

# DENSITY

DEFINITION: how  
much mass is in a  
certain volume

UNITS: kilograms per  
cubic meter; grams per  
cubic centimeter,  $\text{kg}/\text{m}^3$

The density of an object is the amount of mass it contains in a volume. Density is derived from the mass of the atoms and molecules that make up a material and how tightly packed these are in a certain space. A piece of driftwood floats on top of water because it has a lower density than the sea below; on the other hand, an iron anchor has a higher density than the salt water so it sinks to the bottom.

## COSMIC EXAMPLE

**White dwarf:** A typical white dwarf star is half as massive as the Sun, yet only slightly bigger than Earth. An Earth-sized white dwarf has a density of  $1 \times 10^9 \text{ kg}/\text{m}^3$  (1,000,000,000  $\text{kg}/\text{m}^3$ ).

The Cat's Eye Nebula from Chandra & Webb shows a phase that Sun-like stars undergo at the end of their lives, which leaves a white dwarf behind in its center. Material from the star's outer layers puffs off, and a hot core is left behind.

## OLYMPIC EXAMPLE

Density expresses the relationship of the amount of mass to a certain volume.

**Ice:**  $917 \text{ kg}/\text{m}^3$  ;

**Snow:**  $100\text{-}800 \text{ kg}/\text{m}^3$



## EVERYDAY EXAMPLE

Gold is denser than lead, but less dense than platinum.  $19,320 \text{ kg}/\text{m}^3$

