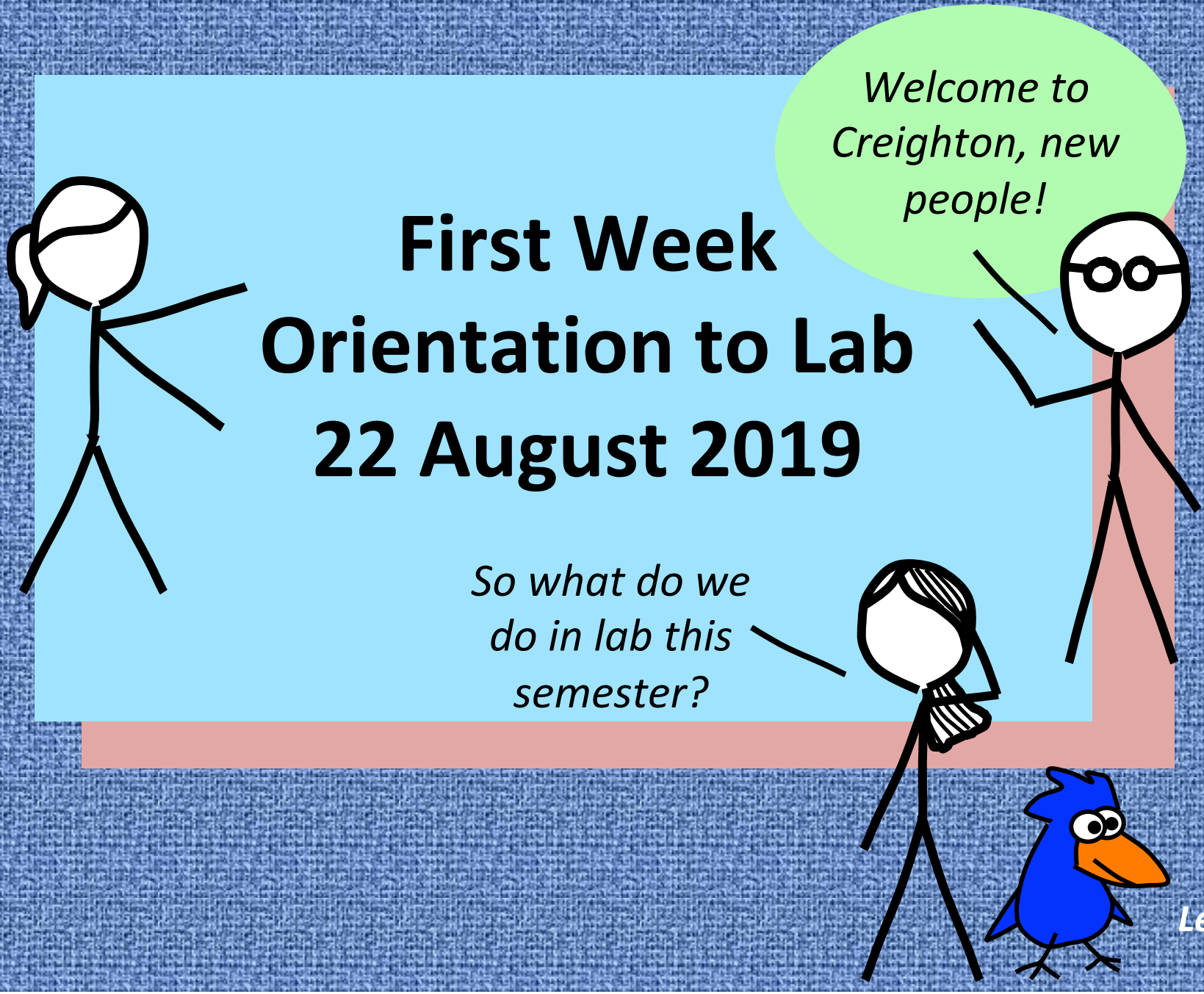
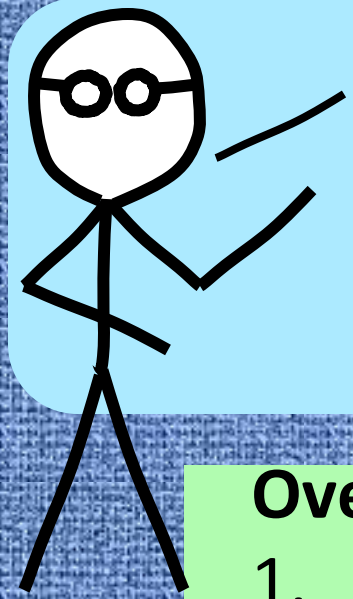
First Week Orientation to Lab 22 August 2019

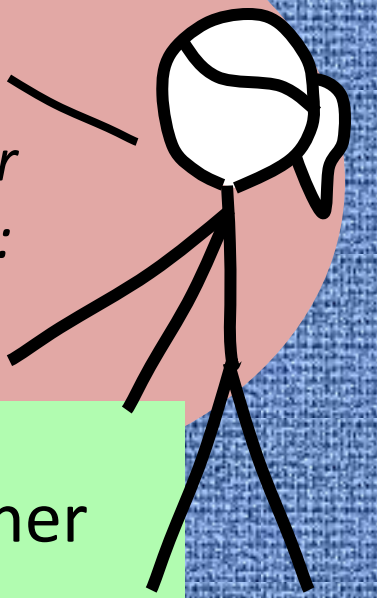


Objectives: Become familiar with the format of Chm 204 and what is required.



What do we do in lab and… how is our lab similar and different from some of the other sections?

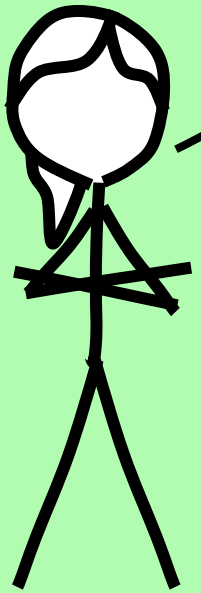
In this orientation, we will cover these topics:



Overview:

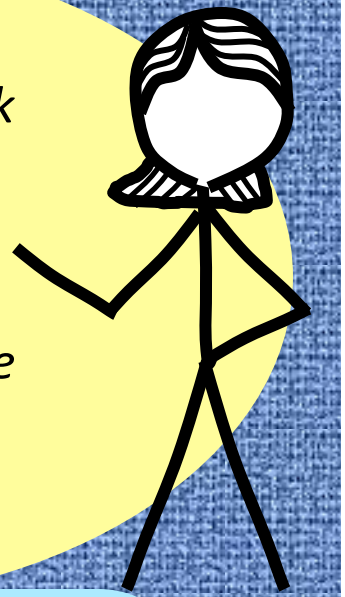
1. Syllabus, website, lab station, lab partner
2. Format of weekly lab experience
3. Laboratory Safety
4. Laptop, Excel, LoggerPro
5. Your work product (what you do/turn in)
6. For our first experiment (next week)

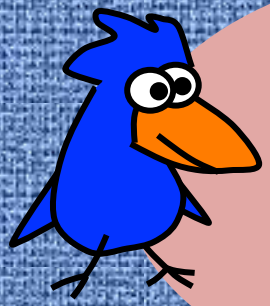
1. Syllabus, website, lab station, lab partner



The syllabus covers everything you need to know about the course, Chm 204. It provides the weekly schedule, lab reports, grading policies, quizzes, as well as unusual situations – such as not having a lab partner or missing lab.

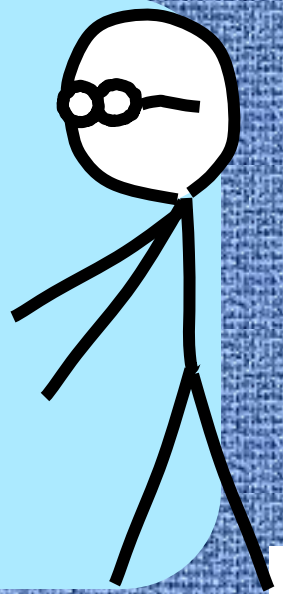
There is a quiz every week at the start of lab. The quiz next week will be over the syllabus, this orientation – and over the pre-lab presentation for Experiment 1!



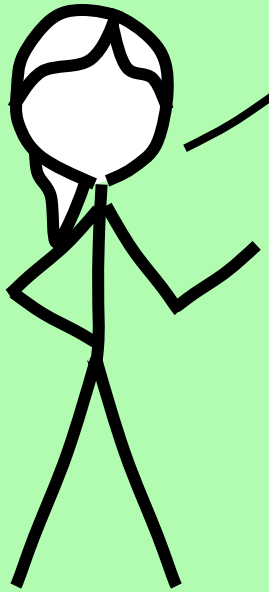


Link to the lab website from mattson.creighton.edu - just click Chm 204.

Pre-lab presentations will be available about one week before the lab. (The one for Experiment 1 is available now.) Download it from Dr. Mattson's Chm 204 website and study it before lab.

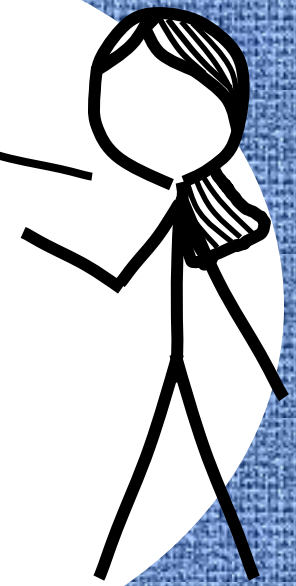


1. Syllabus, website, lab station, lab partner



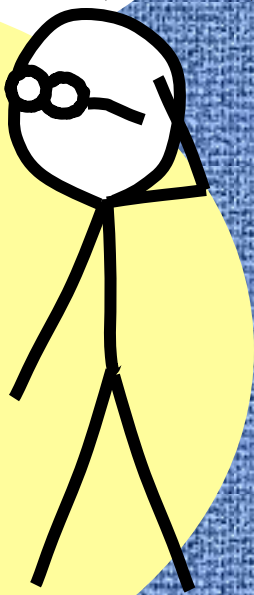
Your lab partner is your most important lab accessory. You will do almost all of the experiments with your partner. You and your lab partner will turn in individual lab reports, but will turn in one set of on-line results. Exchange phone numbers. Wake each other up.

If your lab partner is absent, notify Dr. Mattson and you will be re-assigned for the day. Joining the other two people at your station is not automatically allowed.

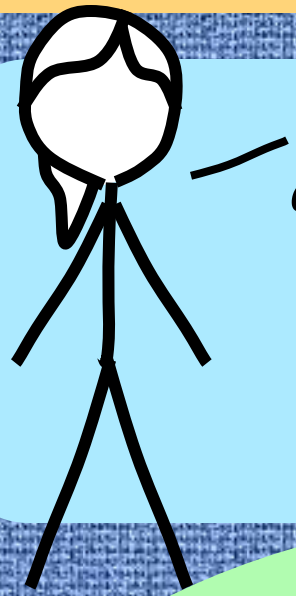


Be kind to your lab partner.

If you are going to be absent, tell your lab partner and Dr. Mattson as early as possible so arrangements can be made.

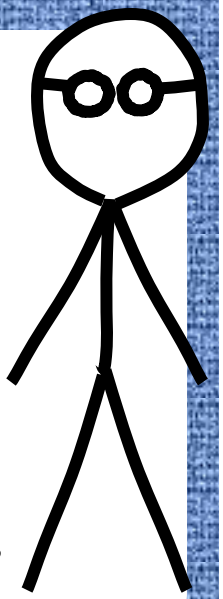


2. Format of weekly lab experience



So every teacher is different and has slightly different requirements. For example, we submit some results on-line.

In our section, you should bring your laptop every week. You will use your laptop to refer to the pre-lab presentation during the lab, and to collect data and make graphs.



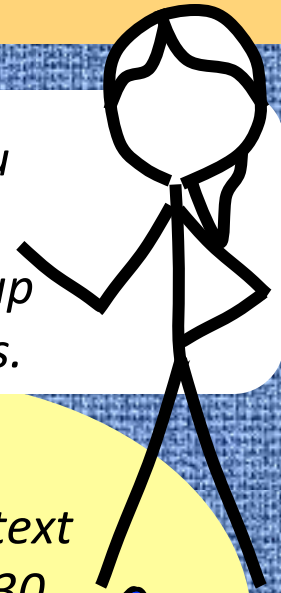
Read and follow the safety rules on page vii. The first section is called Attire, where it describes proper lab clothing. We call this "Dress for a mess." However some experiments do not require the special clothing. We will tell you in the pre-lab presentation when we should do this..

I like the sun.

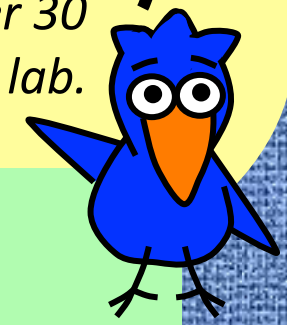
2. Format of weekly lab experience

Each experiment is worth 50 points, of which 10 points come from the quiz. The quiz starts promptly at 11 AM or 2 PM and usually lasts 10 minutes. Spend 30 minutes or more with the pre-lab presentation before the quiz. Use the pre-lab to write your introduction before the lab starts.

Don't be late or you will miss the quiz. There are no make-up quizzes or late-takes.



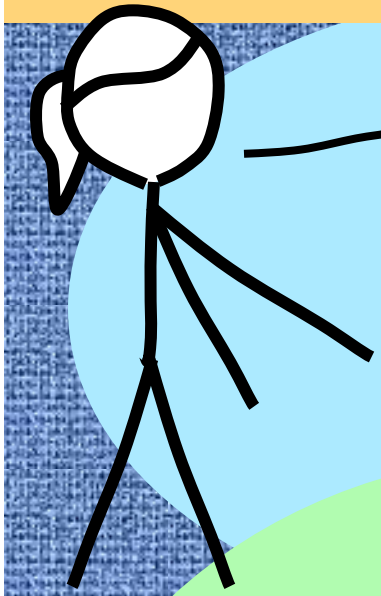
Arrange to call or text your lab partner 30 minutes before lab.



After the quiz is collected, things go like this:

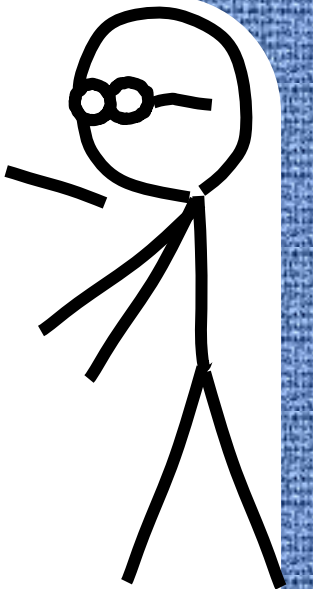
1. *Introductory comments by Dr. Mattson (<10 minutes)*
2. *Perform the experiment (90 - 120 minutes)*
3. *Submit on-line results (15 min, but not every week)*
4. *Clean up your area and put stuff back.*
5. *Finish your lab report and turn it in as instructed.*

2. Format of weekly lab experience



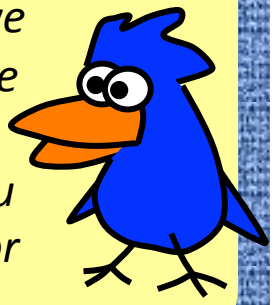
There are a few things that should be part of who you are, but let's talk about them, just so we know what they are.

Ethical behavior is imperative. CU people and all good people behave ethically. We do nothing to hurt others or to unjustly improve our own results.

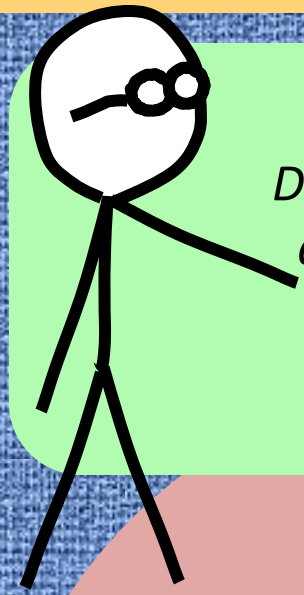


Your writing should be your own. This applies to the Introduction and Conclusion. Oh, and sources of error if there are any. Discussing what to write with your partner is fine, but don't copy what they wrote. Write it in you own words.

For example, suppose we had an 8% error but knew that if we fudged a bit, we could improve that. But doing so would be unethical. Instead, maybe you could repeat the experiment or live with the 8% error.

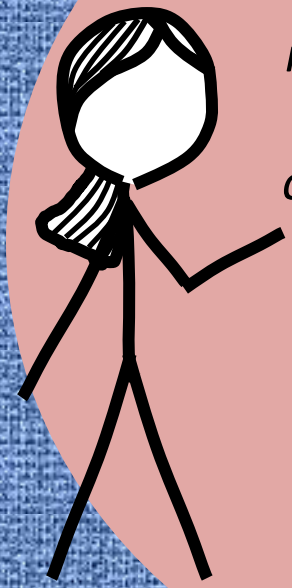


3. Safety orientation



During the first lab, Dr. Mattson and the TAs will show you the safety features of the lab.

The Safety tour includes:
1. *Fire extinguisher (2)*
2. *Doors (4)*
3. *Eye washes (3) and sinks*
4. *Safety shower (1)*



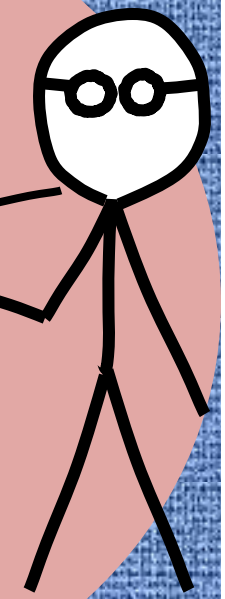
Regarding personal safety, read the Safety section starting on page vii. In addition to clothing, it covers lab etiquette, chemical and glassware safety and disposal of materials. We almost always keep our safety glasses on unless Dr. Mattson announces we can take them off.

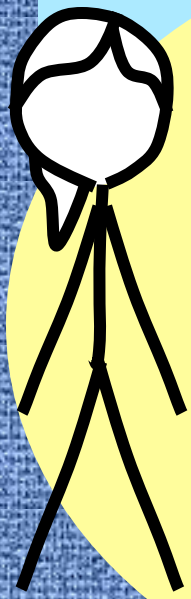
Not mentioned: If you break glassware, do not pick it up yourself. Immediately ask a TA or Dr. Mattson for help. Ask about cleaning up chemical spills before doing so.

4. Laptop, Excel, LoggerPro

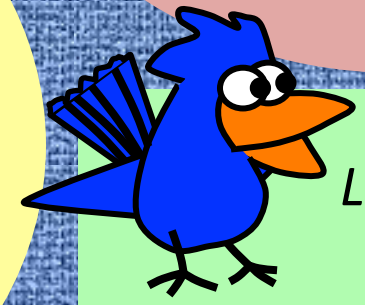
We will learn how to use Excel. You can get a free copy of Microsoft Office just by being a Creighton student. Get your copy today! We need it for Experiment 1!

On page xv, the lab manual discusses LoggerPro, a data collection program you can download for free. We will need LoggerPro this semester, but not until Experiments 11 and 12.





Generally, lab reports are due the day after lab at the start of lecture. That way you can think about your conclusions a bit more carefully, and check your calculations and so on… (You can also opt to hand in the report before you leave.)



LoggerPro is a hoot!

5. Your work product (what you do/turn in)

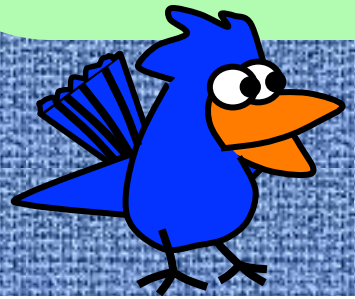
Laboratory Report Format

A. Cover Sheet

B. Lab report (carbon copy pages)

1. Introduction (written prior to lab.)
2. Experimental Details, Observations, Results, Calculations (in detail, units, significant figures)
3. Conclusions
4. Sources of error
5. On-line results (not every week and not for Experiment 1)

C. Graphs produced during lab (not every week)

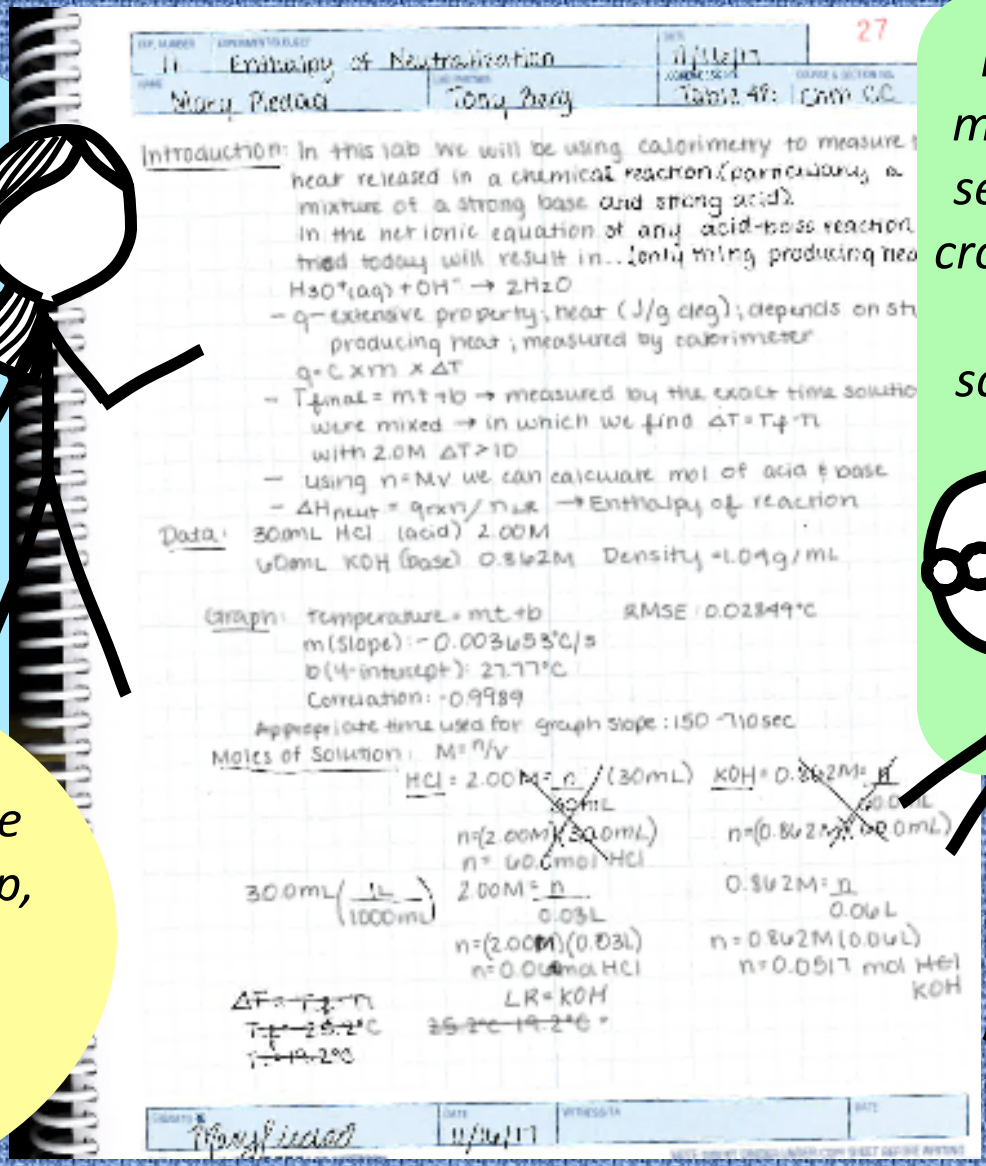


The cover sheet gives a summary of what is needed

This is the general format for every lab report.

5. Your work product (what you do/turn in)

The lab notebook is a "live notebook" – it is a record of what you did, recorded as you were doing it. Do not take notes on a separate paper and write it later.



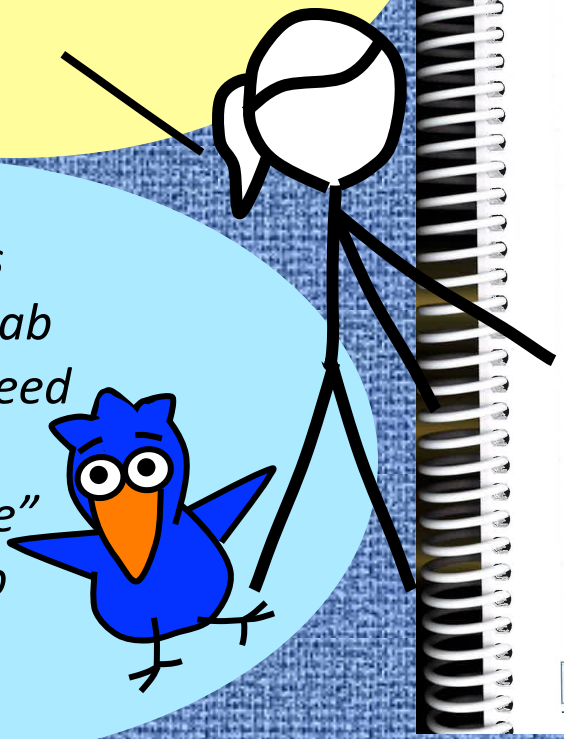
If you make a mistake like you see here, simply cross it out with a line. Do not scratch it out or erase it.

Also, fill out the boxes at the top, and sign and date it at the bottom.

5. Your work product (what you do/turn in)

Large spaces at the bottom of each page are sometimes X-ed out like you see here.

We mention this because in future lab courses, you may need to follow this "standard practice" for keeping a lab notebook



EXP. NUMBER: 11 | EXPERIMENT/SUBJECT: Enthalpy of Neutralization | DATE: 11/16/17 | 30

NAME: Mary Piedad | LAB PARTNER: Tony Berg | LOCKER/DESK NO.: Table 4B | COURSE & SECTION NO.: Chm CC

Sources of Error: None, because the ~~styrofoam~~ styrofoam cup is not a perfect calorimeter, temperature change may have been influenced by the pores that allowed external air to enter and cool the solution

Conclusion: Overall, this lab reinforced the use of a calorimeter & analyze how much heat was released in the equation. By finding moles we found that KOH was the limiting reagent. Our T_f was 27.4°C based off the linear equation of our graph. Our T_i = 19.1°C, which was the exact temperature when both solutions were mixed. Given that our specific heat was 3.7 J/g deg and our total mass was 93.8g, our q = 2900J. Because $q_{surr.} = -q_{rxn}$ $q_{rxn} = -2900J$. To find ΔH we divided −2900J by the LR (KOH) and our final value was −56 KJ/mol. The ideal ΔH was roughly −57.6 KJ/mol. Our % error was 2.8%.

$$\frac{56 - 57.6}{57.6\ KJ/mol} \times 100 = 2.78\%$$

Overall, we found that the base added accelerated the temperature change from T_f and T_i. This indicates the exothermic reaction had weak intermolecular forces. We could see these intermolecular relationships through the graph's steep change and through our $q = cxmx\Delta T$ equation.

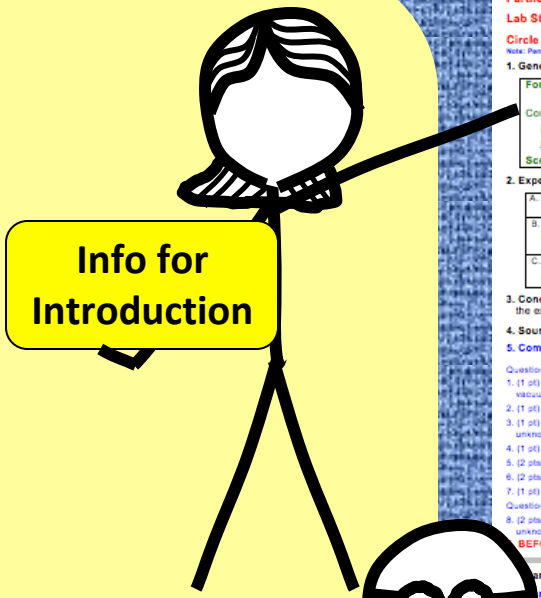
SIGNATURE: Maryfiedad | DATE: 11/16/17 | WITNESS/TA | DATE

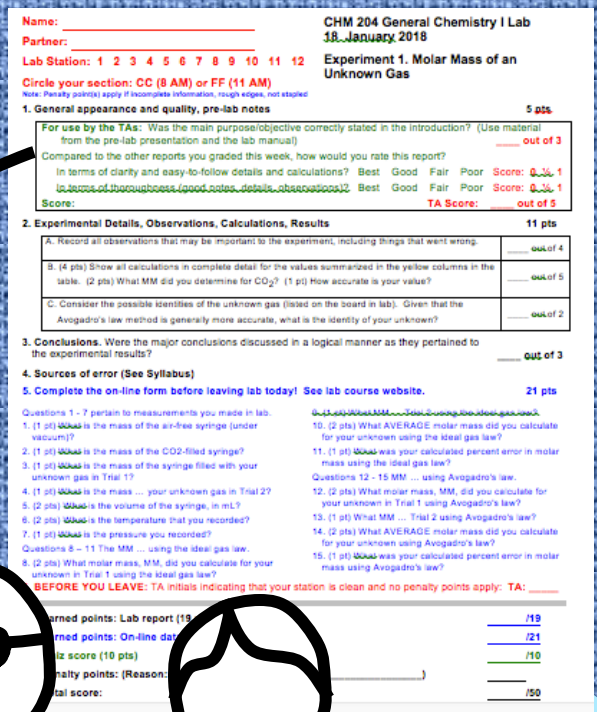
THE HAYDEN-McNEIL STUDENT LAB NOTEBOOK

NOTE: INSERT DIVIDER UNDER COPY SHEET BEFORE WRITING

5. Your work product (what you do/turn in)

Before you come to lab you should study the pre-lab presentation and write an Introduction that includes the main purpose/objective. This is always stated in Slide 2 of the pre-lab. Include additional information from slides labeled with this yellow alert





Name: _____
Partner: _____
Lab Station: 1 2 3 4 5 6 7 8 9 10 11 12
Circle your section: CC (8 AM) or FF (11 AM)
Note: Penalty point(s) apply if incomplete information, rough edges, not stapled

CHM 204 General Chemistry I Lab
18 January 2018
Experiment 1. Molar Mass of an Unknown Gas

1. General appearance and quality, pre-lab notes — 5 pts
For use by the TAs: Was the main purpose/objective correctly stated in the Introduction? (Use material from the pre-lab presentation and the lab manual) ____ out of 3
Compared to the other reports you graded this week, how would you rate this report?
In terms of clarity and easy-to-follow details and calculations? Best Good Fair Poor Score: 0 .5 1
In terms of thoroughness (good notes, details, observations)? Best Good Fair Poor Score: 0 .5 1
Score: TA Score: ____ out of 5

2. Experimental Details, Observations, Calculations, Results — 11 pts
A. Record all observations that may be important to the experiment, including things that went wrong. ____ out of 4
B. (4 pts) Show all calculations in complete detail for the values summarized in the yellow columns in the table. (2 pts) What MM did you determine for CO_2? (1 pt) How accurate is your value? ____ out of 5
C. Consider the possible identities of the unknown gas (listed on the board in lab). Given that the Avogadro's law method is generally more accurate, what is the identity of your unknown? ____ out of 2

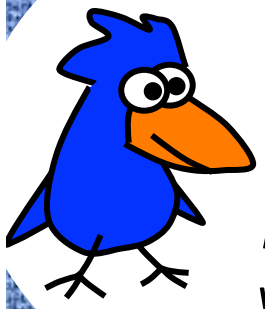
3. Conclusions. Were the major conclusions discussed in a logical manner as they pertained to the experimental results? ____ out of 3

4. Sources of error (See Syllabus)

5. Complete the on-line form before leaving lab today! See lab course website. — 21 pts

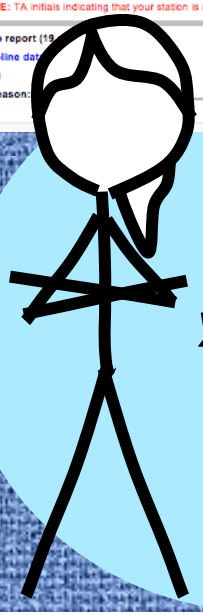
Questions 1 - 7 pertain to measurements you made in lab.
1. (1 pt) ~~Blank~~ is the mass of the air-free syringe (under vacuum)?
2. (1 pt) ~~Blank~~ is the mass of the CO_2-filled syringe?
3. (1 pt) ~~Blank~~ is the mass of the syringe filled with your unknown gas in Trial 1?
4. (1 pt) ~~Blank~~ is the mass ... your unknown gas in Trial 2?
5. (2 pts) ~~Blank~~ is the volume of the syringe, in mL?
6. (2 pts) ~~Blank~~ is the temperature that you recorded?
7. (1 pt) ~~Blank~~ is the pressure you recorded?
Questions 8 – 11 The MM ... using the ideal gas law.
8. (2 pts) What molar mass, MM, did you calculate for your unknown in Trial 1 using the ideal gas law?
10. (2 pts) What AVERAGE molar mass did you calculate for your unknown using the ideal gas law?
11. (1 pt) ~~Blank~~ was your calculated percent error in molar mass using the ideal gas law?
Questions 12 - 15 MM ... using Avogadro's law.
12. (2 pts) What molar mass, MM, did you calculate for your unknown in Trial 1 using Avogadro's law?
13. (1 pt) What MM ... Trial 2 using Avogadro's law?
14. (2 pts) What AVERAGE molar mass did you calculate for your unknown using Avogadro's law?
15. (1 pt) ~~Blank~~ was your calculated percent error in molar mass using Avogadro's law?
BEFORE YOU LEAVE: TA initials indicating that your station is clean and no penalty points apply: TA: _____

~~Earned~~ points: Lab report (19 — /19
~~Earned~~ points: On-line data — /21
Quiz score (10 pts) — /10
Penalty points: (Reason: _____) — _____
Total score: — /50



The Intro is carefully read. Don't copy the work of others – including that of your lab partner.

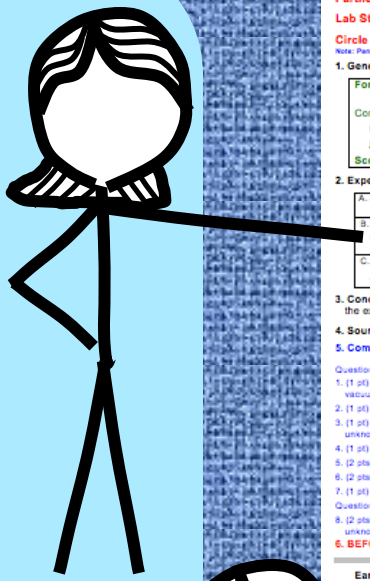
The introduction should include everything flagged in the pre-lab and is worth 3 points.

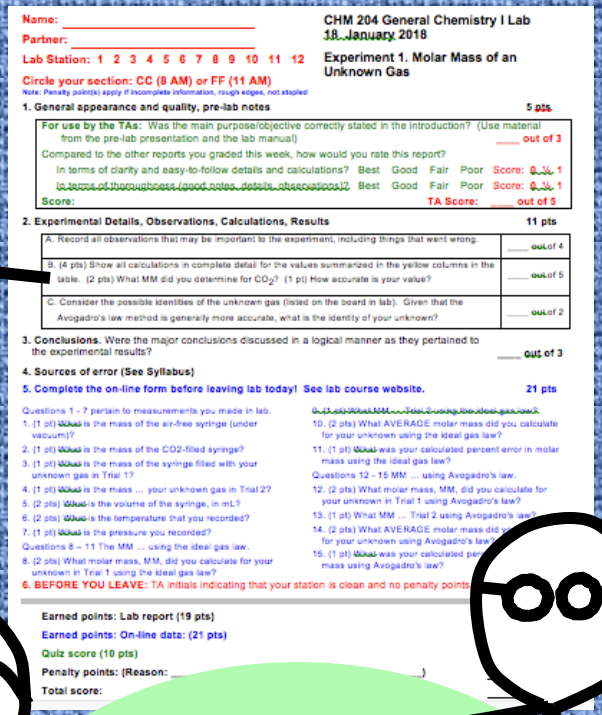


It's ok to discuss what you are going to write, but always write it yourself.

5. Your work product (what you do/turn in)

In the second part, we provide experimental details, observations, calculations, and results. This part varies with every experiment. Make sure you've done everything mentioned. If calculations are called for, carefully show your work, using proper units and significant figures.





Name: _____ CHM 204 General Chemistry I Lab

Partner: _____ 18 January 2018

Lab Station: 1 2 3 4 5 6 7 8 9 10 11 12 Experiment 1. Molar Mass of an Unknown Gas

Circle your section: CC (8 AM) or FF (11 AM)

Note: Penalty point(s) apply if incomplete information, rough edges, not stapled

1. General appearance and quality, pre-lab notes 5 pts

For use by the TAs: Was the main purpose/objective correctly stated in the introduction? (Use material from the pre-lab presentation and the lab manual) ____ out of 3

Compared to the other reports you graded this week, how would you rate this report?

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Score: TA Score: ____ out of 5

2. Experimental Details, Observations, Calculations, Results 11 pts

A. Record all observations that may be important to the experiment, including things that went wrong. ____ out of 4

B. (4 pts) Show all calculations in complete detail for the values summarized in the yellow columns in the table. (2 pts) What MM did you determine for CO_2? (1 pt) How accurate is your value? ____ out of 5

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3. Conclusions. Were the major conclusions discussed in a logical manner as they pertained to the experimental results? ____ out of 3

4. Sources of error (See Syllabus)

5. Complete the on-line form before leaving lab today! See lab course website. 21 pts

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3. (1 pt) ~~Blank~~ is the mass of the syringe filled with your unknown gas in Trial 1?
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Questions 8 – 11 The MM ... using the ideal gas law.

8. (2 pts) What molar mass, MM, did you calculate for your unknown in Trial 1 using the ideal gas law?

~~9. (1 pt) Which MM ... Trial 2 using the ideal gas law?~~

10. (2 pts) What AVERAGE molar mass did you calculate for your unknown using the ideal gas law?
11. (1 pt) ~~Blank~~ was your calculated percent error in molar mass using the ideal gas law?

Questions 12 - 15 MM ... using Avogadro's law.

12. (2 pts) What molar mass, MM, did you calculate for your unknown in Trial 1 using Avogadro's law?
13. (1 pt) What MM ... Trial 2 using Avogadro's law?
14. (2 pts) What AVERAGE molar mass did ... for your unknown using Avogadro's law?
15. (1 pt) ~~Blank~~ was your calculated ... mass using Avogadro's law?

6. BEFORE YOU LEAVE: TA initials indicating that your station is clean and no penalty points

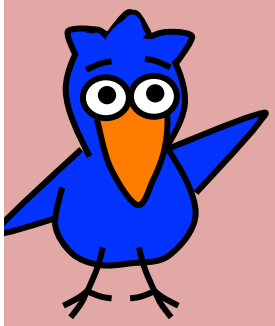
Earned points: Lab report (19 pts)

Earned points: On-line data: (21 pts)

Quiz score (10 pts)

Penalty points: (Reason: _____)

Total score: _____



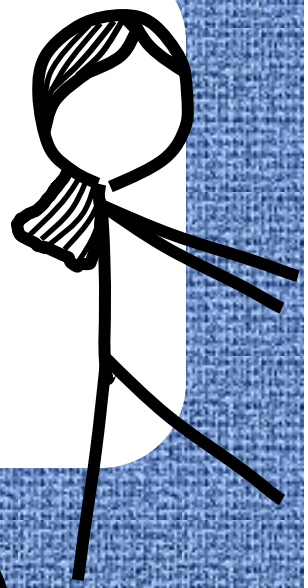
Double-check each other when reading volume. It's real easy to mess up.

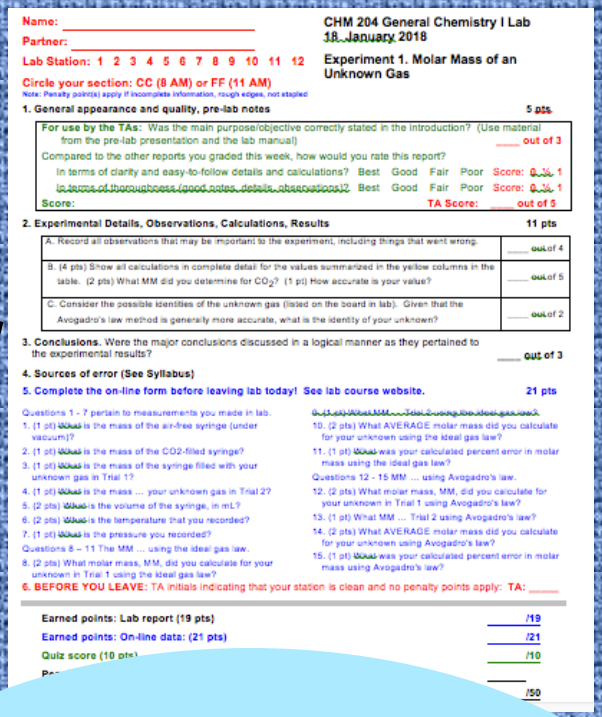
Make sure you and your lab partner agree on all measured and calculated values.

Regarding Experimental Details, you can write "We followed the procedure in the lab manual" unless we or you made changes, of course.

5. Your work product (what you do/turn in)

Then we have conclusions and sources of error. Spend time writing the conclusions. It's here we write about what we now know from our hard work. Discuss conclusions with your partner, but write it yourself.





Name: _____
Partner: _____
Lab Station: 1 2 3 4 5 6 7 8 9 10 11 12
Circle your section: CC (8 AM) or FF (11 AM)
Note: Penalty point(s) apply if incomplete information, rough edges, not stapled

CHM 204 General Chemistry I Lab
18 January 2018

Experiment 1. Molar Mass of an Unknown Gas

1. General appearance and quality, pre-lab notes — 5 pts

For use by the TAs: Was the main purpose/objective correctly stated in the introduction? (Use material from the pre-lab presentation and the lab manual) ____ out of 3

Compared to the other reports you graded this week, how would you rate this report?

In terms of clarity and easy-to-follow details and calculations? Best Good Fair Poor Score: 0 .5 1

In terms of thoroughness (good notes, details, observations)? Best Good Fair Poor Score: 0 .5 1

Score: TA Score: ____ out of 5

2. Experimental Details, Observations, Calculations, Results — 11 pts

A. Record all observations that may be important to the experiment, including things that went wrong.	____ out of 4
B. (4 pts) Show all calculations in complete detail for the values summarized in the yellow columns in the table. (2 pts) What MM did you determine for CO_2? (1 pt) How accurate is your value?	____ out of 5
C. Consider the possible identities of the unknown gas (listed on the board in lab). Given that the Avogadro's law method is generally more accurate, what is the identity of your unknown?	____ out of 2

3. Conclusions. Were the major conclusions discussed in a logical manner as they pertained to the experimental results? ____ out of 3

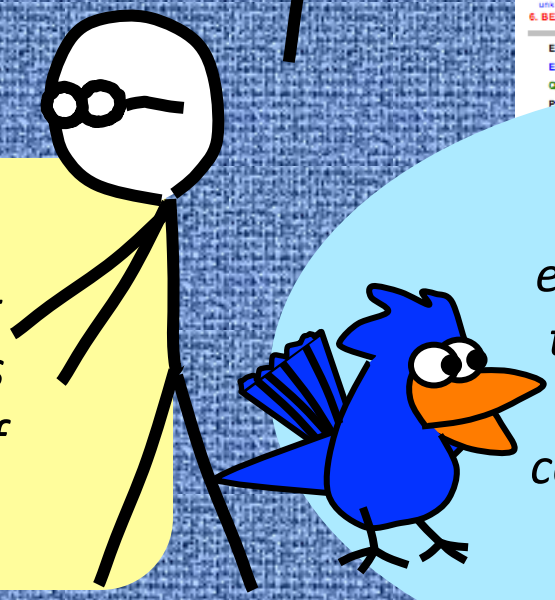
4. Sources of error (See Syllabus)

5. Complete the on-line form before leaving lab today! See lab course website. — 21 pts

Questions 1 - 7 pertain to measurements you made in lab.
1. (1 pt) Mass is the mass of the air-free syringe (under vacuum)?
2. (1 pt) Mass is the mass of the CO2-filled syringe?
3. (1 pt) Mass is the mass of the syringe filled with your unknown gas in Trial 1?
4. (1 pt) Mass is the mass ... your unknown gas in Trial 2?
5. (2 pts) Volume is the volume of the syringe, in mL?
6. (2 pts) Temp is the temperature that you recorded?
7. (1 pt) Press is the pressure you recorded?
Questions 8 – 11 The MM ... using the ideal gas law.
8. (2 pts) What molar mass, MM, did you calculate for your unknown in Trial 1 using the ideal gas law?
10. (2 pts) What AVERAGE molar mass did you calculate for your unknown using the ideal gas law?
11. (1 pt) Error was your calculated percent error in molar mass using the ideal gas law?
Questions 12 - 15 MM ... using Avogadro's law.
12. (2 pts) What molar mass, MM, did you calculate for your unknown in Trial 1 using Avogadro's law?
13. (1 pt) What MM ... Trial 2 using Avogadro's law?
14. (2 pts) What AVERAGE molar mass did you calculate for your unknown using Avogadro's law?
15. (1 pt) Error was your calculated percent error in molar mass using Avogadro's law?

6. BEFORE YOU LEAVE: TA initials indicating that your station is clean and no penalty points apply: TA: _____

Earned points: Lab report (19 pts) /19
Earned points: On-line data: (21 pts) /21
Quiz score (10 pts) /10
/50

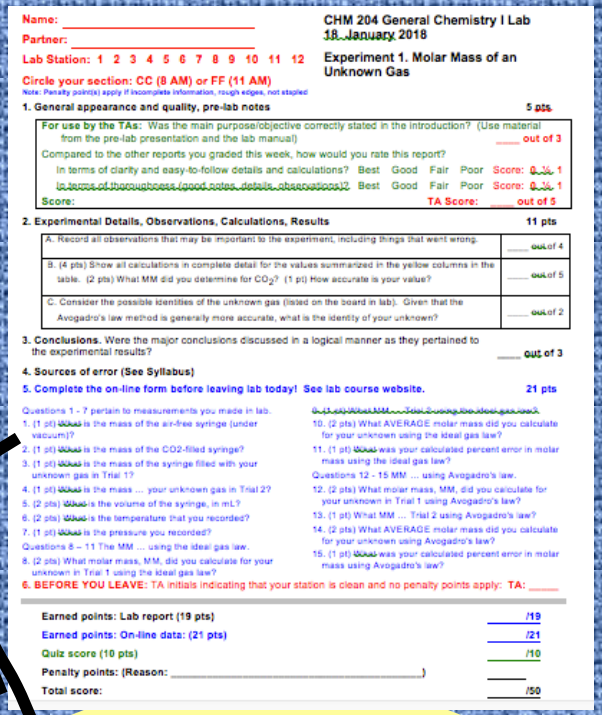


So with sources of error… sometimes – usually even – everything justs works. It is ok to write, "None noted" if that's the case.

If there was a source of error that you noted along the way, discuss this with Dr. Mattson. In many cases there is time and you can just do it over.

5. Your work product (what you do/turn in)

The on-line portion allows Dr. Mattson to check your calculations. Most of the experiments this semester involve submitting results on-line. You and your lab partner normally submit only one set. Enter the data carefully and read the questions carefully. In addition, you will be graded for significant figures and units



Name: _____
Partner: _____
Lab Station: 1 2 3 4 5 6 7 8 9 10 11 12
Circle your section: CC (8 AM) or FF (11 AM)
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CHM 204 General Chemistry I Lab
18 January 2018
Experiment 1. Molar Mass of an Unknown Gas

1. General appearance and quality, pre-lab notes — 5 pts
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Compared to the other reports you graded this week, how would you rate this report?
In terms of clarity and easy-to-follow details and calculations? Best Good Fair Poor Score: 0 .5 1
In terms of thoroughness (good notes, details, observations)? Best Good Fair Poor Score: 0 .5 1
Score: TA Score: ____ out of 5

2. Experimental Details, Observations, Calculations, Results — 11 pts
A. Record all observations that may be important to the experiment, including things that went wrong. ____ out of 4
B. (4 pts) Show all calculations in complete detail for the values summarized in the yellow columns in the table. (2 pts) What MM did you determine for CO_2? (1 pt) How accurate is your value? ____ out of 5
C. Consider the possible identities of the unknown gas (listed on the board in lab). Given that the Avogadro's law method is generally more accurate, what is the identity of your unknown? ____ out of 2

3. Conclusions. Were the major conclusions discussed in a logical manner as they pertained to the experimental results? ____ out of 3

4. Sources of error (See Syllabus)

5. Complete the on-line form before leaving lab today! See lab course website. — 21 pts
Questions 1 - 7 pertain to measurements you made in lab.
1. (1 pt) ~~Blank~~ is the mass of the air-free syringe (under vacuum)?
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6. BEFORE YOU LEAVE: TA initials indicating that your station is clean and no penalty points apply: TA: _____

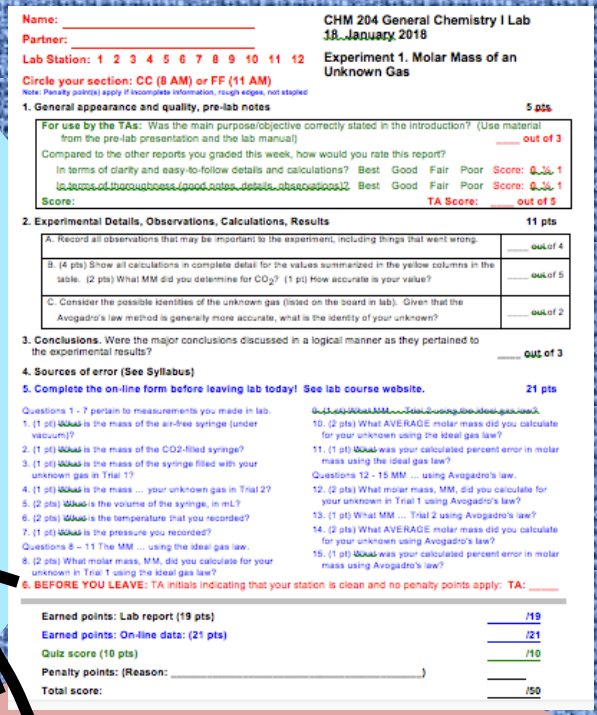
Earned points: Lab report (19 pts) /19
Earned points: On-line data: (21 pts) /21
Quiz score (10 pts) /10
Penalty points: (Reason: _____) _____
Total score: /50

On-line results can be worth quite a few points. Enter data together, double-checking what is being entered.

If you mess up, you can enter everything again. Dr. Mattson uses the most recent data set received before the deadline (end of the lab period)

5. Your work product (what you do/turn in)

After you are done, clean up your station. Dispose of chemical wastes as instructed. Wash all glassware, rinse with distilled water, and set to dry on paper towels. Wipe down your bench top. It should look great for the next group. Call your TA over and she/he will sign you out. This signature is worth 5 points! Don't leave without it.



Name: _____ CHM 204 General Chemistry I Lab

Partner: _____ 18 January 2018

Lab Station: 1 2 3 4 5 6 7 8 9 10 11 12 Experiment 1. Molar Mass of an Unknown Gas

Circle your section: CC (8 AM) or FF (11 AM)

Note: Penalty point(s) apply if incomplete information, rough edges, not stapled

1. General appearance and quality, pre-lab notes 5 pts

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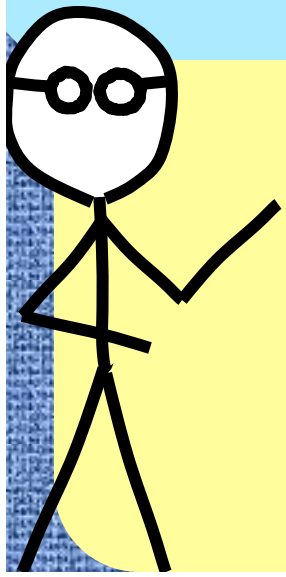
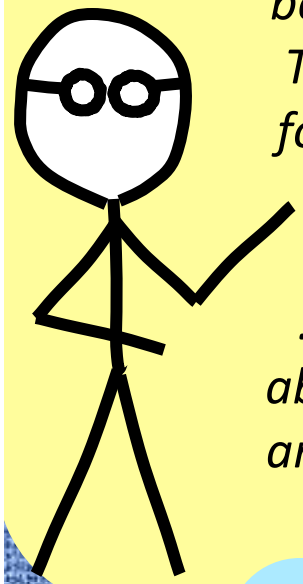
Quiz score (10 pts)	/10
Penalty points: (Reason: _____)	_____
Total score:	/50



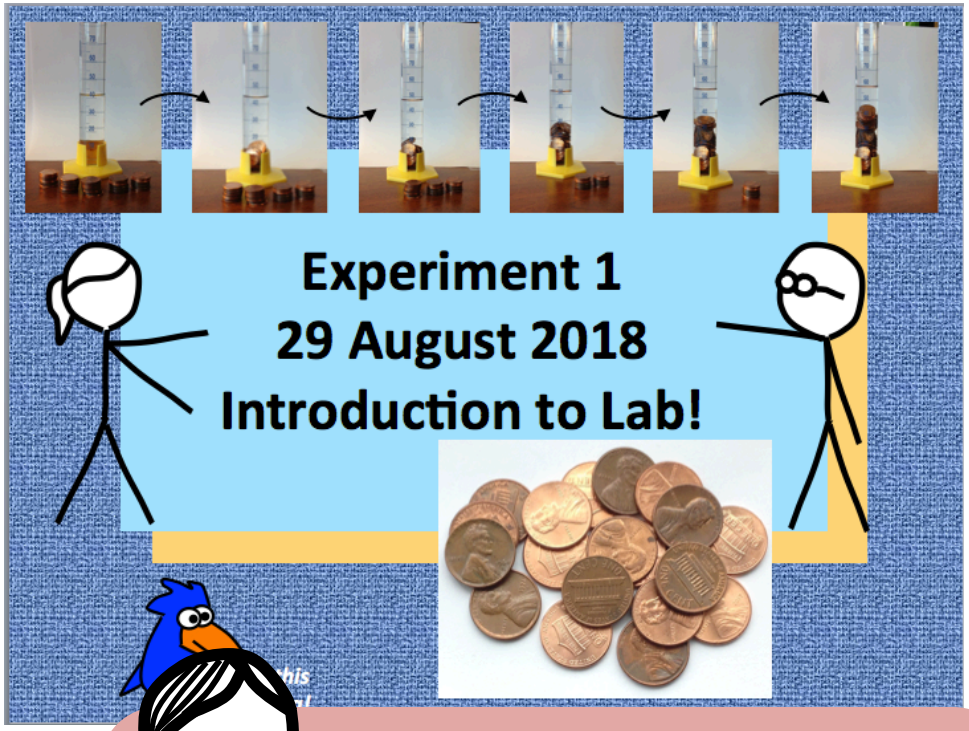
You can turn in your lab report the same day, or prior to the start of class tomorrow. Some weeks you have to turn it in the same day.

Oh, one more thing about on-line results… If you submit on-line results as an individual, they will be graded just for you, separate from your lab partner. This is always a choice you have.

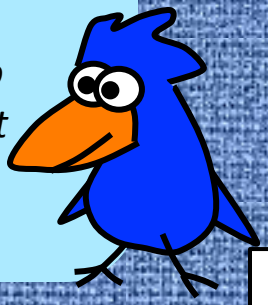
6. For next week… Experiment 1



Download and study the lab presentation before coming to lab. The quiz will include four questions about the pre-lab presentation…
…and six questions about this orientation and the Chm 203/204 syllabus



Oh BTW and FYI: You can bring food and drinks, but leave them on the table outside of lab. No food or drink in lab. Not even bird seed.



Lab starts right on time with a quiz. Special attire is not necessary for Experiment 1.

Stick people inspired by xkcd cartoons by Randall Munroe (www.xkcd.com)

Chem Lab with the Stick People and Bird *was created and produced by Dr. Bruce Mattson, Creighton Chemistry. Enjoy it and share it if you wish.*