Phys CP6 Investigating densities

Your teacher may watch to see if you can:

- take careful measurements.

Aim

To compare the densities of different liquids and solids.

Densities of solids

Apparatus

- balance
- displacement can
- measuring cylinder
- bowl
- solids

⚠ Safety

Mop up any spills straight away.

Method

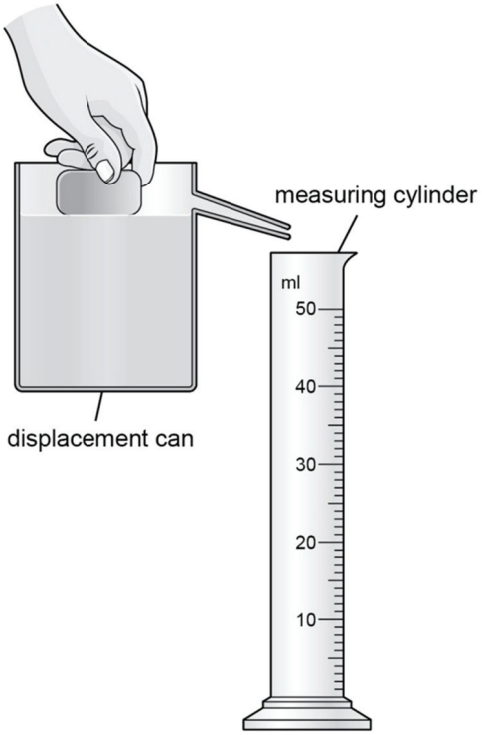
A Find the mass of a solid. Write the name of the material and the mass of the object in a table.

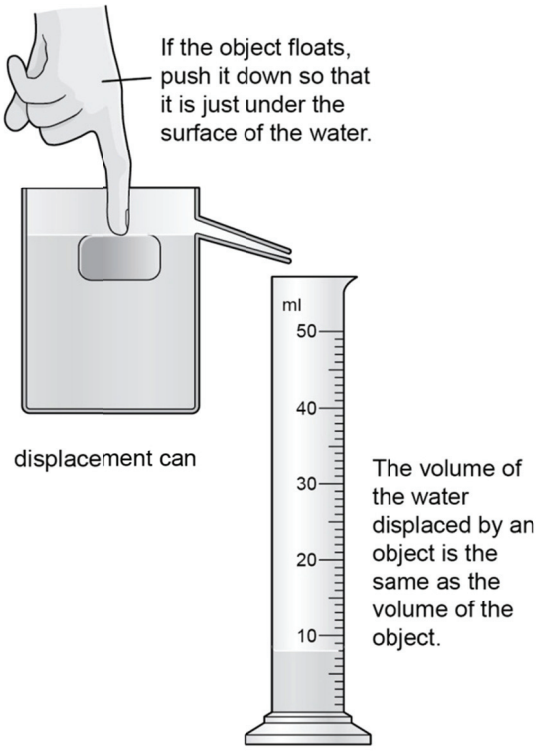
B Stand a displacement can on the bench with its spout over a bowl. Fill the can with water until the water just starts to come out of the spout.

C Hold a measuring cylinder under the spout and carefully drop your object into the can.

D If your object floats, carefully push it down until all of it is under the water. Your finger should not be in the water.

E Stand the measuring cylinder on the bench and read the volume of water you have collected. This is the same as the volume of your object. Write the volume down.





Recording your results

1 Draw a table like this for your results.

Material	Mass (g)	Volume (cm^3)	Density (g/cm^3)

2 Calculate the **density** of each solid and write it in the table. The equation you need is:

$$\text{density } (g/cm^3) = \frac{\text{mass (g)}}{\text{volume } (cm^3)}$$

Densities of liquids

Method

F Put an empty beaker on a balance and zero the balance.

G Use a measuring cylinder to measure 50 cm^3 of a liquid and pour it into the beaker. Write down the name of the liquid and the reading on the balance. This is the mass of 50 cm^3 of the liquid.

Apparatus

- balance
- measuring cylinder
- beaker
- liquids

⚠ Safety

Mop up any spills straight away.

Recording your results

3 Draw a table like this for your results.

Liquid	Mass of 50 cm^3 (g)	Density (g/cm^3)

4 Calculate the density of each liquid and write it in the table. The equation you need is:

$$\text{density (g/cm}^3\text{)} = \frac{\text{mass (g)}}{\text{volume (cm}^3\text{)}}$$

Considering your results/conclusions

5 **a** What is the range of densities for the solids you measured?

b What is the range of densities for the liquids?

6 Compare the densities of the solids and liquids that you tested.

Aim

To observe how heating can change the **density** of a liquid.

Apparatus

- beaker of hot water
- thermometer

Method – thermometers

A Record the temperature shown on the thermometer. This is room temperature.

B Stand the thermometer in the beaker of hot water and note what happens to the liquid in the thermometer.

C When the liquid in the thermometer stops moving, record the temperature again.

Recording your results

1 Write down the room temperature and the temperature of the hot water.

2 What happened to the volume of the liquid in the thermometer when you put the thermometer in the hot water? Explain your answer.

Considering your results/conclusions

3 The volume of the liquid in the thermometer changed when it was heated. Explain what happened to the mass of the liquid inside the thermometer.

4 Explain what the change in volume of the liquid tells you about:

a how the spacing of the particles in the liquid changed

b how the density of the liquid changed.

Edexcel GCSE (9–1)
Sciences Phys CP6 Changing density

Aim

To observe how heating can change the density of a solid.

Apparatus

- Bunsen burner
- heat resistant mat
- bimetallic strip

Method – bimetallic strip

A Note down the shape of the bimetallic strip.

B Hold the handle of the bimetallic strip and gently heat the flat part with the Bunsen burner. Note what happens to it.

Recording your results

1 What shape was the bimetallic strip before you heated it?

2 What happened to the bimetallic strip when it was heated?

Considering your results/conclusions

3 A bimetallic strip is made of two different metals stuck together. The metals expand by different amounts. Which of the two metals expands the most for a certain increase in temperature – the one on the inside of the curve or the one on the outside?

4 **a** Does the density of the two metals change when they are heated? If so, does it increase or decrease? Explain your answers.

b For which of the two metals is the change in density the greatest? Explain your answer.