

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)

The pull of gravity everywhere on an 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

$2 \cancel{\text{kg}} \times \underline{9.8 \text{ N}} = 19.6 \text{ N}$ BUT weighs 19.6 N

$\cancel{1 \text{ kg}}$

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You Try

$$\frac{9.8 \text{ N}}{1 \text{ kg}}$$

Assume you have a mass of 50 kg. What would be your weight on earth?

$$50 \text{ kg} \times \frac{9.8 \text{ N}}{1 \text{ kg}} = 490 \text{ N}$$

Supplies soon needed for activity

Density Formula

Density of a substance can be determined by calculating its mass-to-volume ratio.

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

Shorthand

$$D = \frac{m}{V}$$

Rearranged

$$V = \frac{m}{D}$$

$$m = V \times D$$

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

-For solids density is measured in g/cm³

Density of water is 1.00 g/mL

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

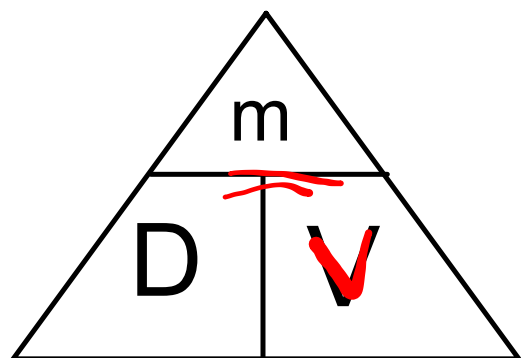
A substance that had a density of 0.82 g/mL would float in water. It is less dense than water.

Which substance would float or sink in water? 1.00 g/mL

Substance	Density of substance	Sink or Float
A	0.35 g/mL <i>smaller</i>	<i>Float</i>
B	1.02 g/mL <i>bigger than water</i>	<i>Sink</i>
C	0.99 g/mL <i>small</i>	<i>Float</i>

Table 5.1 on page 141 shows the approximate densities of common substances

Helps with rearranging



$$D = \frac{m}{V}$$

$$m = D \cdot V$$

$$V = \frac{m}{D}$$

Ex) Find the density of an object with a mass of 10 g and a volume of 2 cm³.

$$m = 10\text{ g}$$

$$V = 2\text{ cm}^3$$

$$D = ?$$

$$D = \frac{m}{V}$$

$$= \frac{10\text{ g}}{2\text{ cm}^3}$$

(Answer:)

$$D = 5\text{ g/cm}^3$$

Complete the chart in #4 on page 143 ("Check your understanding")