Compound Measures

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

A 200cm³ rock has a mass of 540g. Find its density.

Step 1 · State the formula

Density = Mass ÷ Volume

Step 2 · Substitute values

Density = 540 ÷ 200

Step 3 · Calculate

Density = 2.7 g/cm³

Answer: 2.7 g/cm³

Check: 540 ÷ 200 = 2.7 ✓

2. Now try one with the steps

A force of 450N is spread over an area of 1.5m². Find the pressure.

Step 1 · State the formula

Step 2 · Substitute values

Step 3 · Calculate

Answer:

3. Practice

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

1. A metal block has mass 540g and volume 60cm³. Calculate its density. [2]

2. A force of 200N acts over an area of 4m². Calculate the pressure. [2]

3. A block of wood has density 0.8 g/cm³ and mass 400g. Find its volume. [2]

4. Population density is calculated ÷ area. A city has 2.4 million people in 600km². Find the population density. [2]

5. A gold bar has a volume of 50cm³ and a density of 19.3 g/cm³. Calculate its mass, then convert to kg. [3]

6. Explain why a steel ship floats even though steel is denser than water. [3]

7. An object has mass 300 g and volume 100 cm³. What is its density in g/cm³? [1]

8. A force of 60 N acts on an area of 3 m². What is the pressure in N/m²? [1]

9. A material has density 2.5 g/cm³. Find the mass of 40 cm³ of it. [2]

10. A tap fills a 150 litre tank in 6 minutes. What is the flow rate in litres per minute? [1]

11. A town of 45,000 people covers 15 km². Find its population density in people per km². [2]

12. A printer prints 18 pages per minute. How many minutes does it take to print 270 pages? [2]

13. A force of 1,000 N produces a pressure of 250 N/m². What area, in m², is it acting on? [2]

14. A 2 kg block has a volume of 800 cm^3. Find its density in g/cm^3. [2]

15. A solid cube with sides of 3 cm has a mass of 216 g. Find its density in g/cm^3. [3]

16. Water flows from a hose at 2.5 litres per second. How many litres flow out in 4 minutes? [2]

17. 50 cm^3 of a metal with density 8 g/cm^3 is melted together with 50 cm^3 of a metal with density 4 g/cm^3. Find the density of the mixture in g/cm^3. [3]

4. Before you hand it in

Rearranging Density = Mass÷Volume incorrectly = Mass÷Density when finding mass

Use a formula triangle: Mass on top, Density and Volume on the bottom. Mass = Density × Volume. Volume = Mass ÷ Density. Density = Mass ÷ Volume. Cover what you want to find.

Forgetting to convert units before calculating (e.g. mixing kg and g, or m^3 and cm^3)

Always check units match before calculating. Density in g/cm^3 requires mass in g and volume in cm^3 — convert kg to g (×1000) or m^3 to cm^3 (×1,000,000) first if needed.

Working out population density ÷ population

Read the units: 'people per km^2' means people ÷ km^2. The quantity before 'per' goes on top. The same goes for g/cm^3 (grams ÷ cm^3) and litres per minute.