Unit Test Review

Pressure
Valve
Pump
Surfactant
Viscosity
Plimsoll line
Density
Units for density
Neutral buoyancy
Pipeline pig

4. What properties affect or change the density of a substance?
5. Describe the difference between a hydraulic system and a pneumatic system.
8. Using particles, explain the difference in the compressibility of gases and liquids. What can compress the most? What can compress the least?
9. What is the bends and how does someone get it?
10. What does Pascal's law state?
11. How does a submarine work? (3 stages)
12. How does temperature affect viscosity?
Know how to calculate density
Know how to calculate pressure

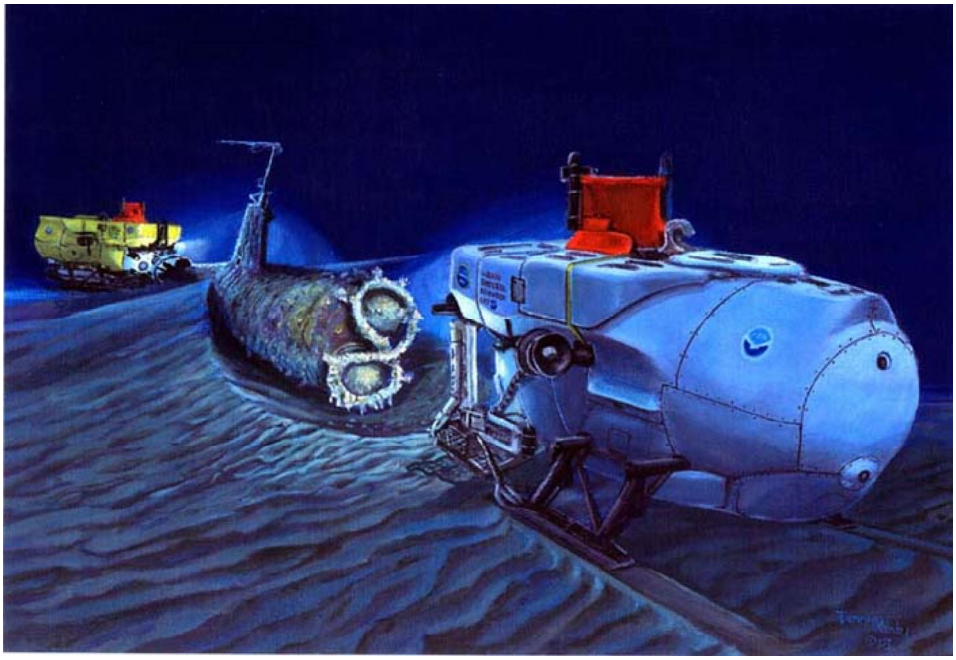
Pressure

Pressure is the amount of force applied to a given area.

The formula is: $P = \frac{F}{A}$ $\frac{N}{m^2}$ or Pa

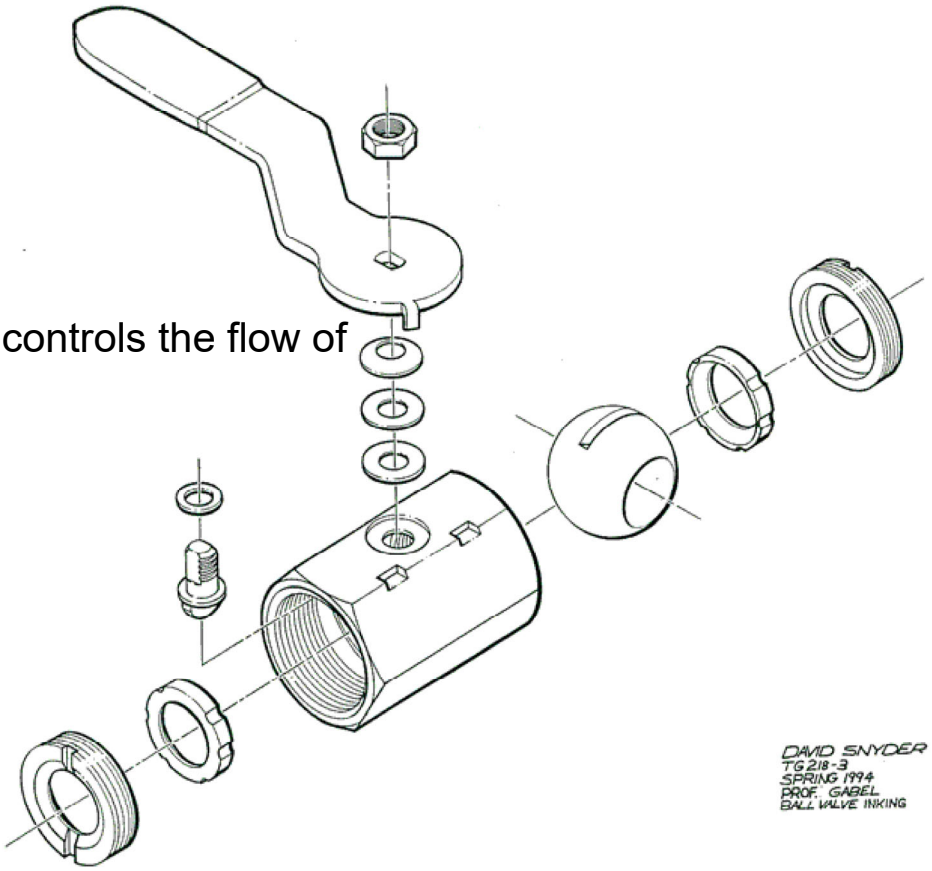
P is pressure measured in pascals (pa)
F is force measured in newtons (N)
A is area measured in meters squared (m^2)

Ex. If 18 N of force is applied to a $5m^2$ area, what is the pressure?



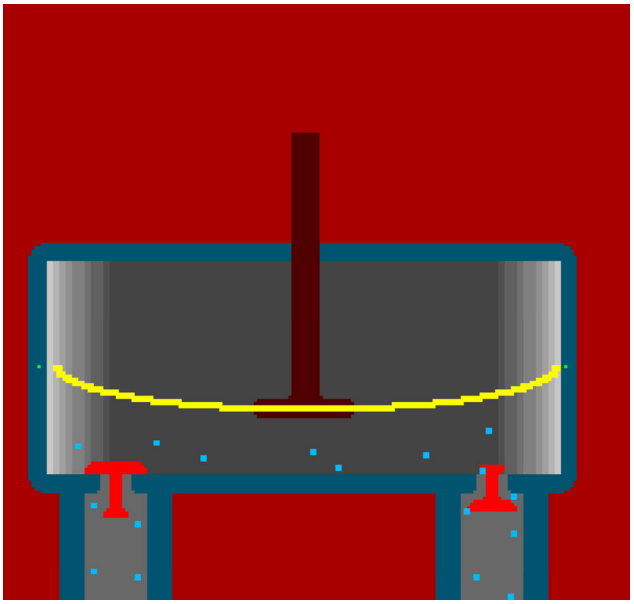
Valve

A device that controls the flow of fluids

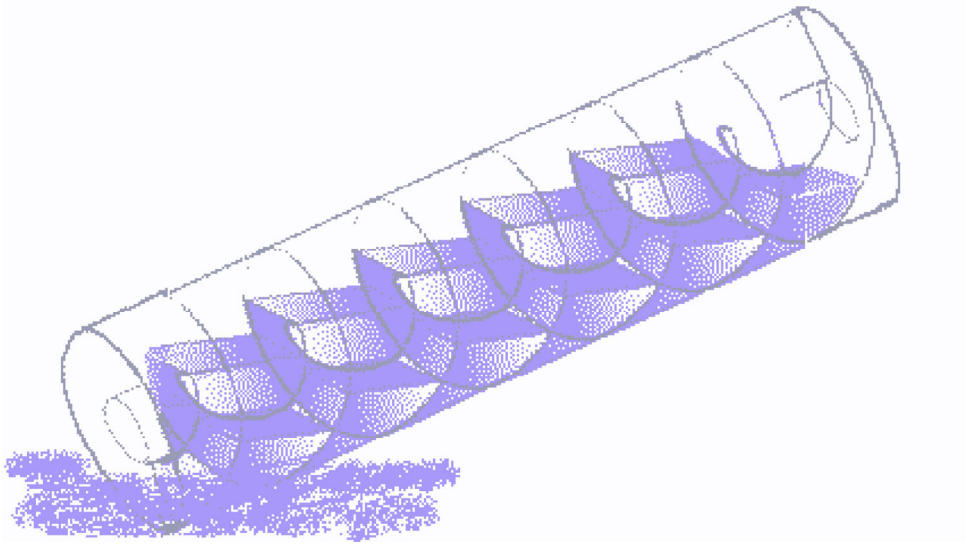


Pump A device that moves a fluid through or into something

Diaphragm pumps: Use a flexible diaphragm to move fluids

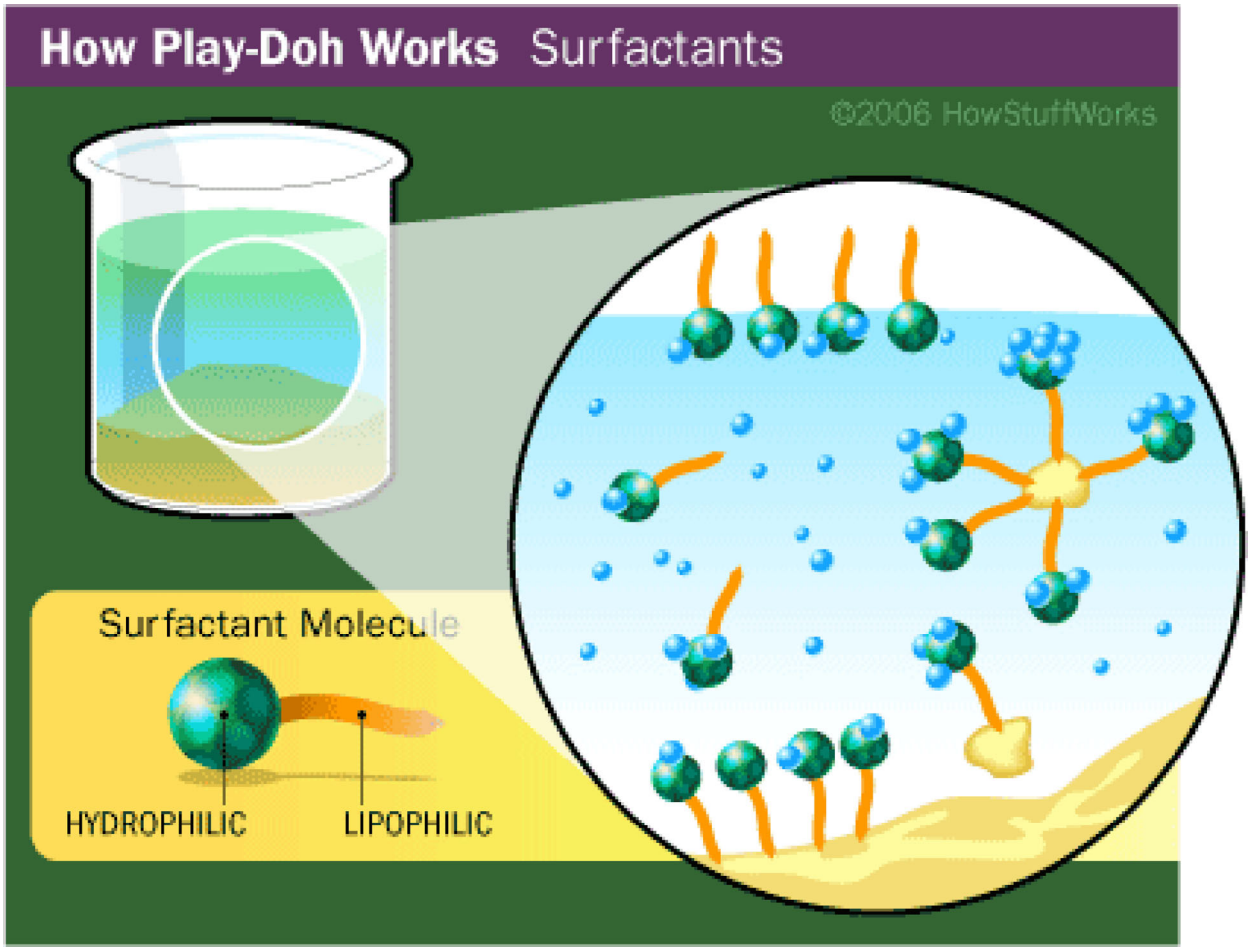


Screw Pumps operate like grain augers to move water



Surfactants

Detergents can remove dirt from fabric. Detergents contain a cleaning agent known as a surfactant. Surfactants attach themselves to dirt and oil and separate them from the fabric



Viscosity

How Quickly Fluids Flow

"Viscosity is a measure of fluids internal friction"

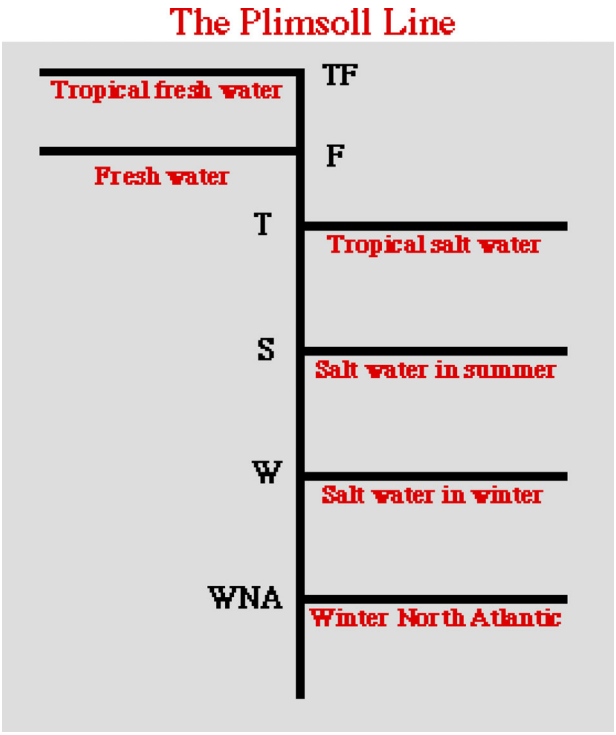
Remember the particle model of matter??
When those particles rub each other, friction occurs

The greater the friction between the rubbing particles, the higher the viscosity

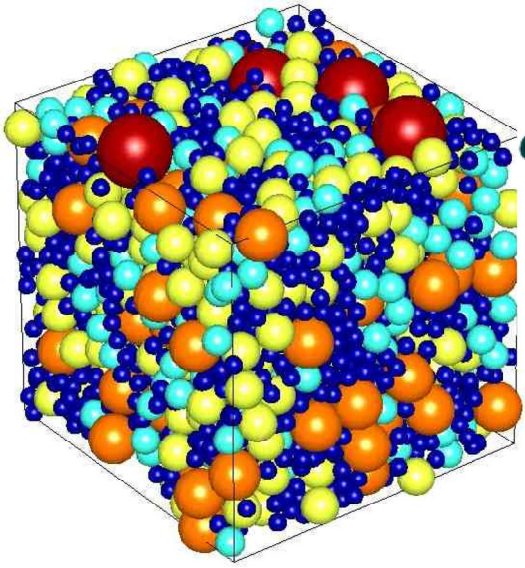
Fluids with high viscosity flow slowly
Fluids with low viscosity flow quickly

Plimsoll Line

The Plimsoll Line on large ships indicates the level for loading them safely in different types of water.



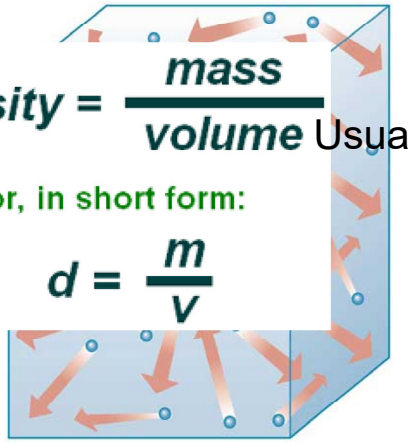
Density: The amount of matter in a given volume



$$density = \frac{mass}{volume}$$ Usually in g / mL

or, in short form:

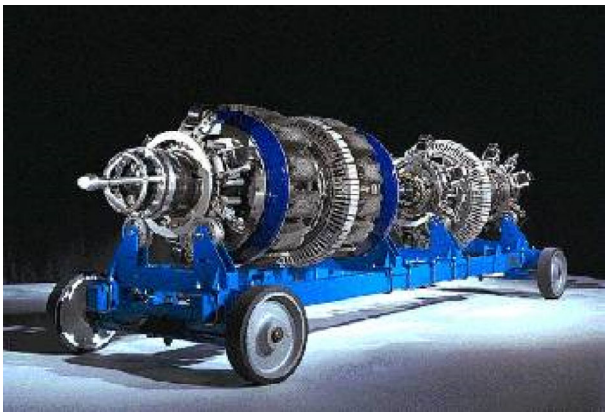
$$d = \frac{m}{v}$$



Neutral Buoyancy

When the force of gravity pushing down is equal to the buoyant force pushing up, an object floats in the middle.

Pipeline Pig



Clean and check the condition of oil and gas pipelines. Pushed through the pipe by oil or gas

4. Properties that affect density of a substance

- Temperature — Higher temp = lower Density
- Concentration

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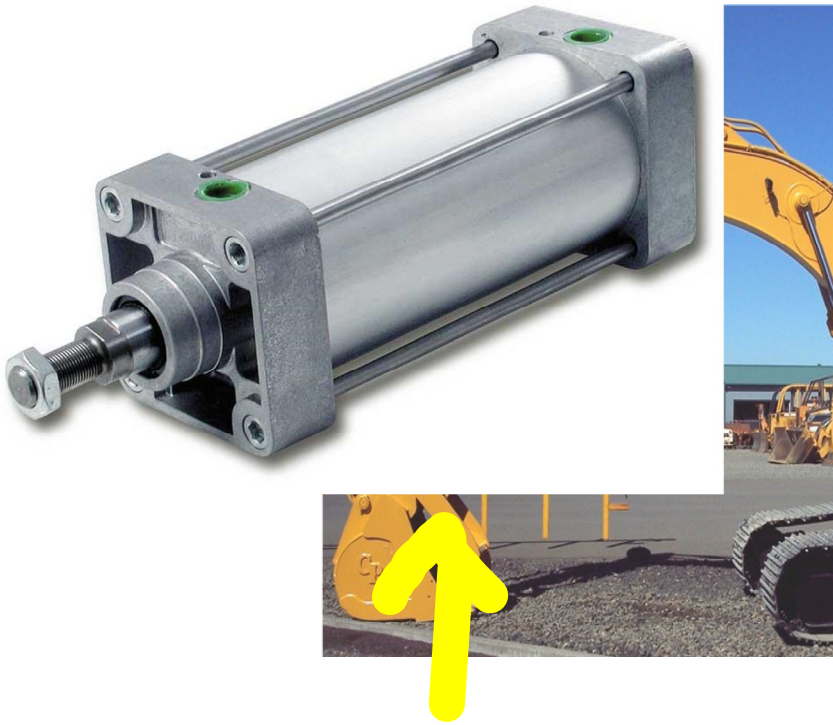
add salt to a lake

↳ increase concentration — higher density

5.

Hydraulic systems use liquids

Pneumatic systems use air



6.

In a saturated solution no more solute can be dissolved at a given temperature

7.

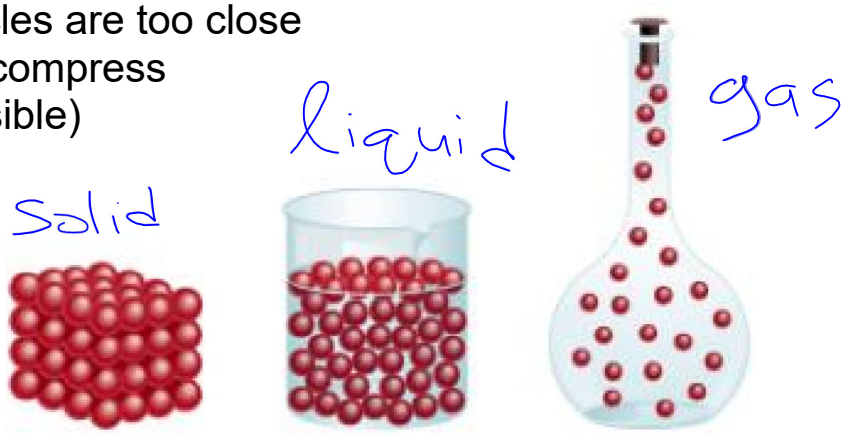
In a homogeneous mixture (a solution), you cannot see the different parts.

In a heterogeneous mixture, you can see the different parts

8.

Air particles are further apart, so they can be pushed (compressed) together.

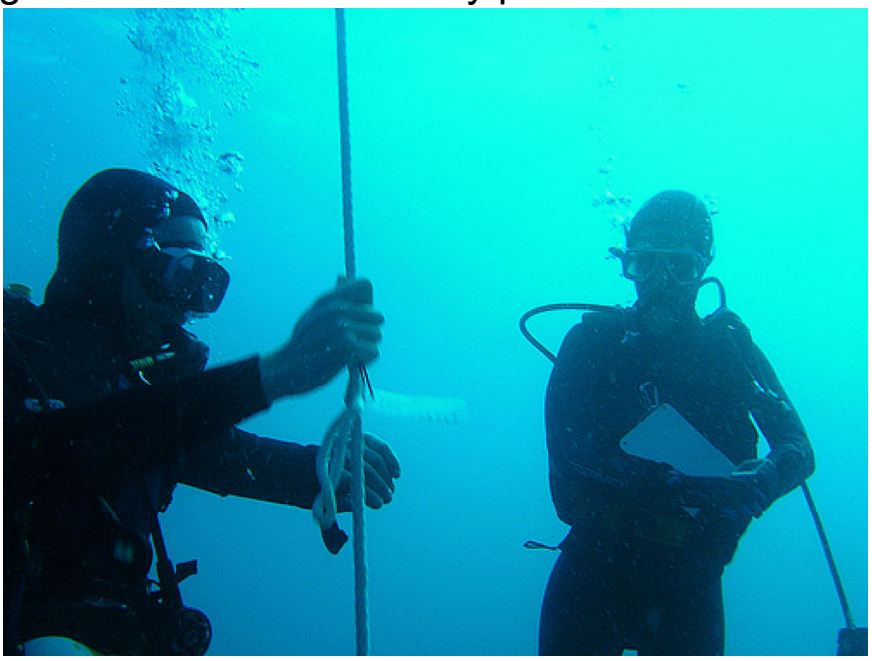
Liquid particles are too close together to compress (incompressible)



9.

The Bends: When a diver dives or surfaces too quickly, the change in pressure can cause the nitrogen dissolved in their blood to form bubbles.

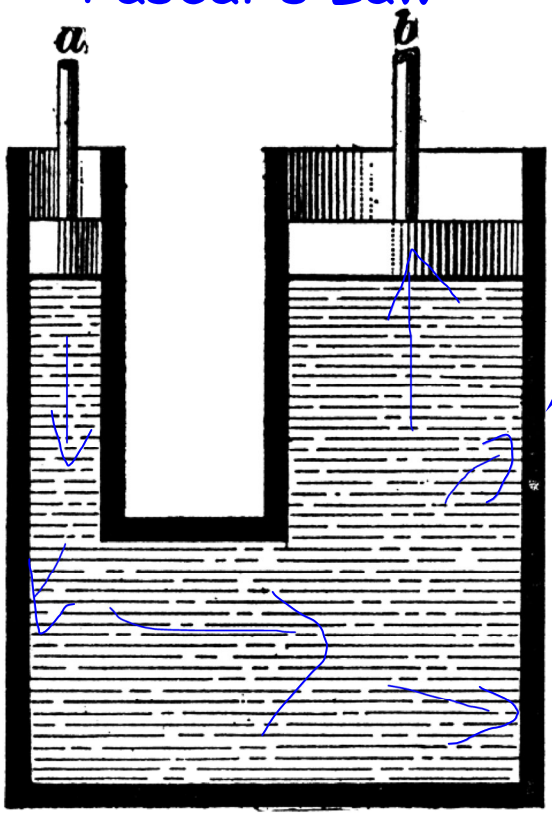
These Nitrogen bubbles are extremely painful and can be deadly



10.

Pascal's Law

Pascal s law: pressure is transmitted in all directions equally



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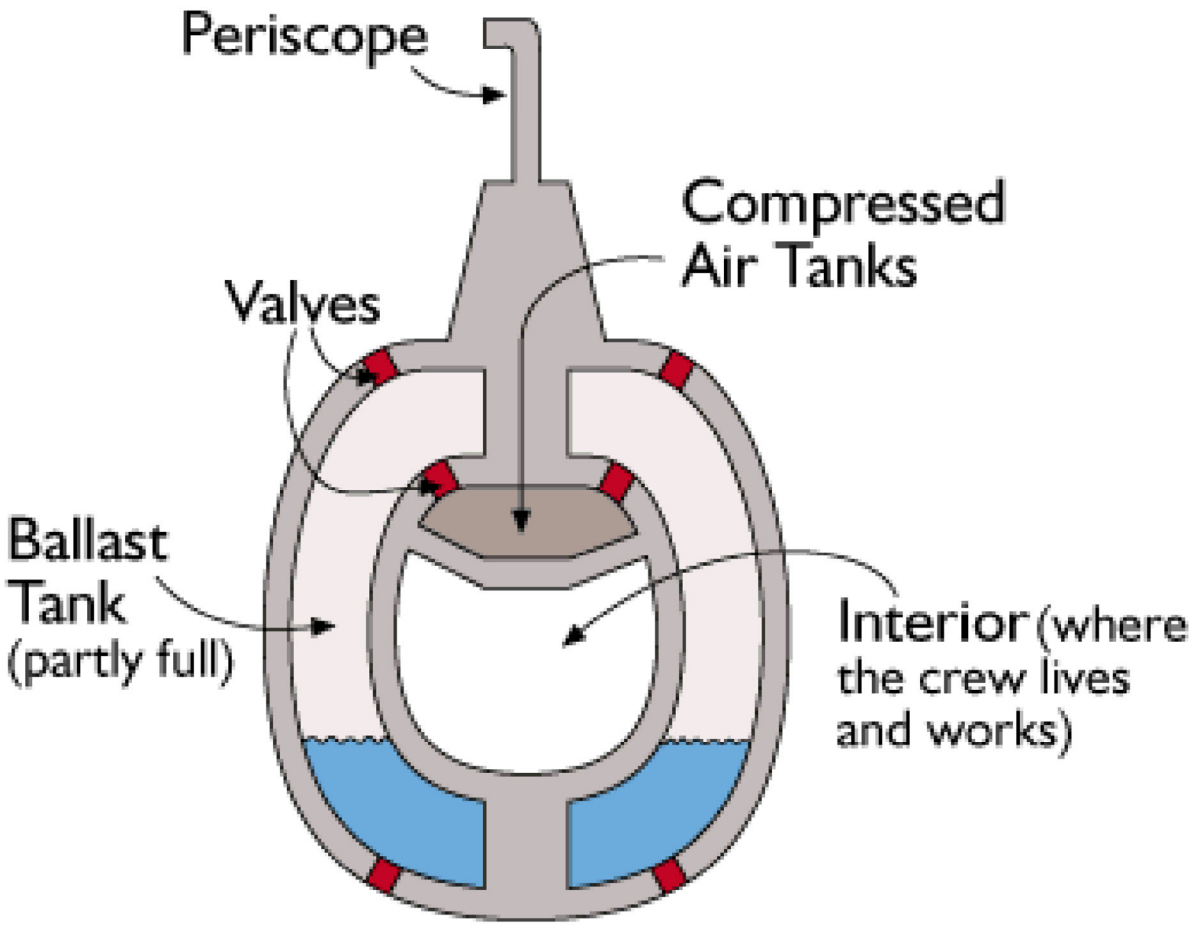
An enclosed fluid transmits pressure equally, and undiminished, in all directions

This is incredibly important... why?

11. Submarines



Submarine (cross section)

Stage 1:
On surface: Compressed air is pumped into the ballast tanks, giving the sub more buoyant force, causing it to float

Stage 2:
diving; ballast tanks filled with water, more dense, sub sinks

stage 3;
surfacing; compressed air is pumped into ballast tanks, causing lower density, the sub surfaces

12.

Viscosity is resistance to movement, so as temperature increases, the particles speed up, causing more space between them (read: less resistance), allowing viscosity to decrease

High temp = low resistance = low viscosity

Low temp = high resistance = High viscosity