Matter

- anything that takes up space and can be perceived!

What about the structure of matter? Matter as atoms!

THE PHASES OF MATTER

SOLIDS

* Rigid: Fixed shape AND fixed volume

* Dense: contain much mass in a given volume!

LIQUIDS
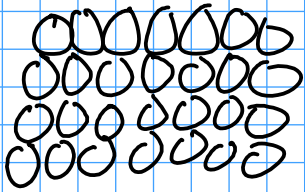
* Variable shape ("fluid")

* Fixed volume

* Dense

GASES

* Variable shape ("fluid")

* Variable volume

* Not dense ("diffuse")
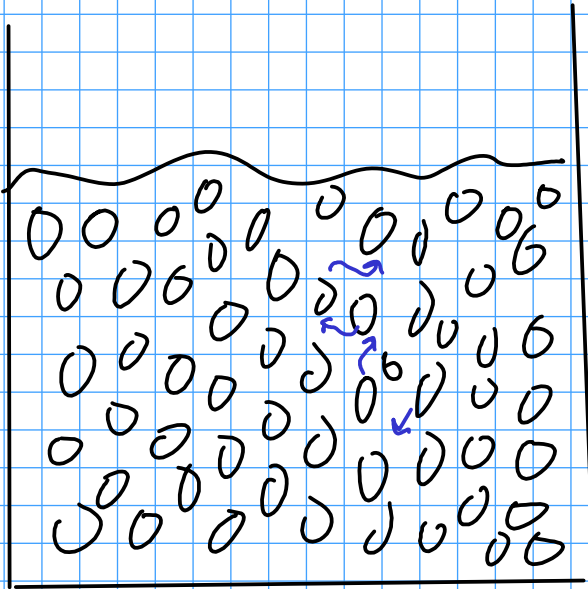
An atomic picture of the phases of matter

Solids:

- fixed shape, dense, fixed volume

- Atoms closely packed
- Atoms are arranged in a regular structure (a CRYSTAL), giving the solid rigidity
- Atoms are strongly attracted to each other, keeping the solid together
- Atoms do not move about freely, but there is some vibration

Liquids:

- variable shape, dense, fixed volume

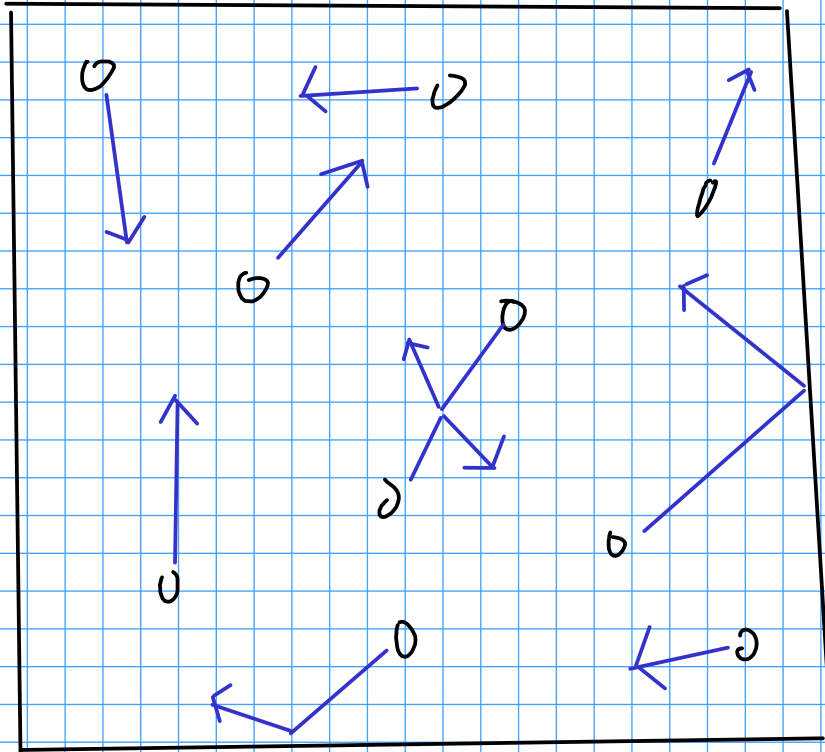- Atoms still very close to each other, but <u>usually</u> a little farther apart than in solid phase

An 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

Evidence: DIFFUSION - a drop of food coloring in a glass of water will eventually spread throughout the glass, even if the glass is NOT stirred.

Gases:

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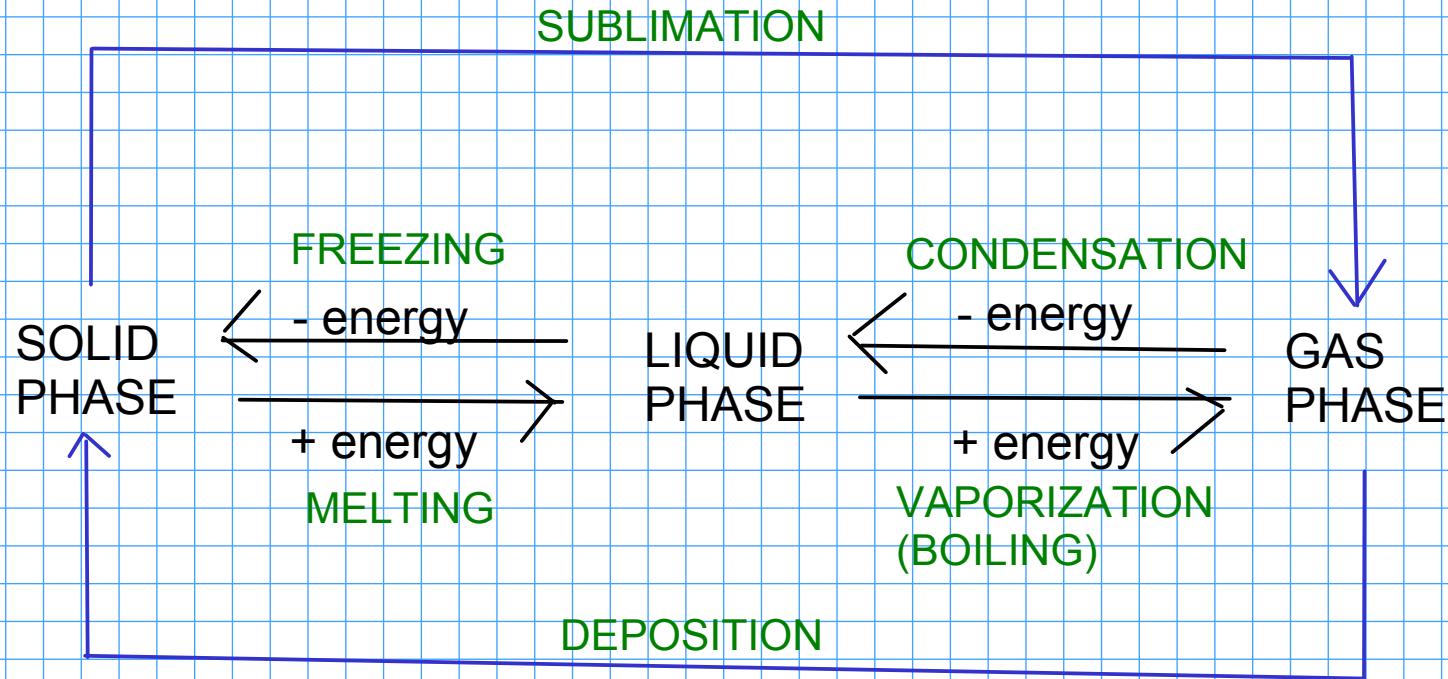

- Atoms are spread far apart

- 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

SUBLIMATION

FREEZING   CONDENSATION

- energy   - energy

SOLID   LIQUID   GAS
PHASE   PHASE   PHASE

+ energy   + energy

MELTING   VAPORIZATION
                            (BOILING)

DEPOSITION

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