

# Density

Which has the greater mass, air or lead? Most would answer lead, but this question actually does not have an answer. To compare these two things, you need to know how much of each you have. A large amount of air could have a greater mass than a small amount of lead. To compare different things, we have to compare the masses of each that occupy the same space, or volume. This is called **density**. It is measured in units of g/mL or g/cm<sup>3</sup>.

$$\text{density} = \frac{\text{mass}}{\text{volume}} \text{ or } D = \frac{M}{V}$$

Solve each problem.

1. What is the density of carbon dioxide gas if 0.196 g occupies a volume of 100 mL?
2. A block of wood that measures 3.0 cm on each side has a mass of 27 g. What is the density of the block?
3. An irregularly shaped stone was lowered into a graduated cylinder holding a volume of water equal to 2.0 mL. The height of the water rose to 7.0 mL. If the mass of the stone was 25 g, what was its density?
4. A 10.0 cm<sup>3</sup> sample of copper has a mass of 89.6 g. What is the density of copper?
5. Silver has a density of 10.5 g/cm<sup>3</sup>, and gold has a density of 19.3 g/cm<sup>3</sup>. Which would have a greater mass, 5 cm<sup>3</sup> of silver or 5 cm<sup>3</sup> of gold?
6. Five mL of ethanol has a mass of 3.9 g, and 5.0 mL of benzene has a mass of 4.4 g. Which liquid is denser?
7. A sample of iron in the shape of a rectangular prism has the dimensions of 2 cm × 3 cm × 2 cm. If the mass of this object is 94 g, what is the density of iron?