

SCIENCE 8 – DENSITY CALCULATIONS WORKSHEET

NAME: KEY

- 1) A student measures the mass of an 8 cm^3 block of brown sugar to be 12.9 g. What is the density of the brown sugar?

$$\text{mass} = 12.9 \text{ g} \quad \text{density} = \frac{\text{mass}}{\text{volume}} = \frac{12.9 \text{ g}}{8 \text{ cm}^3} = 1.61 \frac{\text{g}}{\text{cm}^3}$$

$$\text{volume} = 8 \text{ cm}^3$$

- 2) A chef fills a 50 mL container with 43.5 g of cooking oil. What is the density of the oil?

$$\text{volume} = 50 \text{ mL} \quad \text{density} = \frac{\text{mass}}{\text{volume}} = \frac{43.5 \text{ g}}{50 \text{ mL}} = 0.87 \frac{\text{g}}{\text{mL}}$$

$$\text{mass} = 43.5 \text{ g}$$

- 3) Calculate the mass of a liquid with a density of 2.5 g/mL and a volume of 15 mL.

$$\text{density} = 2.5 \frac{\text{g}}{\text{mL}} \quad \text{mass} = \text{density} \times \text{volume}$$

$$\text{volume} = 15 \text{ mL} \quad = 2.5 \frac{\text{g}}{\text{mL}} \times 15 \text{ mL} = 37.5 \text{ g}$$

- 4) Calculate the volume of a liquid with a density of 5.45 g/mL and a mass of 65 g.

$$\text{density} = 5.45 \frac{\text{g}}{\text{mL}} \quad \text{volume} = \frac{\text{mass}}{\text{density}} = \frac{65 \text{ g}}{5.45 \frac{\text{g}}{\text{mL}}} = 11.9 \text{ mL}$$

$$\text{mass} = 65 \text{ g}$$

- * 5) A machine shop worker records the mass of an aluminum cube as 176 g. If one side of the cube measures 4 cm, what is the density of the aluminum?

rip if they are not learned volume in Math 8 yet... or calculate with/for them.

$$\text{mass} = 176 \text{ g} \quad \text{density} = \frac{\text{mass}}{\text{volume}} = \frac{176 \text{ g}}{64 \text{ cm}^3} = 2.75 \frac{\text{g}}{\text{cm}^3}$$

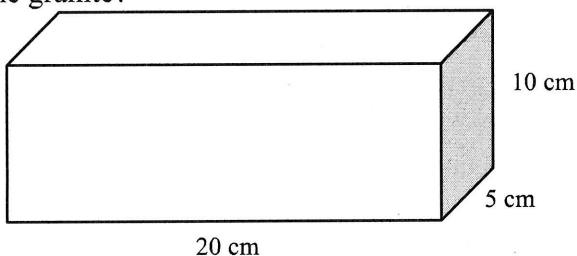
$$\text{volume} = (4 \text{ cm})^3 = 64 \text{ cm}^3$$

- 6) A teacher performing a demonstration finds that a piece of cork displaces 23.5 mL of water. The piece of cork has a mass of 5.7 g. What is the density of the cork?

$$\text{volume} = 23.5 \text{ mL} \quad \text{density} = \frac{\text{mass}}{\text{volume}} = \frac{5.7 \text{ g}}{23.5 \text{ mL}} = 0.24 \frac{\text{g}}{\text{mL}}$$

$$\text{mass} = 5.7 \text{ g}$$

- * 7) A carver begins work on the following block of granite that weighs 2700 g. What is the density of the granite?



$$\text{mass} = 2700 \text{ g}$$

$$\text{volume} = 10 \text{ cm} \times 5 \text{ cm} \times 20 \text{ cm} = 1000 \text{ cm}^3$$

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{2700 \text{ g}}{1000 \text{ cm}^3} = 2.7 \frac{\text{g}}{\text{cm}^3}$$

- 8) A piece of PVC plumbing pipe displaces 60 mL when placed into a container of water. If the pipe has a mass of 78 g, what is the density of PVC?

$$\text{mass} = 78 \text{ g} \quad \text{density} = \frac{\text{mass}}{\text{volume}} = \frac{78 \text{ g}}{60 \text{ mL}} = 1.3 \frac{\text{g}}{\text{mL}}$$

$$\text{volume} = 60 \text{ mL}$$

- 9) A solid magnesium flare has a mass of 1300 g and a volume of 743 cm^3 . What is the density of the magnesium?

$$\text{mass} = 1300 \text{ g}$$

$$\text{volume} = 743 \text{ cm}^3$$

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{1300 \text{ g}}{743 \text{ cm}^3} = 1.75 \frac{\text{g}}{\text{cm}^3}$$

10) A graduated cylinder has a mass of 50 g when empty. When 30 mL of water is added, the graduated cylinder has a mass of 120 g. If a rock is added to the graduated cylinder, the water level rises to 75 mL and the total mass is now 250 g. What is the density of the rock?

$$\text{mass} = 250\text{g} - 120\text{g} = 130\text{g}$$

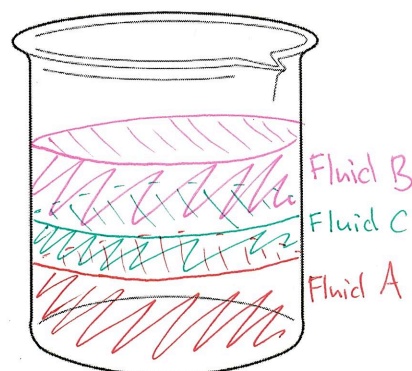
$$\text{volume} = 75\text{mL} - 30\text{mL} = 45\text{mL}$$

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{130\text{g}}{45\text{mL}} = 2.89 \frac{\text{g}}{\text{mL}}$$

11) A student performs an experiment with three unknown fluids and obtains the following measurements:

Fluid A: $m = 2060\text{ g}$, $V = 2000\text{ mL}$ $\text{density}_A = 1.03 \frac{\text{g}}{\text{mL}}$
 Fluid B: $m = 672\text{ g}$, $V = 850\text{ mL}$ $\text{density}_B = 0.79 \frac{\text{g}}{\text{mL}}$
 Fluid C: $m = 990\text{ g}$, $V = 1100\text{ mL}$ $\text{density}_C = 0.9 \frac{\text{g}}{\text{mL}}$

Draw how the fluids would be layered if they were combined in a beaker.



12) Use your density skills to find the identity of the following mystery objects.

Table of Densities			
Solids	Density g/cm ³	Solids	Density g/cm ³
Marble	2.56	Copper	8.92
Quartz	2.64	Gold	19.32
Diamond	3.52	Platinum	21.4



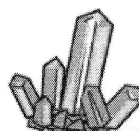
While digging in the backyard, you find an old coin. Its mass is 26.76 g and its volume is 3 cm³.

$$\text{mass} = 26.76\text{g}$$

$$\text{volume} = 3\text{cm}^3$$

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{26.76\text{g}}{3\text{cm}^3} = 8.92 \frac{\text{g}}{\text{cm}^3}$$

What is the coin made of? copper



You think you have found a diamond. Its mass is 5.28 g and its volume is 2 cm³.

$$\text{mass} = 5.28\text{g}$$

$$\text{volume} = 2\text{cm}^3$$

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{5.28\text{g}}{2\text{cm}^3} = 2.64 \frac{\text{g}}{\text{cm}^3}$$

What did you find? quartz



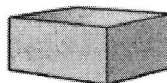
You find a ring with a mass of 107 g. You fill a graduated cylinder up with 10 mL of water and put the ring into the cylinder. The water rises up to the 15 mL mark.

$$\text{mass} = 107\text{g}$$

$$\text{volume} = 15\text{mL} - 10\text{mL} = 5\text{mL}$$

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{107\text{g}}{5\text{mL}} = 21.4 \frac{\text{g}}{\text{mL}}$$

What is the ring made of? platinum



There is a block on your desk that acts as a paperweight. Its measurements are 3 cm by 4 cm by 6 cm. The block has a mass of 184.32 g.

$$\text{mass} = 184.32\text{g}$$

$$\text{volume} = 3\text{cm} \times 4\text{cm} \times 6\text{cm} = 72\text{cm}^3$$

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{184.32\text{g}}{72\text{cm}^3} = 2.56 \frac{\text{g}}{\text{cm}^3}$$

What is the block made of? marble