A Teaching Potluck
(no need to beg, borrow or steal!)

How to share teaching materials
and ideas for a better world

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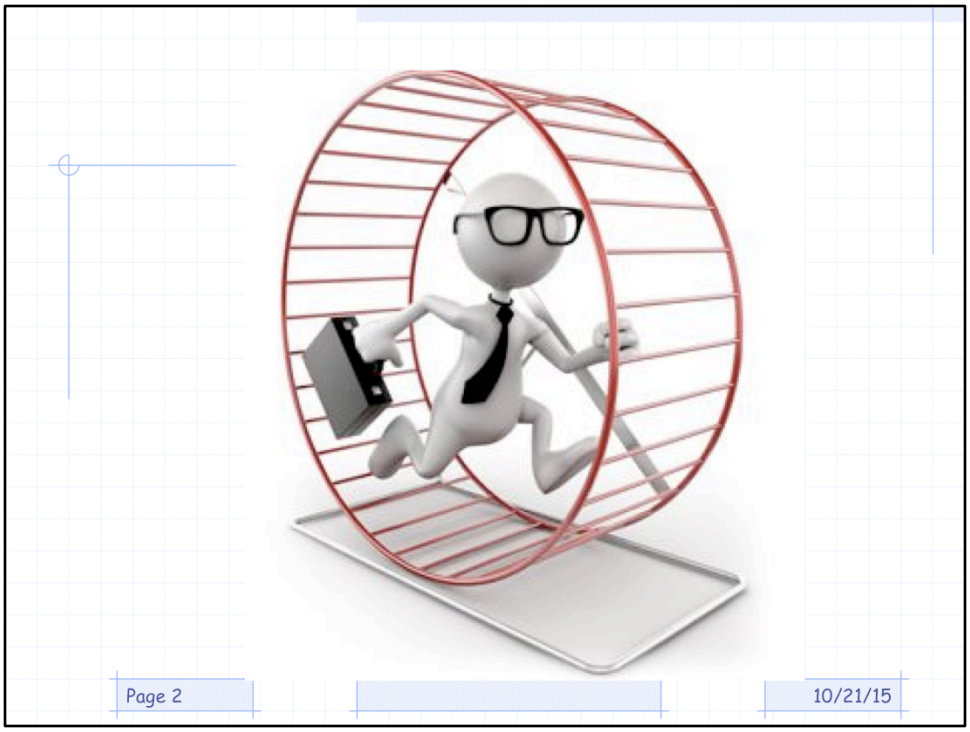
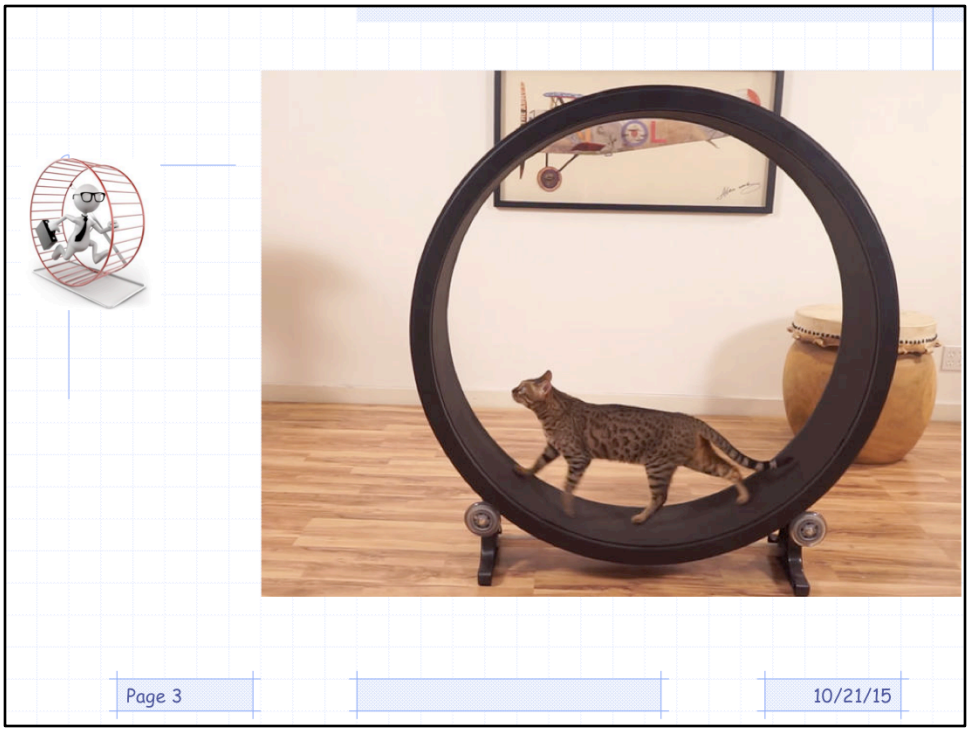
WCCTA 2015

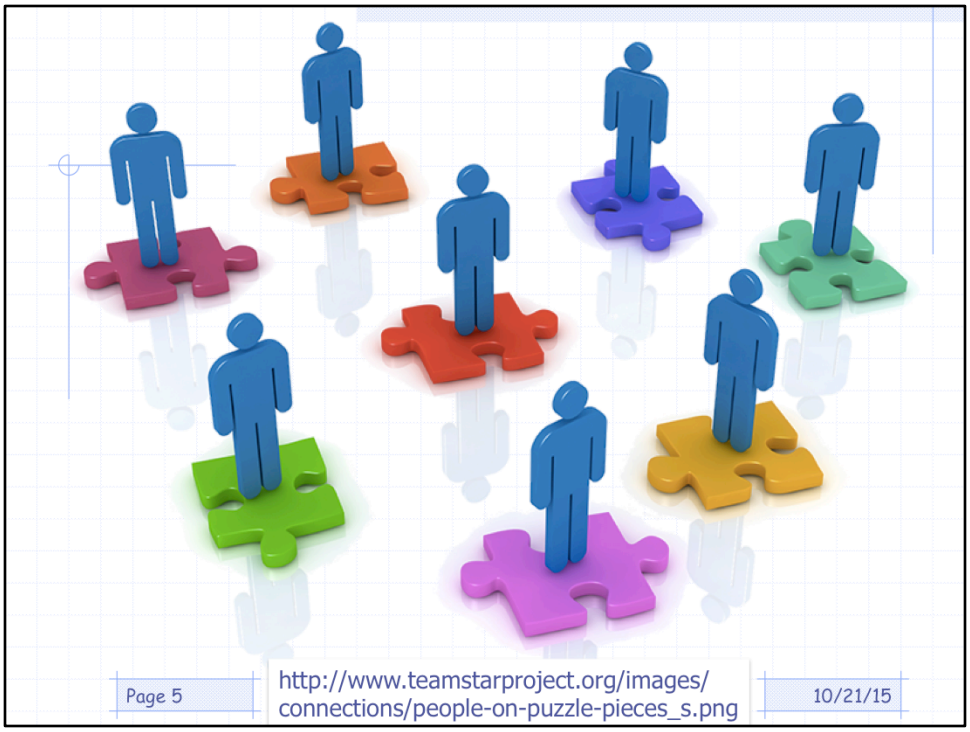


I think as teachers, we often feel like this all the time!
Early morning classes, meetings, preparing for lecture, grading papers, etc.



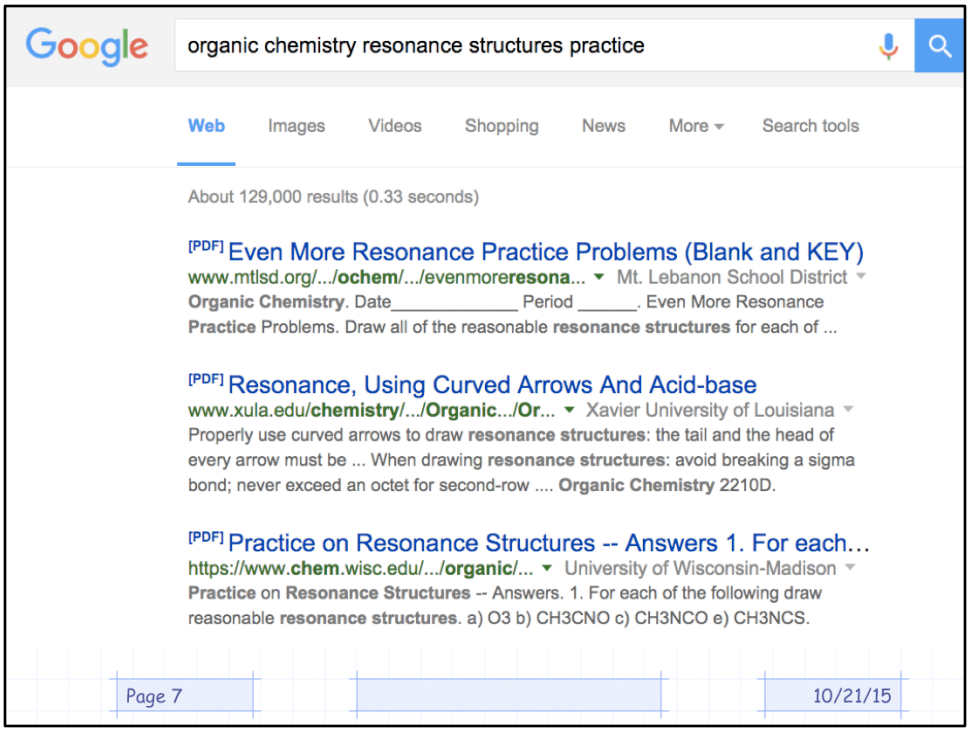
(I digress to show you a hamster wheel for cats now!)

And one for humans! French hotel room



Each of these people are us. We are all creative and have our own unique skill sets. Think of these individual puzzle pieces – each one represents something you do or use in class. How many students are impacted by these? A hundred a quarter? Every few years, that's thousands of students. It's a lot of responsibility on us to come up with the best teaching materials we can. Of course, we each also have many demands on us which prevent us from keeping our word when we say the usual "oh, I'm going to make this better for next time…" (Yeah right!)

Of course, there is a lot of benefit in discussing and collaborating together to create something better. We all know that peer review is an important part of this, but so is a simple sharing of ideas and informal feedback.



So given our time constraints, what do we do?
I, for one, am the first to admit that if I need something, I look to see what's already out there.
But this takes time and most of what I want is not editable or is for the wrong level (audience)
I want something that I would make. Or something that one of my colleagues would make.

The swapmeet

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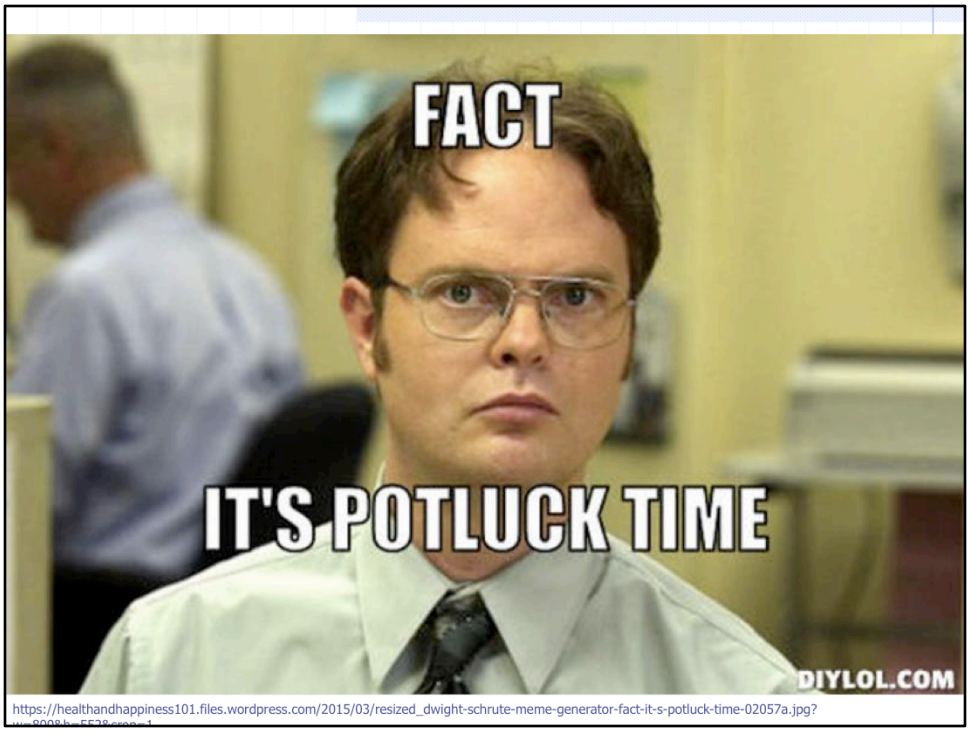
This scene is a metaphor for my teaching materials, let's say. Some of these items look like they can be used again, others look like they might need to be tossed! But the point is that each person can browse and take what is useful and leave the rest. But the thing is: There is not much of a collection unless people contribute to it!



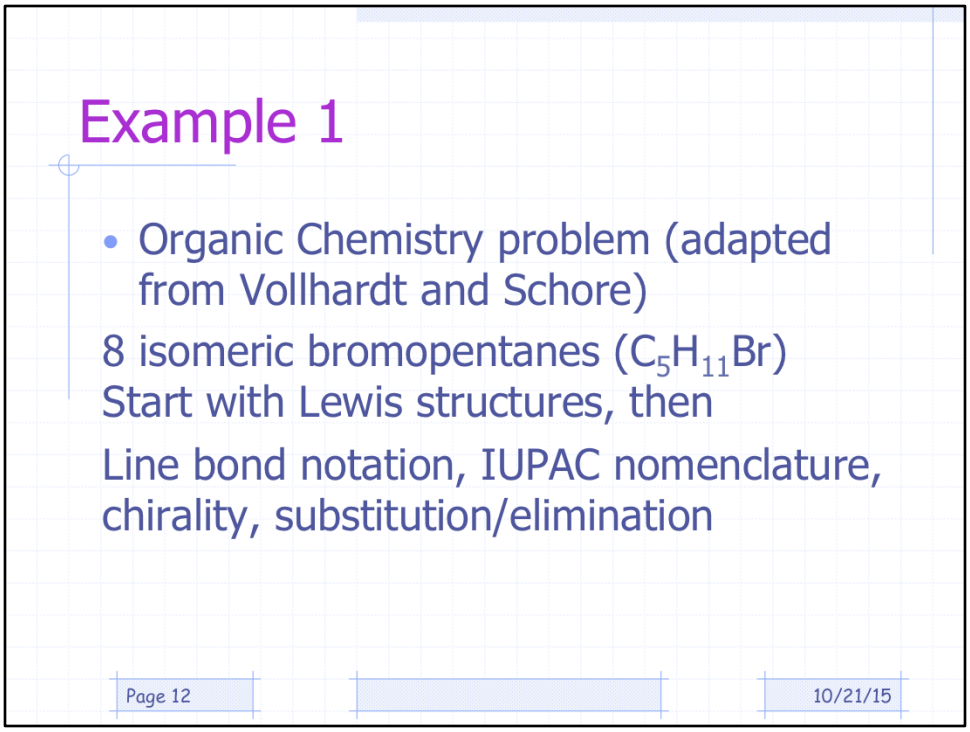
https://healthandhappiness101.files.wordpress.com/2015/03/resized_dwight-schrute-meme-generator-fact-it-s-potluck-time-02057a.jpg?

Dwight's FACT

I’m in inviting you to a potluck = it’s a teaching potluck!
Notice, some of the things brought to the table are made from scratch while others were store bought
You can contribute something that is either made by yourself or adapted, or with the permission of others.

What kind of things can we bring to the teaching potluck?

- Activity or assignment
- Exam question(s)
- Youtube links
- Materials from a conference
- An intriguing real life application
- An idea that you haven't executed yet
- **Anything worth doing in class!**



This is an assignment I use in Organic Chem I. It is a problem students add to throughout the quarter as we cover various topics (isomerism, nomenclature, chirality, etc) Students turn in the assignment at the end. Each time they add to it, it helps them to get closer to the correct answer.

ISOMER Extra Credit Problem (8pt)

Name_____ Circle one: AM lab or PM lab

Compounds A through H are isomeric bromoalkanes with molecular formula $C_5H_{11}Br$.
Use the following data to assign plausible structures for compounds A through H.
Include the IUPAC name and use LINE drawings – do not draw out the hydrogens!!!

- Treatment of compounds A through G with NaCN in DMF followed second order kinetics and showed the following relative rates of reaction: A = B > C > D = E > F >> G
- Compound H does not undergo S_N2 under the preceding conditions.
- Compounds C, D, and F were found to be optically active each having the S absolute configuration at the chiral center. Products of D and F proceeded with inversion of configuration while treatment of C in the same way proceeded with retention of configuration. (Include the stereochemistry in the drawings for these)

A

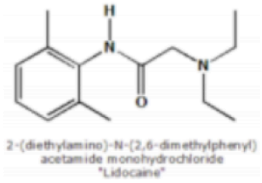
B

Here's part of the assignment

Example 2

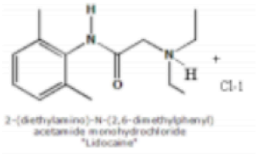
- Chemistry in dentistry/medicine

Lidocaine



2-(diethylamino)-N-(2,6-dimethylphenyl) acetamide monohydrochloride "Lidocaine"

+ HCl —>



2-(diethylamino)-N-(2,6-dimethylphenyl) acetamide monohydrochloride "Lidocaine"

Lidocaine + hydrochloric acid Lidocaine hydrochloride

More examples at Ron Schwisher's website:
http://www.oit.edu/libraries/about/collections/library-publishing/swisher

I visited the dentist one day and I asked what chemistry he uses in his work. This is one example he gave of how chemistry is used in his work everyday.
More biological and medicinal examples are given in Ron Schwisher's open textbook (link above)

Example 3

- Exam Analysis (and other reflective assignments, cpree.uw.edu)

CHEM& 161 EXAM 1 Analysis & Self-Evaluation Assignment

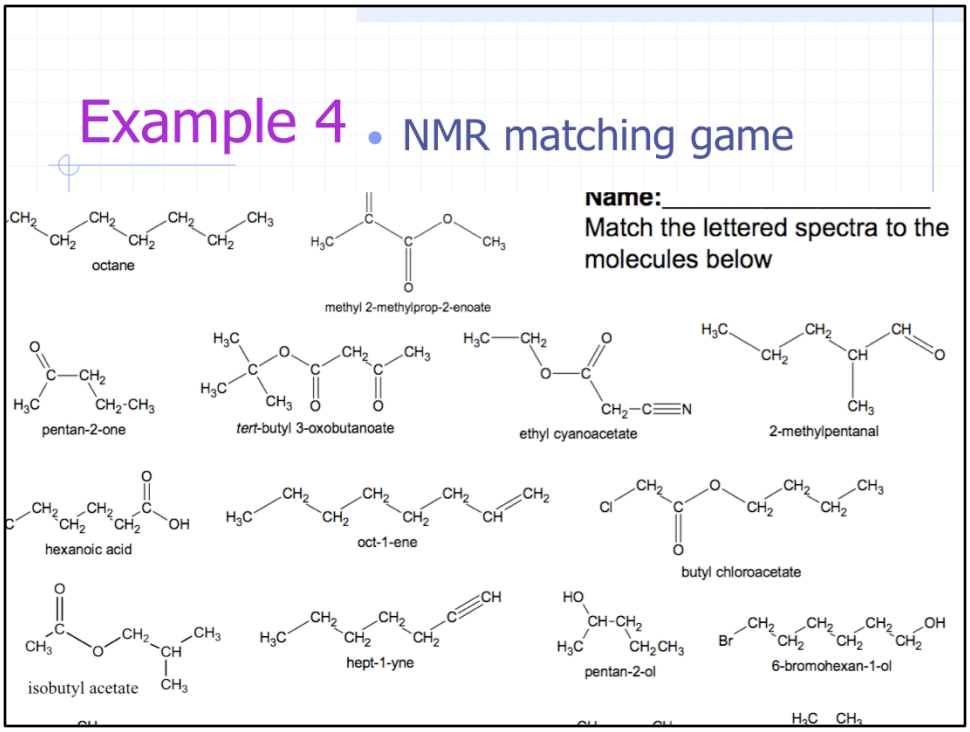
1. For each multiple-choice or short-answer question that you selected/wrote an incorrect answer on the exam, fill in the requested information, including identifying the reason that best describes why you missed the question.
2. Complete the follow-up questions on the next page.

Possible reasons:

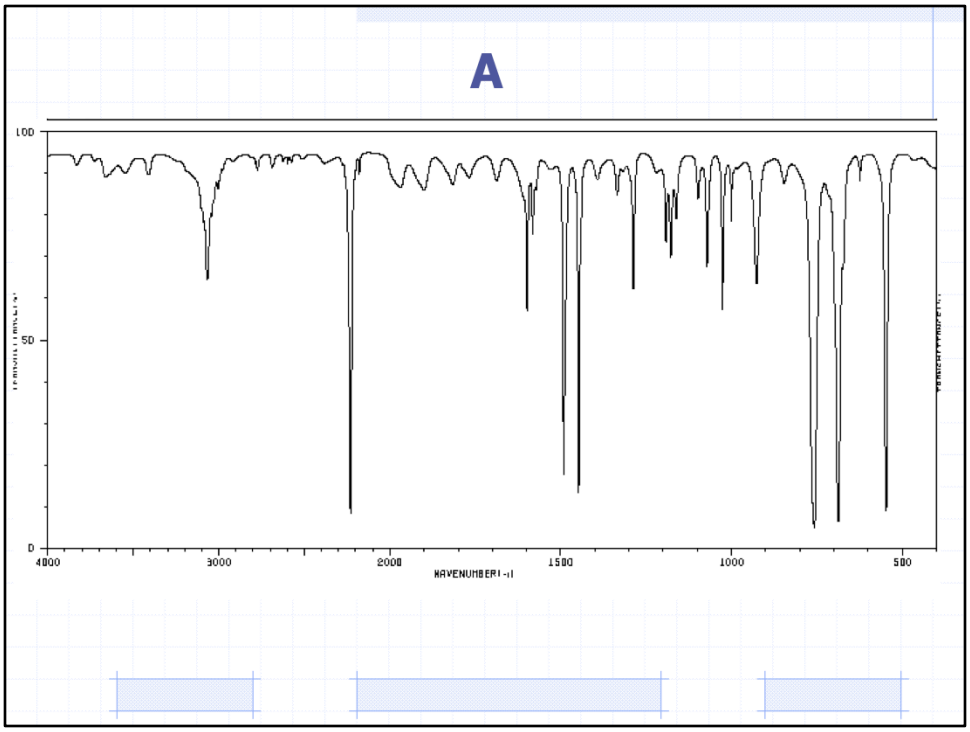
a) I misread the question.
b) I misread the choices (answer selection).
c) I had trouble interpreting the question.
d) I didn't consider the combination answer(s) (all of the above, none of the above, a and b, etc.)
e) I wasn't confident in my initial answer so I changed the right answer to the wrong answer.
f) I didn't study this concept enough.

a) I didn't review this concept/information because I didn't think it was important.
b) I didn't review the diagrams from the lecture notes, group activities, or the textbook.
c) I didn't review the example problems/questions in the lecture notes.
d) I didn't do enough practice problems (working them completely on my own).
e) I never understood this concept and didn't get help.

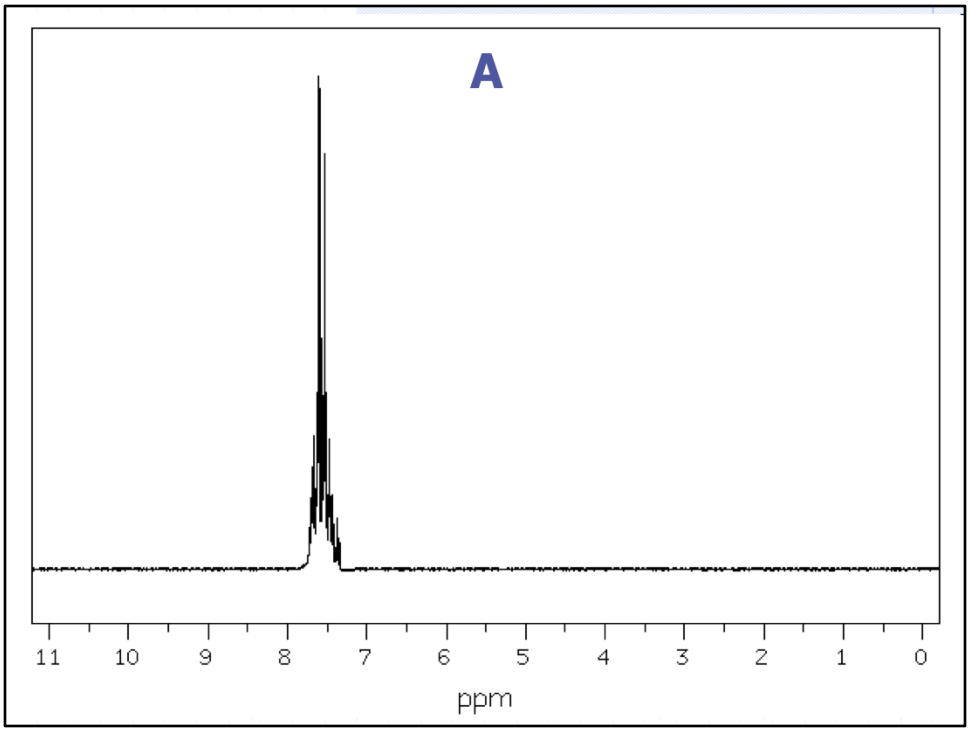
This is an example of how an idea became a product. Several of my colleagues and I were discussing the need for addressing student performance on exams. I had read about exam wrappers (analysis) in a book about teaching, and passed it along to two of my colleagues. One of them, Gina Fiorini, made this assignment for students to analyze their incorrect answers on an exam in an attempt to improve their performance on future exams, and to cut down on exam criticisms.
This is one of many types of reflective assignments submitted for the CPREE project (CPREE = consortium to promote reflective in engineering education, see website on slide for more info)



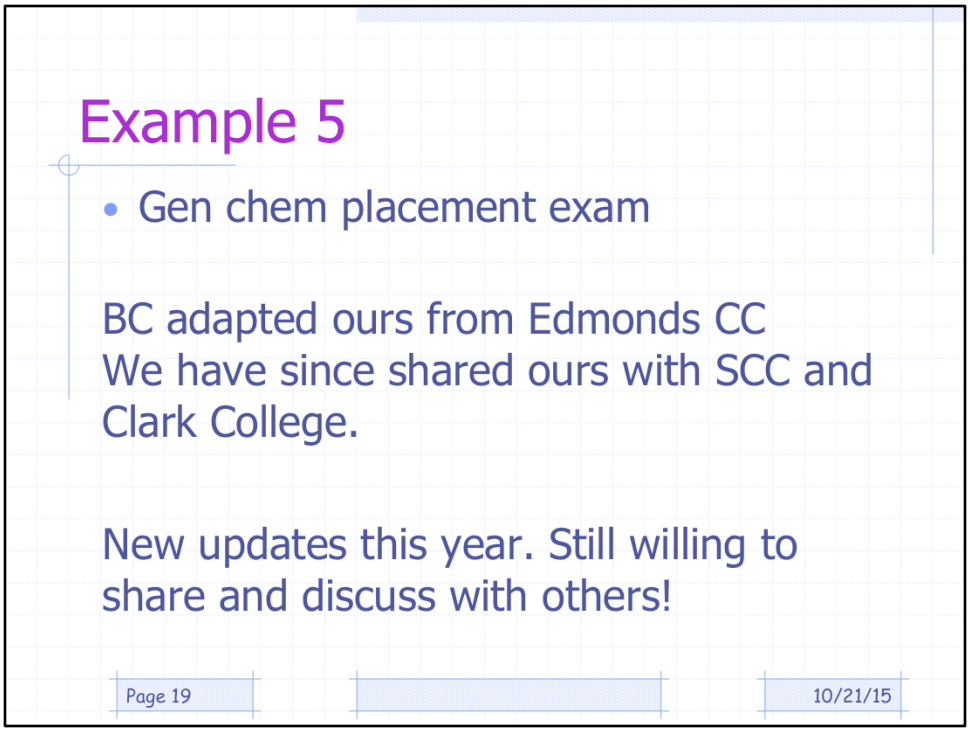
This is an NMR matching game designed by one of our faculty, Brett Goldston. We use this assignment in Organic Chem II and it gives students more practice and familiarity with analyzing IR and 1H-NMR spectra, especially real spectra.



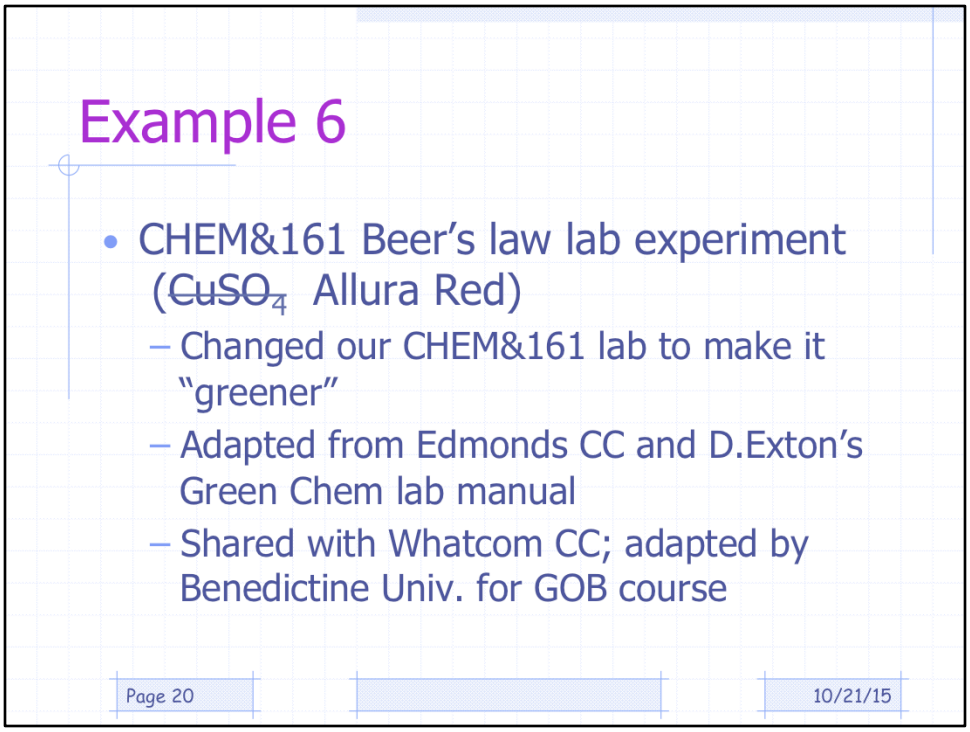
benzonitrile (example of spectra given)



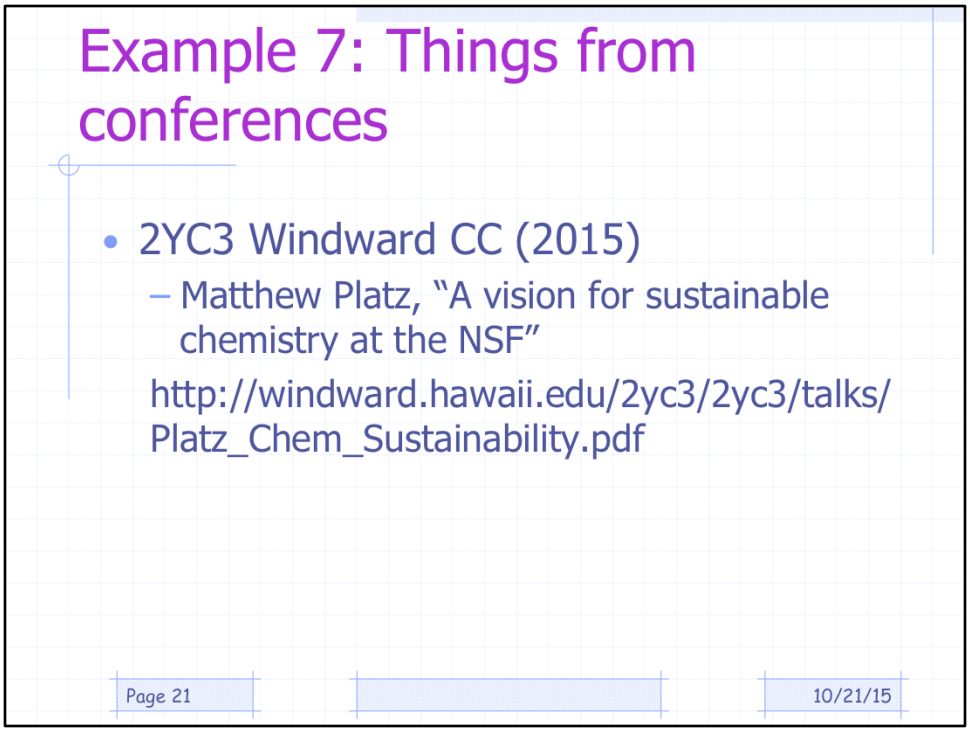
benzonitrile (example of spectra given)



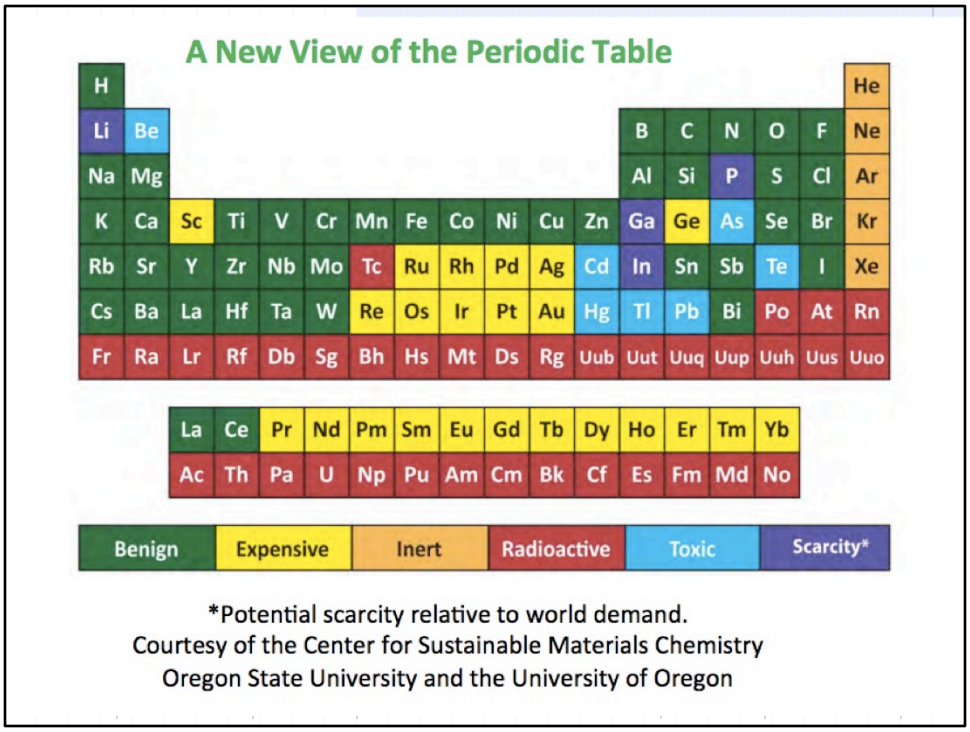
This stimulated much discussion during the talk.
A shared repository such as ours could be a potential place to share documents such as these with each other to give guidance to people developing similar materials.



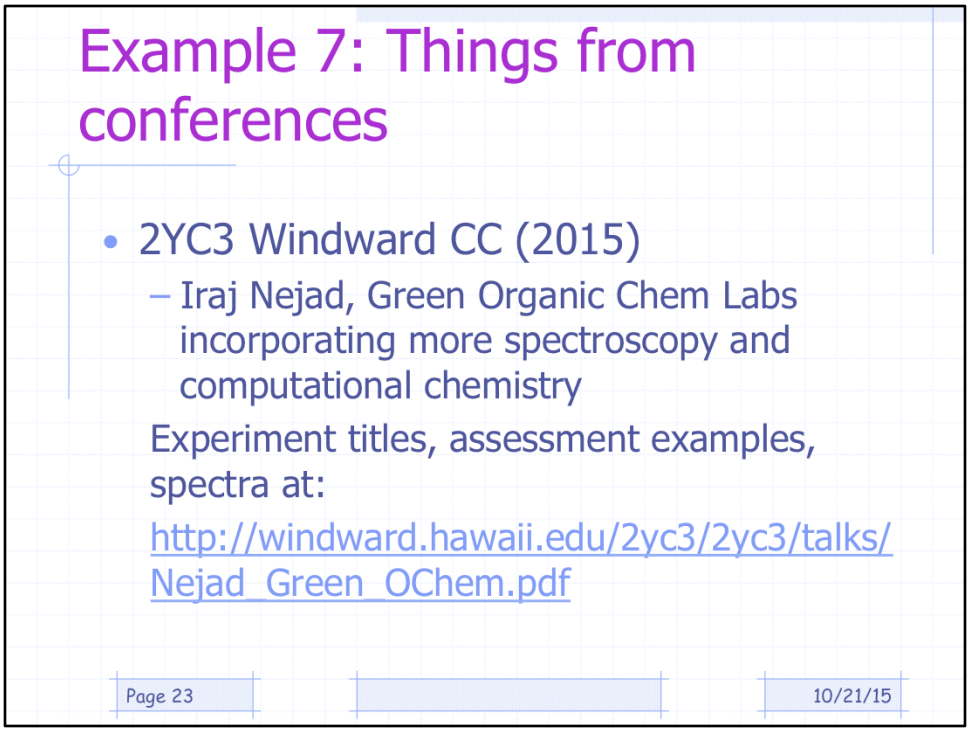
This is a very common lab. At BC, we adapted from several sources (including EdCC) and others have asked to adapt it (or use as is) from what we have. We are happy to share this. Faculty at Benedictine U in MN have used the gen chem version and adapted it for GOB as well.



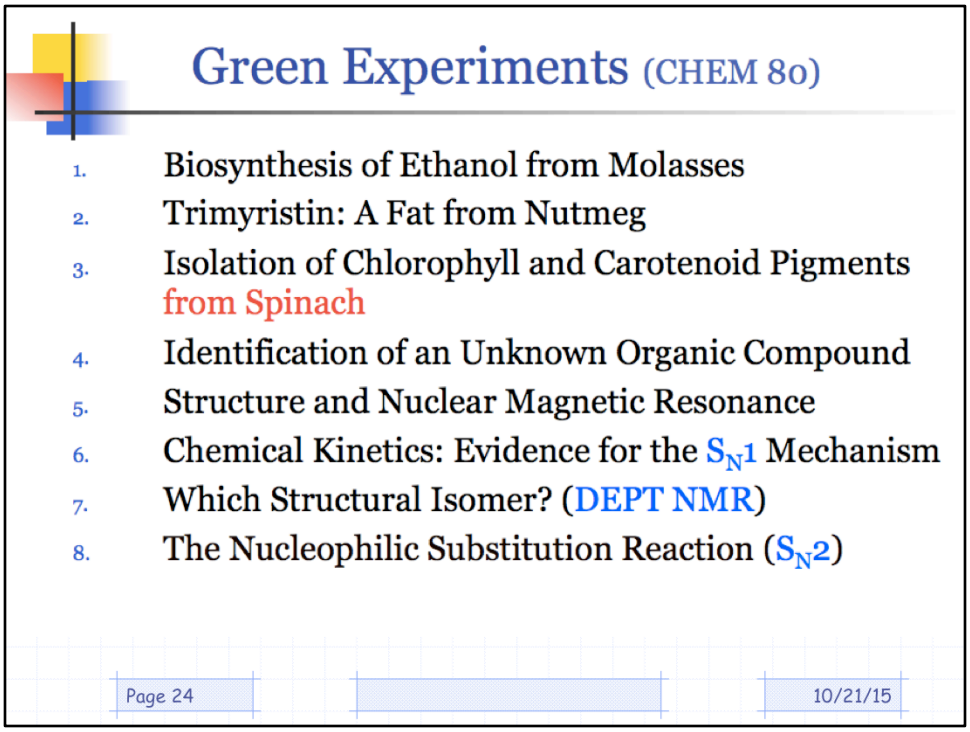
I attended several talks at the last 2YC3 conference. It would be great to share materials that we gather through conferences as well as things we develop ourselves. This was one conference where almost all the presenters shared their talks (they are available on the website above, windward.hawaii.edu/2yc3 (or google the "2YC3 Windward") and find the page of links with presentations.



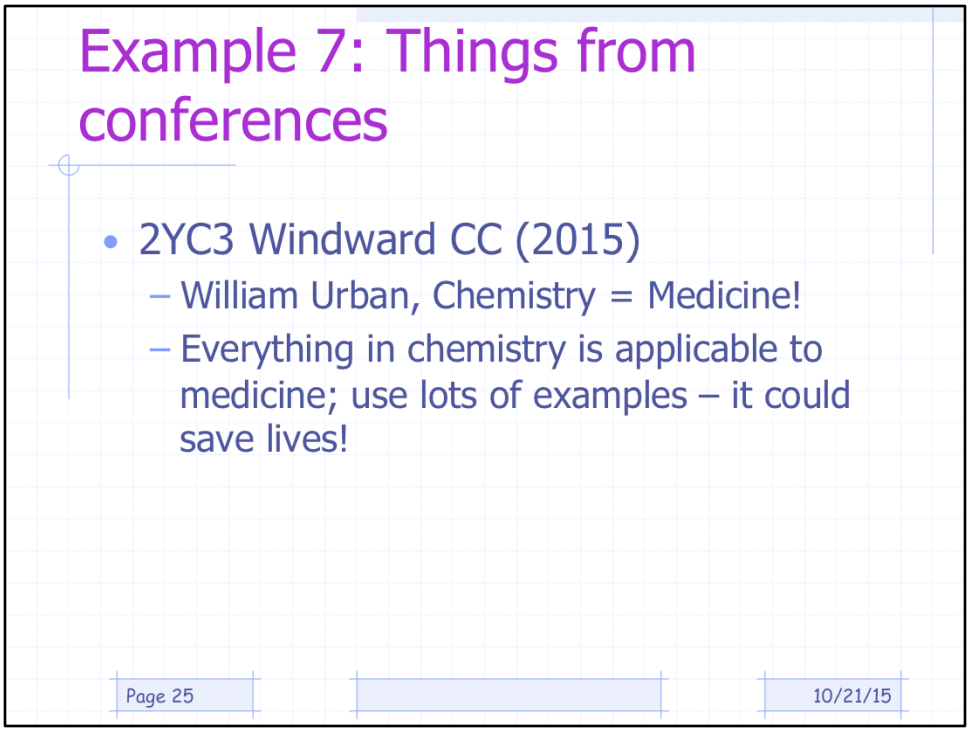
The keynote address contained this periodic table, which several of us in the audience wanted!



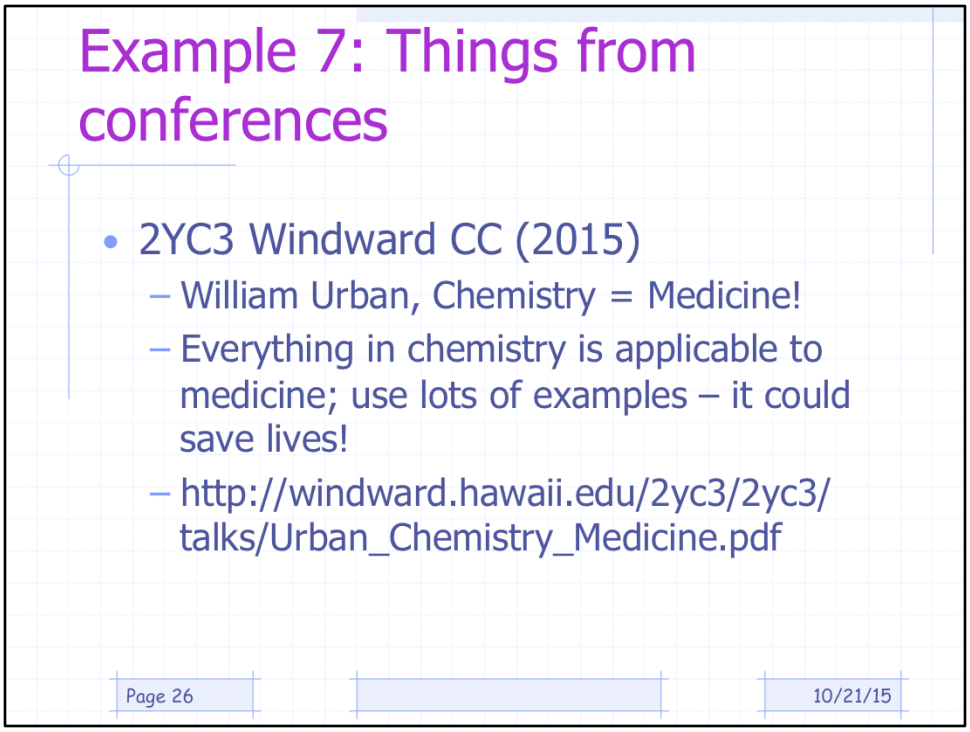
Same with this talk by Iraj, on his experience redeveloping organic chem labs with green principles.



Continued (a list of labs Iraj included in his sabbatical project). Many labs were re-written to incorporate spectroscopy and modeling.



This was one of the most useful talks I have ever gone to in chem ed. Urban is a retired veterinarian, and is teaching chemistry exclusively to pre-nursing students. He teaches it in a way that is completely geared to allied health.



His complete powerpoint is available at the weblink above.

The recommended dose of Cleocin (clindamycin) pediatric oral solution is 8 to 25mg/kg/day in three (t.i.d. = ter in die) to four (q.i.d. = quarter In die) equally divided doses. The child weighs 60lb.

a) Calculate the minimum safe dose per day = 218 mg/day

b) Calculate the maximum safe dose per day = 682 mg /day

$$\frac{8\text{mg}}{1\text{kg}\ 1\text{day}} \quad \frac{60\text{lb}}{1} \quad \frac{1\text{kg}}{2.2\text{lb}} = \frac{218\text{mg}}{1\text{day}}$$

$$\frac{25\text{mg}}{1\text{kg}\ 1\text{day}} \quad \frac{60\text{lb}}{1} \quad \frac{1\text{kg}}{2.2\text{lb}} = \frac{682\text{mg}}{1\text{ day}}$$

The number 1 medical dosing error in the USA is converting pounds to kilograms!

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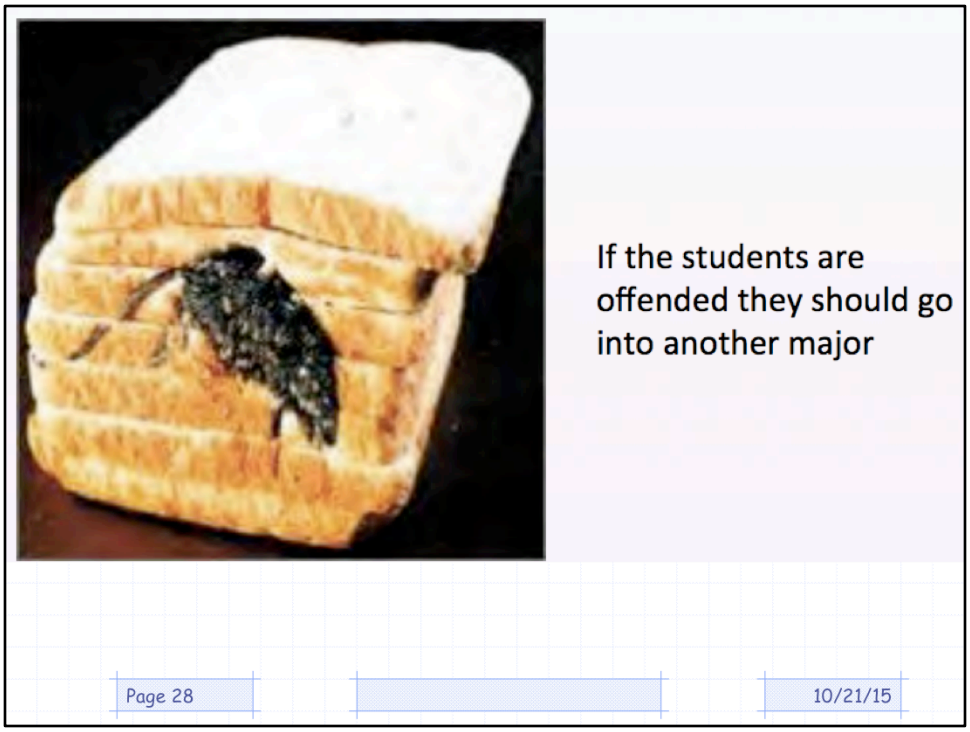
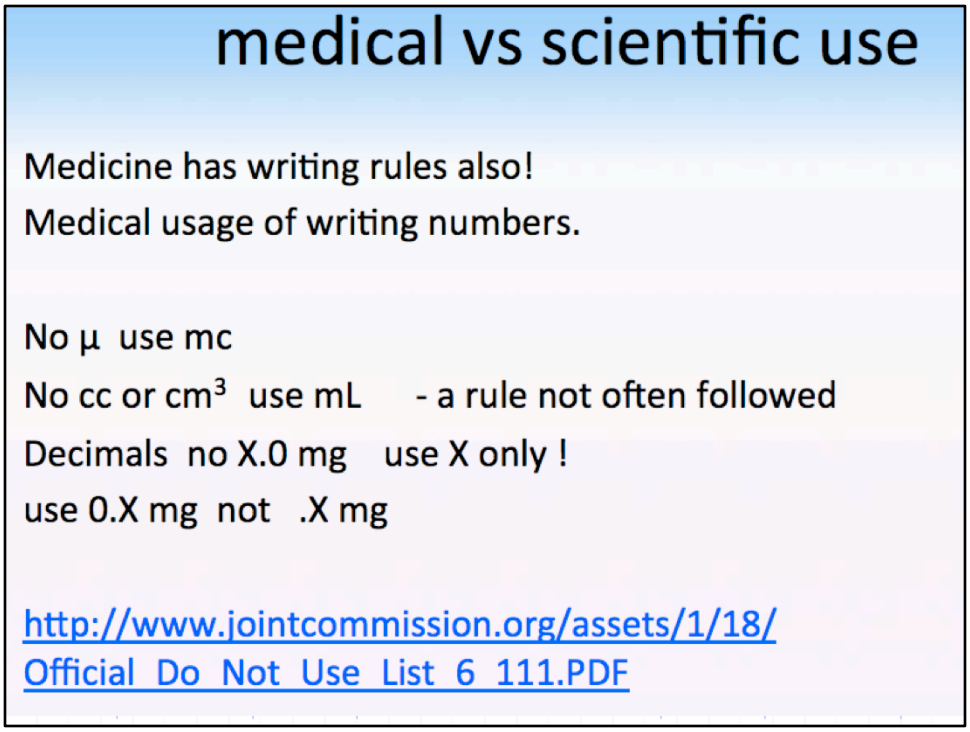
Dimensional analysis is of course important for dosing… did you know the factoid in red though?



He also incorporates things to let his students know how “gross” medicine and health can be. Students are dealing with all kinds of fluids they may not like, and seeing very disturbing things in the clinical setting. It’s best for them to be thinking about this before they fully commit to these career paths.

Nursing faculty quote

80% on a 10 question DA test = 2 dead patients!



Importance of how we convey units and numbers. It would be worthwhile to mention these things in class. I personally don't always emphasize "mc" for micro, nor do I enforce the 0 before the decimal place. Sig figs are also treated very differently by nurses – usually trailing zeros are taken off to avoid mistakes (2.0 might look like 20!) So we might consider this when we teach GOB.

Old (common) nomenclature, ferric and ferrous, etc. are often encountered. It would be worth mentioning these things even if we don't use them today in majors science.

Acid-base Reactions

More than 90% of **drugs** are organic, weak electrolytes, especially those compounded, manufactured, or reconstituted as injections in predominantly ionized or salt form.[18] Consequently, acid-base reactions are the most common causes of drug incompatibility as precipitation of nonionized drug forms.

http://www.safeinfusiontherapy.com/cps/rde/xchg/hc-safeinfusion-en-int/hs.xsl/7247.html

ppt Rx's?

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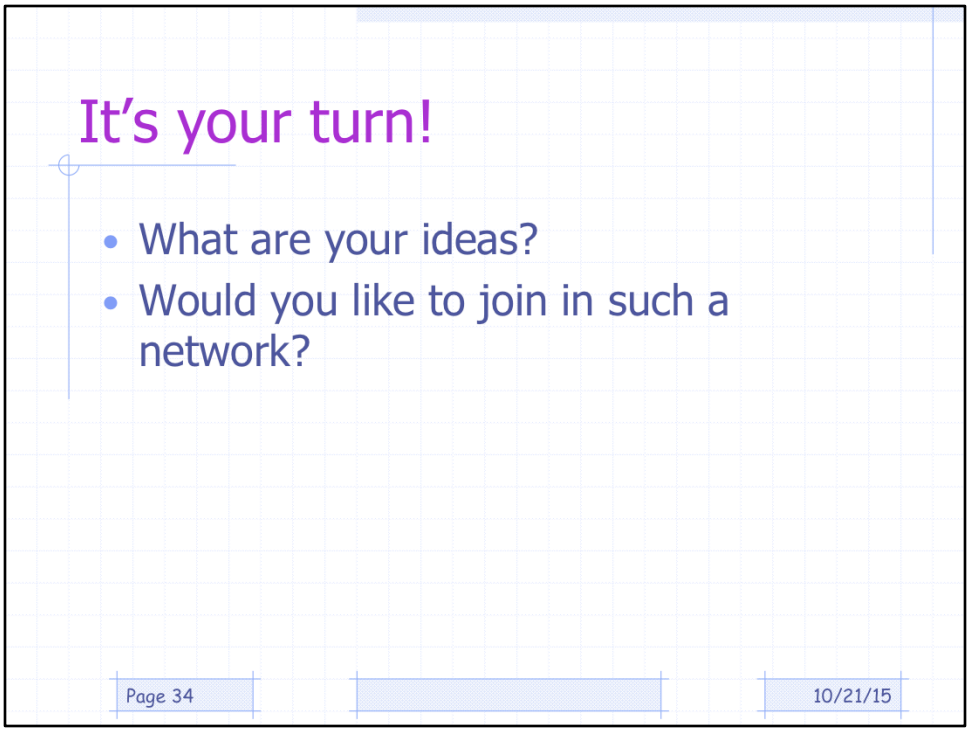
We teach acids and bases, but do we get to organic acids/bases, and ionized and nonionized forms, and their properties? I certainly did not really touch on this much in GOB (I do in majors organic). This is something that could be taught in all chem classes (GOB, gen chem, organic). I do emphasize buffers and have taken out acid/base titration in order to do so.

Goal

- Create a network of faculty interested in developing, creating, sharing, adapting ideas and existing items into (better) teaching materials
- Create a permanent and easily accessible repository for these materials



We shared out ideas for assignments that work for us, that we've either created or used in the past.

I distributed a handout to fill out to join the network. If you are interested, please send me a note at jmayer@bellevuecollege.edu. All you need to do is contribute ONE teaching resource (assignment, video, weblink), explain how you use it, and then you will gain access to our shared repository.

I hope you will consider joining the network! :)