

## SCIENCE 8 – DENSITY CALCULATIONS WORKSHEET

NAME: Key

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

$$m = 12.9 \text{ g}$$

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

$$D = ?$$

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

$$D = \frac{12.9 \text{ g}}{8 \text{ cm}^3}$$

$$D = 1.6125 \text{ g/cm}^3$$

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

$$V = 50 \text{ mL}$$

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

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

$$D = \frac{43.5 \text{ g}}{50 \text{ mL}}$$

$$D = 0.87 \text{ g/mL}$$

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

$$D = 2.5 \text{ g/mL}$$

$$V = 15 \text{ mL}$$

$$2.5 \text{ g/mL} = \frac{m}{15 \text{ mL}}$$

$$m = (2.5)(15)$$

$$m = 37.5 \text{ g}$$

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

$$D = 5.45 \text{ g/mL}$$

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

$$5.45 = \frac{65}{V}$$

$$V = \frac{65}{5.45}$$

$$V = 11.93 \text{ mL}$$

- 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?

$$m = 176 \text{ g}$$

$$V = L \times w \times h$$

$$= 4 \times 4 \times 4 \rightarrow V = 64 \text{ cm}^3$$

$$D = \frac{176 \text{ g}}{64 \text{ cm}^3}$$

$$D = 2.75 \text{ g/cm}^3$$

- 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?

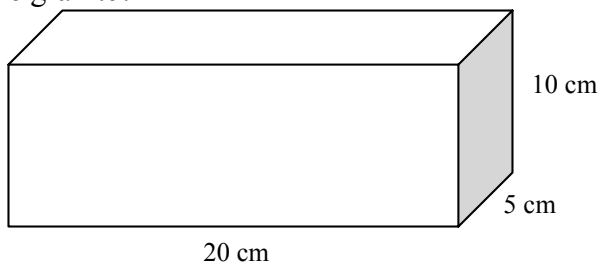
$$m = 5.7 \text{ g}$$

$$V = 23.5 \text{ mL}$$

$$D = \frac{5.7}{23.5}$$

$$D = 0.24 \text{ g/mL}$$

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



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

$$V = L \times w \times h$$

$$= 20 \times 5 \times 10$$

$$= 1000 \text{ cm}^3$$

$$D = \frac{2700}{1000}$$

$$D = 2.7 \text{ g/cm}^3$$

- 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?

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

$$m = 78 \text{ g}$$

$$D = \frac{78}{60}$$

$$D = 1.3 \text{ g/mL}$$

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

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

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

$$D = \frac{1300}{743}$$

$$D = 1.75 \text{ g/cm}^3$$

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?

$V = 75\text{ mL} - 30\text{ mL} = 45\text{ mL}$   
 Mass: ①  $120\text{ g} - 50\text{ g} = 70\text{ g}$   
 ②  $250\text{ g} - 50\text{ g} = 200\text{ g}$   
 $m = 200\text{ g} - 70\text{ g} = 130\text{ g}$

$D = \frac{130}{45}$

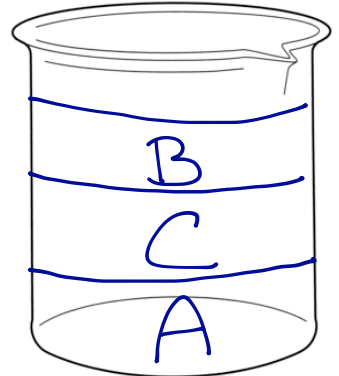
$D = 2.89\text{ g/mL}$

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

Fluid A:  $m = 2060\text{ g}$ ,  $V = 2000\text{ mL}$   
 Fluid B:  $m = 672\text{ g}$ ,  $V = 850\text{ mL}$   
 Fluid C:  $m = 990\text{ g}$ ,  $V = 1100\text{ mL}$

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

$D_A = \frac{2060}{2000} = 1.03$   
 $D_B = \frac{672}{850} = .79$   
 $D_C = \frac{990}{1100} = .9$



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

Table of Densities			
Solids	Density g/cm <sup>3</sup>	Solids	Density g/cm <sup>3</sup>
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 cm.

$D = \frac{26.76}{3} = 8.92$

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 cm<sup>3</sup>.

$D = \frac{5.28}{2} = 2.64$

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.

$m = 107\text{ g}$   
 $V = 15\text{ mL} - 10\text{ mL} = 5\text{ mL}$   
 $D = \frac{107}{5} = 21.4$

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.

$V = L \times w \times h = 3 \times 4 \times 6 = 72\text{ cm}^3$   
 $m = 184.32\text{ g}$   
 $D = \frac{184.32}{72} = 2.56$

What is the block made of? Marble