**Density Calculation**

**Purpose**: To investigate the density of fluids (regular water & salt water) – working with and understanding numbers and importance of units. Teaching excel, plotting/understanding of graphs, and extracting information from linear graphs.

**Items:** Computer with Excel and calculator

The mass (g) and volume (mL) data for Liquid A (left) and Liquid B (right) are given in the following tables. One of the liquid is regular water and the other is salt water

|  |  |
| --- | --- |
| ***Liquid B Volume (mL)*** | ***Liquid B Mass (g)*** |
| 90 | 88.7 |
| 80 | 81.02 |
| 70 | 67.52 |
| 60 | 60.67 |
| 50 | 50.91 |
| 40 | 38.82 |

|  |  |
| --- | --- |
| ***Liquid A Volume (mL)*** | ***Liquid A Mass (g)*** |
| 95 | 104.28 |
| 85 | 92.90 |
| 75 | 81.80 |
| 65 | 73.19 |
| 55 | 60.47 |
| 45 | 44.36 |

**Part I: Calculate Density using Equation:**

**Density = Mass / Volume**

1. Pick one set of volume and mass data from table for liquid A to calculate the density of liquid A using the above equation, please include the right units and keep two decimal places for density

Mass =\_\_\_\_\_\_\_\_\_\_ Volume=\_\_\_\_\_\_\_\_\_

Density of liquid A = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Pick one set of volume and mass data from table for liquid B to calculate the density of liquid B using the above equation, please include the right units and keep two decimal places for density

Mass =\_\_\_\_\_\_\_\_\_\_ Volume=\_\_\_\_\_\_\_\_\_

Density of liquid B = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part II: Calculate Density using Excel graphing**

1. Use the table above for liquid A to plot a graph of mass (g) on the y-axis and volume (ml) on the x-axis in Excel. Add a linear trendline. *Copy your graph here with the equation for the trendline. [Clearly label your axis and include the appropriate units].*
2. Find the slope of your graph using the equation for the trendline, and record your answer below (include the appropriate units)

Slope = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Using the definition of density, what does the slope of the graph represent? What is the density of liquid A:

Density of liquid A = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Compare density of liquid A you calculate in part II with that in part I. Are they very similar or very different?
2. Use the table above for liquid B to plot a graph of mass (g) on the y-axis and volume (ml) on the x-axis in Excel. Add a linear trendline. *Copy your graph here with the equation for the trendline. [Clearly label your axis and include the appropriate units].*
3. Find the slope of your graph using the equation for the trendline, and record your answer below (include the appropriate units)

Slope = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Using the definition of density, what does the slope of the graph represents? What is the density of liquid B:

Density of liquid B = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Compare density of liquid B you calculate in part II with that in part I. Are they very similar or very different?
2. Which of the two liquid (A or B) could be salt water and which could be regular water? Why?
3. You used two methods to calculate Density: part I using one data set and equation, part II using trendline from Excel graph. Which method do you think is better to calculate the Density and Why?