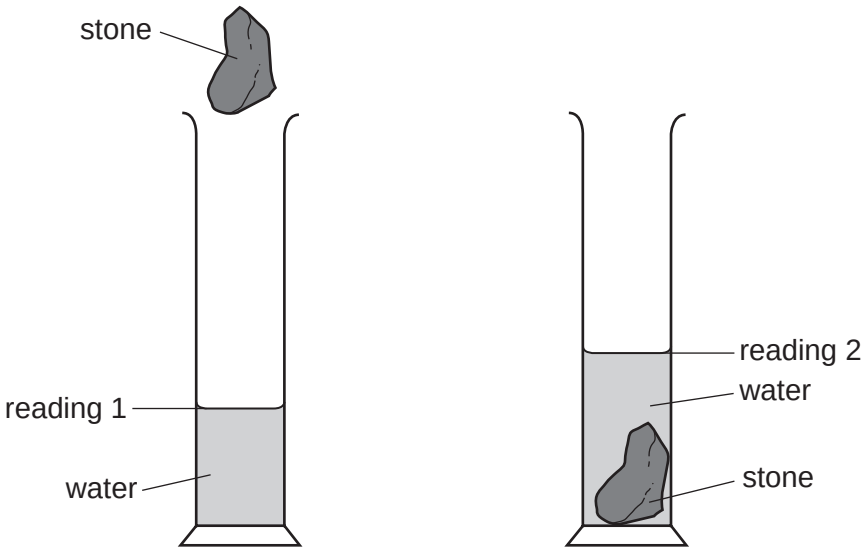
1 A student wishes to determine the density of an irregularly-shaped stone.

First he finds the mass of the stone. Next he lowers the stone into a measuring cylinder containing water.

The diagrams show the measuring cylinder before and after the stone is lowered into it.



How should the student calculate the density of the stone?

A mass of stone × reading 2

B mass of stone × (reading 2 – reading 1)

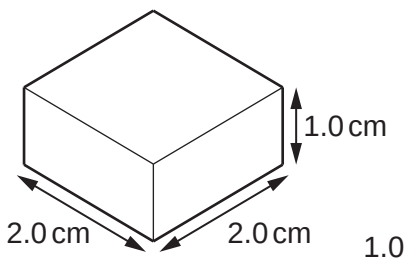
C mass of stone ÷ reading 2

D mass of stone ÷ (reading 2 – reading 1)

2 The diagrams show the dimensions and masses of four regular solid objects. The objects are made from different metals.

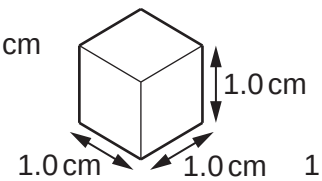
Which metal has the greatest density?

A



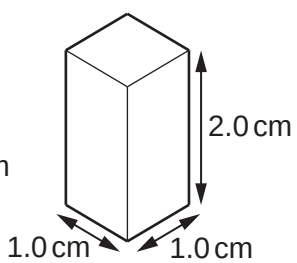
mass = 20 g

B



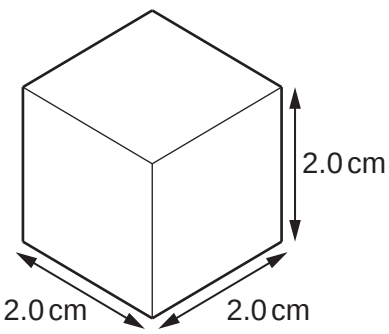
mass = 6.0 g

C



mass = 14 g

D



mass = 32 g

3 Diagram 1 shows a measuring cylinder containing water.

Diagram 2 shows the same measuring cylinder and water after 10 identical solid glass spheres have been added.

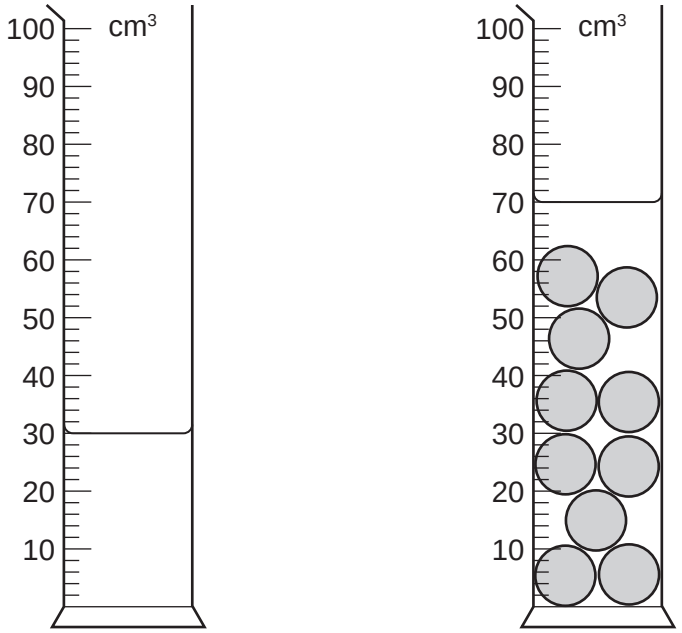


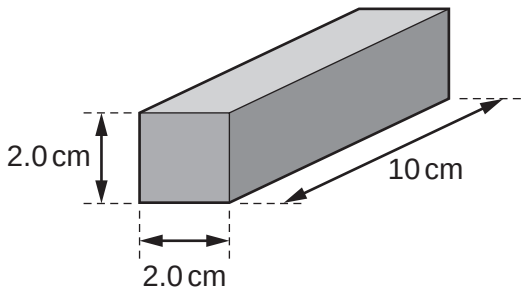
diagram 1 diagram 2

The mass of one of the spheres is 10 g.

What is the density of the glass from which the spheres are made?

A 0.25 g / cm^3 **B** 0.40 g / cm^3 **C** 2.5 g / cm^3 **D** 4.0 g / cm^3

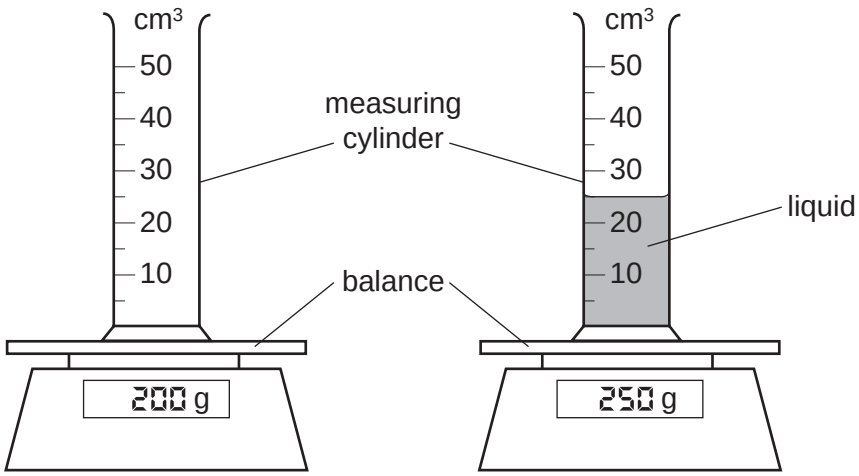
4 The diagram shows a cuboid block made from a metal of density 2.5 g / cm^3.



What is the mass of the block?

A 8.0 g **B** 16 g **C** 50 g **D** 100 g

5 The diagram shows an experiment to find the density of a liquid.



What is the density of the liquid?

A $0.5\,g/cm^3$ **B** $2.0\,g/cm^3$ **C** $8.0\,g/cm^3$ **D** $10.0\,g/cm^3$

6 Diagram 1 shows a piece of foam rubber that contains many pockets of air. Diagram 2 shows the same piece of foam rubber after it has been compressed so that its volume decreases.

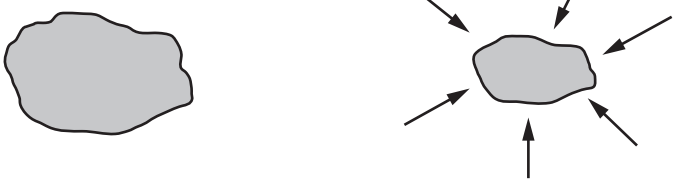


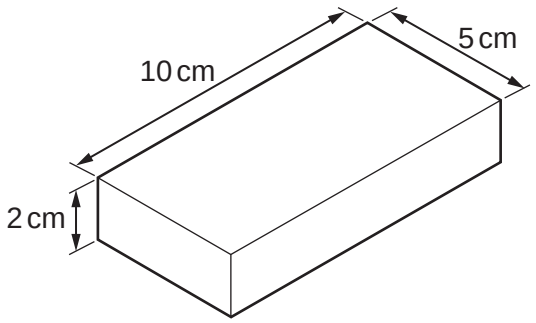
diagram 1
(before compression)

diagram 2
(after compression)

What happens to the mass and to the weight of the foam rubber when it is compressed?

	mass	weight
A	increases	increases
B	increases	no change
C	no change	increases
D	no change	no change

7 A metal block has the dimensions shown. Its mass is 1000 g.



What is the density of the metal?

A $\left(\frac{5 \times 10}{1000 \times 2}\right) \text{g/cm}^3$

B $\left(\frac{2 \times 5 \times 10}{1000}\right) \text{g/cm}^3$

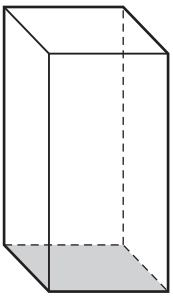
C $\left(\frac{1000 \times 2}{5 \times 10}\right) \text{g/cm}^3$

D $\left(\frac{1000}{2 \times 5 \times 10}\right) \text{g/cm}^3$

8 Which substance in the table has the lowest density?

	substance	mass / g	volume / cm^3
A	nylon	1.14	1.0
B	cotton	1.55	1.0
C	olive oil	1.8	2.0
D	water	2.0	2.0

9 A student wishes to determine the density of the solid block shown.



Which quantities must be known?

A the area of the shaded face and the volume of the block

B the area of the shaded face and the weight of the block

C the mass of the block and the height of the block

D the mass of the block and the volume of the block

10 Two cylinders are made of the same metal. Both cylinders have the same cross-sectional area but one is longer than the other.

cylinder 1 cylinder 2

Which quantity is the same for both cylinders?

A density

B mass

C resistance

D volume

11 The mass of a piece of metal is 1200 g.

A measuring cylinder contains 150 cm^3 of water.

The piece of metal is put into the measuring cylinder. The water level rises to 250 cm^3 and covers the metal.

What is the density of the metal?

A 3.0 g/cm^3 **B** 4.8 g/cm^3 **C** 8.0 g/cm^3 **D** 12.0 g/cm^3

12 A person measures the length, width, height and mass of a metal block with rectangular sides.

Which of these measurements must be used in order to calculate the density of the metal?

A mass only

B height and mass only

C length, width and height only

D length, width, height and mass

13 A liquid has a volume of 100 cm^3 and a mass of 85 g.

The density of water is 1.0 g/cm^3.

How does the density of the liquid compare with the density of water?

A Its density is higher than that of water.

B Its density is lower than that of water.

C Its density is the same as that of water.

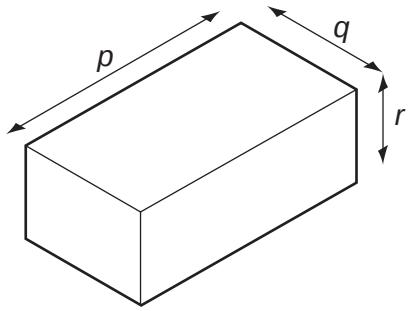
D It is impossible to say with only this data.

14 The table gives the volumes and masses of four objects.

Which object has the greatest density?

	mass / g	volum / cm^3
A	5.4	1
B	13	3
C	15	6
D	18	5

15 The diagram shows the dimensions of a rectangular block of metal of mass m.



Which expression is used to calculate the density of the metal?

A $m \times p \times q$

B $m \times p \times q \times r$

C $\dfrac{m}{(p \times q)}$

D $\dfrac{m}{(p \times q \times r)}$

16 Diagram 1 shows an empty measuring cylinder on a balance.

Diagram 2 shows the same measuring cylinder on the balance, but it now contains a liquid.

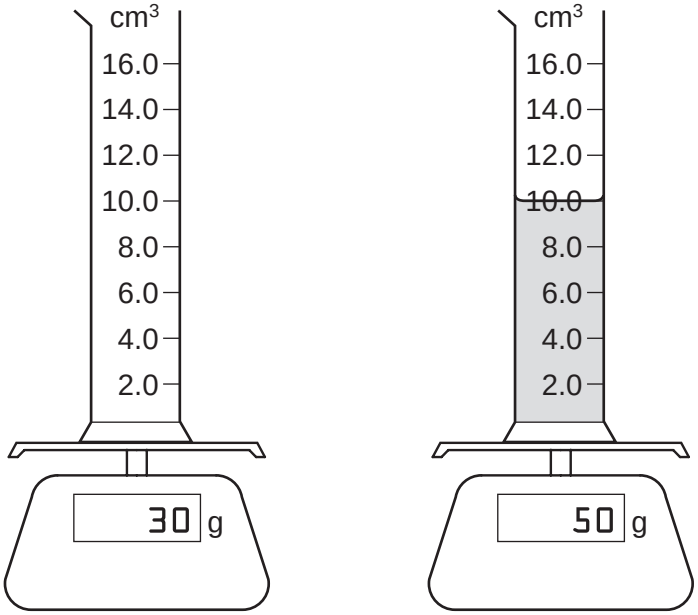
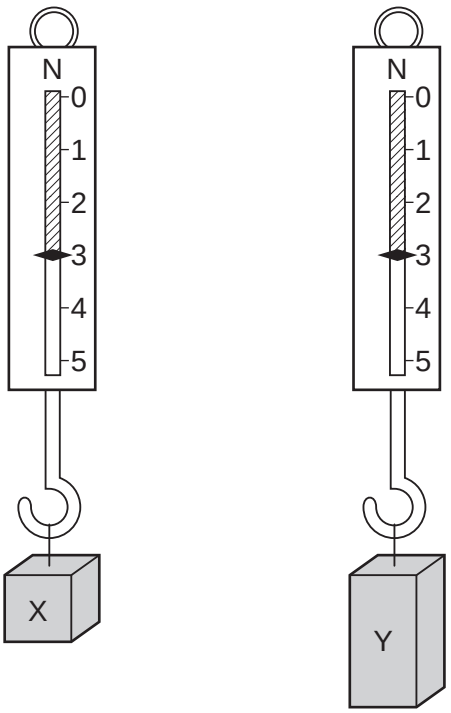


diagram 1 diagram 2

What is the density of the liquid?

A $0.2\,g/cm^3$ **B** $0.5\,g/cm^3$ **C** $2.0\,g/cm^3$ **D** $5.0\,g/cm^3$

17 Two blocks of metal X and Y hang from spring balances, as shown in the diagrams.



What does the diagram show about X and Y?

A They have the same mass and the same volume but different weights.

B They have the same mass and the same weight but different volumes.

C They have the same mass, the same volume and the same weight.

D They have the same weight and the same volume but different masses.

18 A measuring cylinder has a mass of 120 g when empty.

When it contains 50 cm^3 of a liquid, the total mass of the measuring cylinder and the liquid is 160 g.

What is the density of the liquid?

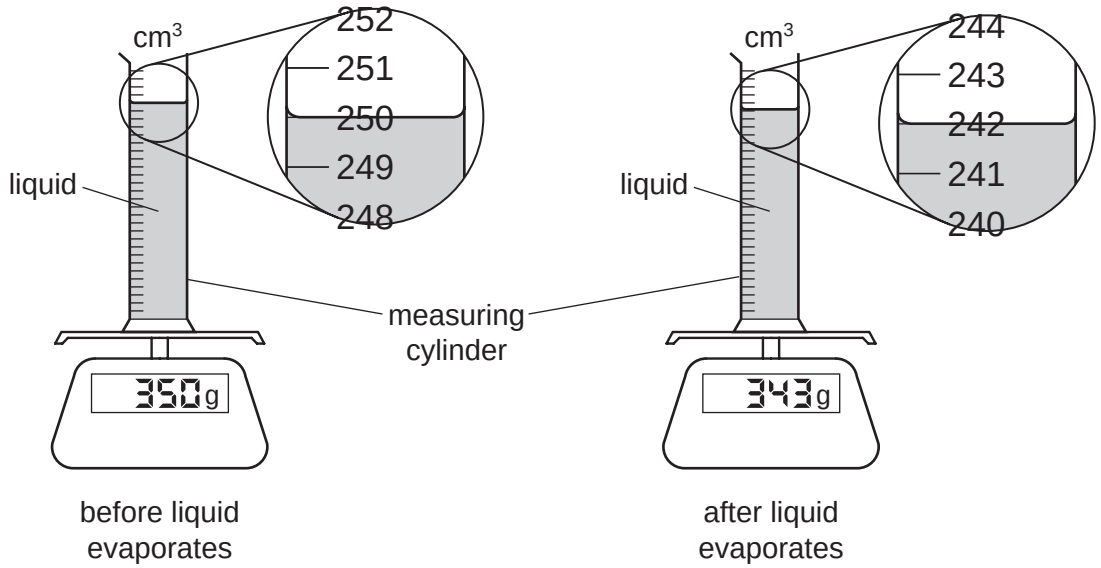
A $\frac{40}{50}$ g / cm^3

B $\frac{50}{40}$ g / cm^3

C $\frac{120}{50}$ g / cm^3

D $\frac{160}{50}$ g / cm^3

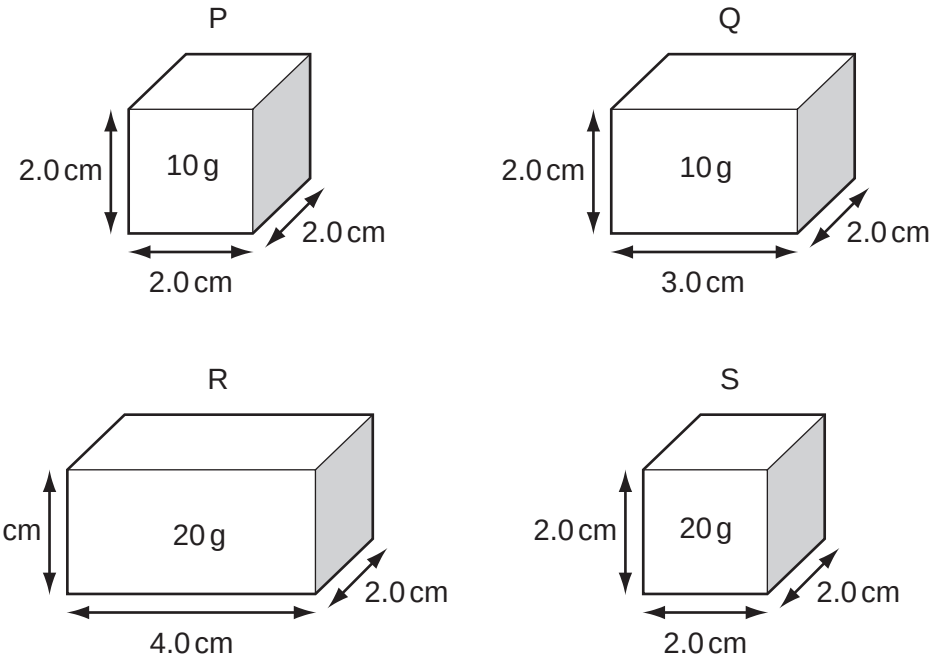
19 A measuring cylinder containing liquid is placed on a top-pan balance. The apparatus is left overnight and some of the liquid evaporates. The diagrams show the readings.



What is the density of the liquid?

A 0.875 g / cm^3 **B** 1.14 g / cm^3 **C** 1.40 g / cm^3 **D** 1.42 g / cm^3

20 Four rectangular blocks, P, Q, R and S are shown. Each block is labelled with its size and its mass.

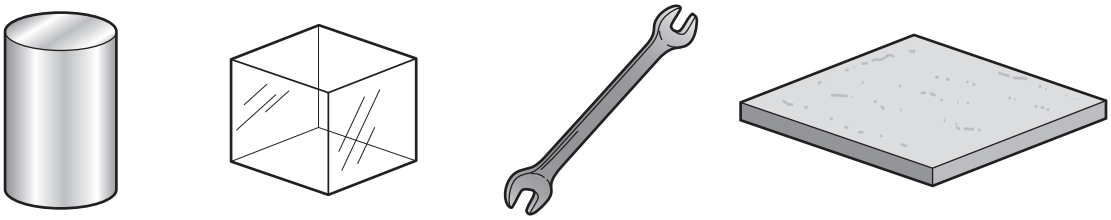


Which two blocks have the same density?

A P and Q **B** P and R **C** Q and R **D** R and S

21 A student is given four different objects and a metre rule.
Each object has a known mass. She is asked to determine the densities of the materials from which the four objects are made.

The objects are a copper cylinder, a glass cube, a steel spanner and a stone tile.



copper glass steel stone

Using only the metre rule, she is able to find the densities of only three of the four materials.

Which three materials are these?

A copper, glass and steel

B copper, glass and stone

C copper, steel and stone

D glass, steel and stone

22 A stone has a volume of $0.50\,cm^3$ and a mass of $2.0\,g$.

What is the density of the stone?

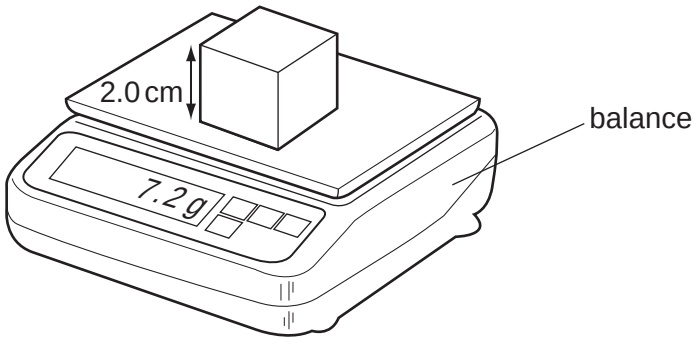
A $0.25\,g/cm^3$

B $1.5\,g/cm^3$

C $2.5\,g/cm^3$

D $4.0\,g/cm^3$

23 A cube of side 2.0 cm is placed on a balance.



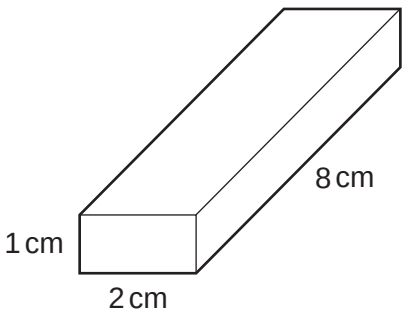
What is the density of the cube?

A $0.90\,g/cm^3$ **B** $1.2\,g/cm^3$ **C** $1.8\,g/cm^3$ **D** $3.6\,g/cm^3$

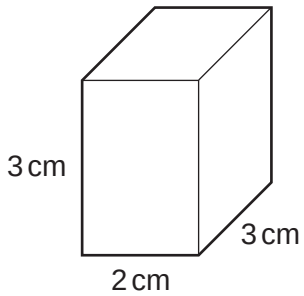
24 The diagrams show four blocks with the same mass.

Which block is made from the least dense material?

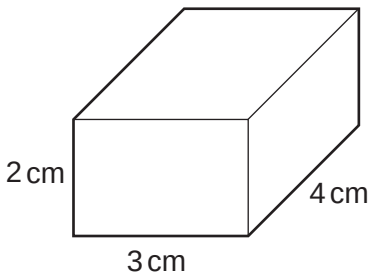
A



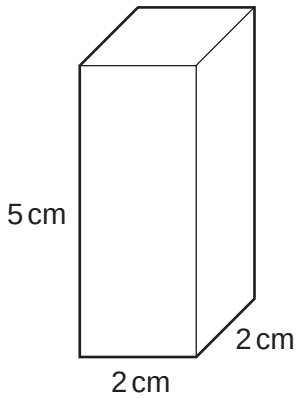
B



C



D



25 A student is told to measure the density of a liquid and also of a large cube of metal.

Which pieces of equipment are sufficient to be able to take the measurements needed?

A balance, measuring cylinder and ruler

B balance and thermometer

C measuring cylinder and ruler

D measuring cylinder, ruler and thermometer