Measurement Review

Key Terms:
Accuracy
Conversion
Density
Error
Magnitude
Precision
SI Units
Significant figures
Uncertainty
Volume

Command Terms: Expect to see these IB Command Terms.
Outline
Describe
Explain
Solve
Interpret
Analyze
Evaluate

Measurements

1. You are asked to measure the volume of your phone in mm^3.
    a. How would you accomplish this task?
    b. What are some sources of uncertainty in the process you described?
    c. What information would you need to be able to comment on the accuracy of a measurement?
    d. Another student is also measuring her phone. What information would she need to provide for you to be able to comment on the precision of her data?
2. A student is attempting to measure the width of a classroom using a ruler. Identify a possible source of random error and a possible source of systematic error.

Conversions

1. Chicago is 182 km from Detroit. Convert this distance to yards. *1 km = 1093 yards.*
2. A pet owner buys 20 oz of birdseed per week. Find her rate of birdseed purchasing in pounds per year. *16 oz = 1 pound* *52 weeks = 1 year*

Significant Figures

1. How many sig figs in each of the following measurements:
    a. 3.00002 miles
    b. 0.04580 gallons
    c. 5400 meters
2. How many sig figs in the calculation of volume given by 5.43 m x 4.820 m x 0.034 m?
3. What is the total mass of three objects whose individual masses are: 14.2 g, 5.337 g, 10.49 g? Be sure to follow your sig fig rules.

Scientific Notation

1. Rewrite the following numbers in scientific notation:
    a. 8970000
    b. 0.0000256
2. Rewrite the following numbers in standard notation:
    a. 3.45×10^{6}
    b. 9.72×10^{-3}

Integrated Question

The volume of a desk is determined by first measuring the three dimensions to be length = 1.50 m, width = 0.75 m, and height = 0.80 m.

a. Calculate the volume of the desk in m^3.
b. Describe how you determined the correct number of sig figs in your answer.
c. In order to convert the volume into mm^3 you must convert all three units of m into mm. Convert the volume you calculated into mm^3.
d. Rewrite your mm^3 answer in scientific notation.
e. Two students are given the task of finding the volume of a desk in both m^3 and mm^3.

Student A's proposal: 1. Measure the length of each side in meters.
2. Calculate the volume in m^3.
3. Convert the volume from m^3 to mm^3.

Student B's proposal: 1. Measure the length of each side in meters.
2. Calculate the volume in m^3.
3. Convert the lengths from m to mm.
4. Use the mm lengths to calculate the volume in mm^3.

Analyze and Evaluate each proposal to completing the task.