PRACTICE

Activity 7: Calculating Density

Name   Date   Class

Short Answer

For the problems below, *show your work* and *use the correct units*. Refer to the shortened Table of Densities at the end of this practice.

(Questions 1-3) Suppose you had a rectangular block of shiny gray metal that was 3 cm wide, 2 cm high, and 4 cm long. The metal block has a mass of 252 g.

 1. What is the *volume* of the metal block? Show your work.

 2. What is the *density* of the metal block? Show your work.

 3. What type of *metal* is the block probably composed of? Use the *Table of Densities*.

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(Questions 4-6) Suppose that you are conducting an experiment in which you are trying to identify 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, filling a graduated cylinder half full of water. You measure the water volume and find it to be 52 mL ($= 52$ cm^3). Then place the toy in the cylinder so the water completely covers it. The combined volume of the water and toy soldier is 65 mL.

 4. What is the *volume* of the toy soldier? Show your work.

5. What is the *density* of the toy solider? Show your work.

Table of Densities*
(Remember that 1 mL = 1 cm³)

Material	Density
Solids	
Aluminum	2.7 g/cm³
Silver	10.5 g/cm³
Steel	7.6 g/cm³
Tin (grey)	5.8 g/cm³
Liquids	
Acetic Acid	1.05 g/mL
Mercury	13.0 g/mL
Rubbing Alcohol	0.79 g/mL
Salt Water (saturated)	1.20 g/mL
Water	1.00 g/mL

Approximate values at sea level and 20°C.

6. What *metal* is the toy soldier probably composed of? Use the *Table of Densities*.

Multiple Choice

(Questions 7-9) You will need to use the Table of Densities above to answer the questions below.

7. Suppose you conduct an experiment to identify an unknown clear liquid. You determine that 100 mL of the liquid has a mass of 120 g. What might the clear liquid be?

　a) rubbing alcohol
　b) acetic acid
　c) water
　d) salt water

8. José has three blocks of shiny gray metal. He is trying to determine which block, if any, is made of steel. All three blocks have a volume of 20 cm³. The first block has mass of 210 g; the second block has a mass of 54 g; and the third block has a mass of 106 g. Which block, if any, is probably made of steel?

　a) block with a mass of 106 g
　b) block with a mass of 54 g
　c) block with a mass of 210 g
　d) None of the blocks is made of steel.

9. Which of the following liquids has the largest mass?

　a) 10 cm³ of mercury
　b) 50 cm³ of salt water
　c) 75 cm³ of water
　d) 100 cm³ of rubbing alcohol