

**WorksheetCloud: MEMORANDUM**

**Grade 9**

**Subject: Natural Sciences**

**Topic: Introduction to Density: Enquiry into the equation**

1. Explain the reasoning behind which is heavier: wood or steel

**It depends on how much of each you have. Assuming you had 1 kg of each then neither would be heavier they would weight the same. If you had the same volume (1L) of each then steel would be heavier as steel is more dense then wood.**

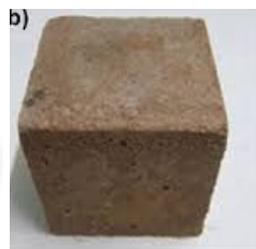


2. Which has a greater mass and volume? A kilogram of steel or a kilogram of feathers?

**They both have identical mass - 1 kg**

**1 kg of feathers would take up a greater volume that 1 kg of steel**

3. Complete: *I see ... I think ... I wonder ...* for the following images.



4 Define volume.

**The amount of space that a substance or object occupies.**

**Volume is the quantity of three-dimensional space enclosed by a closed surface, for example, the space that a substance or shape occupies or contains. Volume is often quantified numerically using the SI derived unit, the cubic metre.  $1 \text{ cm}^3 = 1 \text{ ml}$ .**

5. Define mass.

**The amount of matter in a substance. An object's mass also determines the strength of its gravitational attraction to other bodies. The basic SI unit of mass is the kilogram.**

**A large body of matter with no definite shape**

6 Define density.

**The density of a substance of any shape can be found by dividing its mass by its volume.**

**Density equals mass divided by volume.  $D = m / V$**

7. What are the symbols and units for: density, mass and volume?

density = D (capital **D**) measured in  **$\text{g/cm}^3$  k OR  $\text{kg/m}^3$**

mass = m (lowercase **m**) measured in SI unit kilogram **kg** can also be g

Volume = V (capital **V**) measured in SI unit is metre cubed  **$\text{m}^3$**  Can also be ml and L

8. How do you calculate the volume of a cube?

**Volume = length x breadth x height**

**$V = \text{cm} \times \text{cm} \times \text{cm}$**

**$V = \text{cm}^3$**

9. What scientific laboratory equipment do we use to measure the mass of a substance?

**Triple beam balance**

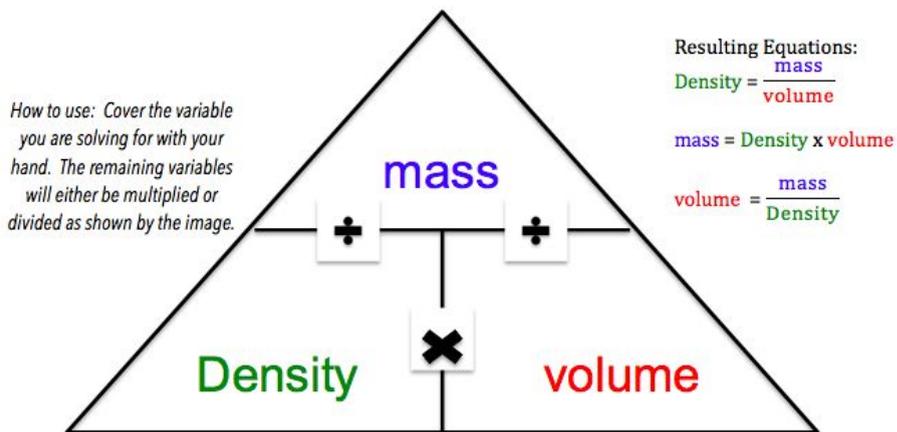
**Electronic scale**

10. What are the units for density?

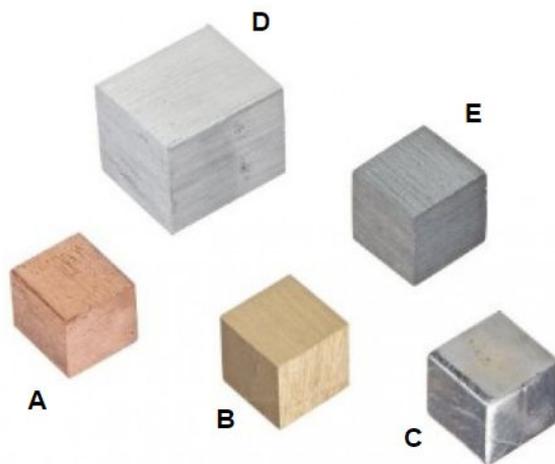
**$D = m/V$**

**$\text{g/cm}^3$  k OR  $\text{kg/m}^3$**

11. Explain your understanding of “the magic triangle” below.



12. Study the images below and answer the following questions



a) What are the similarities and differences between blocks A, B and C?

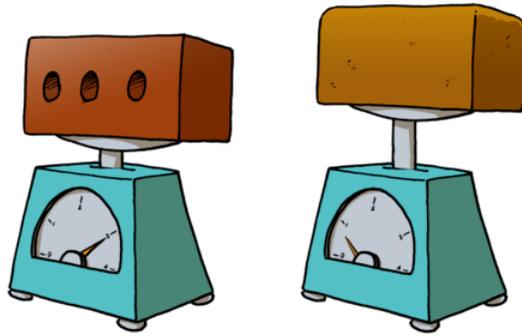
- Same size**
- Same volume**
- Different colours**
- Different substances**
- Different masses (maybe)**
- Different densities (maybe) it will depend on the mass of each block.**

b) What will the density be of the three different size aluminium blocks (C, D and E) be?

**Each element on the periodic table has its own density. Aluminium density = 2,7 g/cm<sup>3</sup>**

**The density for this element will be the same irrespective of the volume of mass of the objects being compared**

13. Study the image below and answer the following questions.



- a. Imagine a brick and a loaf of bread that are the same size. Would the brick or the bread have a greater volume?

**They are the same size therefore have the same volume**

- b. Which one, the brick or the bread, has more mass?

**The brick has a greater mass**

- c. Which one, the brick or the bread, would have the greater density? Explain your answer.

**The brick has the greater mass, therefore has the greater density. The particles in a brick are more tightly packed together. Density is an indication of how tightly packed the particles in the substance are.**