Name Colton Kreischer
Date 8-23-16 Block 1

Laboratory Measurement

Purpose

The purpose of this activity is to help you become more familiar with laboratory(metric) measurement and common equipment used in the lab. It is important that you read and follow all directions carefully, fully complete each section, and THINK about what you are doing as you go. The tools you use in this activity will be used throughout the course.

Materials (per team of 2)

-metric ruler
-meter stick
-string
-graduated cylinder (10 or 25 mL)
-50, 250, 400 mL beakers
-erlenmeyer flask
-electronic balance
-plastic pipet
-plastic petri dish

Part A: Volume Measurement Tools & Precision

Using the set of glassware given to you, fill in the chart below and answer the accompanying questions.

Tool	Graduations (smallest increment measurable)	Maximum volume that can be accurately measured	Graduations equidistant? (yes/no)
Graduated cylinder	0.5mL (larger cylinder)	25mL (larger cylinder)	Yes, excluding the portion at the bottom that doesn't have any
50 mL beaker	10mL	40mL	Yes
250 mL beaker	25mL	200mL	Yes
400 mL beaker	25mL	325mL	Yes
Erlenmeyer flask	25mL	200mL	No

Questions

A. Why is the beaker labeled "400 mL" when you can't accurately measure 400 mL of liquid?
That is the maximum amount it can safely hold without spilling.

B. Which container does not have equidistant graduations? Why?

The Erlenmeyer flask, because as it goes up it can store less liquid so the increments have to be spaced out further to stay accurate.

C. Look at the plastic pipet. How much liquid can be accurately measured using this pipet? 0mL

D. Fill the graduate to 9 mL with water. Using the pipet, count the number of drops needed to fill to the next graduation (10 mL). How many drops are in 1 mL of water? 14
What would be the mass of this 1 mL of water? 0.76g

E. Using the list of tools above, describe how you could accurately measure 43 mL of water?

Fill the 25mL to 25mL, then pour that into a 50mL beaker. Then fill it back up to 18mL and pour that into the same 50mL beaker.

Observation Station A: Observe the containers and answer the questions.

1. Fill in the chart below

Name of glassware	Amount of liquid present
A. Beaker	15mL
B. Buret	21mL
C. Erlenmeyer flask	55mL
D. Medical Syringe	6.5mL

2. Examine the glass pipet at this station. The numbering of the graduations reversed (as compared to a beaker or flask). Why?

   That way you can count how many mL you have taken out of it.

   Can you think of other volume measurement devices that are designed this way? List some

   Syringes.

Part B: Length & Mass: Use the tools available and your knowledge of metric measurement and conversions to complete this section.

1. Metric ruler: smallest increment (unit) = mm

   Meterstick: smallest increment (unit) = mm

2. Measure and record the following:
   a. Height of lab table = 0.915 M, 91.5 cm, 915 mm
   b. Width of lab table = 1.07 M, 107 cm, 1070 mm
   c. Floor tile length = 0.305 M, 30.5 cm
   d. Length of room = 13.008 M, 1300.8 cm, e. Width of room = 9.857 M, 985.7 cm

3. Measure the following. Choose the unit which will reflect the most accurate measurement.
   a. Chemistry book: Length = 27.5cm Width = 20.7cm
   b. Desk top: Length = 24cm Width = 18cm
   c. Height of 400 mL beaker = 11cm, diameter = 7.5cm, circumference = 23.56cm

Part C: Mass & Density

1. Properly using the electronic balance. Choose one of the electronic balances available to you to complete this section. Note that the balances are not all the same.
   a. Balance brand name and model number: Scout Pro | SPE401
   b. Gently push the ON/OFF button, and wait for the screen to come up. It should read all zeros. (0.0 or 0.00). What is the smallest mass (in grams) the scale can measure? .01g
   c. When using the balance, there are two general rules to remember: 1)always be sure to put the object being massed in the middle of the pan to get the most accurate reading, and 2) gently place the object on the pan, do not drop it as this will damage the balance. Place the plastic petri dish on the balance and wait until the mass is displayed on the screen. Mass of dish = 2.27g. Now gently push the TARE or RE-ZERO button once. What happens?

   The scale zeroes out.

c. (continued) Many times in lab you will need to measure the mass of a liquid or powder. To safely and accurately do so, you must put the liquid or powder in another container or piece of weighing paper. To do this, you must first measure the mass of the container or paper, then use the TARE feature to "re-zero" the scale so only the mass of the liquid or powder is measured.

2. Use the scale to measure the following:
   a. Mass of 1 penny = 2.5 g, 5 pennies = 13.09 g Ave. mass of a penny = 2.61 g
   b. Mass of powder sample and vial = 13.61 g
      Mass of empty vial = 6.98 g
      Mass of powder sample = 6.63 g

3. Use the tools available to you, and the density equation to calculate the density of the following. Put all measurements and answers in the chart below.

OBJECT	MASS(g)	VOLUME(mL)	DENSITY(g/mL)
A. Marble	16.42g	7mL	2.346g/mL
B. Block	256.3g	317.9mL	0.8062g/mL
C. Liquid	15.61g	9mL	1.734g/mL
D. Nut	15.72g	2mL	7.86g/mL