

Write one important fact from each paragraph in this space.

## Science Shorts -6

### Density

Density is a physical property of matter. Each element and compound has a unique density associated with it. Density can be defined as the mass of a known volume of a substance. It is usually measured in grams per cubic centimeter ( $\text{g/cm}^3$ )

In chemistry, the density of many substances is compared to the density of water. Does ice float on water or sink in the water? Everyone knows what happens in the case of ice cube in a glass of water. They float!

Why does ice float? What other observations or facts are known? Because ice floats, we can infer that ice must be less dense than water. If water is frozen in a glass jar, the glass jar breaks. If a soda can freezes, it will also burst. From both of the above, we can infer that the volume of the ice has increased. So we can conclude that the volume of ice must be greater than the same mass of liquid water.

The normal pattern for most compounds is that as the temperature of the liquid increases, the density decreases as the molecules spread out from each other. As the temperature decreases, the density increases as the molecules become more closely packed. The pattern does not hold true for ice since the exact opposite occurs. When you look at the molecules of water and compare them to ice, the molecules of water are very close together. The molecules of ice are spread apart which leaves more open space. The ice structure takes up more volume than the liquid water molecules, so ice is less dense than liquid water.

The increase in volume of ice is about 9%. This increase causes enough force to break most rigid containers. This is the same force, repeated on a daily basis that creates "pot holes" in the roads in the wintertime.

The density of gases can also be compared. A gas' density is usually compared to the density of air. Does an object float in air or sink in the air. If an object containing a gas floats in air, it is less dense than air. If it sinks, it is denser than air.

Compare the behavior of a helium-filled balloon with that of an air filled balloon. Even taking into account the weight of the rubber balloon, the helium balloon floats on the air and is less dense than the air. The air filled balloon sinks because the weight of the rubber balloon makes it slightly heavier and thus denser.

Have you ever seen the effect of having dry ice (frozen carbon dioxide) in a punch bowl at a party? The dry ice produces a white fog that sinks in the air. This shows that the dry ice vapor is denser than air.

# Density

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26	27	28	29	30	31																						

Unscramble each of the clue words.

Copy the letters in the numbered cells to other cells with the same number.