Notes: Fluids and Pressure

# Review - Particle Model

* The particle model is a *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
	+ It is based on the idea that matter is made up of *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* (*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*)
	+ It allows us to better understand how the different states of matter are *\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

**Solids**

*Have a definite \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

* Atoms are held together by *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

**Liquids**

*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*, but has *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

* + Atoms spread out *to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
	+ Atoms are held by *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

**Gases**

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

* + There are *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*holding the atoms together
	+ Atoms of gases *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*



-Neatly arranged

-Strong forces of attraction between particles (physical bonds)

-No real movement of particles

- Far apart

- No forces of attraction between particles

- Move a lot!

- Close together but not as structured as a solid

-Weak forces of attraction between particles

-Particles can slide over each other

## Phase Changes

* Substances in the different states of matter *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* by either *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*\_\_\_\_\_\_\_(*heat*) or *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*\_*\_\_\_\_\_\_\_*(*heat*)

\*\*The *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*atoms have, the *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* they move!\*\*

Gas

Liquid

Solid

# Fluids

**What is a fluid?**

* A fluid is a substance that has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and can \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* It can take on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

There are 2 types of fluids:

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

**What is the difference between a liquid and a gas?**

* Can you squish a liquid?
	+ \_\_\_\_\_\_\_\_\_\_\_\_
	+ Liquids are said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Can you squish a gas?
	+ \_\_\_\_\_\_\_\_\_\_\_\_
	+ Gases are said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
| Fluids Recap* **Liquids:**
	+ Are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_fluids
	+ They have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_but do \_\_\_\_\_\_\_\_\_ have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Gases:**
	+ Are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ fluids
	+ They do \_\_\_\_\_\_\_\_\_\_\_ have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
 |

# Gases

Recall from sec 1 and 2:

* Gases are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* So they’re \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_into each other and their surroundings a lot
* If you \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the particles get closer together, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ And since each particle has mass, this collision applies \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
| **Pressure:** * the force exerted \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_with a constricting surface
 |

* So:
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_volume = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_pressure
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ volume = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_pressure
* Recall **Diffusion**
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_from an area of \_\_\_\_\_\_\_\_\_\_\_\_ concentration to an area of \_\_\_\_\_\_\_\_ concentration
		- In order to equalize the concentration
* Gases are going to move from areas of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

# Pressure

* Pressure is the result of a *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* applied in a *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*fashion to a surface
	+ *Pressure is therefore affected by:*
		- The amount of *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* applied
			* *Increased force = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
		- The *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
			* *Increased surface area =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

$$P=\frac{}{}$$

P is *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*, usually measured in Pascals (Pa)

F is *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* measured in Newtons (N)

A is the *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*measured in m2

## Pressure and Fluids

In **incompressible fluids** (aka *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*) pressure is a result of the *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* exerted by the *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* of the particles

* *The more liquid above an object, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ above the object, therefore the more force exerted and the greater the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
* *Pressure is also dependent on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
	+ \_\_\_ density = \_\_\_ pressure

In **compressible** **fluids** (aka *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*) pressure is a result of the force exerted by the particles when they *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* with an object or each other. The sum of all of these forces = *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*.

* *Pressure is dependent on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ collisions = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pressure*
* *Collisions are dependent on:*
	+ *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
		- *\_\_\_\_ particles = \_\_\_\_ pressure*
	+ *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
		- *\_\_\_ temperature = \_\_\_ pressure*
	+ *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
		- *\_\_\_\_ volume = \_\_\_ pressure*