

Density is measured as the mass of an object divided by its volume. For example, if an object with a volume of 50cm^3 and has a mass of 30grams, its density is $30 \div 50 \text{ g/cm}^3$, which is 0.6 g/cm^3 . Density determines whether a substance will sink or float when placed in a second substance. The substance with less density will always float. $D = \frac{m}{V}$

Use the information provided to find the densities. In the "Show Your Work" column, write the set-up of the problem.

Substance	Volume in cm^3	Mass in grams (g)	Show Your Work	Density: g/cm^3
Gasoline	5	3.5		
Milk	10	10.3		
Gold	8	154.4		
Aluminum	12	32.4		
Water (at 4°C)	14	14		
Water (at 20°C)	16	15.968		
Ice (at 0°C)	20	18.4		

Find the mystery substance by finding the density.

Substance	Volume in cm^3	Mass in grams (g)	Show Your Work	Density: g/cm^3
	32	617.6		
	15	17.5		
	24	64.8		

Using the completed table(s) above answer the following questions:

- When milk is "mixed" with gasoline, which substance will float? _____
- Why do ice cubes always float at the top a glass of water? _____
- Why do you suppose that the water at 20°C is less dense than water at 4°C ? _____

- In an ocean, the water is not the same temperature throughout. Do you think the surface is warmer or cooler than the water at the bottom? Explain. _____

- If the density of iron is 7.8 g/cm^3 and you find an iron nail having a mass of 15g, what would the volume of the nail be? Show your work.
- Using what you know, how do you think a hot air balloon works? _____

- If the volume of a substance is 50 cubic centimeters, and the density is 1.03 g/cm^3 , what is the mass of the substance? Show your work.