

To calculate density, you must use this equation: $density = \frac{mass}{volume}$

You do not have to remember the equation but it is important to choose the correct values to use.

Units

Density is measured in g/cm^3 or in kg/m^3 . Look for units in the question to know which of these options to use with your answer.

In order to use the equation, you must know the **mass** and the **volume**. The different methods to find these are described below. When you describe how to calculate density, remember to name the **equipment** you need and how to use it.

Calculating the density of a regularly shaped solid

1. Measure the mass using a balance.

e.g. 25g

2. Use a ruler to measure the length, width and height of the solid.

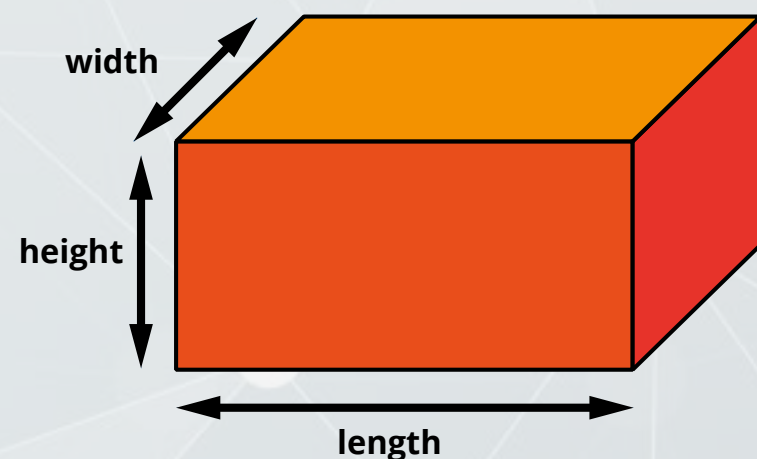
e.g. 3.0cm, 2.0cm, 1.5cm

3. Calculate the volume using:
volume = length × width × height

e.g. $3.0 \times 2.0 \times 1.5 = 9.0cm^3$

4. Calculate the density using
 $density = \frac{mass}{volume}$

e.g. $density = \frac{25}{9} = 2.8 g/cm^3$



Calculating the density of an irregularly shaped solid

1. Measure the mass using a balance.

e.g. 6.0g

2. Fill a measuring cylinder with water to a specific volume.

e.g. $28cm^3$

3. Place the solid in the measuring cylinder and record the new volume.

e.g. $33cm^3$

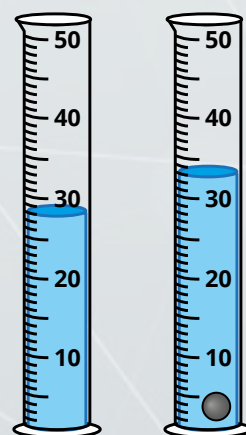
4. Calculate the volume of the solid by subtracting the initial volume (step 2) from the new volume (step 3).

e.g. $33 - 28 = 5cm^3$

5. Calculate the density using:

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

e.g. $density = \frac{6.0}{5} = 1.2 g/cm^3$



Variations

What if the solid floats in the water? Then you must use something to ensure the solid is completely under the water. Remember if you use something to sink the solid you must subtract its volume and the volume of the water from the new volume.

Calculating the density of a liquid

1. Measure the mass of an empty measuring cylinder.

e.g. 80.0g

2. Fill the measuring cylinder with a specific volume of the liquid. Record the volume.

e.g. $20cm^3$

3. Measure the combined mass of the measuring cylinder and the liquid.

e.g. 96.0g

4. Calculate the mass of the liquid by subtracting the empty mass (step 2) from the new mass (step 3).

e.g. $96.0 - 80.0 = 16.0g$

5. Calculate the density using:

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

e.g. $density = \frac{16.0}{2.0} = 0.8 g/cm^3$

