Welcome to Chem 101 Lab

Introduction & Stoichiometry Experiment

TA Contact Info

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Lab Syllabus Highlights

- Lab is worth **25%** of your grade

- Type of Assignments
  - Lab Report (Lab Notebook pages) due **1 week** after completing the experiment
  - Due to the **Undergraduate Drop-box, Room 1219**:

- Penalty for Late assignments – 10% first day then 5% per day

- Grades will be posted on Sakai on the Lab Site

Lab Syllabus Highlights

- Attendance Policy
  - **NO** lab make-ups
  - **ONLY** one Excused absence, submit the Excused Absence for Short Term Illness form (to Lab manager and me)

- **Individual** reporting
  - Pair work: same data, different discussion

- Tardiness = 1 point deducted from preparedness grade

- Arrive after presentation = sent home, **0 point** for that day's lab

Graded Assignments

Notebook Pages (30 points)

All of the following sections should be included:

(Fill out BEFORE lab):

1. **Name, course and section number, experiment title, and date**
2. **Objective** – Statement explaining the purpose of the experiment
3. **Procedure** – outline of the steps you will perform, organized and concise

(Fill out DURING lab):

4. **Observations** – Record your observations & measurements, procedural changes, etc.
5. **Calculations** – Show all work for your calculations and include any graphs
6. **Results** – Record in table format; these are the final results of the experiment
7. **Discussion** – Complete after Lab; Write in paragraph form. Demonstrate your understanding of the experiment, summarize your results and state your confidence in them, and discuss sources of error in the experiment, if applicable.

*More details could be found on Sakai

*Always follow the instructions

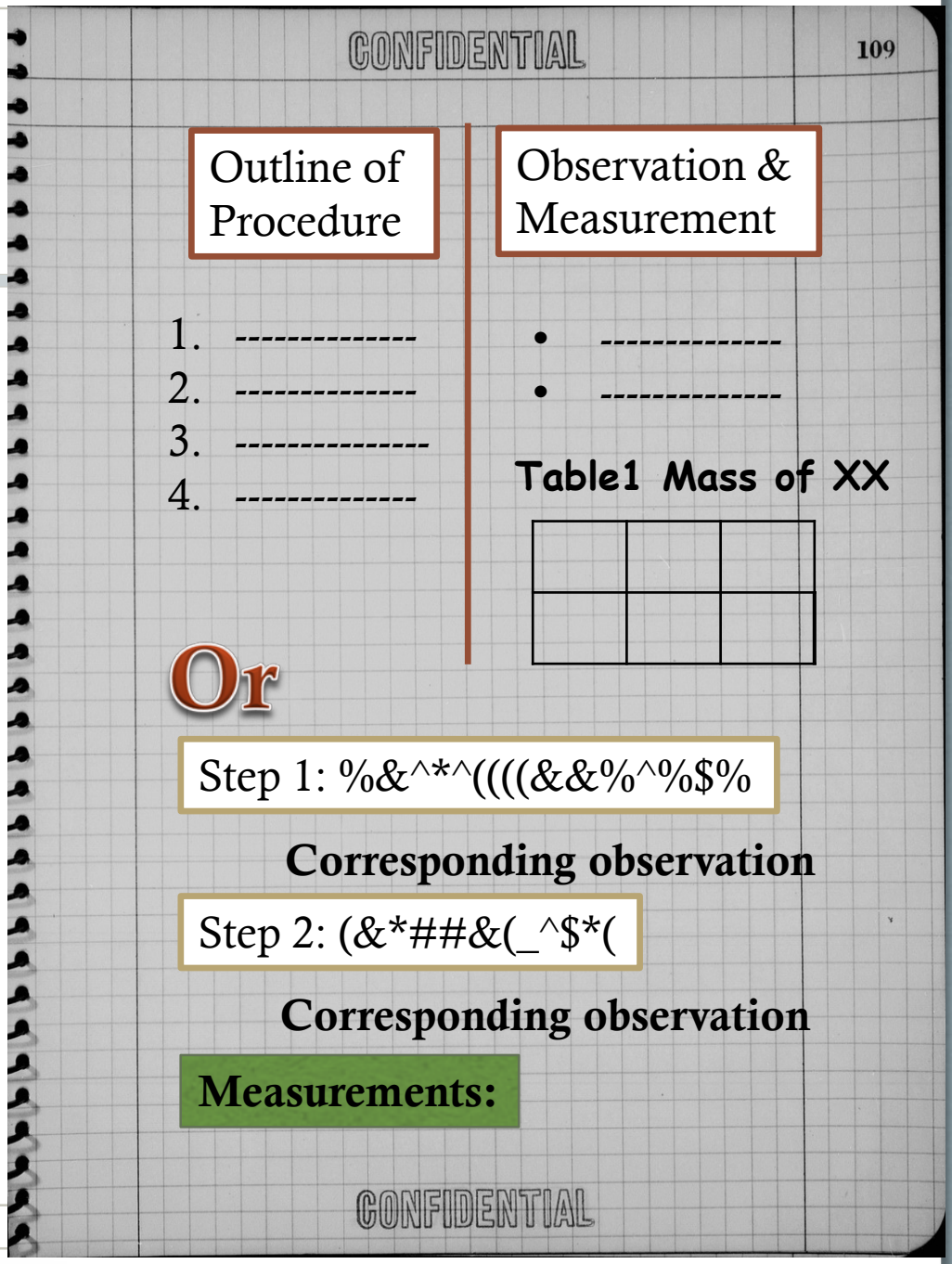
Notebook Pages

- left– Procedure
- right–Observation & Measurement

Or

- Leaving blank between procedures for observation;
- Put measurement tables/record in the end

➢ Depends on how much observation/measurement to record



Graded Assignments

Sapling Pre-lab Assignments – (15 points) Found on Sapling Learning; Due by 8:30 or 1:25 pm the day of your lab meeting.

Balance Czar – (10 points) Given for cleaning the balances and balance area for one experiment – once a semester

Cleanliness Czar – (10 points) Given for cleaning common areas, cleaning and returning shared equipment to proper place – once a semester

Bin Check – (10 points) Your hood randomly checked by TA after lab to make sure each piece of glassware is clean and in the correct bin – once a semester

Preparedness & Technique Grade – (10 points) Grade assigned as an evaluation of your overall performance in lab

Balance & Cleanliness Czar

Hood#	Name	Email	Balance Czar	Cleanliness Czar
1			Sept. 20	Oct. 4
			Sept. 20	Oct. 4
2			Oct. 4	Sept. 20
			Oct. 4	Sept. 20
3			Oct. 18	Nov. 8
			Oct. 18	Nov. 8
4			Nov. 8	Nov. 22
			Nov. 8	Nov. 22
5			Nov. 22	Oct. 18
			Nov. 22	Oct. 18

Writing Sessions

- Designed to give you a basic introduction to scientific writing and the various types of scientific literature.
- Skills you can apply to any science class not only Chemistry.
- You will meet for three 1-hr sessions on the weeks listed in your schedule in Room 1243.
- Attendance/Participation is required.
- First Session is next week – Watch the Announcements on Sakai for more information.

Laboratory Safety

In the case of an Accident (Broken Glass, Fire, Chemical Spill):

- ✓ **ALWAYS** Notify the TA
- ✓ Know where the following Safety Equipment is located:

First Aid Kit

Fire Extinguisher

Safety Shower

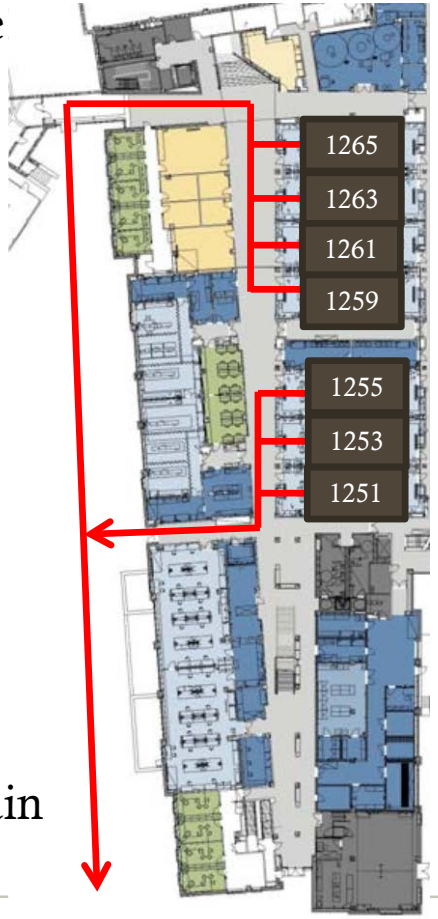
Eyewash Stations

Laboratory Safety

In the case of an Accident (Broken Glass, Fire, Chemical Spill):

- ✓ Dispose of waste, broken glass and syringes in the appropriate places!

- ✓ Know the Fire Evacuation Route



- ✓ Without permission, Never Pour Chemicals Down the Drain

Laboratory Safety

- ✓ Always where proper lab ATTIRE!

ALWAYS wear Safety Glasses

ALWAYS wear gloves

NO open toed shoes

Wear Long pants

Lab Partner/Fume Hood

- After Pre-Lab discussion, pick a lab partner.
- Each pair of students will be assigned to 1 fume hood. This is your hood for the rest of the semester
- In the cabinets under each hood, there are 4 glassware bins
- Students are responsible for checking the contents of each bin and ensure that the glassware is CLEAN and DRY after each experiment!
- If something is missing or broken, it can be replaced from the stockroom (**Room 1237**). Extra equipment can be placed in the bin at the front of the room.

Today's Experiment - Stoichiometry

Experimental Objective/Challenge – Apply several fundamental chemical concepts and work as a team to collect and analyze data/observations about a chemical reaction.

Background Concepts:

1) Conservation of Mass

2) Law of Definite Proportions

3) Dalton's Atomic Theory

Reaction - A + B ⟶ ?

What we know about the reaction:

- Reagents A & B combine to form a white, fluffy solid – a precipitate
- Without knowing the reagents identity, we still know:

Mass of the precipitate = the amount of product formed

Two Different Trials

Trial A – How much product forms when you change the concentration of reagent A?

- Add 10 mL of 0.25, 0.5 M, 0.75 M, and 1 M Reagent A to 10 mL of 1 M Reagent B

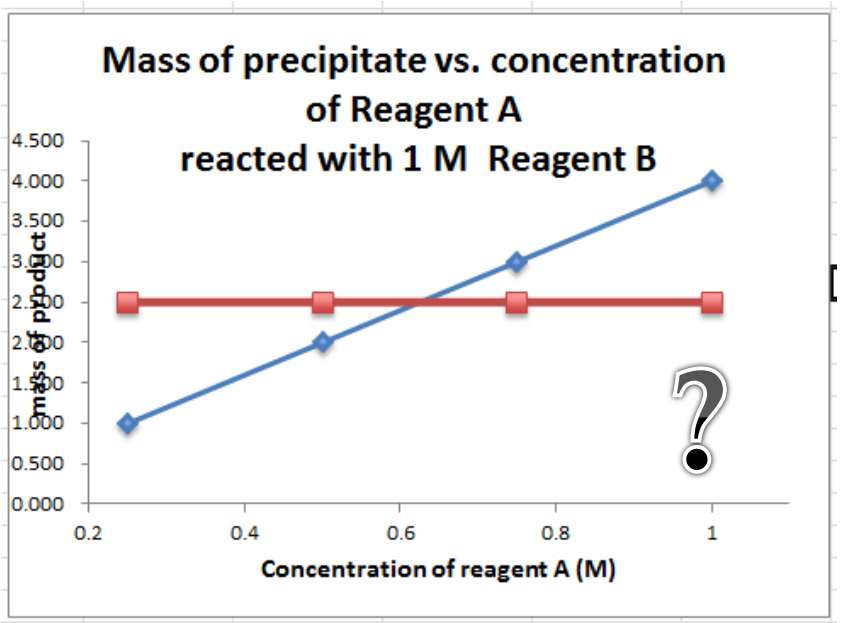
Trial B – How much product forms when you vary the volume of reagent A added to the reaction?

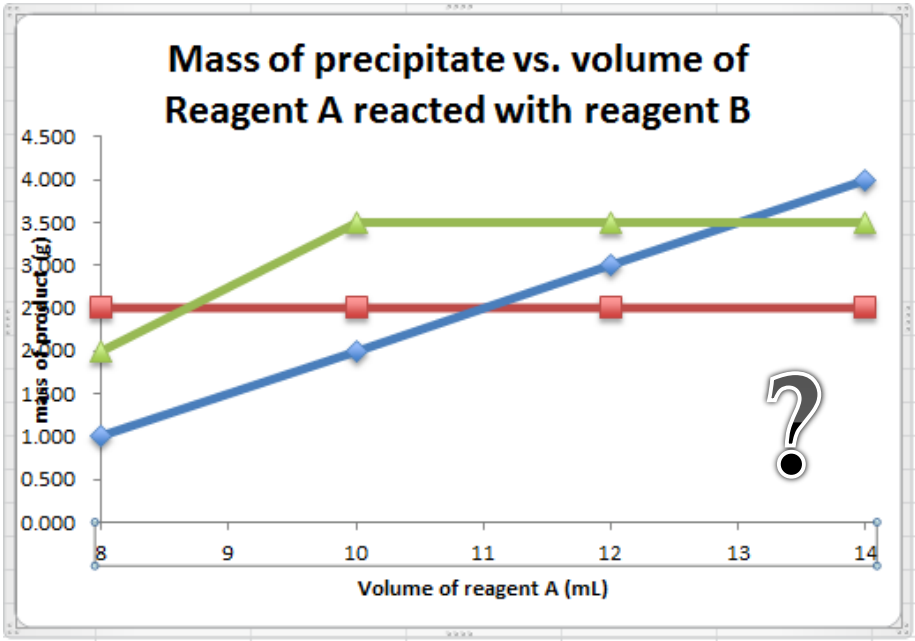
- Add 8, 10, 12, 14 mL of 1 M Reagent A to 10 mL of Reagent B

Hood# 1~2: Trial A
Hood# 3~5: Trial B
Then we'll share the data within the class.

Questions to Consider:

- Predict what your graph will look like.
  (Volume/Concentration of A vs. Mass of your product)

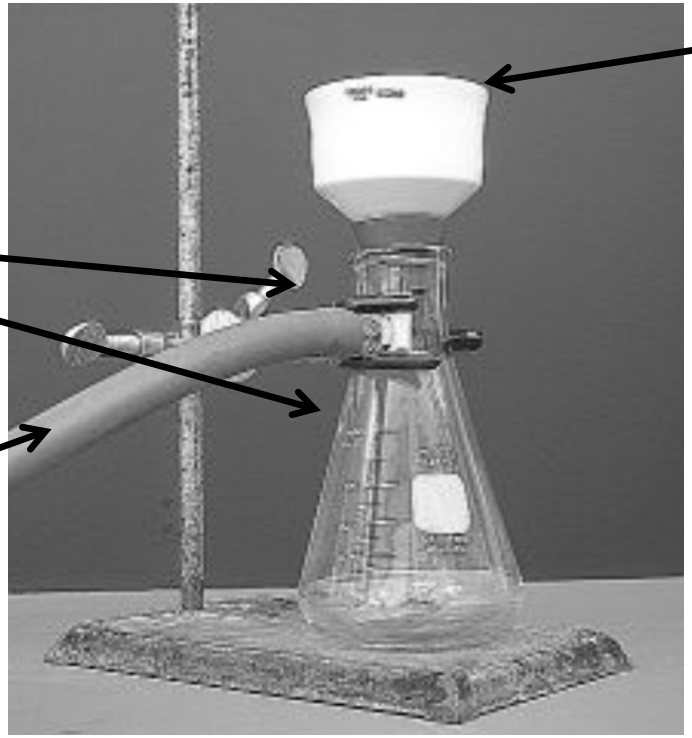




- How to determine which reagent is in excess?

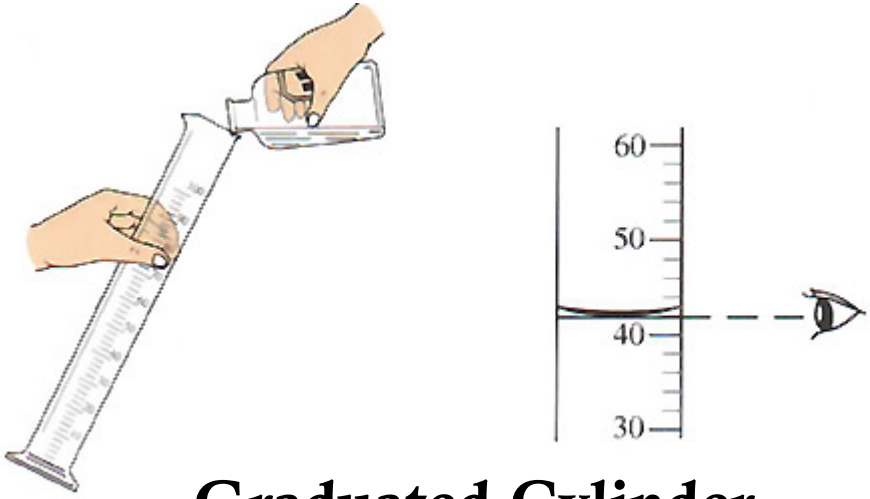
Experiment Details

- We will use **Vacuum Filtration** to separate the product and then weigh it to find its mass using the Balance

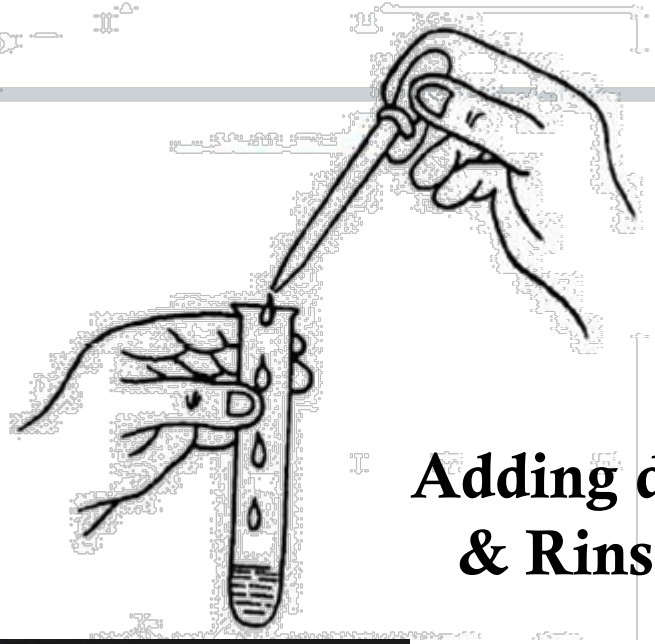


- Use the correct size filter paper
- Turn on vacuum, then wet the paper with DI water
- Check for sufficient vacuum

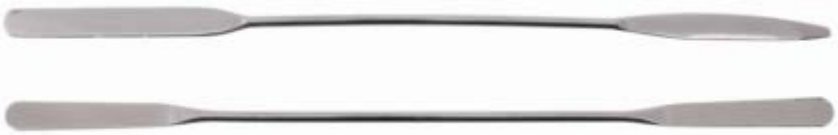
Experiment Details



Graduated Cylinder



Adding drops & Rinsing



Spatula

Plastic Pipet

Experiment Details

Watch glass

Evaporating dish

Experiment Details

- **Transferring**
  - From bottle to beaker: pour directly, **roughly**
  - From beaker to graduate cylinder: pour at first (like, until 9 mL), then using pipet to drop till 10.0 mL, **precisely**

** Using the proper size of graduate cylinder

- **Rinsing**
  - Using pipet or squirt bottle

Experiment Details

- **Take masses** of filter paper and watch glasses, **label** beakers and graduated cylinders before use

- Set up **TWO** vacuum filtration at the same time. Turn on the vacuum just before transferring.

- Think about probable sources of error:
- **Be sure to**:
  - Rinse solid adhering to your spatula back into test tubes
  - Rinse the test tube to transfer your solid completely
  - Let each reaction mixture sit for full ~30 min **(?)**
  - Break up the precipitate to completely dry
  - Dry over vacuum for 15 min

loss

add

Safety & Waste

- Reagent B is an eye and skin irritant; Always were safety glasses and rinse skin immediately if there is contact!
- Solids and filter paper should be disposed of in the Solid Waste Container.
- All excess reagents should be placed in Waste Containers.
- ONLY the reaction solution can go down the drain

Before Leaving the Lab

- Once you have all of your data collected, enter it into my excel spreadsheet.
  **For Trial B, check the volume of reagent A before entering it.

- After I check the cleanliness of your hood and sign your notebook, you're free to go.
  ** Hood#1 ~ Balance czar, Hood#2 ~ Cleanliness czar

Note:

- (1)Data spreadsheet, (2) Detailed instruction for Reporting & Discussion, (3) Rosters and (4) Balance & Cleanliness Czar will be sent to you via email later today.

- You'll have to discuss both trial A & B. Using the whole data we collected in the spreadsheet.