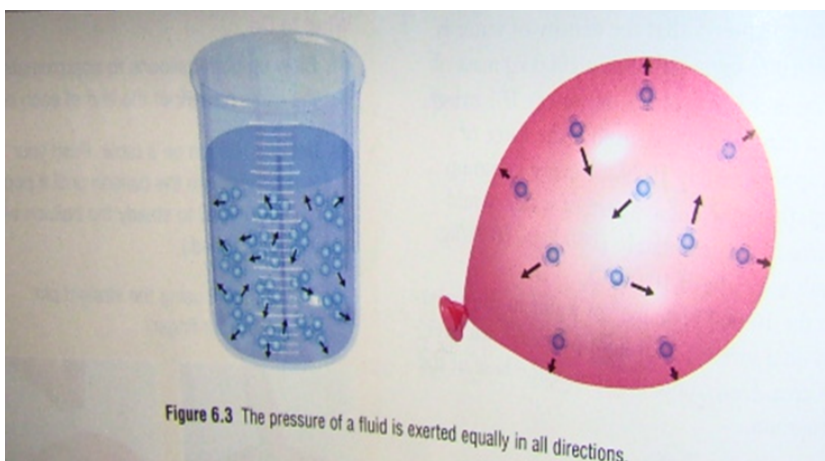


## Pressure and Particle Theory

Particles in solid, liquid and gas are constantly moving. When we increase energy(temp) then particles move faster and when we decrease energy (temp) then particles move slower. When they move the particles bump into each other spreading them out and leaving more space between them.

Nov 16

Moving particles exert force in the direction of their motion. Most of the forces cancel out each other, but some are not canceled. These forces are exerted against the wall of the container, causing pressure. Thus when there is a crack or hole on the container the fluid will flow out. This indicates that the pressure of a fluid is exerted equally in all directions, as shown below.



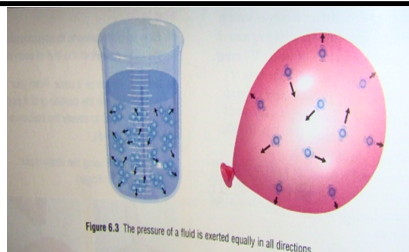
## Spaces Between Particles

Space between particles depends on 2 factors:

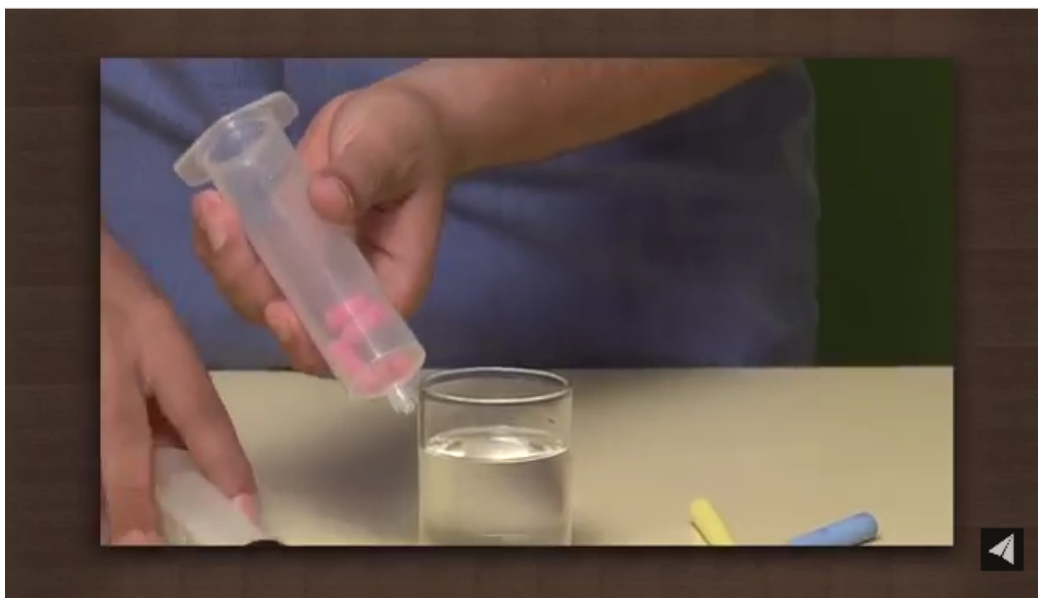
- 1) the physical state of the substance (solid, liquid, or gas)
- 2) the amount of energy that the particles have

Since gas particles are spread out they have lots of space between particles, thus gases are compressible.

**Compressible** - is the ability to be squeezed into a smaller volume



When force is applied to a solid or liquid the particles within cannot move closer so they transmitted (pass along) the force like the domino effect. They are **incompressible**.



Gases are easiest to compress, solids most difficult | Compressibility | Chemistry

When gases are under pressure (squeezed in a bottle), they are ready to expand when given the opportunity. So when a gas finds a way to escape, through a hole or nozzle, it exits with a great deal of force.

Great for oxygen tanks and certain tools such as air compressors

**Flow Pressure** - is pressure that causes motion because the fluid is moving

ex) wind is moving air that can lift your hair

ex) water pressure from tap can remove food off plates

**Static Pressure** - is a fluid's pressure that exerts a force on an object even if it is not moving. It pushes  $90^\circ$  to the walls of the pipe.

ex) When the water in your tap is turned off, the water in your pipes is exerting static pressure.

ex) when you swim deep underwater you can feel pressure on your eardrums. (the deeper you go the more pressure you feel since the weight of the water and air above you pushes down.)

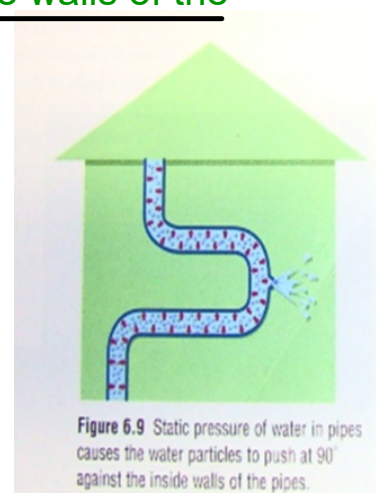


Figure 6.9 Static pressure of water in pipes causes the water particles to push at  $90^\circ$  against the inside walls of the pipes.