

Density

GLE 0807.9.2 Explain that matter has properties that are determined by the structure and arrangement of its atoms.
GLE 0807.Inq.2 Use appropriate tools and techniques to gather, organize, analyze, and interpret data.
GLE 0807.Inq.4 Recognize possible sources of bias and error, alternative explanations, and questions for further exploration.
GLE 0807.Inq.5 Communicate scientific understanding using descriptions, explanations, and models.

The table shows the known densities several substances. Use the information in the table to answer the following questions. Include an explanation of your reasoning.

Substance	Density (g/mL)
Acetic acid	1.05
Antifreeze	1.11
Gasoline	0.74
Mercury	13.0
Alcohol	1.20
Water	1.00
Salt water	1.18
Silver	10.50
Steel	7.87
Tin	5.75

1. Suppose you are conducting an experiment in which you want to identify a clear liquid. You determine that 100 mL of the liquid has a mass of 120 g. What might the clear liquid be?
2. A scientist has 3 samples: 10 cm³ of mercury, 75 cm³ of water, and 100 cm³ of alcohol. Which sample has the largest mass?
3. Suppose you are conducting an experiment in which you are trying to determine the identity of the metal out of which a small toy soldier is made. Using a balance, you determine that the mass of the toy soldier is 75.4 g. To find the toy soldier's volume, you use the water-displacement method, putting 52 mL of water in 100 mL graduated cylinder. Then you place the toy in the cylinder so the water completely covers the toy. The combined volume of water and toy soldier is 65 mL.
 - a. What is the volume of the toy soldier?
 - b. What is the density of the toy soldier?
 - c. What metal is the toy soldier probably composed of?
4. Suppose you had a rectangular block of shiny gray metal that was 2 cm wide, 3 cm high, and 4 cm long. The metal block had a mass of 252 g.
 - a. What is the volume of the metal block?
 - b. What is the density of the metal block?
 - c. What type of metal is the block probably composed of?