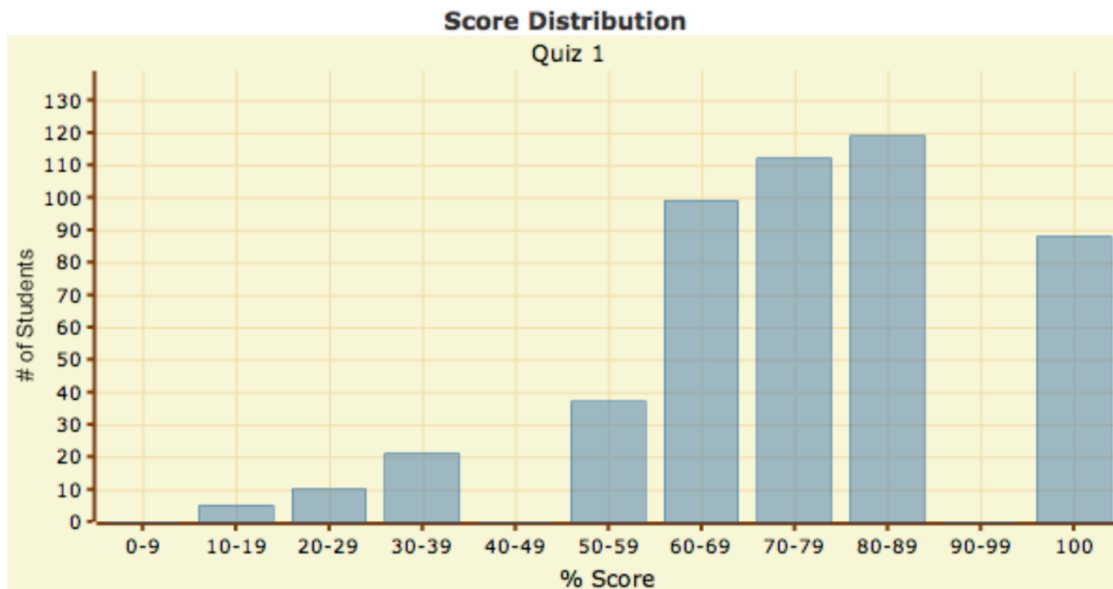


## Random Musings February 3, 2011

1. The results from the first quiz are in and the average was a 75 which is okay, but you can do better than that. No questions are being killed since all of them were answered at >50% correct. I am disappointed in the two colligative property questions which were answered correctly by only about half of you. In thinking about preparing for the next quiz, and for the first exam, be aware that we will be learning new material right up until you are tested, and the newest material will require the greatest attention since it is the least familiar.

Students participating:	491	501
Class median:	75%	75%
Class average:	74.85%	73.35%
Quest average:	64	64
Average points earned:	29.94	29.34
Standard deviation:	7.79	8.78



I am especially concerned that about 70 of you who got half the questions or less correct. This should send a big wake up call that you are either not studying the right way or don't know how to study for my quizzes and exams. I urge all of you to redouble your efforts and get started on learning the material in a systematic way.

2. **“How to get an A in Dr. Laude’s Class”** presentation by Dr. Laude on Sunday evening, February 13<sup>th</sup>, at 8 pm.

As I mentioned the first day of class, I do not believe in curves and in fact believe instead that my job is to make it possible for you to learn what is expected for this course, and if I do so, I will give you an A, just like I gave 220 out of 502 students As in the fall.

Well there are 110 new students this semester, many of whom are wondering what the heck is going on—“doesn't Dr. Laude actually teach anything?” many of you might be saying as I explode balloons and play hip hop music. No wonder I receive numerous e-mails from new students who are not used to how my course works and would like advice on how best to study.

In response, I will host a “How to get an A in Dr. Laude’s Class” presentation February 13 evening at 8 pm in this room. During that time I will offer the study strategies that I have seen work both in terms of week to week learning of the material and specifically, what you should do to prepare for my quizzes and exams. All are invited—most folks who had me for CH301 will have heard what I have to say before. It is my strong hope that

you will start doing what I recommend early so you aren't in my office after spring break, on the other side of two failed exams, having to hear me repeat what I will tell you on Sunday.

3. No time like the present to learn what it is you need to learn--there is a quiz on the 15<sup>th</sup> and an exam on the 24<sup>th</sup>. I will have plenty of details about the exam in the next musings but for now be aware that it will be from 7:30 till 9 in rooms to be determined and if you have to take the make-up it will be the following Sunday night, at 6 pm, no exceptions. Also, I will have an exam review on Monday night, the 21<sup>st</sup>, at 9 pm and Travis has a review on the 22<sup>nd</sup> at 9 pm.

3. Question types for quiz 2 follow:

- Setting up an equilibrium expression
- Using LeChatlier's Principle to determine reaction direction
- Comparing Q to K to determine reaction direction
- Using the RICE set-up to find equilibrium values
- Understanding the relationship between free energy and equilibria:  $\Delta G = -RT\ln K$
- Understanding the relationship between temperature and equilibria (Van't Hoff equation)
- Understanding the autoprotolysis of water and its temperature dependence
- Calculating molar solubility from  $K_{sp}$

3. While there may be a few minor changes, these are effectively the 30 question types for exam 1, three weeks ahead of time.

#### **Physical Equilibria**

- 1 temperature dependence of phase changes
- 2 vapor pressure theory
- 3 salt dissociation in water
- 4 phase diagram interpretation
- 5 phase diagram navigation
- 6 calculating  $\Delta H$  from heating across phases transitions
- 7 gas solubility in liquids
- 8 ranking miscibility of liquids
- 8 calculating vapor pressure in binary system
- 10 Clausius Clapeyron equation theory
- 11 colligative property application
- 12 colligative property calculation
- 13 colligative property theory

#### **Chemical Equilibria**

- 14 setting up K from equilibrium expression
- 15 calculating equilibrium concentrations from K

- 16 calculating equilibrium concentrations from K
- 17 determining reaction direction from Q and K
- 18 LeChatelier and reaction direction
- 19 van't Hoff equation calculation (NOT the van't Hoff factor)
- 20 relationship of  $\Delta G$  to K

#### **Introduction to Water Equilibria**

- 21 theory of auto-protolysis of water
22. temperature dependence of  $K_w$
23. converting between pH, pOH,  $[H^+]$  and  $[OH^-]$
24. simple solubility calculation
25. ranking salt solubility using  $K_{sp}$  estimations
26. ranking acid base strength based on K values
27. strong acid or base calculation
28. weak acid or base calculation
- 29 weak acid or base calculation
30. simple buffer calculation

4. There is no quiz next week but I got so excited about the worksheets that I have posted all of them pretty much through the first exam. By this weekend, you should be able to do Worksheet 3 and starting next week you really need to be working on worksheets 4, 5 and 6 in earnest.

5. The TAs are working their behinds off to get a lot of electronic material posted. By this weekend we should have all of the video clips through lecture 10 posted (which takes you up to the first exam.) In addition, Miranda is beginning to use her magic hand to create video clips of how she would answer worksheet and practice quiz questions. I will have more on how these materials are to be inserted into the portal coming soon.

6. Poetry Corner. For poetry corner today I offer up a pretty funny story told by another professor who teaches freshman chemistry—it is the challenge that every parent, who knows more than is good for them, faces. It also includes a bunch of the stuff I am teaching you right now.

### **DIALOGUE WITH SARAH, AGED 3: IN WHICH IT IS SHOWN THAT IF YOUR DAD IS A CHEMISTRY PROFESSOR, ASKING "WHY" CAN BE DANGEROUS**

By Stephen McNeil

- FROM THE ARCHIVES -

SARAH: Daddy, were you in the shower?

DAD: Yes, I was in the shower.

SARAH: Why?

DAD: I was dirty. The shower gets me clean.

SARAH: Why?

DAD: Why does the shower get me clean?

SARAH: Yes.

DAD: Because the water washes the dirt away when I use soap.

SARAH: Why?

DAD: Why do I use soap?

SARAH: Yes.

DAD: Because the soap grabs the dirt and lets the water wash it off.

SARAH: Why?

DAD: Why does the soap grab the dirt?

SARAH: Yes.

DAD: Because soap is a surfactant.

SARAH: Why?

DAD: Why is soap a surfactant?

SARAH: Yes.

DAD: That is an EXCELLENT question. Soap is a surfactant because it forms water-soluble micelles that trap the otherwise insoluble dirt and oil particles.

SARAH: Why?

DAD: Why does soap form micelles?

SARAH: Yes.

DAD: Soap molecules are long chains with a polar, hydrophilic head and a non-polar, hydrophobic tail. Can you say 'hydrophilic'?

SARAH: Airofawwic

DAD: And can you say 'hydrophobic'?

SARAH: Airofawwic

DAD: Excellent! The word 'hydrophobic' means that it avoids water.

SARAH: Why?

DAD: Why does it mean that?

SARAH: Yes.

DAD: It's Greek! 'Hydro' means water and 'phobic' means 'fear of'. 'Phobos' is fear. So 'hydrophobic' means 'afraid of water'.

SARAH: Like a monster?

DAD: You mean, like being afraid of a monster?

SARAH: Yes.

DAD: A scary monster, sure. If you were afraid of a monster, a Greek person would say you were gorgophobic.  
(pause)

SARAH: (rolls her eyes) I thought we were talking about soap.

DAD: We are talking about soap.

(longish pause)

SARAH: Why?

DAD: Why do the molecules have a hydrophilic head and a hydrophobic tail?

SARAH: Yes.

DAD: Because the C-O bonds in the head are highly polar, and the C-H bonds in the tail are effectively nonpolar.

SARAH: Why?

DAD: Because while carbon and hydrogen have almost the same electronegativity, oxygen is far more electronegative, thereby polarizing the C-O bonds.

SARAH: Why?

DAD: Why is oxygen more electronegative than carbon and hydrogen?

SARAH: Yes.

DAD: That's complicated. There are different answers to that question, depending on whether you're talking about the Pauling or Mulliken electronegativity scales. The Pauling scale is based on homo- versus heteronuclear bond strength differences, while the Mulliken scale is based on the atomic properties of electron affinity and ionization energy. But it really all comes down to effective nuclear charge. The valence electrons in an oxygen atom have a lower energy than those of a carbon atom, and electrons shared between them are held more tightly to the oxygen, because electrons in an oxygen atom experience a greater nuclear charge and therefore a stronger attraction to the atomic nucleus! Cool, huh? (pause)

SARAH: I don't get it.

DAD: That's OK. Neither do most of my students.

*Stephen McNeil is an Assistant Professor of Chemistry at University of British Columbia Okanagan in Kelowna, British Columbia. His lectures and conversation tend to incorporate a large degree of both gesticulation and pontification, occasionally of a frighteningly unbridled and reckless nature. He often reminds people of his namesake on "Blue's Clues", and he knows that already, so you really don't need to mention it again.*

7. Since it isn't quite Valentine's Day we need to get the hate poetry out of the way. Here is something from one of your peers. And please, please, get your poetry in, especially the love poetry.

## Hate Poem

by: Julie Sheehan

I hate you truly. Truly I do.  
Everything about me hates everything about you.  
The flick of my wrist hates you.  
The way I hold my pencil hates you.  
The sound made by my tiniest bones were they trapped  
    in the jaws of a moray eel hates you.  
Each corpuscle singing in its capillary hates you.  
Look out! Fore! I hate you.  
The blue-green jewel of sock lint I'm digging  
    from under by third toenail, left foot, hates you.  
The history of this keychain hates you.  
My sigh in the background as you explain relational databases  
    hates you.  
The goldfish of my genius hates you.  
My aorta hates you. Also my ancestors.  
A closed window is both a closed window and an obvious  
    symbol of how I hate you.  
My voice curt as a hairshirt: hate.  
My hesitation when you invite me for a drive: hate.  
My pleasant "good morning": hate.  
You know how when I'm sleepy I nuzzle my head  
    under your arm? Hate.  
The whites of my target-eyes articulate hate. My wit  
    practices it.  
My breasts relaxing in their holster from morning  
    to night hate you.  
Layers of hate, a parfait.  
Hours after our latest row, brandishing the sharp glee of hate,  
I dissect you cell by cell, so that I might hate each one  
    individually and at leisure.  
My lungs, duplicitous twins, expand with the utter validity  
    of my hate, which can never have enough of you,  
Breathlessly, like two idealists in a broken submarine.