FLINN SCIENTIFIC

Name_____

Laboratory Report

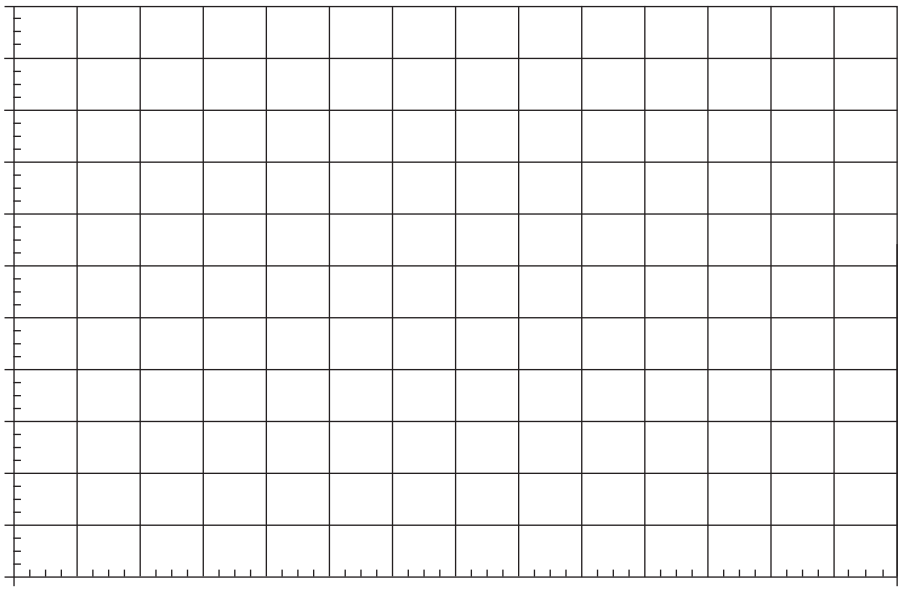
Density of Reference Solutions

Solution	Mass, g	Sample Volume, mL	Density, g/mL
0% Sugar			
5% Sugar			
10% Sugar			
15% Sugar			
20% Sugar			

Beverage Densities

Beverage	Mass, g	Sample Volume, mL	Density, g/mL

1. Plot density versus concentration for the five reference solutions on a graph. The concentration is the independent variable (*x*-axis), and the density is the dependent variable (*y*-axis). Use a spreadsheet program or ruler to draw a "best-fit" straight line through the data points.



2. Use the graph to estimate the unknown sugar concentration in each beverage. To do this, locate the point on the *y*-axis that corresponds to the density of the beverage. Follow that point on the *y*-axis across horizontally to where it meets the best-fit straight line. Read down vertically from this point on the best-fit line to the *x*-axis to estimate the percent concentration of sugar in the beverage. Construct a *Results Table* on the next page and record the density of each beverage and its estimated percent sugar concentration.

3. Calculate the actual or accepted value of the sugar concentration in weight percent for each beverage, using the nutrition label information and the measured density value. **Hint:** See Pre-Lab Question 3 for how to do this calculation. Record both the nutrition label information and the actual percent sugar concentration in your *Results Table*.

4. Calculate the percent error in your experimental determination of the sugar content in each beverage. Enter the percent error in the *Results Table*.

$$\text{Percent error} = \frac{|\text{Measured value} - \text{Accepted value}|}{\text{Accepted value}} \times 100\%$$

Results Table:

5. What was your measured density for pure water (0% sugar solution)? The density of water is usually quoted as 1.00 g/mL, but this precise value is for 4 °C. Comment on why your measured density might be higher or lower than 1.00 g/mL.

6. This lab looks at the relationship between the density of a beverage solution and its sugar content. What assumption is made concerning the other ingredients in the beverage and their effect on the density of the solution? Do you think this is a valid assumption? Explain.

7. When plotting data such as that obtained in this experiment, why is it not appropriate to "connect the dots?" If you were to repeat the lab, do you think you would get exactly the same results? Comment on sources of error in this experiment and their likely effect on the results.