# Exp 01: Measurement

### Part A: Measuring Length

Using a ruler, measure the:

- width of your fingernail
- length of your lab book (instead of distance around your wrist)
- height of 600 mL beaker (instead of length of your shoe)
- the line indicated in your lab book

Compare your measurements with that of the student next to you.

### Part C: Measuring Mass

Observe and record the mass of the following objects using the lab balance (scale).

- 50 mL Beaker
- Rubber Stopper
- Evaporating Dish
- Unknown Object



### Part B: Measuring Volume

(1) Fill a large and small graduated cylinder about half way with water. Allow the student next to you take a measurement of this volume. Take measurements from the ones they provide.

(2) Fill a small test tube with water. Transfer it's volume to a small graduated cylinder and measure it. Repeat with a large graduated cylinder.

(3) Measure the volume of the provided small object by displacement (difference).









Capture data as precisely as your instrument allows, while still being accurate.

# Lab Reports



#### CHEM 30A Intro General, Organic & Biochemistry I

De Anza College, Fall 2015

Instructor: Prof. Nick DeMello, Ph.D. (email: nick@chemlectures.com)

Syllabus: <u>Class Syllabus (pdf)</u> Schedule: <u>Course Schedule (pdf)</u>

Prerequisite: Mathematics 114 or equivalent. Advisory: English Writing 211 and Reading 211 (or Language Arts 211), or English as a Second Language 272 and 273.

Description: 5 units. This is a two-part class to be taken in sequence by students entering allied health fields. The focus of the first part of this class is an introduction to general chemistry. This course begins with a discussion of various measurement tools. This will be followed with a discussion of energy and matter which will be followed by a discussion of the discovery of an atom. The next set of topics will cover an introduction to elements, compounds, and types of bonding in compounds followed by various types of chemical reactions and stoichiometric calculations based on chemical equations. Properties of gases and solutions will be discussed. The course concludes with a discussion of acid-base chemistry and nuclear chemistry.

#### Topics & Objectives (links) (what we're trying to learn)

[Ch 1] Scientific Method [Ch 2] Measurement [Ch 3] Matter & Energy [Ch 4] Atoms & Elements [Ch 6] Compounds [Ch 7] Reactions [Ch 8] Gases [Ch 9] Solutions [Ch 10] Acids & Bases [Ch 5] Nuclear Chemistry

Worksheets (pdf) (example problems)

Significant Figures Dimensional Analysis Counting Atoms Nomenclature

### Lecture Slides (pdf)

About 30A & Ch01a: Science Ch02a: Measurement Ch03a: Matter Ch03b: Energy Ch04b: Flavors of the Atom Ch06b: Nomenclature Ch06b: Nomenclature Ch07a: Molar Mass Ch07b: Stoichiometry Ch08a: Gas Laws

Lab Experiments (pdf)

Lab Safety Agreement Cover Page for Reports Example Lab Report MEETING TIME:

This class meets 9/21/15 - 12/11/15 T/Th

LAB: Sec 01 07:30am - 10:20am (Tue) Sec 02 07:30am - 10:20am (Thr) in Room 2204 of SC2 Building

LECTURE: 10:30am - 12:20pm (Tue/Thr) in Room L47 of L4 Building

OFFICE HRS: 12:30pm - 1:20pm (Tue) in Room S43 of S4 Building (the student success center)

Study Aids (pdf)

Registering Mastering Chemistry

Student Success Center

Metal Ions (w/ 2 Charges)

Oxy-Ions

Molar Subway pt 1 (Stoich)

## http://chem.ws/30a

On the website you can download:

- Report Cover Sheet
- Example Report



# Lab Reports

| Experiment # 1   | Name:      | Examp<br>D: GO | DODIZS | YS    |
|--|------------|----------------|--------|-------|
| Chemistry 210<br>Cañada College  | Section    | ID:            | AAX    | .,    |
| Experiment Title:  | sification | not            | KLATT  | IR.   |
| Ink# 42  | Be         | nch / Lock     | ker: G | 152   |
| write N/A if no unknown for this experiment;                           | )          |                |        |       |
| write N/A if no unknown for this experiment;<br>For use by instructor: | )          |                |        |       |
| write N/A if no unknown for this experiment;<br>For use by instructor: | )          | pre-lab        | report | total |

**Reminder:** All experiment reports should include the following five sections. Each section should start a new page and be clearly labeled.

- ➡ <u>Cover Page</u> (this page)



Important things you saw or recorded. Observations both qualitative and quantitative (measurements). Data should be clearly labeled and formatted as a table whenever appropriate. Provide proper significant figures and DATA

#### PART A:

We heated a small amount of a blue solid in a test tube, using a bunsen burner. We're told the blue solid is a pure substance.

#### Observations:

- The substance was described as copper (II) sulfate pentahydrate (CuSO4·5H2O)
- · Vapors escape the blue substance.
- . The vapors condense to a clear liquid at the top of the test tube.
- . The blue substance changes color; it becomes white.
- When the condensed liquid falls back into the test tube, it turns the substance blue again.
  - ~

Part B:

We are provided with a vial (or plastic bag) containing an unknown. We're told it's either a pure substance, homogenous mixture, or heterogeneous mixture.

#### Observations/Measurements:

Our unknown is labeled #42.

Initial Conditions:

| Weight of Unknown + Vial | 5.35 g |
|--------------------------|--------|
| Weight of Vial alone     | 0.95 g |

### Substance 1, after separation:

- · Substance 1 was soluble in water.
- It tried to a white solid.
- My instructor described it as sodium chloride (table salt)

Containers used:

| Weight of Evaporating Dish | 69.98 g |
|----------------------------|---------|
| Weight of Watch Glass      | 58.75 g |



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### CALCULATIONS

### PART A:

We were asked to determine if the blue substance, described as copper (II) sulfate pentahydrate, was an element or a compound based on our observations.

We're told it's a pure substance, so it must be one of those two. All pure substances are either compounds or elements.

When we heated the blue solid it decomposed into a colorless gas and a white solid. Elemental solids contain only one type of atom, only one element. They cannot be decomposed into simpler substances. Because the blue substance broke into two other substances, it cannot be . an element. It must there, fore be a compound.

PART B: 5.35 g unk + viz 1  
- 0.95 g viz 1  
4.40 g unk  

$$\frac{49.98}{4.40} g lish$$
  
+ 58.75 g gliss  
 $128.73 g container$   
 $0.178 g sub #1 + container
 $0.178 g sub #1$   
 $(25.5.)$   
 $2\% sub #1 = \frac{506 #1}{0.16} \cdot 100 = \frac{0.78 g}{4.40 g} \cdot 100 = 17.72727 \%$   
 $(35.5.)$   
 $0.98 g Paper
+ 115.72 g beaker
- 120.20 g sub #2 + container
 $120.20 g sub #2 + container
- 120.20 g sub #2 + container
 $2.50 g container$$$$ 



### CONCLUSIONS

In part A, we determined that copper (II) sulfate pentahydrate is as compound, because we were able to break it down into a simpler substance.

In part B, we determined the unknown #42 is 18 % substance 1 (salt) and 79.5% substance 2 (sand).

In part C, we determined the green pen ink was a mixture, the pink pen ink was a pure substance, and the purple pen ink was a mixture.

In part D, we determined the following mixtures all produced a chemical reaction.

| 6M NaOH                | 6M HCI    | is a reaction |
|------------------------|-----------|---------------|
| Mg strip               | 6M HCI    | is a reaction |
| Fe shot                | 6M HCI    | is a reaction |
| NaHCO<br>(baking soda) | 6M HCI    | iș a reaction |
| 0.1M K                 | 0.1M BaCl | is a reaction |



# **Questions**?

