

AQA Physics GCSE

Required Practical 5

Density

Method taken from [AQA Required Practical Handbook](#)

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Aim:

Determine the densities of regular and irregular solid objects and liquids. The volume of objects should be determined from the dimensions of regular shaped objects and by a displacement technique for irregularly shaped objects.

Equipment List:

- Various regular and irregular shaped objects
- A suitable liquid (e.g. sugar solution)
- A 30cm ruler (smallest division is millimetres)
- Digital balance
- Displacement can
- A variety of measuring cylinders
- Two 250cm³ beakers

Method:

Calculating the Density of Regular Objects:

1. Measure the length, height and width of the object, recording your values to the nearest millimetre.
2. Calculate the volume by multiplying the length, height and width, giving your value in cm³.
3. Measure the mass of the object, using the mass balance. Remember to reset the balance with nothing on the scales to reduce zero errors.
4. To calculate the density, use the equation:

$$\rho = \frac{m}{V}$$

where ρ is the density, measured in kg/m^3 (You must convert from g/cm^3 to kg/m^3)

Calculating the Density of Irregular Shaped Objects:

1. Fill the displacement can with room temperature water and align a measuring beaker with the spout. Make sure that the level of water lies below the level of the spout, but that there isn't too much of a gap between the two levels.
2. Place the irregular shaped object slowly into the can, ensuring not to drop it from a height or cause it to splash.
3. Collect the displaced water and measure the volume of water displaced.

The volume of water displaced will equal the volume of the object that caused the displacement.

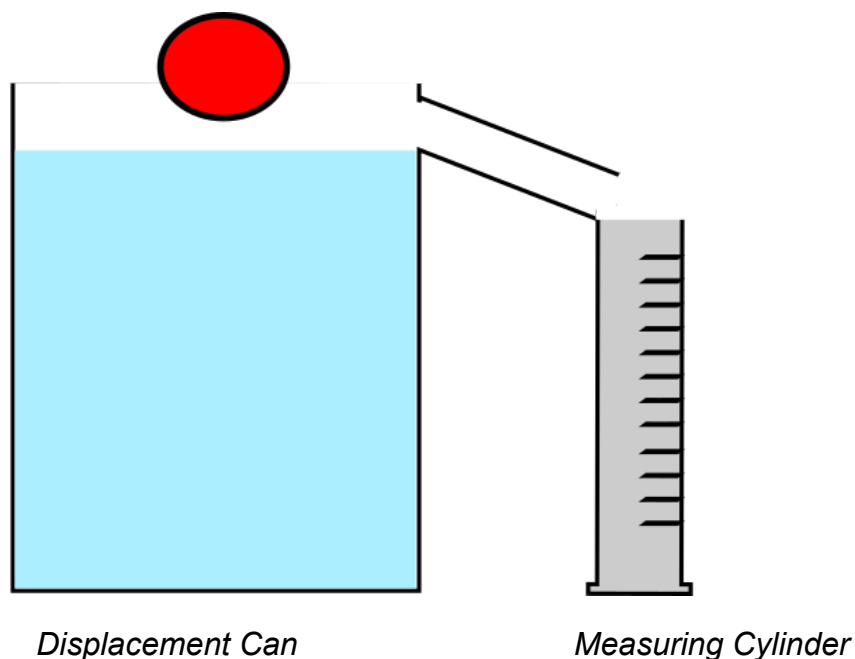
4. Measure the mass of the object using a mass-balance.
5. Calculate the density of the irregular object, using the density equation in step 4 of the method above.



Calculating the Density of Liquid:

1. Measure the mass of an empty measuring beaker, using the mass-balance.
2. Pour 100cm³ of the liquid into the beaker.
3. Measure the combined mass of the beaker and the liquid.
4. To calculate the liquid's mass, subtract the mass of the beaker from the mass of the combined beaker and liquid.
5. Calculate the density of the liquid using the density equation.

Diagram:



Safety Precautions:

- Take care handling glass equipment
- Clean any spillages of water

