

Properties of Fluids



Fluid =

Examples:

Viscosity

• Viscosity is a property that represents the internal _____ or the "_____".

• Viscosity is due to the _____ between the molecules.

• At higher temperatures, molecules possess _____, and they can _____.



Density

• Density is defined as _____.

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

• Density of a substance, in general depends on _____ and _____.

• Increasing the pressure on an object _____ of the object and thus increases its density. Increasing the temperature of a substance (with a few exceptions) decreases its density by _____.

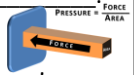
Pressure

• Pressure is the _____.

• The weight of a fluid creates a _____, and therefore a _____, at each depth.

• The deeper an object moves under the fluid's surface, the _____.

• Units: _____ (Pa), _____ (atm), pounds per square inch (_____).



Buoyancy

• Buoyancy is the ability of a _____.

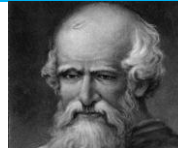
• If the buoyant force of the fluid is equal to or greater than the weight of the object, _____.

• If the buoyant force of the fluid is less than the weight of the object, _____.



3 Important Principles of Fluids

Archimedes



Daniel Bernoulli

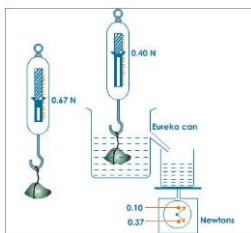


Blaise Pascal



Archimedes' Principle

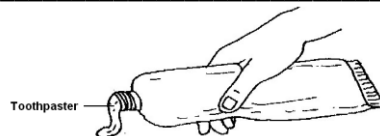
- The buoyant force is equal to the weight of the displaced water.
- The stone weighed 0.67 N in air and 0.40 N when immersed in water. The displaced water weighed 0.27 N ($= 0.67 - 0.40$).



Pascal's Principle

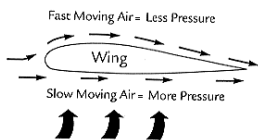
- Pressure applied to a fluid is

_____.



Bernoulli's Principle

- As the velocity of a fluid increases, _____



Click on the image to see an [animation of Bernoulli's Principle](#)

Science of Flight

- The air above the wing _____ than the air below it. _____ than faster air, so the air pressure pushing up on the bottom of the wing is _____ than the pressure pushing down. When this happens the wing moves up and we have lift.



Check your Understanding

- Which substance is more viscous...Hershey's chocolate syrup or the milk?
- If 30.943 g of a liquid occupy a space of 35.0 ml, what is the density of the liquid?
- Which of these is not a unit for pressure?
psi, atm, newtons, pascals
- A ping-pong ball is dropped into a pail of water and floats. Does the ping-pong ball or the water have more buoyant force?

Pre-lab Questions

- How do you measure the mass of a liquid?
Be specific. ("Use a scale" is not an acceptable answer.)
- How do you measure volume of a liquid?
- What observations will you make to describe viscosity?