Required Practical Activity:

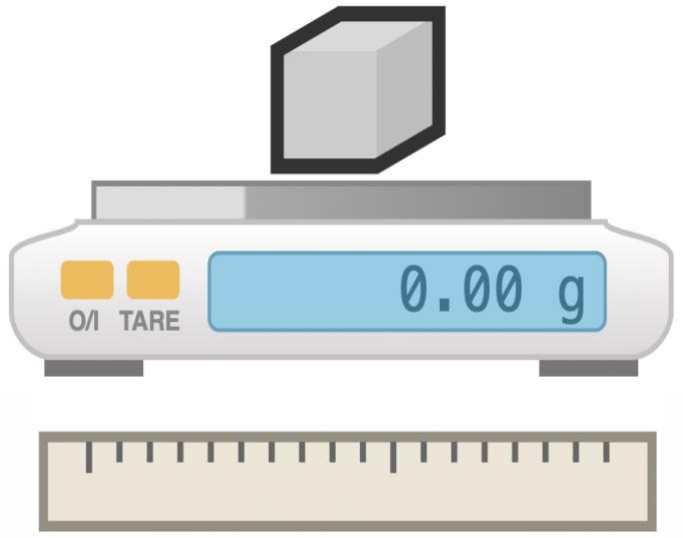
Density 1

Note:
This resource is designed as a review of the required practical activity, covering all possible skills that could be developed through the investigation. This resource can be adapted to suit the needs of your class, depending on which skills your class need support with.

In this investigation we will use a ruler and balance to determine the density of a regularly shaped solid.

Method:

1. Use the ruler to measure the length, width, and height of each of your selected regular shaped objects. Record this data in your results table.
2. Calculate the volume of each object and record this in your results table also.
3. Use the digital mass balance to measure the mass of each of your objects. Record this in your results table.
4. Calculate and then record the density of the objects using the equation: density = mass/volume.
5. Convert your density measurements into the standard units of kg/m^3.



1. Equipment:	
a. What measurements need to be taken in this investigation?	**The dimensions of the object, the mass of the object.**
b. What is the most suitable piece of apparatus to take measurements with? Why?	**A ruler is of sufficient resolution to measure the dimensions of the object.** **A mass balance accurate 0.1 g or 0.01 g is of sufficient resolution to measure the mass of the object.**
c. Identify any hazards in this investigation.	**Ensure the mass balance is able to withstand the weight of your chosen object. Some very sensitive balances can be damaged if too much force is applied.**
d. Why is it important that the balance is properly zeroed before weighing your object?	**If the balance is improperly zeroed it will not give an accurate measurement of the weight of the object. Zero the balance before placing the object on the balance.**
e. What units will we use for mass, length, and volume?	**We will use grams (g) for mass, centimetres (cm) for length), and centimetres cubed (cm^3) for volume.**
f. What is the difference between weight and mass?	**Weight is the downward force of gravity on the mass. Mass will always be constant, whereas the force of weight will differ with gravity, for instance on other planets.**
g. What is the equation for volume of a regular shaped object?	**Volume = length x width x height**
h. What is the relationship between 1 cm^3 and 1 ml?	**They are equal.**
i. What is the equation to calculate density?	**Density = mass / volume**
j. What will be our units for density if we measure mass in grams (g) and length in centimetres (cm)?	**Grams per centimetre cubed, or g/cm^3, or $g.cm^{-3}$**
k. What are the S.I. units for density?	**Kilograms per metre cubed, or kg/m^3, or $kg.m^{-3}$**

2. Results

Regular Shaped object	Length (cm)	Width (cm)	Height (cm)	Volume (cm^3)	Mass (g)	Density (g/cm^3)	Density (kg/m^3)
Metal block	3.0	2.0	2.0	12.0	100.0	8.300	8300
Wooden block	4.0	3.0	3.0	36.0	21.9	0.608	608
Plastic block	5.0	2.0	2.0	20.0	23.1	1.155	1155
Foam block	6.0	6.0	6.0	216.0	4.3	0.020	20

l. Explain why it is appropriate to round measurements taken with a ruler to the nearest millimetre.	**This is as precise a measurement as can be inferred from the readings.**
m. Which object had the highest density?	**The metal block.**
n. Which object had the lowest density?	**The foam block.**
o. Given the density of water is 1 g/cm^3, which objects would you expect to float in water?	**The wooden block and the foam block.**