Names

Date   **Period**

Lab 4

Measuring Matter

PreLab Questions - Refer to textbook

Use the correct number of significant figures in all problems.

1. Change the following to exponential form;)
    a. 62 000 000
    b. 0.000 8

2. Convert the fo1lowing exponential numbers to ordinary numbers;
    a. 2.14×10^4

    b. 1.95×10^{-5}
3. Multiply the fo1lowing:
    a. $(4.1 \times 10^{-2}) \times (2.8 \times 10^3)$
          b. $(6.02 \times 10^{23}) \times (4.5 \times 10^2)$

4. Divide the following:
    a. $\dfrac{2.64 \times 10^3}{1.88 \times 10^2}$ b. $\dfrac{5.02 \times 10^3}{4.6 \times 10^2}$

5. Covert the following to the indicated smaller unit:
    a.   14 meters (m)   to   cm (centimeter)
    b.   0.8 kilometers (km)   to   m (meter)
    c.   20.9 liters (L)   to   mL (milliliter)
    d.   4.6 grams (g)   to   mg (milligrams)
    e.   7.8 kilograms (kg)   to   g (grams)

NAME _____   PERIOD _____

DATE: _____   LAB PARTNERS:

EXPERIMENT 4
MEASURING MATTER

Part I - Rules for making measurements in the laboratory
(Remember every measurement has a unit.)

DATA TABLE

Measuring Instrument	Unit you Want	Place Value Of Smallest Marking On Instrument	Place Value You Should Measure To
Scale – Triple Beam Balance			
100 mL graduated cylinder			
10 mL graduated cylinder			
250 mL graduated cylinder			
Centimeter ruler			
Meter Stick			
Thermometer (°C)			

Part II - Measuring mass and volume

A. Weighing Pennies
   Weigh two U.S. pennies separately**.** Express the mass to the unit of accuracy of the triple beam balance.

   1. The mass of one penny is   grams.
   2. The mass of a second penny is   grams.

3. Are the two masses identical? Explain.

4. Weigh both pennies together. The combined mass of the two pennies is _____ grams.

5. Is the combined mass of the pennies exactly twice the mass of a single penny? Explain.

B. Measuring the Volume of A Liquid

Test Tube	Volume in mL
1	
2	
3	

C. Measuring the Volume of A Solid

Using the formula: length X width X height = volume

1. The length of the block is _____ cm.

2. The width of the block is _____ cm.

3. The height of the block is _____ cm.

4. The volume of the block is _____ cm^3.

Using water displacement.

5. The original volume of water is _____ cm.

6. The volume of water with the block is _____ cm^3.

7. The volume of the block is _____ cm^3.

8. Compare the volumes obtained by both methods. Are they exactly the same? Explain.

CONCLUSION QUESTIONS

1. Why is measurement so important in science?

2. Why are all Measurements uncertain?

3. Find the volume of a rectangular block of detail with the following dimensions:

    length   = 2.9 cm

    width   = 4.7 cm

    height   = 1.1 cm

    Be sure to use the correct number of significant figures.

4. Which method is best suited for determining the volume of solids with irregular dimensions? Are there any limitations to this method? Explain.

5. Why should the graduated cylinder be held at eye level when reading the volume of a liquid?

Discussion

Conclusion