

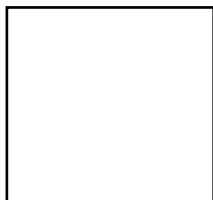
Section A

1. There are three states of matter.

a. In the boxes below, sketch particle diagrams for the three states of matter.



Solid



Liquid



Gas

b. Which state of matter has the highest density?

c. Use your particle diagrams to explain why.

d. Which is the correct equation to calculate density?

Tick (✓) **one** box.

Density = mass x volume

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Density = $\frac{\text{mass}}{\text{volume}}$

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Density = $\frac{\text{volume}}{\text{mass}}$

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e. Density can be measured in kg/m^3 . Which of these is another unit that could be used to measure density?

Tick (✓) **one** box.

g/cm

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cm/g^3

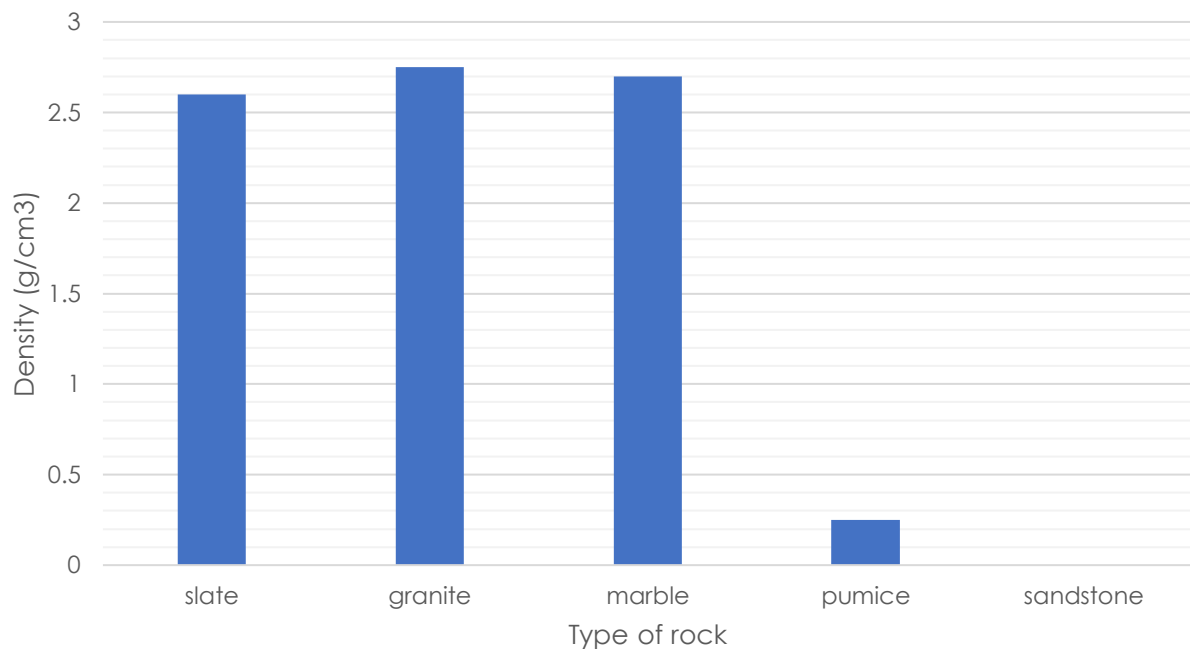
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g/cm^3

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Section B

2. The graph below gives the density of several types of rock.



a. Which type of rock would contain the most particles in a 1 cm³ sample?

b. What type of graph is this?

c. Why is this type of graph suitable?

d. A scientist has a sample of sandstone with a mass of 0.011 kg. What is this mass in grams?

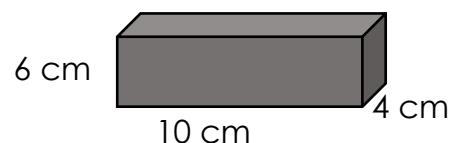
e. The sample of sandstone has a volume of 5 cm³. Calculate the density of the sandstone.

f. Add this value to the graph above.

g. Calculate the volume of a 1.375 g piece of granite, using information from the graph.



- h. Calculate the mass of this block of slate, using information from the diagram and the graph.



3. Helium-filled balloons float in air. Explain what this shows about the relative densities of air and helium and their particle arrangements.

Section C

4. Water is a useful substance to demonstrate changes of state because its melting and boiling points can be achieved in the lab.
- State what water is called when it exists as each different state of matter.
 - State the melting and boiling points of water.
 - Describe what happens to the particles when water changes from liquid to solid.
 - Define internal energy.
 - In which state of matter do particles have the most internal energy.
 - Describe what happens to internal energy when a substance melts from a solid to liquid.
 - An iceberg has a volume of 35 m^3 and a mass of $32\,000 \text{ kg}$. Calculate the density of the iceberg.
 - Explain why the iceberg floats on water.
 - The iceberg will eventually melt. Explain why.

