_* that were the smallest pieces of matter.

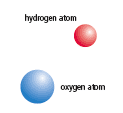
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ believed matter was made of different

combinations of \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Early Ideas About Matter.**

* \_\_\_\_\_\_\_\_\_\_\_\_ experimented with matter and tried to turn common metals into \_\_\_\_\_\_\_.
* Their activities marked the beginning of our \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

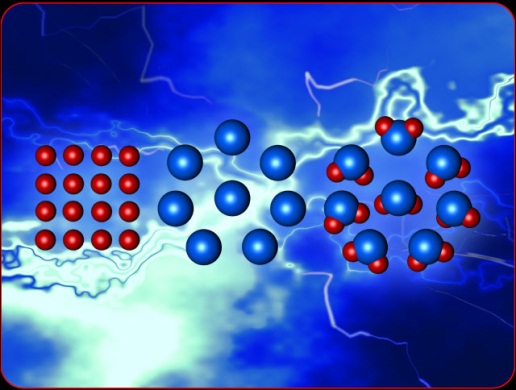
**Atomic Theory #1.**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1766 - 1844)
  + ****Credited with developing a theory that was a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + He studied \_\_\_\_\_\_\_ that make up \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + Based on his studies, he suggested that:
    - Matter is made of small, hard spheres that are different

for different element.

* + - The smallest particle of an element is called an atom.

**Dalton's Atomic Theory.**

* All matter is made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Atoms \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

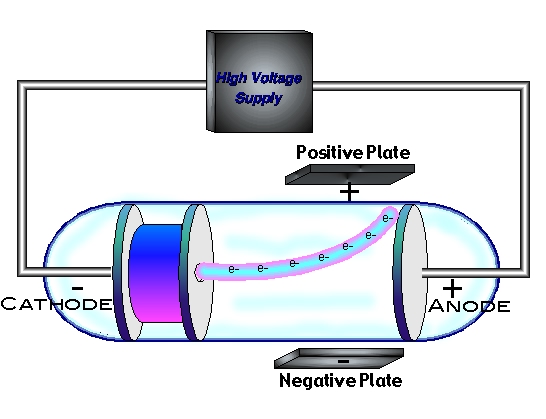
into smaller particles.

* All atoms of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

but they are different in mass and size from the

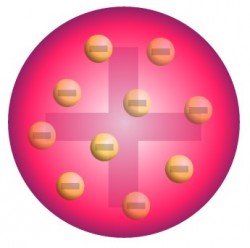
atoms of other elements.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are created when atoms of
* different elements link together in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

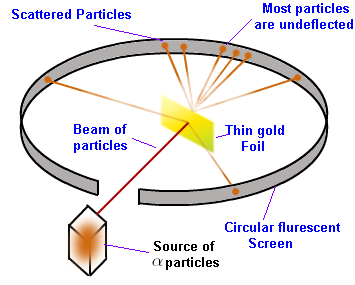
**Atomic Theory #2.**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1856 - 1940)
  + Thomson studied \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in gas

discharge tubes (like today’s fluorescent lights). From

his studies, he determined that the currents were streams of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ particles. These were later called \_\_\_\_\_\_\_\_\_\_\_\_.

* + He hypothesized that atoms are made of smaller particles. He proposed the “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” model of the atom.
  + This model is best visualized as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ spread out in it like raisin.

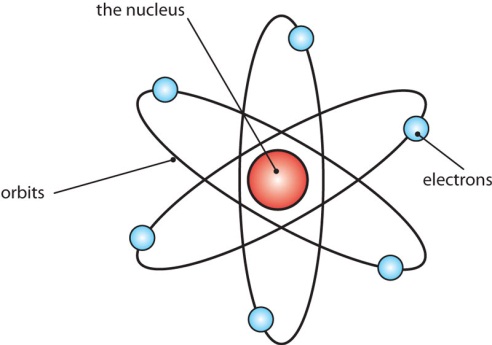


**Atomic Theory #3.**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1871 - 1937)
  + After experimenting with charged particles, he

found that some particles were \_\_\_\_\_\_\_\_\_\_\_\_

in directions \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + He suggested that the deflection of the charged particles was because the atom contained

a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ called a \_\_\_\_\_\_\_\_\_\_\_\_, and electrons moved around the nucleus.

**Atomic Theory IV**

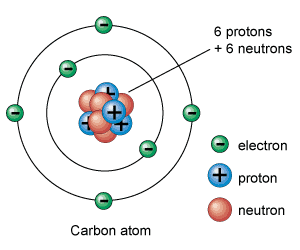
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1885 - 1962)
  + He studied gaseous samplesof atoms, which were made to \_\_\_\_\_\_ by passing an

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ through them.

* + Based on his observations, Bohr proposedthat electrons surround the nucleus in specific “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” or “\_\_\_\_\_\_\_\_\_\_\_.”

**Inside the Atom.**

* An atom is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* All atoms are made up of three kinds of particles called

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

. These particles are:

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_