## 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.

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).



Graduated cylinder


## Lab Reports



# http://chem.ws/30a 

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] Reaction
[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
Ch03a: Matter Ch04a: Atomic Theory Ch04b: Flavors of the Atom $\frac{\text { Ch04b: Flavors of the Atom }}{\text { Ch06a: Molecular Formula }}$ Ch06a: Molecular Formula Ch06b: Nomenclature Ch07b: Stoichiometry Ch08a: Gas Laws

## Lab Experiments (pdf)

## Study Aids (pdf)

Registering Mastering Chemistry Student Success Center al Ions (w/2 Charges)<br>Oxy-Ions<br>Molar Subway pt 1 (Stoich)

$\xrightarrow{\text { Lab Safety Agreement }}$ Example Lab Report

On the website you can download:

- Report Cover Sheet
- Example Report


## Lab Reports

## Experiment \# 1

 Name:
## Example Report

Student ID: 600012345
Chemistry 210
Canada College
Section ID: AAX
Experiment Title: Classification of $\mathrm{K} A N \mathrm{ANER}$.

Unk\#: 42
Bench/Locker: 6 152
(write N/A if no unknown for this experiment)

| For use by instructor: |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  | $\overline{p r e-l a b}$ |  |  |

Reminder: All experiment reports should include the following five sections. Each section should start a new page and be clearly labeled.
$\Rightarrow$ COVER PAGE (this page)
$\Rightarrow$ DATA

- 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 ( $\mathrm{CuSO}_{4} \cdot 5 \mathrm{H}_{2} \mathrm{O}$ )
- 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)
A.

| Containers used: |  |
| :--- | :--- |
| Weight of Evaporating. Dish | 69.98 g |
| Weight of Watch Glass | 58.75 g |

## CALCULATIONS

## PART:

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:

$$
\text { 3: } \begin{aligned}
& 5.35 \mathrm{~g} \text { gunk }+v i \geq 1 \\
&- 0.95 \mathrm{~g} \text { vial } \\
& 4.40 \mathrm{~g} \text { uni. }
\end{aligned} \quad \text { Ink } \# 42-4.40 \mathrm{~g}
$$



$$
\begin{aligned}
& 0.98{ }^{1} \mathrm{~B} \text { paper } \\
& \begin{array}{r}
120.2019 \\
-\quad 116.709 \\
\hline 1
\end{array}
\end{aligned}
$$

## 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.

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

## Questions?



