Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour \_\_\_\_\_\_

**Periodic Properties Lab**

(Honors Chemistry)

**Procedure**:

1. Determine the mass of the samples to the nearest 0.01 gram using the digital scale and record your mass in Data Table 1.
2. Fill a 100-mL graduated cylinder with approximately 50-mL of water and record your volume in Data Table 1.
3. Tilt the graduated cylinder and carefully slide one of the samples down the side. Make sure the sample is completely submerged in the water. Record your volume in Data Table 1.
4. Dry the samples and return them.

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| **DATA TABLE 1: GROUP DATA AND CALCULATIONS** | | | |
| **Group #1 Data** | **Lead** | **Silicon** | **Tin** |
| Mass of Metal (g) |  |  |  |
| Volume of Water alone (mL) |  |  |  |
| Volume of Water + metal (mL) |  |  |  |
| Volume of Metal Sample (mL) |  |  |  |
| Density of Metal (g/mL) |  |  |  |

1. Obtain the Class Data (mass and volume) for each metal from the other 7 groups.
2. Using the mass and volume obtained from the class, make a graph with a line of best fit for each metal. Enter your density in Data Table 2. *You will be using the graphical analysis program for this step.*

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| **DATA TABLE 2: CLASS DATA: MASS AND VOLUME OF METAL SAMPLES** | | | | | | |
|  | **Lead** | | **Silicon** | | **Tin** | |
| Group | Mass (g) | Volume (mL) | Mass (g) | Volume (mL) | Mass (g) | Volume (mL) |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |
| Density (g/mL) obtained from  LOBF Graph |  | |  | |  | |

**Analysis & Conclusion:**

1. Prepare 2 graphs by hand using graph paper:
   1. Graph 1 compares the period of silicon, lead, and tin versus their densities obtained from Data Table 1.
   2. Graph 2 compares the period of silicon, lead, and tin versus their densities obtained from Data Table 2.
2. Based on your graphs, estimate the density of germanium.
   1. Estimated density of germanium from Graph 1 should be based on the densities obtained in Data Table 1
   2. Estimated density of germanium from Graph 2 should be based on the densities obtained in Data Table 2
3. Calculate the percent error *(2 decimal places)* for the density obtained in Graph 1 and from Graph 2. Show work!!

|  |  |
| --- | --- |
| **Estimate from Graph 1** | **Estimate from Graph 2** |
| Accepted Value of Germanium = 5.32 g/mL  Estimated Density from Graph 1 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Percent Error = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Accepted Value of Germanium = 5.32 g/mL  Estimated Density from Graph 2 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Percent Error = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

1. Compare the percent errors obtained from your estimate in graph 1 and the estimate in graph 2.
2. What does the percent error tell you about the data collected in Data Table 1 and Data Table 2?
3. Is using a period vs. density graph of the elements within a group a good way to determine the unknown density of an element within that same group? Explain your answer using data from the lab.
4. Regardless of your data, should the percent error obtained from Graph 1 or Graph 2 be more accurate? Explain.