Name Answer Key Hour ____

Density Calculations

(Honors Chemistry)

Answers should be expressed in grams, mL, or g/mL. Round your answers to 2 decimal places.

1. A student finds a rock on the way to school. In the laboratory, he determines that the volume of the rock is 22.7 cm^3, and the mass is 39.943 g. What is the density of the rock?

$D = \frac{M}{V} = \frac{39.943\text{-g}}{22.7\text{-mL}} =$ **1.76 g/mL**

2. If 30.943 g of a liquid occupy a space of 35.0 ml, what is the density of the liquid in g/cm^3?

$D = \frac{M}{V} = \frac{30.943\text{-g}}{35.0\text{-mL}} =$ **0.88 g/mL**

3. The density of silver is 10.49 g/cm^3. If a sample of pure silver has a volume of 12.993 cm^3, what is the mass?

$M = D \cdot V =$ 10.49 g/mL × 12.993 mL = **136.30 -g**

4. What is the mass of a 350-cm^3 sample of pure silicon with a density of 2.336 g/cm^3?

$M = D \cdot V =$ 2.336 g/mL × 350 mL = **817.60 -g**

5. How many cm^3 would a 55.932 g sample of copper occupy if it has a density of 8.93 g/cm^3?

$V = \frac{M}{D} = \frac{55.932\text{-g}}{8.93\ \text{g/mL}} =$ **6.26 mL**

6. The density of lead is 11.342 g/cm^3. What would be the volume of a 200.0 g sample of this metal?

$V = \frac{M}{D} = \frac{200.0\text{-g}}{11.342\ \text{g/mL}} =$ **17.6 mL**

7. The mass of a toy spoon is 7.5 g, and its volume is 3.2 ml. What is the density of the toy spoon?

$D = \frac{M}{V} = \frac{7.5\text{-g}}{3.2\ \text{mL}} =$ **2.34 g/mL**

8. A mechanical pencil has the density of 3.0 g/cm^3. The volume of the pencil is 15.8 cm^3. What is the mass of the pencil?

$M = D \cdot V =$ 3.0 g/cm³ × 15.8 mL **47.40 -g**

9. A screwdriver has the density of 5.5 g/cm^3. It also has the mass of 2.3 g. What is the screwdrivers volume?

$V = \frac{M}{D} = \frac{2.3\text{-g}}{5.5\ \text{g/mL}} =$ **0.42 mL**

Understanding Percent Error

(Honors Chemistry)

1. Three lab groups were calculating the density of chromium. The accepted value of chromium is 7.19 g/mL. In the spaces below, calculate the error and percent error for each group based on their experimental values from the lab. Go to 2 decimal places for all calculations. Show all work!

Group A	Group B	Group C
Exp. Value = 9.36 g/mL	Exp. Value = 5.89 g/mL	Exp. Value = 7.64 g/mL
Error: 2.17	Error: 1.30	Error: 0.45
% Error: 30.18 %	% Error: 18.08 %	% Error: 6.26 %

2. Three lab groups were calculating the density of copper. The accepted value of copper is 8.96 g/mL. In the spaces below, calculate the error and percent error for each group base on their experimental values from the lab. Go to 2 decimal places for all calculations. Show all work!

Group A	Group B	Group C
Exp. Value = 9.36 g/mL	Exp. Value = 5.89 g/mL	Exp. Value = 7.64 g/mL
Error: 0.40	Error: 3.07	Error: 1.32
% Error: 4.46 %	% Error: 34.26 %	% Error: 14.73

3. Use the following data to explain why it is important to get a "Percent Error" instead of the "Error" when in the lab. If you had the same error (1.65 g/mL) when getting the experimental values for the density of tin and lead, would they have the same percent error? (Accepted value of Tin: 7.31 g/mL) (Accepted value of Lead: 11.35 g/mL)

% Error for Tin: 22.57 % $\left\lvert \frac{1.65}{7.31} \right\rvert \times 100$	% Error for Lead: 14.54 % $\left\lvert \frac{1.65}{11.35} \right\rvert \times 100$
Explanation: Error = Accepted − Experimental % Error = $\frac{\text{Error}}{\text{Accepted}}$	