Density, Mass and Volume

Name: _____

Date: _____

Hour: _____

Information: Density

| Object	Mass of Object (g)	Volume of Object (mL)	Density of Object (g/mL)
1	21.50	18.40	1.168
2	12.6	14.7	0.857
3	41.90	31.60	1.326
4	32.90		2.560
5	59.5	61.7	
6		0.574	1.035
7	17.23	21.67	

Critical Thinking Questions

1. Consider the data for objects 1, 2 and 3 only. Which of the following equations correctly show the relationship(s) between mass (M), volume (V) and density (D)? There may be more than one answer.

    A) $D = \dfrac{V}{M}$ 　　 B) $M = \dfrac{V}{D}$ 　 C) $D = \dfrac{M}{V}$ 　　 D) $V = \dfrac{D}{M}$ 　　 E) $V = \dfrac{M}{D}$

    F) $V = DM$ 　　 G) $M = DV$ 　　 H) $D = MV$

2. For objects 4, 5, 6 and 7 there are blanks in the table. Using your answers to question 1, fill in the blanks by calculating the missing quantities.

3. What are the units for density if the mass of an object was measured in kilograms and the volume in liters?

4. In your own words, define "density".

5. Calculate the density of an object that has a mass of 45.0 kg and a volume of 20.0 L. Include units.

6. Use the following graph of mass vs volume to answer the following questions.
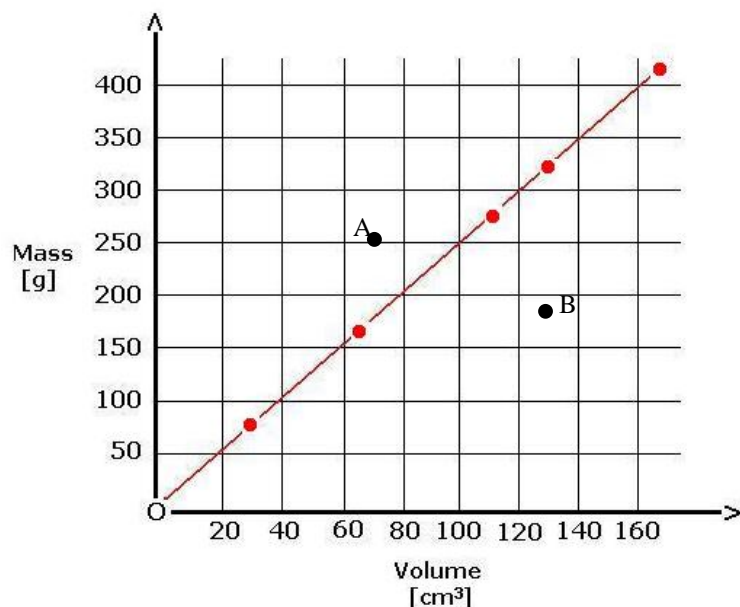
a) Calculate the density of the substance.

b) When students were obtaining data to plot on the graph, they used a graduated cylinder and water displacement to find the volume. Notice data point "A" that isn't located on the line of best fit. What error(s) might the students have made when they collected data for point "A"?

c) Notice data point "B" that isn't located on the line of best fit. What experimental error(s) might the students have made when they collected data for point "B"?

d) True or False: Whenever mass is plotted vs volume, the resulting line must pass through the origin at (0,0).

e) From the graph, estimate the volume of 125g of the material.

7. A certain substance has a density of 3.44 g/cm³. Find the mass of a block of the substance with the dimensions 5cm x 10cm x 2 cm.

8. Sara drank 45 grams of Pepsi. How many mL of Pepsi did she drink if the density is 1.29 g/mL?

9. The cup is a volume widely used by cooks in the U.S. One cup is equivalent to 237 cm³. One cup of olive oil has a mass of 216 g; what is the density of olive oil?

Use the following information for questions 10-12: Gold has a density of 19.3 g/ cm^3. A certain cube of gold measures 4.23 cm on each edge.

10. What is the volume of the cube?
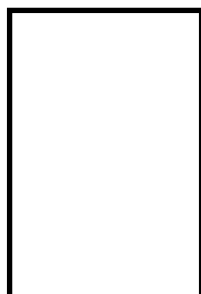
11. What is its mass?

12. A standard backpack is approximately 30cm x 30cm x 40cm. Suppose you find a hoard of pure gold while treasure hunting in the wilderness. How much mass would your backpack hold if you filled it with the gold? An average student has a mass of 70 kg. How do these values compare?

13. Consider the following graph. Which substance—A or B—will float in water? Why?
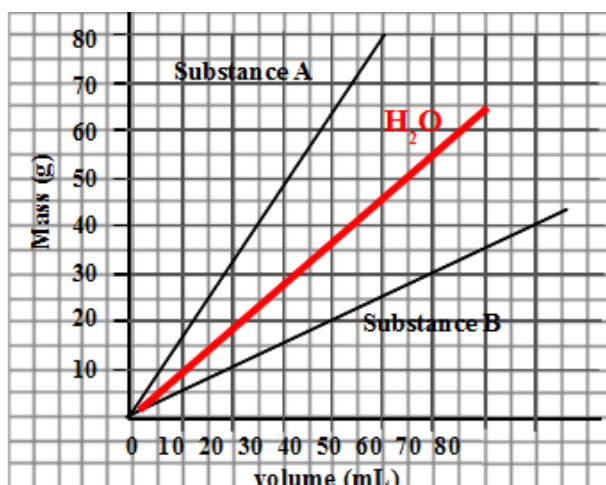
14. Given the above graph, draw particle diagrams for Substances A and B.

Substance A   Substance B