TEACHING AND LEARNING PORTFOLIO
BY
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Learning

Research Teaching

This portfolio submitted in partial fulfillment of the requirements for the Delta Certificate in Research, Teaching, and Learning.

Delta Program in Research, Teaching, and Learning
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C I R T L

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Teaching and Learning Portfolio

Adam Hoffman

May 13th, 2008

Portfolio Overview

The purpose of this portfolio is to present artifacts with personal reflections on my scholarly thinking concerning teaching and learning. Specifically my aim in putting together this portfolio is to show how aspects of my core teaching and learning beliefs (active learning, diversity, practicality, and assessment) compliment the three pillars of the Delta Program (teaching-as-research, learning-through-diversity, and learning community). I consider this a living document, in that it is constantly being revised and updated to reflect my growth as a teacher and learner. Thanks for reading!

Portfolio Contents

Adam Hoffman's Teaching and Learning Philosophy

You can observe a lot by watching. - Yogi Berra
We can learn a lot by doing. - Me

The first step of both the scientific method and learning is observing. Just as scientific problem solving breaks down if one does not progress past the observing step, learning also fall shorts if students do not progress from watching to doing. I approach teaching in the same manner as research; using a constant feedback loop to measure preset learning goals/objectives and then modifying my approach based on the results. The teaching as research model is a constant thread throughout four important areas of my teaching philosophy: active learning, diversity, practicality, and assessment.

I believe that an active learning environment fosters learning. Science is discovery though dynamic group work and I believe that learning should be undertaken using the same framework. I have found using micro-lectures interspersed with short activities is beneficial to student focus and learning. While teaching English in Sweden I mixed grammar activities with group listening exercises based on English pop songs, and at Madison Area Technical College we incorporated new flashpoint instrumentation to use a "hands-on" activity to aid students in relating the theory of vapor pressure to the application of measuring biofuel flash points. I prefer to act as a facilitator of learning rather than a dictator of information, shifting the onus of achievement from the teacher alone to all individuals in the classroom via large amounts of student-teacher and student-student interaction. Regardless of class size, active learning can enhance traditional lecture settings, as active engagement enhances learning and retention and builds higher-order thinking skills and reaches a diverse makeup of students[1].

I believe diversity enhances learning. When characterizing a chemical or compound it is helpful to use a multitude of diverse instrumentation. A gas chromatograph is useful, but a gas chromatograph coupled with a mass spectrometer can help us learn much more. Diversity in the lab is important, as is diversity (both student population and teaching styles) in the classroom. One benefit of teaching with diverse styles is the utilization of the diversity in student backgrounds and learning styles for the benefit of all students[2]. In recognizing student diversity I strive to make my classroom as inclusive as possible to enable the class to learn through one another's experiences. An inclusive environment strengthens the learning experience by making students comfortable to ask questions and more clearly focus on the subject matter. One way I attempt to strengthen the classroom environment is to clearly articulate course goals and grading rubrics in the syllabus and subsequent handouts so all students feel equal in knowing what is expected from them. I utilize exams consisting of multiple formats (short answer, take home essay questions, oral/verbal, and multiple choice), and assignments that are equally varied (group work, oral presentations, and problem sets) in order to vary assessments to match different learning styles and accurately assess each student's knowledge. My lectures are often infused with inclusive activities such as incorporating examples from current scientific literature, telling historical stories focusing on underrepresented groups and their contributions to science, engaging students in hands-on activities, or initiating group work or discussions. It is these types of conscious efforts to increase inclusivity that will help broaden the appeal of science to underrepresented groups.

I believe that emphasizing the practical aspects of the subject matter enhances learning. I anticipate that on the syllabus in every course I ever teach, one objective will be that every student will gain the ability to apply chemistry principles and fundamentals to everyday life. A large part of science-funded research is aimed at addressing pertinent questions and exploring relevant real world problems, which also should be a teacher's aim. The stronger the connection a professor can aid a student in establishing with the subject matter the more involved and dynamic the student-topic relationship will be. The first step in engaging students is exposing the relevance of the topic they are learning. To this end, I aim to begin every class period by incorporating examples from current scientific literature, television, or print stories dealing with the topic of the day (e.g. if dealing with isomers and chemical bonding we would discuss banning trans fats in restaurants). Knowledge of science is relevant to everyday life, and I strive to communicate this to my students in lecture, labs, and through undergraduate research. Using the web and community seminars and/or demonstrations, a broader learning community can be established beyond the university walls that can strengthen the bonds between the community and the university and emphasize the practical aspects of the textbook chemistry the students are learning. Service based community projects are a component I would like to incorporate in my classes as environmental chemistry issues often hold broad societal appeal. These service based learning projects, are simply an extension of the Wisconsin Idea, designed to ensure the boarders of learning extend past the walls of the campus to all parts of the surrounding communities to the border of the state.

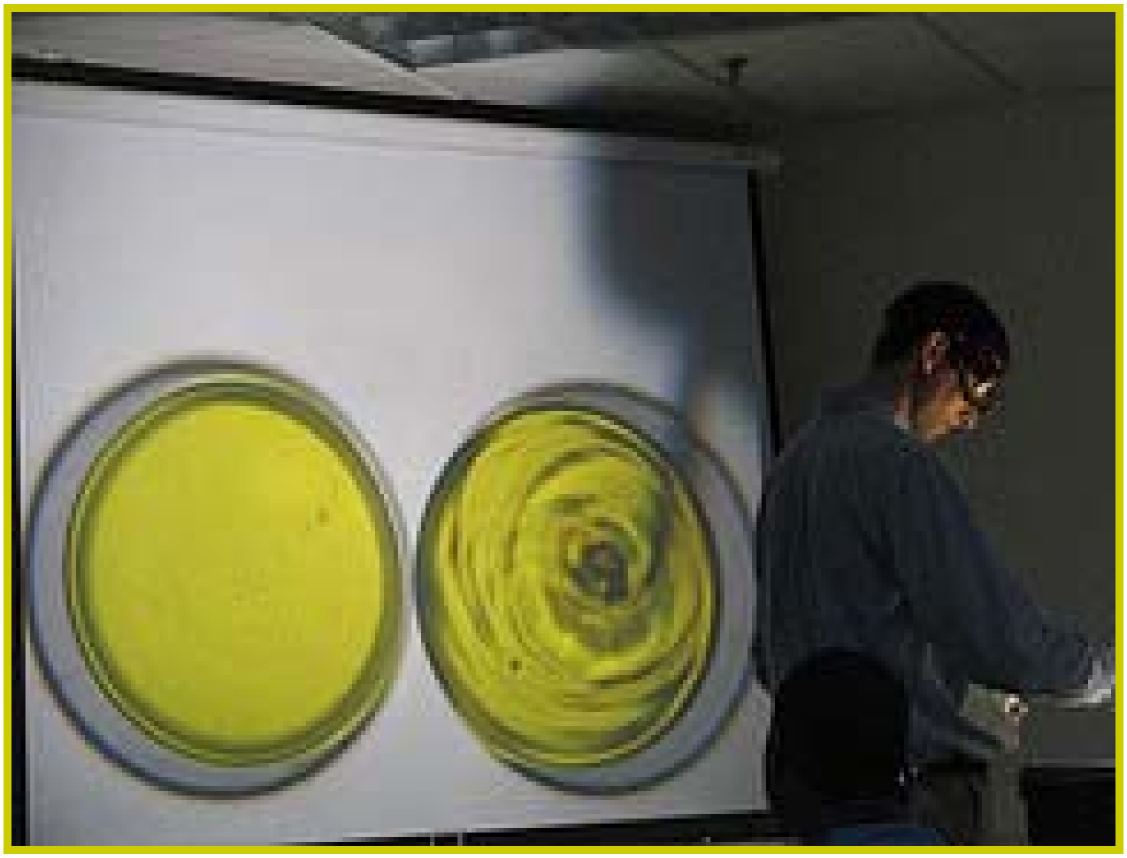
I believe that regular assessment tools are crucial to the process of learning. An integral part of research and teaching is assessment, validating results with previous work and research objectives. Ongoing assessment is integral in creating an efficient learning environment. Keeping a constant eye on the learning roadmap using daily assessment exercises is crucial to determining prior knowledge the students possess, gauging retention of newly introduced ideas, and making sure the students are meeting the learning objectives. In every lecture I try to add some component of assessment, whether it is minute papers, group brainstorming on issues concerning the topic of the day, or having students individually write out what was most clear and least clear concerning the day's learning activities. I build my daily learning activities with a clear picture of the assessment techniques I plan on using to ensure the daily learning objectives are met. In addition to student assessment, I also practice self-assessment and reflection techniques as learning is dependant on assessment, and there is no doubt in my mind teaching-as-research is a constant learning experience.

[1] Handelsman, J., Miller, S., Pfund, C. 2006. *Scientific Teaching*. W. H. Freeman and Company, New York , NY.
[2] Little Soldier, Lee 1989. "Cooperative learning and the Native American student." *Phi Delta Kappan*, October, pp. 161-163.

A. Introduction

What follows in the following pages are artifacts that I have chosen that relate to some of the core ideas from both the delta program and from the preceding pages of my teaching and learning philosophy. My artifacts cover the main themes of active learning, teaching-as-research, learning community, learning-through-diversity, and personal connections. Following each artifact is my reflection explaining the significance of my choosing each artifact. Enjoy.

B. Artifact - Active Learning



ME: What prompted you to take this picture?

STUDENT (Photographer): The color upon the overhead screen, coupled with the light and shadow and your shape, your presence in the context of that visual of the experiment. The moment was a unique representation of how you teach; very hands-on, and with humor and ease. I saw the ease in your body language. That is what prompted me.

B. Reflection - Science is “neat”

The demonstration I’m doing in the photo is one using chemical equilibrium to demonstrate Le Chatelier’s principle - if a chemical system at equilibrium experiences a change, then the equilibrium shifts to partially counter-act the imposed change (Side note: As a class we decided to call it the Braun’s principle for the day, after Karl Ferdinand Braun who came up with the same idea independently, but often does not receive the credit he is due). Having previously okayed pictures to be taken during class to a student who liked to take pictures of “neat things” I was not surprised to get an email with the attached picture, rather I was quite proud. I managed to make science neat!

The aspects of the photo I like are some of the hidden nuances of the photo, including the implied chemical principle, active leaning in action, and why this demonstration did not work for all students. A hidden aspect of this photo is the fact that the students had a vested interest in noting a color change. Just prior to this demonstration the students worked in groups to balance the chemical equation and predict what would happen when acid or base was added. In fact audible cheers went up when the color change occurred. As a general rule of qualitative analysis, cheering during in class demonstrations is a good indication of student enjoyment. In retrospect, this activity (which I was given by a fellow instructor at MATC, or a member of my learning community one could say) is a good example of an active learning activity that worked well in keeping the students attention.

I find it important to present information to the students in multiple formats, and this activity allows a tangible reminder of Braun’s chemical principle. It’s one thing to read about or discuss the phenomenon, but by visually being reminded of the principle I aimed to drive home the concept. And I was successful in this instance, at least for the one student who thought it was “neat” enough to capture on her camera. However, a couple weeks after reflecting upon this activity I realized that like many classroom activities it was not effective for all the students. A large component of the outcome of the demonstration is dependant on observing a color change, which was one reason the student took this picture. But I found in a later lab period that one student in the class is color blind, and likely took little or nothing from this in class demonstration. In the future I intended to supplement this demonstration with another one that doesn’t depend on color recognition.

This is one of my favorite artifacts, due primarily to the impromptu nature of the photograph; I didn’t even know it was taken until the student emailed me days later. It is a nice example of an activity that can break the monotony of a lecture. I’m not sure this picture is worth 1,000 words, but it definitely is worth more to me than I can describe here, and it helped explain to students Braun’s principle.

C. Artifact - Teaching-As-Research

1. Please list an aspect of the biofuels lab you enjoyed.

Compared to chemistry labs in the past, for example in Chem 1, the biodfuels lab seemed so much more applicable then all the others. That is, the problem that making this type of fuel is trying to solve is major. That is the aspect that I enjoyed the most.
Doing something real-world rather than just for the sake of chemistry made this worth-while and memorable. I would recommend keeping it because it exposed the students to information about automobile enginges, about fuels and storage, about alternative energy and the fuel crisis. Now granted most of thses topics are close to my heart anyway, but I did enjoy the lab for chemistry's sake as well.
I enjoyed doing something that related to real life in such a practical way! Now I understand a lot more of the ongoing biofuel-fossil fuel debate!
I enjoyed learning about biofuels. They are becoming such a large part of our lives, and learning about them has helped me better understand the world around all of us.
I like the fact that it addresses a topic so directly relevant/important to life. Not just about chemistry, or making a new product, but about the how and why of something we all need to think about.
I liked being able to test our biofuel's flash point.
I really liked that it was something that pertained to the real world.
The fact that the lab is directly correlated to something that we will potentially use in our society that is environmentally friendly and cost effective. I didn't really know much about biofuels until I did the lab.

2. Please list one aspect of the biofuels lab you did not like and suggest a change in future iterations of this lab.

I would like to see a video on biofuels. Using this medium would better able the instructor to reach all of their students.
Should make or find a mini diesel engine students can put their fuel in to see it work.
Soy bean oil was messy to handle
Testing the solubility of different substances was, in my mind, a waste of time.
The drop by drop solubility test.
The flashpoint testing instrument wasn't as helpful as I thought it would be.
To have all students test the commercial biodiesel. Only some did this, but I would have liked to have seen the flash point for this as well. Possibly letting the reaction sit for a week to see what a difference it makes and washing off the soaps. That would be really interesting!

3. Testing the number of drops it took for different substances to dissolve in water helped me understand solubility. (N=29)

Yes	83% (24)
No	17% (5)

4. The use of the flash point testing instrument helped me understand vapor pressure. (N=29)

Yes	79% (23)
No	21% (6)

5. Timing the compounds as they traveled down a glass slide helped me understand viscosity. (N=29)

Yes	90% (26)
No	10% (3)

6. Making biodiesel was easier than I thought it would be. (N=29)

Yes	93% (27)
No	7% (2)

7. The biodiesel I made met DOT regulations for flash point. (N=27)

Yes	22% (6)
No	78% (21)

C. Reflection – Eureka moment in assessment

This reflection is based on some results generated from my first trial using a SALG survey to access changes we made in a lab component at Madison Area Technical College (MATC). The artifact is a subsample of SALG data, including a sampling of responses of what students liked most and would change about the lab, and how certain aspects of the lab helped them understand chemical principles. This SALG survey was one of my initial steps into the teaching-as-research idea.

Eureka moments in science are great, I still remember when I learned of the power of an excel spreadsheet. I had a similar moment when I heard about the student assessment of learning gains (SALG) survey. Basically it was a "too-good-to-be-true" feeling. I found one of the great thing about SALG surveys to be that once a template is made it allows for quick and easy customizations, allowing for quick modifications to allow for broad usage of this tool. However, prior to creating this survey, I was really naive in the great deal of time it takes to come up with good, thoughtful questions for the students to answer.

If the students can be convinced to fill a SALG survey out, the only limitation to the data that can be generated is the resourcefulness of the questions asked. Multiple choice, short answer, and longer-reflective questions can be asked to access a wide range of student learning characteristics. In my SALG survey I utilized longer answer format to allow for students to anonymously indicate aspects they did or did not like about the lab. I felt going into this exercise that this would give the students a feeling of ownership to dictate how future iterations of the lab will be implemented. It seems from looking at their responses that they did take the question about what they would change about the lab seriously.

Minimal extra credit points were associated with filling out the SALG survey, yet over 70% of the students filled them out. One thing I would like to do in future SALG surveys is to continue to aim for as close to 100% participation from the students as possible. After receiving the entire student responses it seems likely that some modifications could strengthen this lab even more. Specifically focusing in on the testing of the student biodiesel in an engine would be a neat application.

This SALG artifact is one that really is important to me as it signifies very simply the research aspect of teaching-as-research. I learned a great deal about the time it takes, the data it can generate, it's usefulness in implementing and evaluating the change. Analyzing well collected data to improve future changes to curriculum and increase student learning is at the heart of good teaching. My previous sentence strikes me as a bit ironic, because prior to my involvement with the Delta program, a question concerning the importance of data collection for teaching would have been a silly association in my mind. However, now I know better!

D. Artifact - Learning Community

Ein ungewohnter Akzent

Zwei Studenten aus Minnesota besuchten die Realschule Luckenwalde

ELINOR WENKE

LUCKENWALDE ■ Ungewöhnlichen Besuch hatte die Realschule „Freiherr vom und zum Stein" am Donnerstag. Adam Hoffman (22) und Jason La Plant (21), zwei Studenten aus Minnesota (USA), sind derzeit auf Europa-Rundreise. Kontakt zu den Luckenwalder Lehrern fanden sie durch das Sokrates-Projekt. Die beiden absolvierten ein Praktikum an der schwedischen Partnerschule von Luckenwalde und waren zu einer Studienberatung in Finnland, bei der auch Luckenwalder Realschullehrer waren.

Nach ihrem Praktikum in Schweden reisen die beiden Studenten einen Monat lang durch Europa. Nach Athen, Rom, Neapel, München und Prag machen sie nun Station in Berlin und Luckenwalde. Bis Sonntag wohnen sie bei Lehrer Sven Muschert. Der unterrichtet Geografie und Sport und lernt jetzt fleißig Englisch dazu. Nach einem Luckenwalde-Bummel am Mittwoch besuchten die Gäste am Donnerstag den Unterricht und standen den Schülern der 9c Rede und Antwort. Die Schüler schlugen sich mit Bravour auf Englisch, Adam Hoffman spricht aber auch recht gut deutsch. Die Realschüler wollten allerhand über Schule, Familie, Traditionen und Wetter in den USA wissen.

Die Studenten, die zum erstenmal in Deutschland sind, interessieren sich vor allem für Geschichte und Politik. Für die Schüler und Lehrer der Realschule ist so ein Besuch auch Neuland, Gäste mit amerikanischem Akzent hatten sie noch nie. „Da kann man selbst nur dazu lernen", sagt Lehrerin Monika Lustig, die beim Ankündigungsgespräch am Telefon ihre Schwierigkeiten hatte. Sie hofft, dass man die Kontakte erhalten und vielleicht eine Partnerschaft zu einer amerikanischen Schule aufbauen kann.

Die beiden amerikanischen Studenten Jason La Plant (l.) und Adam Hoffman mitten in der Klasse 9c der Luckenwalder Realschule.

D. Reflection - We're in this together

It isn't always easy being the first, but it usually is pretty fun. This reflection is based on a newspaper article chronicles how my fellow English language teaching program (ELTAP) assistant and I as teaching English as a second language in Sweden ended up becoming the first Americans in the Luckenwalder, Germany high school. I love reflecting on this memory as it was my 1st multinational learning community (despite the fact I did not know what a learning community was at the time), it made me think what it meaning to be American, and it gave me an increased understanding of the importance of diversity.

The significance of the European Union (EU) teachers exchange program that we were participating in was largely lost on me at the time. However my involvement in the Delta program leading to the refinement of my reflections skills, has allowed me to be able to appreciate both the program and the opportunity that I had in some six years ago. One aspect of the EU program that rings truer to me now are the importance of putting like-minded (interest in teaching) people from different backgrounds together. I found it to be a great way to show that a specific technique might not be right or wrong; rather it might simply be different.

As a 20-something American student in an EU program for teachers (talk about two fish out of water), I suddenly became an expert on all things American, or so it was assumed. I realized how much I did not know about our educational system. Through this occurrence, the danger in stereotyping/grouping people together, and also the importance of representing a group properly became very apparent to me.

A couple of the best things this experience taught me is that 1) the inherent good nature of people across ethnic, national, and societal divides, and 2) the importance of diverse viewpoints. Each of the EU groups had different historical activities that helped shape their teaching and learning beliefs, and their reasons for even doing the same thing were often different. From an institutional standpoint, it was productive to note the differences between each group's educational systems. The Latvians in the program had much fewer resources than the Greek or Finish schools, yet some of the most innovative activities/ideas came from this underfunded group.

This experience is one that I truly will never forget, as I've made friendships that still exist today. My international learning community before I knew what a learning community was will continue to shape my teaching and learning ideas long into the future. In the future I would love to foster a working relationship with one of theses schools to broaden the reach of this EU program. I'm also very thankful for the Delta Program which has allowed me to retroactively extract even more learning from this wonderful experience.

E. Artifact - Learning-Through-Diversity:

Today's Task – P in Lake Mendota

<u>Group One</u>

Run samples

- Blank
- Spike
- Dissolved Reactive Phosphorus (DRP)
- DRP Duplicate

<u>Group Two</u>

Run samples

- Blank
- Spike
- Total Phosphorus (TP)
- TP Duplicate

<u>Together</u>

- Determine if Lake Mendota might have elevated levels of P
- See how much TP is DRP (plant available)
- Discuss the results/inpacts

E. Reflection - Who is teaching who

This reflection corresponds to the activity I developed to aid underrepresented high schoolers get hands-on experience with environmental chemistry. The slide is a summary of the culmination of my thoughts on how to make environmental chemistry interesting to students in the UW College Access program. This program is designed to introduce underrepresented students to UW-Madison, and to the skills needed to succeed at any post-secondary institution. The main challenges to this activity were that the students had varying knowledge and attitudes about chemistry, they had backgrounds much different than mine, and they had to be able to be performed the activity in less than a half hour.

One of my core teaching and learning beliefs is that science should be relevant to aid in student interest. I figured my association with the students in the UW College Access Program would allow me an opportunity to test out this idea. Early on in my planning stages I realized that creating an activity for a homogeneous group of people is one thing, but creating an activity for a wide range of science literate high school students was a bit more challenging than I anticipated. However, it is much more like a real world teaching experience and I found this experience to be beneficial to me during my experiences at MATC. After much internal debate I decided to have the students do an activity framed around a relevant real-world problem – nutrient pollution. By making the students feel comfortable initially discussing a subject they were familiar with I was able to lead their interest into unchartered territory (eg. Beers Law).

Another challenge I underestimated was the different backgrounds of the students; they differed from mine with respect to socioeconomic background and interest in chemistry, and even greatly differed amongst one another. My hopes of selecting a common problem were pretty well met, as nearly all students had experiences of coming across green, smelly water; and if they hadn’t, I opened the shades in the room and showed them Lake Mendota in full bloom.

Another challenge was doing a science lesson in a half an hour, while also including both background lecturing and some lab activities. I felt it necessary for the students to get the theory and hands-on application during our allotted time, and they really seemed to enjoy both. And in reality the students taught me as much if not more about relating to a diverse audience, than I taught them about chemistry. It turns out that I overshot the lab activity a bit as the students spent most of their lab time taking pictures of each other wearing safety goggles or doing the simplest of tasks – pipetting. At the end we wrapped up our discussion and lab work by determining that Lake Mendota had more P than was healthy for the ecosystem, and we discussed the ramifications. In hindsight I would have liked to incorporate an assessment portion to see what the students thought of the activity, but in some respects their fits of laughter during unsuccessful sample transfer attempts told a good portion of the story.

F. Artifact - Personal Connections

From: <ahoffman@matcmadison.edu>
To: class list
Date: Sunday - October 21, 2007
Subject: Clearing up some muddy points

Below are your questions and my answers from topics pertaining to the lecture on Thursday:

Q: Solubility rules - will they help us understand spectator ions?
A: They can assist you, as often if a compound is 100% soluble (like NaOH in KNO3) it will be in similar form before and after the reaction thus it is a spectator. But it is just as easy to realize that Na,K,OH,NO_3 are all strong conjugate acids/bases so they will act as spectators.

Q: Why do we assume x is small when figuring out Kb?
A: Because the change in conc is often small, and because it's easier mathematically to solve the equation without using the quadratic equation and see if it is small enough (less than 5%) and then use the quadratic equation if necessary.

Q: Why do acidic substances have a Kb constant as well?
A: Because weak acids/bases are only partially ionizable and will also go in the opposite direction. So HCOOH + H2O -> $HCOO^-$ + H_3O can also go in the opposite direction $HCOO^-$ + H_3O^+ -> HCOOH + H_2O. Sometimes, especially with multiprotic acids you'll need to compare the Ka and Kb to see which is the dominant equilibrium expression.

Q: How did you get the pOH?
A: The [OH^-] came form the Kc equation we set up. OH^- was represented by one of the x's. When we knew the OH^- we can take the negative log of that value to get the pOH.

Q: A list of strong acids and bases would've been useful
A: Strong Acids: HCl, HBr, HI, H_2SO_4, HNO_3, $HClO_3$, $HClO_4$, $HBrO_3$, $HBrO_4$, HIO_3, HIO_4. Strong Bases: NaOH, KOH, CsOH, $Ca(OH)_2$

Q: How to determine whether a salt solution will be acidic or basic?
A: Identify the conjugate acid/base pair. E.g. SO_3^{2-} is already negatively charged so it'll look to add a positive H^+, which also gives us an acid we've seen before HSO_3^- . So by taking an H+ out of solution SO_3^{2-} will act to give us a more basic solution.

Q: What is the definition of a spectator ion?
A: An ion (charged atom or molecule) that does not participate in a given reaction. So the reactants of the ion equal the products so it has no role (as far as determining concentration) and thus can be ignored.

All other questions were variations on these questions and should be sufficiently answered above . . . if not please email myself or Dr. Walz for further clarification.

Thanks.

Adam

From: xxx@stu.matcmadison.edu>
To: ahoffman@matcmadison.edu
Date: Sunday - Wed, 19 Dec 2007 12:41:52
Subject: Thanks

Hey, Adam! Everyone in our class thinks you did a great job, and that you're one of the nicest/funniest chemists they've met. For real! So congrats on your excellent debut. Just might take you up on that biodiesel fix!

==

Dear Adam:

I cannot thank you enough for all of the help you have given to me this past semester! I hope you know how much I appreciate all of your time! Without you I would be so lost! You are an amazing tutor and you will make one great professor.

Thank you, Adam!

Best wishes,

F. Reflection - A renewable fuel for a teacher

My artifacts, my responses to student muddiest point minute papers, and end of the semester correspondences to me from two former students, exemplify the importance of student-teacher interactions. In addition to being a good purveyor of knowledge, the best teachers also exhibit a personal connection with their students and demonstrate their investment in helping students reach their full potential. With my artifacts I aim to show the culmination of thoughtful teaching and learning, and what it takes to get there: time, effort, and understanding.

First off, I really like the irony of minute papers – as they take the students minutes to full out, and then it takes me many, many more minutes to go through them and narrate responses. Happily, I found out that the my time commitment was not lost on the students who really appreciated my responses and commented that they felt like I was taking a interest in their learning, which in fact I was. The effort put forth by the students to come up with their most clear and least clear aspects of lectures was good.

However, I aimed to expand the class' interaction by sending my responses via email and also posting them on an online discussions thread to facilitate a bit more student-student interaction concerning the topics of the day. In reality little follow-up occurred after my clarifying remarks about the muddiest points, suggesting either all the questions were cleared up by my responses, or the students did no want to use any time on the class webspace. I'd guess it was a mixture of the two. In the future I'd like to facilitate online dialogs with my students, and this initial foray taught me a lot about this subject.

The notes from two students at the end of the semester are similar in the timescale of the minute papers – short on the students end, but they resulted in many hours of joy on my end. It is incredibly encouraging to be told that one's efforts have paid off. I've always been a big proponent of thanks-you's and I've long debated the best way to thank a hard working class, "Thanks!" I think these two artifacts get to the heart of teaching a bit more than my others – it is a personal profession. Interacting with a diverse group of students to attain a common goal is one of the rewards of being an effective teacher.

In reflecting back upon my time working with students both on a one-on-one and group lecture basis I believe that helping them to realize that I'm there to aid them in learning is really a key feature in building trust between me and my students. I believe that if I do enough activities to aid them in learning the material, their good grades will be thanks enough, but a note here and there from them won't hurt either! And in the future I will not underestimate the importance of me communicating to the students that I appreciate their hard work and effort in my class.

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Research Interests

Biogeochemical cycling of nutrients in aquatic environments, and phosphorus and nitrogen speciation in waters, soils, and sediments.

Education

University of Wisconsin, Madison
Expected Ph.D., Environmental Chemistry and Technology, July 2008
Minor: Geology (hydrogeology emphasis)
Graduate Certificate: Delta in Research, Teaching, and Learning
Advisor: Dr. David E. Armstrong
Thesis Topic: Biogeochemical cycling and bioavailability of phosphorus in varied aquatic environments

University of Minnesota, Morris
Bachelor of Arts with distinction Major: Biology Minor: Chemistry
May 2001

Teaching Experience

Professor of Environmental Chemistry, Department of Natural and Applied Science, University of Dubuque, Dubuque, Iowa. Responsible for teaching general and environmental chemistry courses, as well as conducting research with undergraduate students (Starting Fall 2008).

Adjunct Instructor, College Chemistry 2, Arts and Sciences Division, Madison Area Technical College, Madison, WI. Responsible for a laboratory section, select lecture topics, and curriculum co-design for the second semester of a year long course covering the fundamentals of organic and physical chemistry. (2007-2008)

Delta Intern, University of Wisconsin, Madison and Madison Area Technical College, Madison, WI. Responsible for development, integration, and assessment of adding chemical instrumentation to a lab exercise pertaining to biofuels and a short course about biodiesel. (2007)

Tutor, Fetzer Center, University of Wisconsin, Madison. Tutored scholar athletes individually and in groups for undergraduate level majors and non-majors chemistry courses. (2007-2008)

Mentor, National Science Foundation (NSF) sponsored Research Experience for Undergraduates (REU), University of Wisconsin, Madison. Mentored a REU student in biogeochemical cycling research and professional development via a National Science Foundation funded project. (2007)

Workshop Instructor, College Access Program, University of Wisconsin, Madison. Developed lecture and lab activities for a precollege program designed to help disadvantaged and/or underrepresented high school students explore math and science in everyday life. (2006)

Substitute Lecturer, Water Chemistry, University of Wisconsin, Madison. Covered material dealing with principles and applications of chemical equilibrium for a class of upper level undergraduate and graduate students. (2005)

English Language Teaching Assistant, Teleborg Centrum, Växjö, Sweden. Responsible for lesson planning, implementation, and teaching English as a second language while earning college credit. (2001)

Professional Experience

Graduate Research Assistant, Environmental Chemistry and Technology Program, University of Wisconsin, Madison. Conducted research and supervised undergraduates in EPA and NSF funded projects to measure and model the source, fate, transport, and biogeochemical cycling of phosphorus in a multitude of aquatic environments. (2003-PD)

Environmental Laboratory Technician/Analyst, Minnesota Valley Testing Laboratories, Inc. New Ulm, MN. Involved in sample preparation, extraction and analysis of water, soil, and, oil samples for the presence of Polychlorinated Biphenyls (PCB‘s), Organochlorine Pesticides, Polynuclear Aromatic Hydrocarbons (PAH‘s), and Diesel and Gas Range Organics following EPA methodology. (2001-2003)

Service and Outreach

Wisconsin Biodiesel Assn. exhibit representative at Wisconsin State Fair (2007)
EC&T seminar committee member (2004-2007)
Science fair judge, New Ulm Public Schools, New Ulm, MN (2002)
Teaching Reading Enabling Children (TREC) tutor (2000-2001)

Honors and Awards

Presidential Scholarship recipient
Anna Birge Scholarship recipient
Vilas Travel Grant recipient
Outstanding student poster award honorable mention at the 27th Annual Midwest Environmental Chemistry Workshop

Award of Excellence for presentation at ACS American Chemical Society 232nd National Meeting

Professional Presentations

Hoffman, A.R., D.E. Armstrong, and R.C. Lathrop (2008) Influence of sediment geochemistry on internal phosphorus loading in four Wisconsin lakes. *ACS American Chemical Society 235th National Meeting*, New Orleans, LA, USA, April 6-10.

Hoffman, A.R., D.E. Armstrong, M.R. Penn, and R.C. Lathrop (2006) Factors controlling the amounts and distribution of bioavailable phosphorus in stream sediments in an agricultural watershed. *ACS American Chemical Society 232nd National Meeting*, San Francisco, CA, USA, September 10–14.

Hoffman, A.R. (2006) Phosphorus: measurement and nonpoint source pollution. *University of Wisconsin College Access Program*, Madison, WI, July 11. (Invited Talk)

Hoffman, A.R., D.E. Armstrong, M.R. Penn, and R.C. Lathrop (2005) Distribution and mobility of bioavailable phosphorus in a stream draining an agricultural watershed. *The North American Lake Management Society 25th International Symposium*, Madison, WI, November 9–11.

Hoffman, A.R. and D.E. Armstrong (2004) Storage and mobility of bioavailable phosphorus in sediments of a stream draining an agricultural watershed. *The 27th Annual Midwest Environmental Chemistry Workshop*, Madison, WI, October 15–17.

Hoffman, A.R. and T.M. Anderson (2001) Attachment site preference of parasitic water mite larvae on damselflies in Minnesota. *The 49th annual meeting of the North American Benthological Society*, LaCrosse, WI, June 3-8.

Peer-Reviewed Publications

Hoffman, A.R., D.E. Armstrong, R. C. Lathrop, and M. R. Penn (Accepted pending revisions: *Aquatic Geochemistry*) Factors controlling the amounts and distribution of bioavailable phosphorus in stream sediments in an agricultural watershed.

Rogers, J.S., K.W. Potter, A.R. Hoffman, J.A. Hoopes, C.H. Wu, and D.E. Armstrong (In review: *Journal of Geochemical Research*) Hydrologic and water quality function of a small wetland: Upper Dorn Creek Wetland, Wisconsin.

Hoffman, A.R., D.E. Armstrong, J. S. Rogers, K. W. Potter (In preparation) Phosphorus and sediment transport during variable flow conditions through an agricultural wetland complex.

Hoffman, A.R., D.E. Armstrong, R. C. Lathrop, and M. R. Penn (In preparation) Diagenesis and storage characteristics of bioavailable phosphorus in stream sediments in an agricultural watershed.