

Density, Mass and Volume

Practice Worksheet (Foundation Tier)

I DO

A block of wood has a mass of 1.2 kg and a density of 0.6 g/cm^3 .

Work out the volume in cm^3 .

WE DO

A piece of metal has a mass of 2.4 kg and a density of 1.2 g/cm^3 .

Work out the volume in cm^3 .

YOU DO 1

A block of plastic has a mass of 1.5 kg and a density of 0.5 g/cm³.
Work out the volume in cm³.

YOU DO 2

A piece of stone has a mass of 3.6 kg and a density of 1.8 g/cm³.
Work out the volume in cm³.

CHALLENGE

A solid metal cube has a mass of 1.024 kg and a density of 2 g/cm³.

Work out the side length of the cube.

PRACTICE PERFECT

Solve the following density problems. Show your working.

1) Zoe has a solid cuboid of wood measuring 10 cm by 5 cm by 4 cm. The mass of the cuboid is 160 g. Work out the density of the wood.

2) John has a block of metal. The volume of the block is 80 cm³ and its density is 4.5 g/cm³. Work out the mass of the metal block.

3) Emma finds a stone with a mass of 420 g. The density of the stone is 6 g/cm³. Work out the volume of the stone.

4) Paul has a piece of steel with a mass of 2.4 kg. The density of the steel is 8 g/cm³. Work out the volume of the steel in cm³.

5) Paige has a wooden beam with a volume of 5000 cm³. The density of the wood is 0.7 g/cm³. Work out the mass of the beam in kg.

6) Vicky and Tom mix two liquids. Vicky provides 40 cm³ of liquid A (density 1.5 g/cm³). Tom provides 60 cm³ of liquid B (density 1.2 g/cm³). Work out the density of the mixed liquid.

7) Rob has a solid metal cylinder. The base radius is 5 cm and the height is 10 cm. The density of the metal is 3 g/cm³. Work out the mass of the cylinder to 1 d.p.

8) Sophie and Mark make an alloy by mixing 300 g of metal X (density 5 g/cm³) and 400 g of metal Y (density 8 g/cm³). Work out the density of the alloy to 2 d.p.

9) Katie has an empty glass jar with a mass of 250 g. She fills it with 400 cm³ of honey. The total mass is 810 g. Work out the density of the honey.

10) Steve has a solid cube of copper. The side length is 4 cm. The density of copper is 8.96 g/cm³. Work out the mass of the cube.

11) Keeley and Catherine mix liquid C and liquid D. Keeley uses 200 cm³ of liquid C (density 0.8 g/cm³). Catherine adds some volume of liquid D (density 1.1 g/cm³). The total mass of the mixture is 380 g. Work out the volume of liquid D used.

12) Emily, Kate, Sarah, Ryan, and Poppy examine a solid gold cube. The mass of the gold cube is 2.4125 kg. The density of gold is 19.3 g/cm³. Work out the side length of the gold cube.

ANSWERS & WORKED SOLUTIONS

I Do

Step 1: Convert kg to g. $1.2 \text{ kg} = 1200 \text{ g}$.

Step 2: Use the formula $\text{Volume} = \text{Mass} \div \text{Density}$.

Step 3: $\text{Volume} = 1200 \div 0.6 = 2000$.

Answer: 2000 cm^3

We Do

Step 1: Convert kg to g. $2.4 \text{ kg} = 2400 \text{ g}$.

Step 2: Use the formula $\text{Volume} = \text{Mass} \div \text{Density}$.

Step 3: $\text{Volume} = 2400 \div 1.2 = 2000$.

Answer: 2000 cm^3

You Do 1

Step 1: $1.5 \text{ kg} = 1500 \text{ g}$.

Step 2: $\text{Volume} = 1500 \div 0.5 = 3000$.

Answer: 3000 cm^3

You Do 2

Step 1: $3.6 \text{ kg} = 3600 \text{ g}$.

Step 2: $\text{Volume} = 3600 \div 1.8 = 2000$.

Answer: 2000 cm^3

Challenge

Step 1: Convert kg to g. $1.024 \text{ kg} = 1024 \text{ g}$.

Step 2: Find the volume. $\text{Volume} = 1024 \div 2 = 512 \text{ cm}^3$.

Step 3: A cube's volume is $\text{length} \times \text{length} \times \text{length}$. Find the cube root of 512.

Step 4: Cube root of 512 = 8.

Answer: 8 cm

Practice Perfect

1) $\text{Volume} = 10 \times 5 \times 4 = 200 \text{ cm}^3$. $\text{Density} = 160 \div 200 = 0.8 \text{ g/cm}^3$

2) $\text{Mass} = 80 \times 4.5 = 360 \text{ g}$

3) $\text{Volume} = 420 \div 6 = 70 \text{ cm}^3$

4) $2.4 \text{ kg} = 2400 \text{ g}$. $\text{Volume} = 2400 \div 8 = 300 \text{ cm}^3$

5) $\text{Mass} = 5000 \times 0.7 = 3500 \text{ g} = 3.5 \text{ kg}$

6) $\text{Mass A} = 60 \text{ g}$. $\text{Mass B} = 72 \text{ g}$. $\text{Total Mass} = 132 \text{ g}$.
 $\text{Density} = 132 \div 100 = 1.32 \text{ g/cm}^3$

7) $\text{Volume} = \pi \times 5^2 \times 10 = 785.4 \text{ cm}^3$. $\text{Mass} = 785.4 \times 3 = 2356.2 \text{ g}$

8) $\text{Vol X} = 60 \text{ cm}^3$. $\text{Vol Y} = 50 \text{ cm}^3$. $\text{Total Mass} = 700 \text{ g}$.
 $\text{Total Vol} = 110 \text{ cm}^3$. $\text{Density} = 700 \div 110 = 6.36 \text{ g/cm}^3$

9) $\text{Mass of honey} = 810 - 250 = 560 \text{ g}$. $\text{Density} = 560 \div 400 = 1.4 \text{ g/cm}^3$

10) $\text{Volume} = 4^3 = 64 \text{ cm}^3$. $\text{Mass} = 64 \times 8.96 = 573.44 \text{ g}$

11) $\text{Mass C} = 160 \text{ g}$. $\text{Mass D} = 380 - 160 = 220 \text{ g}$.
 $\text{Volume D} = 220 \div 1.1 = 200 \text{ cm}^3$

12) $2.4125 \text{ kg} = 2412.5 \text{ g}$. $\text{Vol} = 2412.5 \div 19.3 = 125 \text{ cm}^3$.
 $\text{Side} = \text{Cube root of } 125 = 5 \text{ cm}$