Topics
- Syllabus
- Homework, Format & General Notes
- Reading
- Brief History of Chem.
- Divisions of Chem.
- Possibly Unit M

Textbook:
- Bring it to class
- My favorite so far but a little tougher
- Don't open until sure you can register, nonreturns
- Long-term reference for future Chem/Sci classes

⇒ Study 10 hrs/week w/book × 10 = 100 hours spent learning book
  sell back ~½ (difficulty) ⇒ $35
  ⇒ $0.35/hour of knowing how book works

⇒ Pre-Read chapters before class
⇒ Active reading = take notes on book
  ⇒ write down questions,
  ⇒ loose outline of main topics for each section
  (in your own words)

⇒ Review notes after class & compare book notes to class notes

Homework:
⇒ Format handout
⇒ Goal
  ⇒ improve learning
  ⇒ reusuable work (study HW questions for exams)
⇒ Note: Engineering paper NOT required
  Nursing Majors: "chanting" = organized info & notes
HW Due Dates

→ always due on the week after we finish a section
  e.g. We finish Unit I today   Unit M on Thursday
  → Unit I HW due next week (zero problems)
  → Unit M HW due next week (20 problems)

  Both due on Thursdays

→ there are many problems:
  → start early
  → read questions before you read the chapter/lass

Groups: we will form groups on Thursday

- more info then...
- big part of the class, should make it more fun
- after class can be a good time to meet - I hope to stick around until ~8:45
HW (cont.)

- There are many problems to do (ugh!)
  - start early
  - pre-read book for lecture
  - mastering material leads to easier HW time understanding
- Chem 100 is 5 credits
  as a rule, spend 1-4 hours outside of class per week, per credit
  \[5 \text{ - 20 hours per week!}\]

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Early Chemists

- <100 AD → Greek Philosophers: study the world through reason
- 100 AD → Alchemists
  - tried to "change less valued substances into precious ones"
  - matter strives towards perfection
  - turn lead into gold lead → base gold → pure
  - Accomplishments
    - chemical methods for distillation, percolation, extraction
    - developed culture of observation & experimentation
    - confused everyone else.
Old Chemists (cont)

- Alchemists Explain Burning
  - Burn wood → Ash, heat, smoke
    → What happened to missing weight?
      → Loss of phlogiston
      → Related to life force & purity of an object
      → Explains last mass
  - Burn candle under a jar?
    - Burns for awhile, goes out
    - Burns longer, goes out
    - Air must absorb phlogiston, flame dies when air is full
  - Burn phosphorus
    → Burn
    - Ash weighs more
→ If phosphorus ash is heavier, what about phlogiston?
  
  → Theory is bad
  
  (→ Hg evidence too)

→ We now know that burning is:

\[ \text{Fuel} + \text{O}_2 \rightarrow \text{CO}_2 + \text{ash} \]

(oxygen from air)

Scientific Method

→ Lavoisier's work involved a theory → are we sure?

→ an experiment → did it work?

→ New theory → new test

→ Who memorized the "Scientific Method"?

→ Official sci. meth?

My Version

\[ \text{Observation} \]

\[ \text{Hypothesis} \]

\[ \text{Theory} \]

\[ \text{Law} \]

\[ \text{Skepticism} \]

\[ \text{Testing} \]

\[ \text{Revising} \]
Modern Chemistry

- there's a lot of it

- Ph.D. def:
  - learn more & more about less & less
  - focus on a narrow topic & do something new

- all of chemistry
  - biochem
  - analytic
  - physical
  - organic
  - inorganic

- drug discovery
- metabolism
- biotech

- measure how much
- measure what's there
- make new materials

- work with carbon
- make new molecules
- smells
- make synthetic drugs
- improve plastics

- lot's a math
- fundamentals of chem

- work with metals
- very pretty colors
- paint bees

- organic chemists use PChm, Anal. Chem almost everyday

- some anal chemists work on biochem systems
  - e.g. blood glucose monitors

- smaller sample
- faster analysis time
- more reliable

"chemometrics"

working to use math,
and chem to measure blood glucose into blood
Fig 1.4: ~20 ft stack of Chem. Abstracts

- An Abstract is a short 200-300 word description of a scientific paper (6-20 pages)
- A paper usually takes 3 mo - 2 yrs to produce
- Not all work gets published (corporate secrets)

Types of knowledge?
1st Day
- Hello
- Syllabus
- This Course

- Homework (Book)
  → Format
  → Assignments
  → Due 2 days later

- Reading
  → Pre-read for n. 5 minutes going next day
  → Listen in class the review anything

### Lecture 2 (1st Day)
- Hello
- Review Syllabus
- Agenda of Info

0. Scientific (Chemical) Knowledge & Language
   - Idioms, read/visualize
   - Terminology
   - Methods (not just "scientific method")

1. Calculations & Problem Solving
   - Tips of math
   - Story problems
   - The "hand" part of chemistry

2. Good Student Habits & Skills
   - Pre-read,
     → do all work w/future paper & research in mind
     - neat
     - organized
     - expect to forget a lot
   - Test-taking skills
     (later)

   - Computer: Be sure to learn internet, research, spreadsheet, writing
     at some point - use in 140, 150, 160

   - Keep up
     - gets