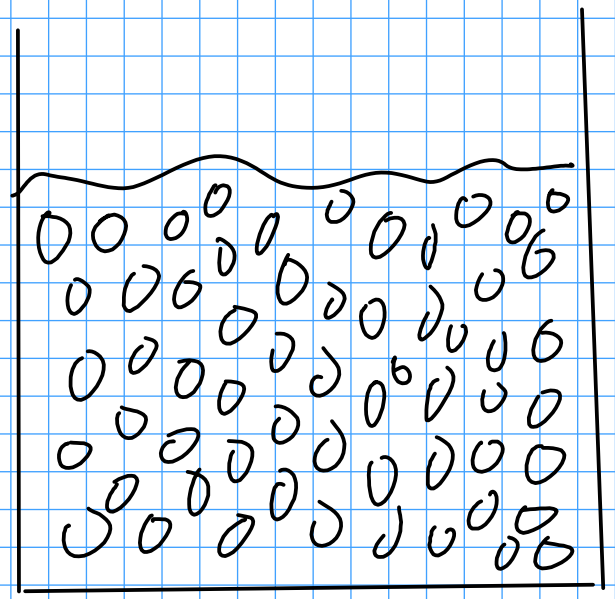
Liquids:

- variable shape, dense, fixed volume



- Atoms still very close to each other, but usually a little farther apart than in solid phase

exception: water!

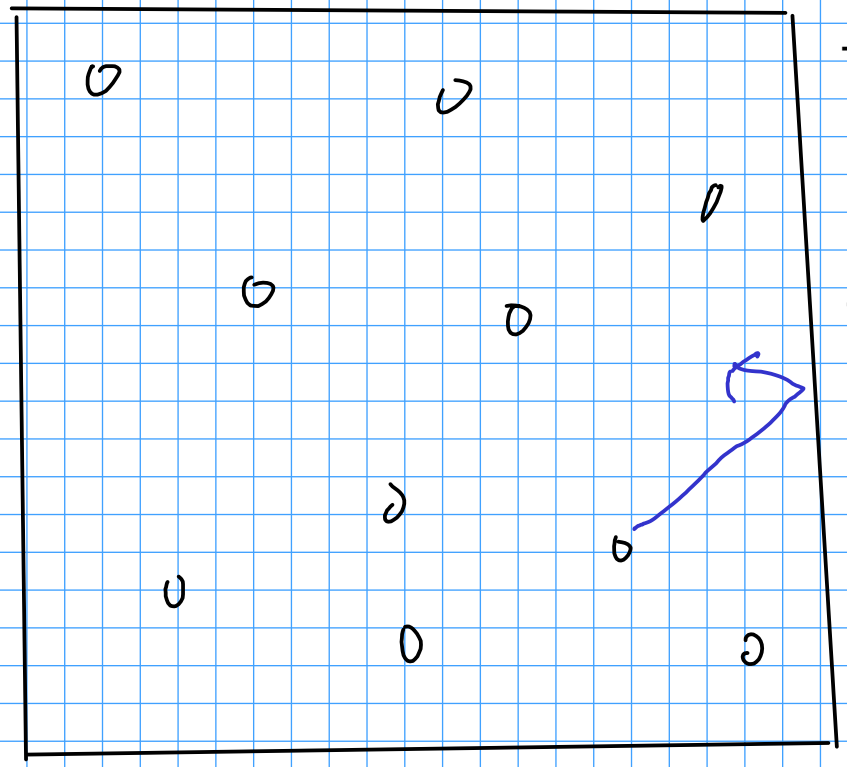
- Atoms are not arranged in an overall order and can slide past and around one another

- Atoms are still strongly attracted to each other, keeping the liquid together

- Atoms move around each other constantly

Gases:

- variable shape, diffuse (not dense), variable volume



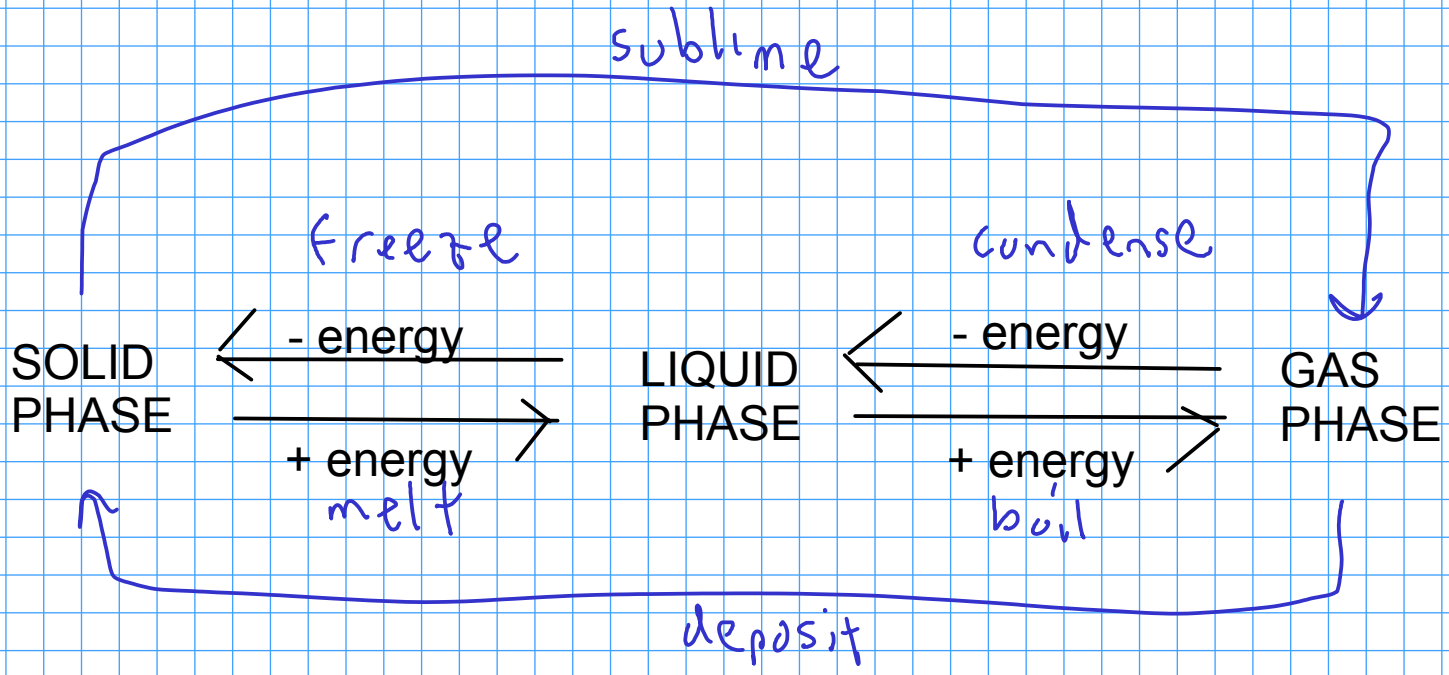
- Atoms are spread far apart
- No structure
- Aroms are NOT strongly attracted to each other. They don't interact much at all, unless they happen to collide.
- Atoms in constant, rapid motion. The speed of the atoms increases as temperature increases.

Gases take the shape of their containers. Collision of atoms/molecule of gas with the walls of their containers create the effect we call PRESSURE.

Kinetic theory

- describes matter in terms of atomic/molecular MOTION

- the energy of the molecules relates to atomic/molecular motion, and temperature



You can speed up the molecules (add energy) by heating!
You can slow down the molecules (remove energy) by cooling!

Physical and Chemical

- We classify changes in matter according to whether the identifiy of matter changes during the process.

PHYSICAL CHANGE

- A change in the form or appearance of matter WITHOUT a change in identity

- Melting, freezing (all phase changes) are physical; changes

- Breaking, cutting, etc. are also physical changes

CHEMICAL CHANGE

- A change in the identity of matter

- also called "chemical reactions"

- Burning, rusting, metabolism

We classify PROPERTIES of substances by whether or not you must change the identity of a substance to obtain information about the property

PHYSICAL PROPERTIES

- can be determined without changing the identity of matter

- size, shape, color, mass, hardness

- melting point, boiling point, density, etc.

CHEMICAL PROPERTIES

- can only be determined by changing the identity of matter

- flammability, reactivity with acids, temperature at which thermal decomposition occurs

Classification of matter

- We can broadly classify matter by how difficult it is to separate

PURE SUBSTANCES

- CANNOT be separated into different materials by PHYSICAL PROCESSES

Examples:

Table salt, gold, silver, nitrogen, oxygen, carbon, hydrochloric acid, carbon dioxide, ethanol (grain alcohol), water, silicon dioxide

MIXTURES

- CAN be separated into other materials by PHYSICAL PROCESSES

Examples:

salt water, vodka, air, toilet bowl cleaner, beef, macaroni and cheese, dirt

More on PURE SUBSTANCES

- Pure substances can be further classified, depending on how easy it is to separate them by CHEMICAL PROCESSES

ELEMENTS

- Cannot be broken down into simpler substances using physical or chemical means

- Elements are the building blocks of chemistry! They are the simple things from which all other things are formed!

- Listed on the PERIODIC TABLE OF THE ELEMENTS

Examples:

gold, silver, carbon, nitrogen, oxygen

COMPOUNDS

-Can be broken down into simpler substances using chemical means

- Are made of ELEMENTS combined in simple, fixed ratios

- A compound, no matter how it was made, has a definite ratio of one atom to another (LAW OF CONSTANT COMPOSITION)

H_2O : 2 parts hydrogen to one part oxygen!

Examples:

carbon dioxide, hydrochloric acid, ethanol, water