

Chemistry Objectives - Measurement and Problem Solving

- Goals:**
1. Know and use SI units and prefixes to perform calculations.
 2. Use 2 methods of solving problems with calculations:
 - 1.) the factor-label method of converting units.
 - 2.) 5-step method to solve problems
 3. Explain & use accuracy, precision, scientific notation, and significant digits.
 4. Solve density problems in 2 different formats.
 5. Understand direct and indirect relationships between data sets
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I. 2.3 Accuracy and Precision: Using Scientific Measurements

- A. Discuss the system of measurement adopted for worldwide use (SI System)
 1. What is the common multiplier for all quantities?
 2. How does this simplify calculations?
- B. Define fundamental unit:
 1. How is the standard unit kept exact?
- C. List the 7 fundamental quantities, their symbols, and their units and symbols
- D. Define and distinguish between accuracy and precision
 1. Given a set of measurements, be able to tell whether they are accurate, precise, both, or neither
- E. Explain uncertainty
 1. Calculate percent error
- F. Determine the number of significant digits used in a measurement
- G. Perform mathematical operations involving the use of significant digits
- H. Use scientific notation to write numbers and carry out arithmetical operations

II. 2.1 Units of Measurement

- A. Describe and explain derived units. Give examples.
- B. List the 7 conversion factors you are responsible for knowing. Write each one 2 different ways (flip each one over.)
- C. Perform unit conversions using the factor-label method

III. 2.4 Solving Quantitative Problems

- A. Explain and use appropriate method of solving problems
 1. calculations for labs

2. unit conversions
3. descriptive problems (the infamous story problem)

B. Perform 2 different types of density calculations

1. 5-step method of problem solving
2. density as a conversion factor

IV. Graphical Analysis of Data Collected

- A. Review basic computer skills - how to open applications and files, and how to save your work.
- B. Collect lab data “by hand” and make a graph “by hand.”
 1. Calculate the slope, using correct algebraic equations and units with every number
- C. Use the data already collected and make the same graph using the Graphical Analysis program on the computer.
 1. Follow directions and let graphical analysis calculate the slope for you ;-)
- D. Do the same procedure, collecting the data on the Science Workshop Interface.
 1. The program will collect and log your data, and make a graph while you watch.
- E. Explain the difference between directly and indirectly proportional variables using equations and graphs.
- F. be able to make a graph from a set of data and tell whether the relationship is direct or indirect.