Chemistry 209:
General Chemistry for Engineers

L01 - Instructor: Dr. Amanda Musgrove Richer

Today:

- Introduction to course:
  - Who am I?
  - Who are you?
  - What are the course rules?
  - What will we do this semester?

Course Structure

- **Lectures / classtime:** Tues/Thurs 2-3:15 PM
  - Notes 'skeletons' posted online before class (not the annotated versions).
  - TopHat questions and group discussions: graded by TH participation. Option to replace one (non-zero) tutorial grade at end of term.
- **Laboratories:** Started yesterday – 3h biweekly
  - 5 experiments plus check-in/orientation.
  - Each has a pre-lab quiz and assignment plus a written report.
  - Must complete at least 3 of 5 labs and have >50% average to get *prerequisite credit* (C- or more).
- **Tutorials**: Start Sept 19 – 1h weekly
  - 5 quizzes alternate with 4 group assignments (all graded)
  - Must have >50% average for prerequisite credit.
- **Exams**: Midterm (evening of Oct 19th) and Final (date TBA)
  - Must have >50% weighted average for prerequisite credit.

CHEM 209 People & Contacts

Lecture

Coordinator:
Dr. A. Musgrove Richer

Instructors:
Dr. A. Musgrove Richer
& Dr. V. Mozol (L02)

Demo Tech:
Mr. Patrick Yu

Tutorials

Coordinator:
Dr. R. Jackson

Instructors:

Mr. K. Hofstetter,
Dr. R. Jackson,
Dr. V. Mozol,
Dr. A. Musgrove Richer,
and Dr. N. Sandblom

Labs

Coordinator:
Dr. R. Jackson

Instructors:
See D2L for names and contact info for each section

Lab Techs:
Ms. D. Jo
& Mr. Z. Mahimwalla

Reaching me

- I will try to be in/around the classroom in the break *after* class
  - I have another class immediately before this – I'll try not to be late!

- Office hours in SA 144F:
  Mon 1-2 PM
  Tues 10:30-11:30 AM
- Coffee hour: at ICT Good Earth
  Wed 3-4 PM
- Appointments: https://doodle.com/musgrove or by email

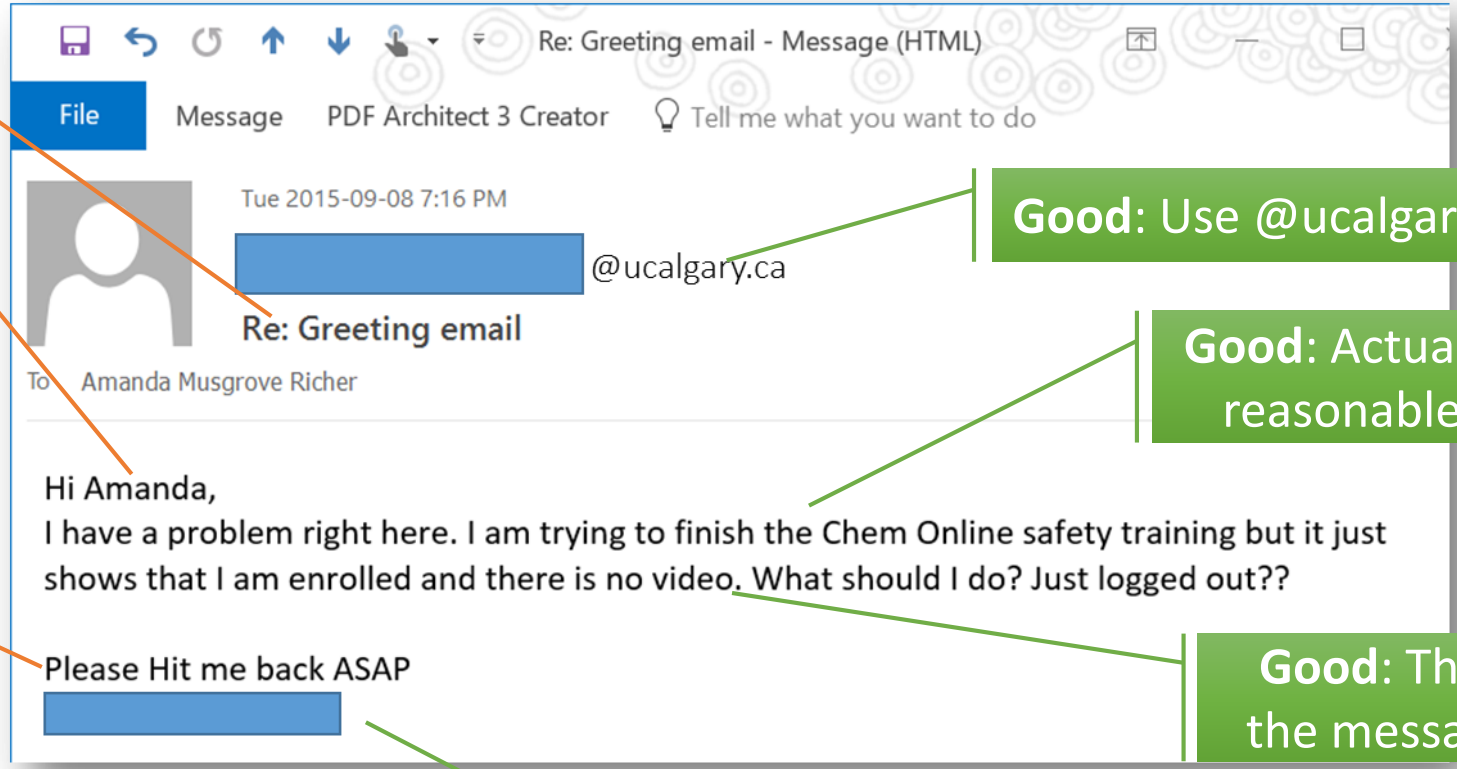
Emailing me (and your other instructors!)

This is an actual email I received:

Improve: Put *CHEM 209* in subject line

Improve: Use a formal greeting: e.g. “Dr. Musgrove”`

Improve: Use a more formal closing



Good: Use @ucalgary.ca email

Good: Actual sentences, reasonable grammar

Good: The point of the message is clear

Good: Sign your name

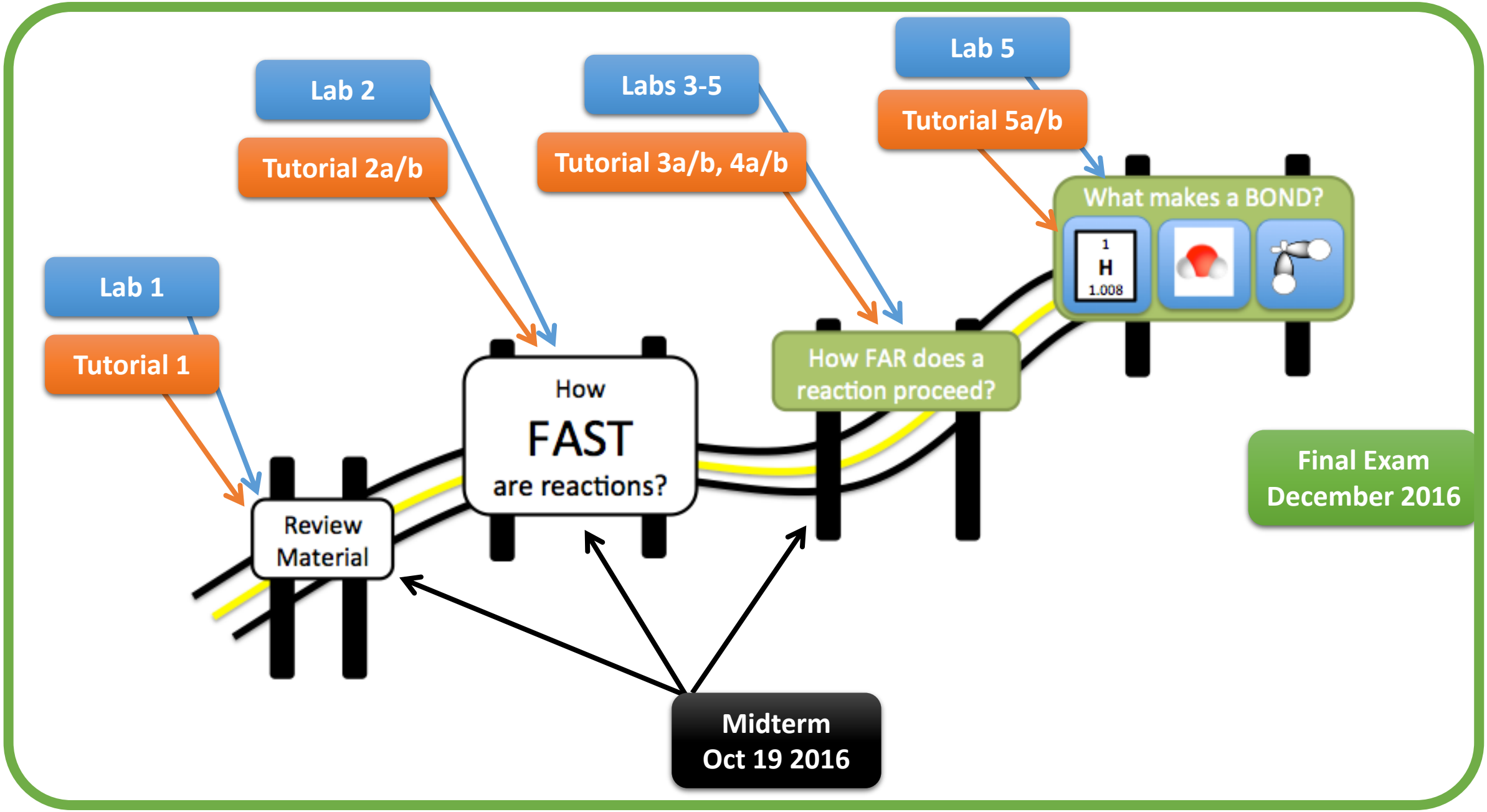
Give **1-2 business days** for a reply in most cases. It may be easier to answer your question in person/at office hours. Make sure you check the syllabus / FAQ before emailing!

Communication & Class Representatives

You don’t have to be an anonymous student number!

- Come to office hours / coffee hour
- Ask questions after class
- Volunteer to be a class rep!
  - 2-5 volunteers
  - Be ‘first contact’ for other students (in person or online)
  - Meet together with me ~1hr/week to discuss course progress
  - Get to know your class better
  - Get a reference letter at end of term
  - Interested? Email me your contact info and **2 week** course schedule along with a short write up of why you’d like to be class rep. **by Sep 26th**

What is CHEM 209?



Desire2Learn (D2L) course site

- Access through my.ucalgary.ca login
- Some features not accessible on mobile site – use the desktop site!
- Contains:
  - Course News
  - Discussions
  - Course Content (Labs, Lecture notes, Tutorial info)
  - Important Documents:
    - Course outline
    - Course syllabus
    - Learning Outcomes
    - Lab Manual

Course Outline

UNIVERSITY OF CALGARY

UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY
COURSE OUTLINE
FALL 2016

1. **Course: COURSE: CHEMISTRY 209, General Chemistry for Engineers**

Lecture Sections:

LEC	DAY	TIME	ROOM	INSTRUCTOR	OFFICE	PHONE	EMAIL	OFFICE HOURS
L01	TR	14:00-15:15	SB103	Dr. A. Musgrove Richer	SA 144F	220-2745	amanda.musgroveriche@ucalgary.ca	TBA
L02	TR	12:30-13:45	SB103	Dr. V. Mozol	SA 144E	210-8458	vjmozol@ucalgary.ca	TBA
Course Coordinator:				Dr. A. Musgrove Richer	SA 144F	220-2745	amanda.musgroveriche@ucalgary.ca	TBA
Lab / Tutorial Coordinator:				Dr. R. Jackson	SA 156	220-8274	rjjackso@ucalgary.ca	TBA

Course website can be reached via the course management system, D2L.
Departmental Office: SA 229, 220-5341, chem.undergrad@ucalgary.ca

2. **Prerequisites:** Chemistry 30 (or Continuing Education - Introduction to Chemistry) and one of Math 30-1 or Pure Mathematics 30 or Mathematics II (offered by Continuing Education). Mathematics 31 is strongly recommended. http://www.ucalgary.ca/pubs/calendar/current/chemistry.html#6509

Note: The calendar description and the Faculty of Science policy on prerequisites and antirequisites is described in section 3.5 C. of the online University Calendar (http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html). Students are responsible to ensure that they meet all prerequisite requirements for each course in which they are registered. Students who do not meet these requirements will be deleted from the course.

This is the course contract.
By remaining registered in CHEM 209, you are agreeing to its' terms.
Review it carefully!

3. **Grading:** The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Tutorial Assignments (9)	20%	
Laboratory experiments (5)	20%	
Midterm Examination	20%	(Wednesday October 19, 2016)
Final Examination	40%	(To be scheduled by the Registrar)

Conflicts with the midterm date/time?

Notify the Coordinator (me!) ASAP with details of the conflict

(i.e. your timetable)

You must request accommodations **at least two weeks before the exam**.

(by Oct 5th)

Course Syllabus

UNIVERSITY OF CALGARY
DEPARTMENT OF CHEMISTRY
COURSE SYLLABUS
Fall 2016

COURSE: CHEM 209, General Chemistry for Engineers

LEC	DAY	TIME	ROOM	INSTRUCTOR	OFFICE	PHONE	EMAIL	OFFICE HOURS
L01	TR	14:00-15:15	SB103	Dr. A. Musgrove Richer	SA 144F	220-2745	amanda.musgroveriche@ucalgary.ca	TBA
L02	TR	12:30-13:45	SB103	Dr. V. Mozol	SA 144E	210-9816	vjmozol@ucalgary.ca	TBA

Course Coordinator:	Dr. A. Musgrove Richer	SA 144F	220-2745	amanda.musgroveriche@ucalgary.ca	TBA
Lab / Tutorial Coordinator:	Dr. R. Jackson	SA 156	220-8274	rjjackso@ucalgary.ca	TBA

TEXTBOOK: *Chemistry: The Molecular Nature of Matter and Change*, 2nd Canadian Ed.; Silberberg M, Amateis P, Lavieri S, Venkatsewaran R, 2016, McGraw-Hill Ryerson.

TOPICS INCLUDED AND SUGGESTED READING:
Students are responsible for all material included in the lectures, laboratories, and tutorials. Most of the relevant material for these content areas are in the designated sections from the textbook: Chapters 1-4, 6-10, 14-17 and 19.

This document lays out the details about course content and relates it to the textbook.

Learning Outcomes Document

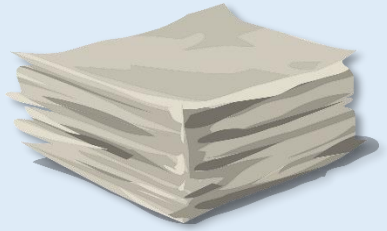
Big Idea: How FAST are reactions?

KEY CONCEPTS	ESSENTIAL SKILLS	TEXTBOOK READINGS:	TEXTBOOK QUESTIONS:
Chemical reactions occur at certain speeds.	✓ Qualitatively *describe* what the speed of a reaction depends upon.	14.1	Chapter 14: 3, 5
The speed of a reaction is measured by looking at concentration changes over time.	✓ *Determine* the instantaneous and average rate of reaction from experimental data.	14.2	12, 14, 18
	✓ *Generate* plots of concentration versus time for the chemical species of a reaction.	14.2	10
	✓ *Relate* reactant concentration to instantaneous reaction rates using rate laws.	14.3	32 Sample 14.2
	✓ Given experimental data, quantitatively *determine* the components of a rate law (*k* and order), using the method of initial rates.	14.3	34 Sample 14.4

Laboratory Component

- Labs are <u>every other week</u> (check your schedule) – 5 experiments total
  - Each involves pre-lab exercises and a lab report
- Labs are <u>mandatory</u>
  - you must complete at least 3 and average >50% to get C- or higher in class
- Started <u>yesterday</u> for odd numbered sections
  - Even numbered sections start next week
- Check D2L for lab manual, schedule, and instructions
- Complete the Online Safety Course before Expt 1
- You'll need **3 blue notebooks** (buy from bookstore or ESS in ENE 132)

Checkin - Remember to bring:



Printouts

PPE

Tutorial Component

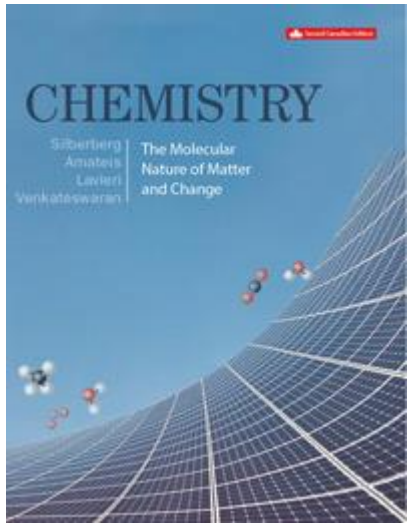
- Tutorials are every week
  - With a few holidays – check the course syllabus
- and mandatory
  - You must obtain >50% average in order to get C- or better in the course
- Starts next week (Sept 19)
- Preparation for Quiz 1 – try the “Preliminary Exercises” and suggested textbook problems for Ch. 1-3
- During tutorial you will do some or all of:
  - Working in small groups to complete open-book assignments
  - Writing quizzes individually
  - Writing closed-book quizzes as a small group
  - Interacting with your teaching assistant/tutorial instructor

Lecture Component

- We will use Top Hat and small-group discussions every day
- Instructions are on D2L to sign up if you haven't already (see the FAQ)
- Your Top Hat grade can replace your lowest tutorial quiz (if it improves your grade) – *add your ID number to your account*
- There is a 'buffer' for sick days / bad wifi days etc – don't panic!
- I don't expect you to get every question right … some questions I expect most people to struggle with, even! Try every question – don't just wait for the answer (we might just move on if everyone who answered got it right!) and participate in the pair-discussions – research shows that trying to explain your answers is a very effective learning strategy… even if your initial answer isn't correct!

You will all have phones/laptops in class – please be respectful to your classmates and avoid distracting them with your Facebook/videos/etc

What should you buy for CHEM 209?



Textbook: *Chemistry The Molecular Nature of Matter & Change,* 2nd Canadian Edition. by: M. Silberberg, S. Lavieri & R. Venkateswaran

3 blue Laboratory Report Notebooks

From bookstore or ESS in ENE 132 (9AM-4PM)

Schulich-sanctioned calculator

Lab coat

What should you do to be successful in CHEM 209?

1. Based on your experience this semester, what should a student do to succeed in this course?

Read the textbook and do practise problems.

Start your pre-lab assignments and lab reports *well* before they're due so you have time to email or visit office hours

Attend all lectures and do all practice problems

Study smarter not longer. especially for the midterm

Read the textbook, do practice questions. Take notes during lectures/listen.

- Sleep
- Pay attention in class

- Practice Problems
- Study
- ask questions

Be prepared for labs and tutorials. Obviously that isn't all that is necessary but I underestimated their importance.

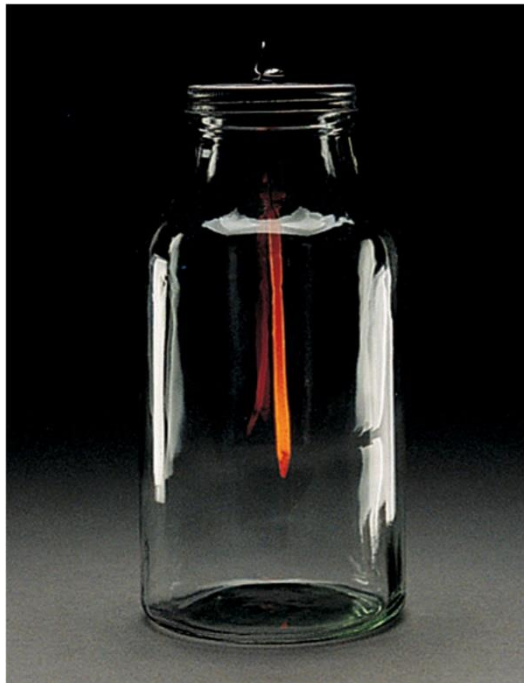
- A lot of practice questions
- Use DARC tutors
- Get labs done early

Big Idea 1: How Fast is a Reaction?

How Fast Is a Reaction?

Oxidization of iron:

$$Fe\ (s) + O_2\ (g) \rightarrow Fe_2O_3\ (s)$$



An iron nail merely glows red.

Steel wool reacts vigorously.

Silberberg et. al., Fig 14.3

Demo: Balloons

Balloon Contents	Initial Observations	Reaction

Video: Burning Steel Wool

Source: https://www.youtube.com/watch?v=5MDH92VxPEQ

Questions you should be able to answer by the end of this topic:

- Why does steel wool burn, while an iron nail does not?
- Why does “fluffing” the steel wool make it burn faster?
- Why does adding KCℓO make the steel wool burn faster?
- Why doesn’t steel wool burn until it is heated?

- Why didn’t H_2 and O_2 react when they were mixed?
- Why did the H_2/O_2 balloon react differently than the H_2/air balloon?