

Assignment 4
Key

Density Practice!

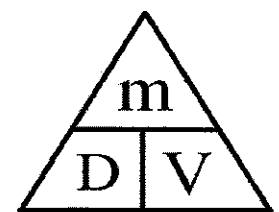
Name: _____ Period: _____

Use the density equation at right to solve the following problems. Don't forget to show full GUESS for each problem.

FYI:

- Water has a density of about 1 g/mL and if something floats in water it must have a density of less than 1 g/mL. If something has a density greater than that, it will sink.
- The eraser on the end of your pencil is about 1 cm³.
- 1 cm³ = 1 mL so 1 g/cm³ = 1 g/mL

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



Example Problem:

A gas tank holds 50 L. If the density of gasoline is 0.7 g/mL, how much mass will the tank of gas have?

Givens	Unknown	Equation	Substitute	Solve
$m = ?$ $V = 50L$ $D = 0.7 \text{ g/ml}$	m		$(50L) \times (0.7 \text{ g/mL})$	35 g

1. A 150 g piece of ice falls off an icicle and falls into a lake. If the icicle has a volume of 163 cm³, will the ice sink or float? *Yes the icicle density is lower than 1*

Givens	Unknown	Equation	Substitute	Solve
$m = 150 \text{ g}$ $V = 163 \text{ cm}^3$ $D = ?$	D		$\frac{150 \text{ g}}{163 \text{ cm}^3}$	0.92 g/cm^3

2. Sometimes new kittens have to be given milk from a dropper if they are away from their mother. What is the mass of 10 mL of milk if the density of milk is 1.03 g/mL?

Givens	Unknown	Equation	Substitute	Solve
$m = ?$ $V = 10 \text{ mL}$ $D = 1.03 \text{ g/mL}$	m		1.03×10	10.3 g


3. A blacksmith was making a horseshoe when a 100 cm³ piece of iron flew off. If the density of iron is 7.8 g/cm³ then what is the mass of that piece of iron?

Givens	Unknown	Equation	Substitute	Solve
$m = ?$ $V = 100 \text{ cm}^3$ $D = 7.8 \text{ g/cm}^3$	m		7.8×100	780 g


Assig #4

(P2)


4. You have a piece of jewelry that you were told was pure gold. You decide to check. You know that the density of pure gold is 19.3 g/cm^3 . You measure the volume of the piece of jewelry to be 3.6 cm^3 , and the mass to be 53 g . Is the jewelry pure gold? Why or why not?

Givens	Unknown	Equation	Substitute	Solve
$m = 53 \text{ g}$ $V = 3.6 \text{ cm}^3$ $D = ?$	D		$\frac{53 \text{ g}}{3.6 \text{ cm}^3}$	14.7 g/cm^3 not gold too light


5. Platinum is a very popular metal for jewelry and has a density of 21.4 g/cm^3 . A platinum ring has a mass of 15 g . What is its volume?

Givens	Unknown	Equation	Substitute	Solve
$m = 15 \text{ g}$ $V = ?$ $D = 21.4 \text{ g/cm}^3$	V		$\frac{15 \text{ g}}{21.4 \text{ g/cm}^3}$	0.7 g/cm^3


6. From #4 you learned the density of gold. If you had a gold ring that had the same mass as the platinum ring in #5, what would its volume be?

Givens	Unknown	Equation	Substitute	Solve
$m = 15 \text{ g}$ $V = ?$ $D = 19.3 \text{ g/cm}^3$	V		$\frac{15 \text{ g}}{19.3 \text{ g/cm}^3}$	0.78 g/cm^3


7. An aluminum block has a mass of 45 g and takes up 16.7 cm^3 of space. Will this block of aluminum float in water? *no Density heavier than water (water is 1 g/cm^3)*

Givens	Unknown	Equation	Substitute	Solve
$m = 45 \text{ g}$ $V = 16.7 \text{ cm}^3$ $D = ?$	D		$\frac{45 \text{ g}}{16.7 \text{ cm}^3}$	2.69 g/cm^3

8. The aluminum block above is hollowed out into a boat shape so that it takes up the same amount of space but only has a mass of 10 g . Will the hollowed out aluminum block float in water now?

Givens	Unknown	Equation	Substitute	Solve
$m = 10 \text{ g}$ $V = 16.7 \text{ cm}^3$ $D = ?$	D		$\frac{10 \text{ g}}{16.7 \text{ cm}^3}$	0.6 g/cm^3

9. Osmium is the densest material with a mass of 22.5 g per cm^3 . If you had a piece of Osmium about the volume of your text book (2400 cm^3), how much mass would it have?

Givens	Unknown	Equation	Substitute	Solve
$m = ?$ $V = 2400 \text{ cm}^3$ $D = 22.5 \text{ g/cm}^3$	m		$\frac{22.5 \text{ g}}{\text{cm}^3} \times 2400 \text{ cm}^3$	$54,000 \text{ g}$