MiSP Density Worksheet #2, L3

Comment [RU1]: I was able to separate L3 and L2,: howver, I do not see how to create a L1.

Name _____ Date _____

GRAPHING THE RELATIONSHIP BETWEEN MASS AND VOLUME

Yesterday you used a table to demonstrate the relationship between various volumes of three different liquids and their corresponding masses. We defined this relationship as **density**. Today you will use the data found in the table on water, oil, and corn syrup to graph the relationship between the volume and the mass of these substances.

Graph the data:

1. Use the data found in the table on water, oil, and corn syrup to make a graph on the next page. Use volume as your independent (manipulated) variable and mass as the dependent (responding) variable.

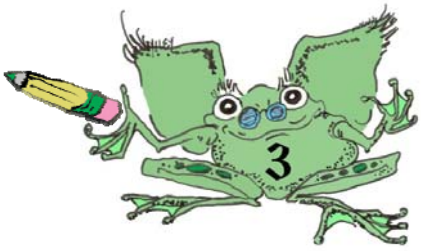
2. The volume of these substances can be any number (23 ml, 37.25 ml, .232 ml, etc.) so the data are continuous rather than discrete. Therefore, it is appropriate to connect the points. **Connect your points.**

3. Why does each graph pass through the point (0, 0)?

_____

_____

_____



Key:
Water =
Oil =
Corn syrup =

4. From the table, we can see that as the volume of water increases by 10 ml, the mass of water increases by 10 grams. This is a constant rate of change representing a linear relationship as seen in your line graph. The unit rate of change (slope) of the line will be 10 g/10 ml or 1 g/ml. The line will intercept the *y*-axis at (0,0). Knowing these two things allows us to write the following equation for the line representing the density of water:

5. From the table, we can see that as the volume of oil increases by 10 ml, the mass of oil increases by _____ grams. This is a constant rate of change representing a linear relationship and resulting in a line graph. The unit rate of change (slope) of the line will be _____ or 0.9 g/1 ml or 0.9 g/ml. The line will intercept the *y*-axis at (___,___). Knowing these two things allows us to write the following equation for the line representing the density of water:

6. From the table, we can see that as the volume of corn syrup increases by 10 ml, the mass of corn syrup increases by 14 grams. This is a constant rate of change representing a linear relationship and resulting in a line graph. The unit rate of change (slope) of the line will be _____or 1.4 g/1 ml or 1.4 g/ml. The line will intercept the *y*-axis at (___ ,____). Knowing these two things allows us to write the following equation for the line representing the density of water:

7. **The general equation for a line is: $y = mx + b$** where *m* represents the unit rate of change (slope) and *b* represents the value of *y* when $x = 0$ (also called the *y*-intercept). For the particular relationship we are working with in this activity, we know that a volume of 0 ml will yield a mass of 0 g. Therefore, the *y*-intercept on the graph will always be at the origin (0, 0).

Comment [SA2]: Questions 4-6 read "Knowing these two things allows us to write an equation for the line representing the density of water." I changed it to "write the following equation and left a blank space for the equation.

Comment [SA3]: I can't quite understand if that was the original intention.

Comment [SA4]: Shouldn't this be before the previous 3 questions?

8. The water, oil, and corn syrup mass and volume data can be represented using three linear equations (complete the table):

Substance	Density or unit rate of change (slope) (m)	y-intercept (b)	Equation $y = mx + b$*
Water	1	0	$y = 1x + 0$ or $y = 1x$
Oil	0.9	0	$y = 0.9x + 0$ or $y = 0.9x$
Corn Syrup		0	

*The x is the volume in ml and y is the mass in g.

9. Use the equation for the oil, $y = 0.9x$, to complete the table of values:

x (volume in ml)	y (mass in g)
0	0
2	1.8
4	
6	
8	
10	

The line of this data can be graphed by plotting points represented by the (x, y) values in the table. It can also be graphed by plotting the y-intercept at (0, 0) and from there showing an increase of 0.9 for y (mass) moving vertically 0.9 for each increase of 1 for x (volume) moving horizontally.