Density of Solids, Liquids, and Gas

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The only way the density of a substance will change is if it changed states.

Ex) Liquid water is a different density than solid water and water vapor

Water

Both liquid water and water vapor have the same particles and the particles are all the same size.

According to the particle theory of gas, gas particles have more space between them than liquid particles. Therefore, water vapor would have fewer particles than liquid water.

The density of the water vapor is less than the density of the liquid water.

Dolphin can leap through the air and dive back into water smoothly and effortlessly.

Solid objects can move easily though liquids and gases. The particle theory states that fluid properties of water and air allow water particles and air particles to move out of the way solids.

You cannot push through a solid substance, like ice, since the particles are held strongly together and will not push aside.

We sometimes confuse weight with mass. When you step on a scale at home you are getting your mass.

Force - is a push or pull.

Gravity - is a natural force that causes an object to move toward the center of the earth.

Weight - is the force of gravity exerted on an object.

- Measured in Newtons (N) Weight on the Moon | How Much Would You Weigh and How Strong

Brian Cox Experiences Zero Gravity! | World Space Week - Wonders of the Universe | BBC Studios - YouTube

The pull of gravity everywhere on earth's surface is the same. It is a downward force of 9.8 N for every kilogram of its mass. (9.8N/kg)

Ex) A bag of sugar has a mass of 2kg

$$2\ \text{kg} \times \frac{9.8\ \text{N}}{1\ \text{kg}} = 19.6\ \text{N}$$

BUT weighs 19.6 N

Density Formula

-For liquids density is measured in g/mL or g/L

-For solids density is measured in g/cm^3

Density of water is 1.00 g/mL

A substance that had a density of 2.85 (bigger) g/mL would Sink in water. It is more dense than water.

A substance that had a density of 0.82 (smaller) g/mL would float in water. It is less dense than water.

Which substance would float or sink in water?

1g/mL

Substance	Density of substance	Sink or Float
A	1.35 g/mL Bigger	Sink
B	0.32 g/mL	Float
C	2.68 g/mL	Sink