

Name KEY

Watch sig. fig.'s!

block:  $V=lwh$  cylinder:  $V=\pi r^2h$  sphere:  $V=4\pi r^3/3$

1. 25.2 mL of water are placed in a graduated cylinder. A 22.6 g stone is dropped in, and the water level rises to 32.4 mL. Find the stone's density.  
 Ans:  $\underline{3.1 \text{ g/cm}^3}$   $d = \frac{m}{V} = \frac{22.6 \text{ g}}{7.2 \text{ mL}} = \underline{3.1 \frac{\text{g}}{\text{cm}^3}}$

$$\begin{array}{r} 32.4 \text{ mL} \\ - 25.2 \text{ mL} \\ \hline 7.2 \text{ mL} \end{array}$$

2. A graduated cylinder is placed on an electronic balance, and the scale reads 78.32 g. 10.0 mL of glycerine are added, and the scale reads 91.78 g. What is the density of glycerine?  
 Ans:  $\underline{1.35 \frac{\text{g}}{\text{mL}}}$   $d = \frac{m}{V} = \frac{13.46 \text{ g}}{10.0 \text{ mL}} = \underline{1.35 \frac{\text{g}}{\text{mL}}}$

$$\begin{array}{r} 91.78 \text{ g} \\ - 78.32 \text{ g} \\ \hline 13.46 \text{ g} \end{array}$$

3. A 3.0 cm x 4.5 cm x 6.7 cm brick as a mass of 985 grams.  
 a. What is its density, and...  
 b. from what material is it most likely made?  
 Ans: a.  $\underline{11 \frac{\text{g}}{\text{cm}^3}}$  b. lead

$d = \frac{m}{V} = \frac{985 \text{ g}}{90.45 \text{ cm}^3} = 10.8899 \frac{\text{g}}{\text{cm}^3}$   
 answer has 2 sig. fig's  $\rightarrow \underline{11 \frac{\text{g}}{\text{cm}^3}}$

4. A cylinder has a mass of 528.6 g, a length of 14.2 cm, and a diameter of 2.30 cm. What is its density and what is the cylinder most likely made of?  
 Density =  $\underline{8.96 \frac{\text{g}}{\text{cm}^3}}$ ; made of copper

$V = \pi r^2 h = \pi (1.15 \text{ cm})^2 (14.2 \text{ cm}) = 58.9975 \text{ cm}^3$   
 $d = \frac{m}{V} = \frac{528.6 \text{ g}}{58.9975 \text{ cm}^3} = 8.96 \frac{\text{g}}{\text{cm}^3}$

5. A ball has a mass of 753 g and a radius of 5.62 cm. What is its density and will the ball float or sink in pure water?  
 Density =  $\underline{1.01 \frac{\text{g}}{\text{cm}^3}}$ ; float or sink in pure water?

$V = \frac{4\pi r^3}{3} = \frac{4\pi (5.62 \text{ cm})^3}{3} = 743.5 \text{ cm}^3$   
 $d = \frac{m}{V} = \frac{753 \text{ g}}{743.5 \text{ cm}^3} = 1.01 \frac{\text{g}}{\text{cm}^3}$   
 pure water =  $1.00 \frac{\text{g}}{\text{mL}}$

6. a. How much would a 15.2 mL chunk of styrofoam weigh?  
 b. How much would the same size chunk of osmium weigh?  
 Ans: a.  $\underline{2.20 \text{ g}}$   
 Ans: b.  $\underline{344 \text{ g}}$

- osmium 22.6 g/mL
- gold 19.3 g/mL
- mercury 13.6 g/mL
- lead 11.4 g/mL
- copper 8.96 g/mL
- aluminum 2.70 g/mL
- water 1.00 g/mL
- alcohol 0.781 g/mL
- styrofoam 0.145 g/mL
- air 1.28 g/L

$d = \frac{m}{V} \Rightarrow m = d \cdot V$   
 $= 0.145 \frac{\text{g}}{\text{mL}} (15.2 \text{ mL})$   
 $= \underline{2.20 \text{ g}}$

$b. d = \frac{m}{V} \Rightarrow m = d \cdot V = 22.6 \frac{\text{g}}{\text{mL}} (15.2 \text{ mL})$

Answers in random order without units: 1.35, 2.20, 344, 1.01, 8.96, 11, 3.1