**CH302 Random Musings January 27, 2009**

1. Quiz 1 is supposed to occur on Thursday. Be aware that I have not been able to pull off a successful first quiz in a general chemistry course in almost 5 years as pretty much every possible reason for things to go wrong, does. Travis is personally 0 for 3 and I know he is going to claim that absolutely everything is under control, but I firmly believe Travis is snake bit when it comes to first quizzes. You can always hope he fails to pull it off because if he can't get it administered on time and fairly, everyone gets a 40.

2. As posted last time, the question types for quiz 1 are as follows:

From Lecture 1:
- Qualitative vapor pressure question.
- Clausius-Clapeyron calculation

From Lecture 2:
- Thermodynamic signs and phase changes (like sign of $\Delta H$ or $\Delta S$ going from s g)
- Interpreting phase diagrams
- Calculating $\Delta H$ for a substance as T changes across various phase

From Lecture 3:
- Dissolving salts in water
- Dissolving gases in water
- Ranking miscibility and solubility in liquids

3. For those new to the course--some thoughts on how to study as prompted by about 10 e-mails from new students wanting to know how to use the e-book and ChemPortal. Here was my response:

Every time there is an quiz or exam coming up you will receive the following new information:

1. A list of the question types will be listed in the musings at least a week ahead of time.
2. At least one new worksheet per week will cover the content material you are expected to learn.
3. At least one, and usual two, practice exams or quizzes based specifically on question types.

Obviously when coupled with the lecture notes and e-book material there will be plenty of content to assist you in learning what you need to learn for the quiz.

So how should you go about studying?

My course is structured a bit differently that other courses in the sciences you might have had. I ask the students to focus on learning to do specific tasks well for a quiz or test. For example, for Quiz 1 you need to do the 8 things listed above, well, and in general, always use assigned question types as your guide to what to emphasize.

You are then free to use any of the materials I provide, from my notes to the text to the worksheets to the practice exams and quizzes, to make yourself confident you can answer the question types on the quizzes and exams. How you choose to read the e-book, or how many problems you do on the worksheet, should be done with this question in mind: do I now know how to do that first question type, and then the second question types, and so on. Make sure you get yourself organized for each question by relocating everything that might help answer that kind of question to an index card and make sure you understand what you have written.

Note that this is very different from the passive approach to learning many of you developed in high school. A kind of "grazing through the material" which is the traditional idea of sitting down with a text, starting on page 1 of a chapter, and reading all the way till the last page of a chapter. This is just about the worst way I can imagine trying to learn science material since there is more information in any single science text book chapter

than anyone (including the authors of the textbook) could hope to put into their brain at one time. The end kind of study session usually results in a strong desire to fall asleep, or if you make it till the end of the chapter, a since of being overwhelmed while at the same time have done very little learning. If you want proof of how little you have learned, after you have graze through a chapter beginning to end. Go to dinner and then afterward ask yourself what you remember from the chapter—probably not much.

Remember, question types, one after another, after another.

4. I am making arrangements with the Chem Portal folks to arrange for an American Express gift card in the amount of $45 to be provided to the spring semester purchasers of the Chem Portal. Those of you intending to make the purchase need to do so by February 1 to be eligible for this offer. Remember, if you were in CH301 with me and already subscribe you needn't do anything new for CH302.

5. The course packets will be sold on Thursday right after the quiz. Please bring either cash or a check for $25 on Thursday and pick up your packets as you leave. This is a one-time sale for tax exemption purposes so make sure you remember to bring a form of payment. All proceeds go to the UT Scholarship fund.

6. As mentioned in my e-mail on Sunday, the following materials have been posted to help you study.

- Worksheet 2 from 2008 which has 20 questions on physical equilibria
- A brand new worksheet 2 from 2009 that has 20 questions specific to what is on quiz 1 from the first three lectures.
- A practice quiz 1 prepared by the TAs.
- A practice quiz 1 I have prepared.
- Lecture 3 notes on the thermodynamics of mixing.

All of the materials listed above are on my website except for the practice quiz I made that is in the ChemPortal.

7. A thought on errors in the materials we produce. I am pretty sure this course is close to number one in the country for most new material produced each week to help you study. The positive side of this is that there is always extra material to help you learn better. The down side is that there are always going to be mistakes when the material is first posted. Please appreciate this and rather than hit your head against a wall when you find an error in the notes, e-mail me so I can correct it for the students.

8. I have quite enjoyed my office hours with students this semester. A bit of advice on how to know whether to go to my office or to the classroom for my office hours:
**Method 1.** I will tell you in the musings each week. For example:
• Next Monday and Tuesday I will hold office hours in my office
• On Wednesday and Thursday before the quiz I will hold them in the assigned classrooms
**Method 2.** Make up a little poem to assist with a common sense assessment. Here are two I have written:
• If there's a quiz or a test, it's not in Dave's nest
• Is there a quiz or test soon? Go to the classroom.

So based on this argument I will hold my office hours on Wednesday and Thursday in the class room since there is a quiz on Thursday.

9. Valentine's Day is close at hand and this is your chance to submit your favorite poetry for publication in a special poetry musings on the 12th. Only lovingly sweet poetry will be published at this time. This is your chance, like on radio stations, to dedicate a poem to someone. Then, in the new millennium equivalent of listening to songs dedication by Kasey Kasem in the 80s, you can go to my web site and point out to your beloved, a dedication on my random musings link.

10. 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.

**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: Aidrofawwic
DAD: And can you say 'hydrophobic'?
SARAH: Aidrofawwic
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 non-polar.
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.*