

### Chemistry Lab #3 – Density Lab Exercise

FINAL DRAFT of lab (title through procedure) in lab book DUE THURSDAY, 10/6/11  
LAB WILL BE ON THURSDAY, OCTOBER 6, 2011

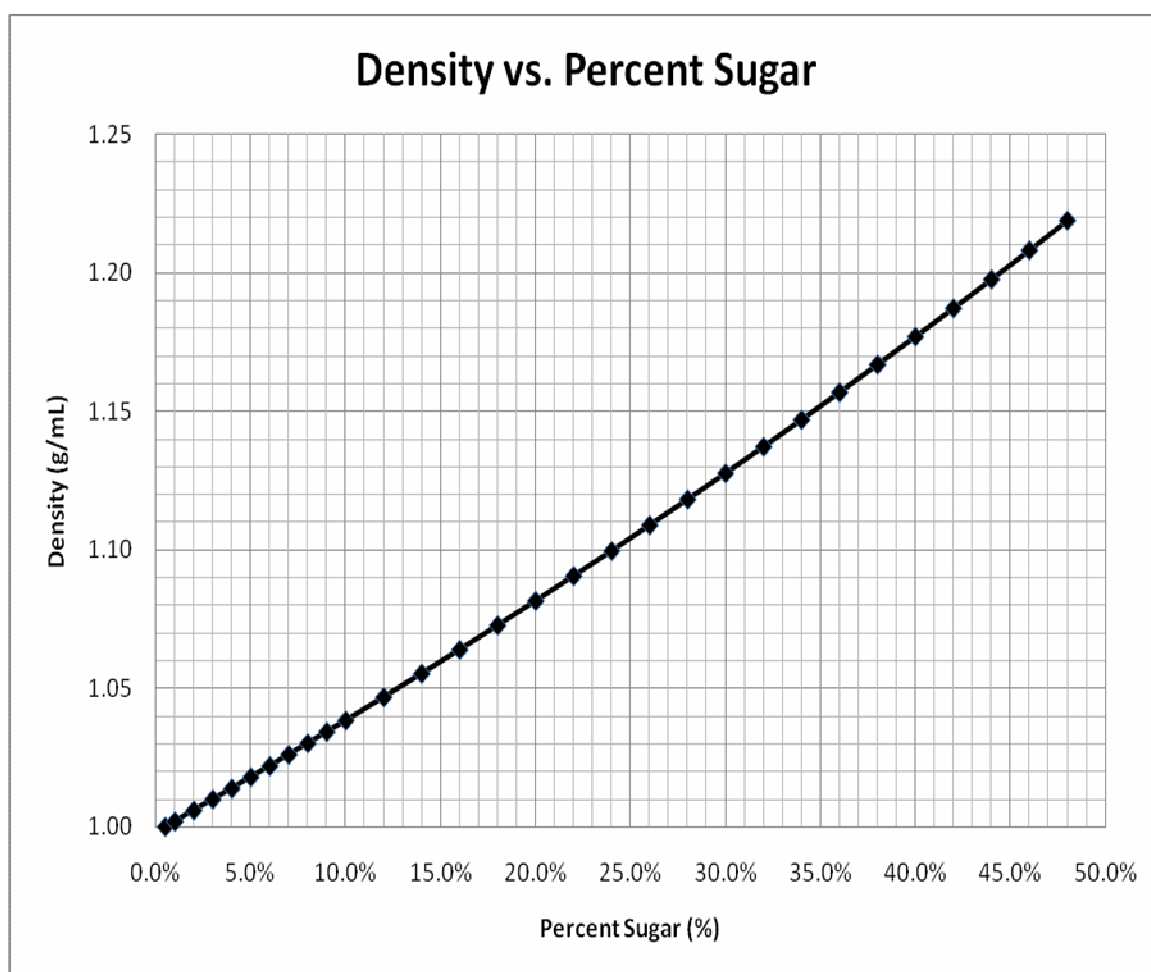
#### Goals:

The goals of this lab are to (a) determine whether water or a sugary beverage is more dense and (b) estimate the sugar content of a sugary beverage based on its density.

#### Introduction/Background:

Nutritionists have recently raised concerns about the popularity of pop, juice, and other beverages with teens due to their high sugar content. The sugar content of a beverage can be estimated from its density. In this lab, you will use two beverages (water and another choice), predict which one will have the highest sugar content, and measure the density of the two to test your prediction.

Here is a line graph of density vs. percent sugar (from the *CRC Handbook*):



Research questions – answer in complete sentences:

- 1) Which do you predict will be more dense, water or your beverage? Why do you think so?
- 2) What is the density formula?
- 3) What are the units of density?
- 4) When a chemical is more dense, what does that mean about its particles?
- 5) Use the graph above to answer the following questions:
  - a) What is plotted on the x-axis?
  - b) What is plotted on the y-axis?
  - c) Estimate the density of a solution that is 27% sugar.
  - d) Estimate the density of a solution that is 12% sugar.
  - e) Estimate the percent sugar of a solution with a density of 1.09 g/mL:
  - f) Estimate the percent sugar of a solution with a density of 1.17 g/mL:
- 6) A group measured the mass of its beverage as 23.30 g and the volume of the beverage as 19.6 mL. What was the beverage's density? What was its percent sugar?

Hazards:

Water and the beverages in this lab are not considered hazardous. Goggles and aprons are NOT required. Shoes MUST cover the whole foot, though, to protect feet from possible broken glass. All liquids may be rinsed down the drain when the lab is over.

Guidelines:

The maximum sample size of each liquid is 20 mL.

Be careful to use measuring tools to their appropriate number of significant figures!

Tip: Measure the liquids separately. Do not mix them!

You may choose your own materials and design your own procedure!

Post-lab calculations should include the density of water and the density of your beverage.