

Density

KS3 Physics · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

A 200 g object has a volume of 100 cm³. Find its density.

Step 1 · Formula

Density = mass ÷ volume.

Step 2 · Calculate

$200 \div 100 = 2 \text{ g/cm}^3$.

Answer: 2 g/cm³

Check: Every cubic centimetre has a mass of 2 g.

2. Now try one with the steps

A metal block is 2 cm × 3 cm × 5 cm and has a mass of 81 g. Find its density and identify the metal.

Step 1 · Volume

Step 2 · Density

Step 3 · Identify

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Write the equation for density. [1]

2. What is the unit of density when mass is in g and volume in cm³? [1]

3. An object has a mass of 200 g and a volume of 100 cm³. What is its density, in g/cm³? [1]

4. A block measures $2\text{ cm} \times 3\text{ cm} \times 5\text{ cm}$. What is its volume, in cm^3 ? [1]
5. The block in the last question has a mass of 81 g. What is its density, in g/cm^3 ? [1]
6. A pebble raises the water level in a measuring cylinder from 50 cm^3 to 62 cm^3 . What is its volume, in cm^3 ? [1]
7. The pebble has a mass of 30 g. What is its density, in g/cm^3 ? [1]
8. Water has a density of 1 g/cm^3 . Will an object with a density of 0.8 g/cm^3 float or sink in water? [1]
9. Gold has a density of 19.3 g/cm^3 . What is the mass of 10 cm^3 of gold, in grams? [2]
10. Aluminium has a density of 2.7 g/cm^3 . What volume of aluminium has a mass of 54 g, in cm^3 ? [2]
11. Explain why ice floats on water. [1]
12. Use the particle model to explain why gases have a much lower density than solids. [2]
13. Cooking oil (0.9 g/cm^3) is poured into water (1 g/cm^3). Predict and explain what happens. [2]
14. $1\text{ g/cm}^3 = 1000\text{ kg/m}^3$. What is the density of aluminium (2.7 g/cm^3) in kg/m^3 ? [1]

4. Before you hand it in

Density = volume ÷ mass.

Density = mass ÷ volume. A dense object has a lot of mass in a small volume.

"Heavy things are dense."

Density compares mass with volume; a large object can be heavy and still have a low density.

Using the final water level volume.

Volume of object = level after – level before.