The Ohio State University
Colleges of the Arts and Sciences Course Change Request

Chemistry
Academic Unit

Chemistry **100**
Book 3 Listing (e.g., Portuguese) Course Number

Summer Autumn **Winter** Spring Year **2009**

Proposed effective date: choose one quarter and put an "X" after it; and fill in the year. See the OAA curriculum manual for deadlines.

A. *Course Offerings Bulletin* Information. Follow instructions in the OAA curriculum manual.
Before you fill out the "Present Course" information, be sure to check the latest edition of the Course *Offerings Bulletin* and subsequent Circulating Forms. You may find that the changes you need have already been made or that additional changes are needed. If the course offered is less than quarter or term, please also complete the Flexibly Scheduled/OffCampus/Workshop Request form.

COMPLETE ALL ITEMS THIS COLUMN

Present Course

1. Book 3 Listing: **Chemistry**
2. Number: **100**
3. Full Title: **Chemistry and Society**
4. 18-Char. Transcript Title:
5. Level and Credit Hours **U, 5 CR**
6. Description **Terminology, methods, and principles of chemistry; examination of the roles of chemistry in our modern technological society**
(25 words or less)
7. Qtrs. Offered : **Au, Wi, Sp**
8. Distribution of Contact Time: **3 cl, 2-hr recitation**
(e.g., 3 cl, 1 3-hr lab)
9. Prerequisite(s): **Math 075 or 076, or satisfactory score on Math placement test**
10. Exclusion: **students with credit for 101, 121 or H201 (or Chem courses with these as prereqs)**
(Not open to....)
11. Repeatable to a maximum of _____ credits.
12. Off-Campus Field Experience:
13. Cross-listed with:
14. Is this a GEC course? **Y**
15. Grade option (circle): **Ltr** S/U P
If P graded, what is the last course in the series?
16. a) Is an honors version of this course available? Y ☐ N☒
b) Is an Embedded Honors version of this course available? Y ☐ N☒
c) Is this a Service Learning Course: Y ☐ N ☒
17. Other general course information:

COMPLETE ONLY THOSE ITEMS THAT CHANGE

Changes Requested

1.
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16. a)
b)
c)
17. **Offer a distance-learning version of this course**

B. General Information

1. Do you want the prerequisites enforced electronically (see the OAA manual for what can be enforced)?

2. Does this course currently satisfy any GEC requirement? if so indicate which category.

3. What other units require this course? Have these changes been discussed with those units?

4. Have these changes been discussed with academic units that might have a jurisdictional interest in the subject matter? Attach relevant letters.

5. Is the request contingent upon other requests? if so list the requests.

6. **Purpose of the proposed change. (If the proposed change affects the content of the course, attach a revised syllabus and course objectives and e-mail to asccurrofc@osu.edu.)**

Offer a distance-learning version in conjunction with an on-ground offering in the same quarter

7. Please list Majors/Minors affected by the proposed change. Attach revisions of all affected programs. This course is (check one): ☐ Required on major(s)/minor(s) ☐ A choice on major(s)/minors(s) ☐ An elective within major(s)/minor(s) ☐ A general elective:

8. Describe any changes in library, equipment or other teaching aids needed as a result of the proposed change. If the proposed change involves budgetary adjustments, describe the method of funding:

CONTACT PERSON: **Christopher M. Hadad** EMAIL: **hadad.1@osu.edu** PHONE: **(614) 292-1204**

Approval Process The signatures on the lines in ALL CAPS (e.g. ACADEMIC UNIT) are required.

1.	Academic Unit Undergraduate Studies Committee Chair	**Christopher M. Hadad** Printed Name	**9/9/2008** Date
2.	Academic Unit Graduate Studies Committee Chair	Printed Name	Date
3.	**ACADEMIC UNIT CHAIR/DIRECTOR**	**Malcolm H. Chisholm** **Printed Name**	**9/9/2008** **Date**

4. **After the Academic Unit Chair/Director signs the request, forward the form to the ASC Curriculum Office, 4132 Smith Lab, 174 West 18th Ave. or fax it to 688-5678. Attach the syllabus and any supporting documentation in an e-mail to asccurrofc@osu.edu. The ASC Curriculum Office will forward the request to the appropriate committee.**

5.	**COLLEGE CURRICULUM COMMITTEE**	**Printed Name**	**Date**
6.	**ARTS AND SCIENCES EXECUTIVE DEAN**	**Printed Name**	**Date**
7.	Graduate School (if appropriate)	Printed Name	Date
8.	University Honors Center (if appropriate)	Printed Name	Date
9.	Office of International Affairs (study tours only)	Printed Name	Date
10.	**ACADEMIC AFFAIRS**	**Printed Name**	**Date**

Christopher M. Hadad

(614) 688-3141 (voice)
(614) 292-1685 (fax)

hadad.1@osu.edu

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Columbus, OH 43210-1185

www.chemistry.ohio-state.edu

September 9, 2008

Kathleen M. Hallihan, Ph.D.
Director, Curriculum and Assessment
Colleges of the Arts and Sciences
CAMPUS

Dear Kate:

The Department of Chemistry requests to create a distance-learning version of Chemistry 100 for winter quarter 2009.

The Chemistry 100 course currently satisfies some GEC requirements and does not have an associated laboratory component. As such, this course is very amenable to a distance-learning version and we would like to offer an online version in conjunction with an on-ground version for winter 2009.

The current offerings of the on-ground version are quite popular and re usually full (~105 students) for each offering in the autumn, winter and spring quarters of each year.

Attached is the course change form along with some information about the syllabus and how the distance-learning version would compare to the on-ground version.

Please let me know if you need anything further.

Sincerely,

Christopher M. Hadad
Professor of Chemistry
Vice Chair for Undergraduate Studies

Chemistry 100 – Distance Learning Effort

Barbara Pappas
(edited by Christopher Hadad)

First let me say that I [Barbara] need to make clear that we are doing DL version not simply to offer this course to more people, though that is also important. I had the clear goal in mind of making this an enhanced learning experience for liberal arts students. Chemistry is a difficult and intimating subject for many of these students. Luckily, it is part of the American higher education model to teach students science ("To know the first sonnet of Shakespeare and the first law of thermodynamics" is how I seen it posed). It is a big challenge and we need to do a better job than we are doing now. I am constantly amazed at the lack of understanding of basic science and an unnerving embrace of anything published on the Internet, especially junk science. We must better prepare our liberal arts students to be more scientifically literate people, able to make informed and reasonable decisions about so many technology-based issues of today. As you know, chemistry is called the "central science" and Chemistry 100 presents significant social, political, and ethical topics involving science and society today.

I have found that many of my liberal arts students have real difficulty grasping the concepts through typical in-class lecture format. I feel strongly that this DL experience will be an enhancement over the lecture-based course through the utilization of Information Technology. IT affords us the chance to create more individualized learning experiences as well as opportunities for deeper levels of understanding and inquiry. This DL project will make both teaching and learning somewhat more labor intensive than traditional in-class but I believe we have created a body of teaching tools that will engage our students to a very high level.

When you look at the material produced and made available in the DL Chem 100 Content, one might be tempted to think that it could simply be used as a supplement to the traditional in-class lecture format. For example, while a demonstration at the front of a large classroom is often lost on the students (it is interesting exercise to ask students later in office hours what they thought was being demonstrated), a video with audio and chemical equations is much more accessible. I think it is important to emphasize that we have learned time and time again that the vast majority of students never take advantage of the wide range of 'auxiliary' material from the publisher and on our chemistry website. This is very disheartening because over 90% of the students are visual learners and concept videos would appear to be a perfect medium for learning. Reasons for this vary but I think students feel they just don't have the time (studies show this is hardly the case, but ...). Students want to spend their time on algorithmic problems, since this is what they are tested on primarily.

With an on-line course the students have the time. And by the very nature of the course, oriented to utilize the visual learning that is presented on-line. Plus, we force them to watch some items (or at least open them - then we must let natural curiosity take over) before they can proceed to the next assignment. We also add assessment questions targeting these live action videos, flash animations, etc.

(1) how the distance education version would differ from the on-ground version?

We divide our topics into 7 Modules and I have assembled an immersive environment for each topic module presented.

Using a Sympodium Smartboard, I have recorded a large number of 15-20 minutes lecture video 'Pods" (and they are given hard copies of slides for notes) encapsulating chemical principles and technological issues.

These Pods are often "free-standing' (covering a single topic, such as The Periodic Table) and allow students to re-watch them as many times as they desire. This is important because I have found these students feel uncomfortable asking questions in lecture. Conversely, I also have students who had reasonable high school chemistry and find they can make quick work of some of the more rudimentary or fundamental videos. We have edited and converted these Pods with the help of Classroom Media Distribution Services to a streaming format for both Windows Media and Real Player for the best student accessibility and easy reexamination potential. These Pods are often accompanied by videos of our intern James Treadway working (with audio of his thought processes) through related chemistry or math problems, with help from the Digital Union. Again, students can watch them as often as they need to.

I have assembled what I consider the best available auxiliary videos and animations relating to the Pod topics. I have gotten multiple publishers' permission plus we have written our own (the Digital Union was very helpful teaching us how to write Flash content).

After each Pod and its subparts, students take a mini self - assessment quiz. Students not only test their understanding but also see what kind of questions will be asked of them on exams (a big concern of my students). I have to make these worth a few points to motivate students. Finally, at the end of each module (which is akin to 1-3 textbook chapters of our textbook "Chemistry in Context" by the ACS) students must take a more heavily weighted quiz.

Methods to maintain student motivation and involvement are much different in a DL course than in traditional courses. I spent a lot of time in pedagogical conversations with experts at TELR on this aspect. I have also taken the E4Me course available from Ohio Learning Network to get an introduction to the student experience. What I came up with is to set a lot of student progress controls chronologically (students can only access modules starting a certain week and by a certain week) and to make liberal use of ‚Release Conditions'. For example, students must have 75% correct answers on their mini self-assessments before they can go to next Pod. This type of assessment is intellectually satisfying to the student, cautions those who are not absorbing the material, and catches students who think they know the material from high school. They are free to review the Pods and take these quizzes as many times are needed.

This introduces one of the most challenging facets of a DL course - on-line assessment and cheating. The end-of-module quizzes will be one-pass-only, with a time limit, no right click printing, etc and will be tied to a random selection generator from a large quiz bank. We will initially ask students to come to campus to take the major exams.

(2) possible enrollment of the distance-education version? 30-40 to start.

Our goal is to make the course more available to students at the regional campuses and continuing education students, as well as the main campus.

(3) how that enrollment would be encouraged?

I have been working with the chemistry department advisor, Mary Bailey, who will work with the university advisors. We have also had a lot of success moving Chem 100 from a 30 person class to a 120 person class by supplying supplemental materials introducing the course to these advisors.

(4) how will grades be assigned? and be assigned relative to the on-ground version?

We will have the great advantage of running two versions of this chemistry class simultaneously: one based on distant learning with significant TI tools available and one based on in-class lectures with no appreciable additional tools. Student class results will be evaluated side by side from the same assessment actions including quizzes and exams. We can also compare the relative sophistication of the group multiple research assignments.

(5) how will students be assessed for knowledge and interaction -- especially since the on-ground version has "interactive recitations?

Chem 100 recitations are run in a Problem-Based Learning model where real problems and situations are used to serve as a focal point for learning new material in chemistry. Because of the opportunities "digital scholarship" will offer, DL students will be able to do more well-organized research with greater information retrieval options, have more frequent discussions, and present their ideas in a more satisfying manner. Students are expected to work in small groups remotely using web-based real-time ("synchronous") discussions (perhaps incorporating Skype lines for audio at a later time), collaborative science-centered search engines, RSS's and Wikis to explore these research projects. We are able to monitor their activities and discussions ("archives"). We have developed a Rubric that grades levels of participation and depth of contribution to the group's work. Group research papers will be collected in Carmen's Dropbox.

(6) anything else?

Instructor Access:

I will be available to DL Chem 100 students via regularly scheduled 'office hours'. This would be done in a number of ways:

Synchronously using D2L's LiveRoom (which allows use of equations and graphics) sessions
Asynchronously through the Discussion board and email.

The LiveRoom works best with fewer people. I am told that around 15 students is the maximum but I think less than 7 active participants would be sufficiently challenging. Multiple sessions per week would therefore need to be scheduled if we get up to the enrollment numbers I am anticipating.

It is interesting to me that this would not be **my** ideal way to interact directly with an instructor but I have learned the generation gap includes 'texting'. I guess it makes sense because students today communicate with each other so much in this fashion that they have no qualms, in fact feel more comfortable and facile, using it in the 'classroom'.

For continuing education students and others who may be un-hip as me, I will be available via the phone or in-person on campus for more conventional office hours.

Dr. Barbara Pappas
Office 280A CE 292-6866
Pappas.42@osu.edu

Chemistry 100
Chemistry and Society
Autumn 2008

T/R 1:30-2:48 MP1015

Recitation: Mon: 2:30 - 4:18 BE 0394; Wed. 1:30 – 3:18 EL 2002; Fri. 12:30 – 2:18 MP 1008
Teaching Assistant: **Seth Kerechanin** (skerecha@chemistry.ohio-state.edu)

Text: *Chemistry in Context: Applying Chemistry to Society, 6th Edition* (Customized for The Ohio State University for better pricing); C.L. Stanitski, L.P. Eubanks, C.H. Middlecamp and W.J. Stratton, American Chemical Society. The ISBN is 0073282294.

Course objectives:

Welcome to Chemistry and Society. Chemistry is often called the "central science". We live our daily lives immersed in substances that are composed of chemicals. Because many chemicals have the dual ability to be useful and harmful, the relationship between mankind and chemicals has always been tense. In addition, chemistry is an arcane and sophisticated language. The stage is set for student apprehension!

This course is designed to introduce students to the way chemical concepts can be used to help interpret the physical world. It is also intended to introduce significant social, political, economic, and ethical issues facing science and society today. The main objective is to better prepare students to be more scientifically literate people who are able to make informed and reasonable decisions about technology-based issues. We will treat the dilemma we face of trying to balance the great benefits of modern chemical sciences and technology with the risks that inevitably accompany them. You will learn to think scientifically by evaluating data and testing theories of others and your own.

Overall Course Structure:

Two lectures per week will introduce select topics and attendance is mandatory. There will be one midquarter exam, a final, five on-line (or in recitation) quizzes, and five homework assignments. The recitation will be run in an inquiry-based manner with small groups of students discussing real-life issues. Attendance in recitations is mandatory. The last part of each recitation session will be spent going over homework and any questions on the lecture material. For the first time we are going to give students the option of using monitored on-line chat rooms to satisfy part of their recitation group work requirements. There will be more details given during the first recitation.

GEC Learning Objectives:

1. ***Students learn the basic facts, principles, theories, and methods of chemistry on a 'need-to-know' basis.***

For example, we introduce Carbon with the Periodic Table of the elements, chemical reactions (principally the combustion of fossil fuels), the Carbon Cycle, and finally, an introduction to Organic chemistry through the Nutrition topic.

2. ***Students learn chemistry presented within social, political, or topical context.***

This is the essence of the entire course. We have an opportunity in this class to do two things: introduce principles and applications of chemistry to students and to give students the opportunity to develop their skills by identifying chemistry in action in the real world. For example, we will discuss specific chemicals in the context of the changes in air quality since the Clean Air Act of 1970 and on-going concerns in Ohio and internationally and the most contentious and potentially greatest in consequence, global warming and climate change.

3. ***Students are taught key discoveries and events in the more recent history of science and their impact on contemporary society.***

Innovation in chemistry impacts almost every aspect of our contemporary lives. Areas we will cover that are very dynamic include unique chemicals and modern materials, alternative energies, nutrition and chemical forensics.

4. ***Students learn to think scientifically by evaluating data and theories of others and their own.***

Our society often seems quite happy to accept spin and slanted statements because we have come to believe that all expertise is bias, that every judgment is relative, that all knowledge is opinion, and that all opinions have equal worth. We will examine experimental data so that students will begin to understand why data derived from the application of the scientific method are valued differently than other kinds of data. We will also examine ways in which data can be misused and misrepresented, what sources of error are as well as alternative hypotheses that must be considered.

5. ***Students are directed to do research, have discussions, and present their ideas***

The recitation sections will be run in an inquiry-based manner with small groups of students discussing problems which are posed by the section leader and the group itself. The aim is the ability to arrive at informed judgments by effectively defining problems, gathering and evaluating information and developing workable solutions to complex issues. We believe this leads to proficiency in technological literacy and information retrieval to enable individuals to gain and apply new knowledge and skills as needed.

Relationship with other courses in Chemistry:

This course provides non-science majors an alternative route toward satisfying the GEC physical science requirement by taking a single Chemistry course without a lab, or as the first course in a Chemistry sequence in which the second course may be Chemistry 101. Chemistry 101 has a laboratory component, and complements the Chemistry 100 material by introducing the skills necessary for actual work in a variety of scientific occupations. It does not dwell on the type of topics treated here, which are all related to the societal impact of chemistry. If a student enters OSU without high school chemistry and would like to take Chemistry 121, Chemistry 100 can serve as an alternative to Chemistry 101 for satisfying the chemistry prerequisite.

Office Hours: Tuesdays, Wednesdays, and Thursdays 9 -10 a.m. and by appointment.

Additional Assistance:

- All students with documented disabilities, who need accommodations, should see the instructor privately to schedule an appointment as early as possible. If your disability requires materials in alternative formats, please contact the Office for Disability Services at 292-3307, Room 150 Pomerene Hall.
- The textbook has a website: www.chemincontext.eppg.com. It offers you practice quizzes, direct links to those referenced in the text under "Consider This" exercises, and some other source materials.
- There are very good web-based tutorials on our Carmen course
- On the department website:

1.) http://www.chemunder.chemistry.ohio-state.edu/under/chemed/qbank/quizmain.htm

2.) http://undergrad-ed.chemistry.ohio-state.edu./index.html (see General Chemistry or Useful Links tab)

Week of and Title	**Text Chaps/Major Topics**
Sept 25th and 30th, Oct 6th **The Air We Breathe**	**Chapters 1 and 6** Composition of Air including Pollutants, Measurement, Substances and Mixtures, Periodic Table, Molecular and Ionic Compounds, Formulas and Names, Acids and Bases, Acid Rain, Indoor Air Pollutants, Regional, National, and Global Air Conditions
Oct. 13th and 20th **Global Warming and Climate Change**	**Chapter 3** Greenhouse Effect, Radiation, Measuring CO_2 levels, Conservation of Mass, Mole, Chemical Rxns, Molecular Shapes, Greenhouse Gases, Enhanced Greenhouse Effect, Climate Change, Projecting into the Future
Oct. 27th and Nov 3rd **Energy, Fossil Fuels, and Alternative Energy Sources** **Midterm Exam is on Tuesday November 4th**	**Chapter 4** Kinetic and Potential Energy, Laws of Thermodynamics, Diamonds, Activation Energy, Spontaneity, Fossil Fuels of Coal, Methane, and Petroleum Oil Carbon, Carbon Cycle, Combustion Rxns, Energy and Enthalpy Calculations Alternative Energy Sources: Biomass, Batteries, Nuclear, Wind, Solar, Waves
Nov 10th **and 17th **The Fascinating Chemical and Physical Properties of Water**	**Chapter 5** Unusual Properties of Water, Aqueous Solutions, Table Salt and other Ionic Compounds, Electronegativity and Polarity, Intermolecular Forces of Attraction in Liquids, Solids, and Solutions
Nov 17th and 24th ** **Everyday Nutrition**	**Chapter 11** Macronutrients: Proteins, Carbohydrates, and Fats, Micronutrients: Vitamins and minerals, Polarity of molecules: Why chemists drink red wine with red meat and sometimes use soap, Chocolate: what's made out of it, why do we love it, and how do different cultures create different tastes (chemically, of course), Organic chemistry introduction
Dec 1st **Chemical Forensics that Makes CSI Possible**	**Class notes only** Chemical structure and behavior of some of the more potent poisons, Chemical structure of blood, Equipment and methodology in Forensic Chemistry We solve the **murder** of the head of the chemistry dept. using **Forensic Chemistry**

** Tuesday Nov. 11th, Thursday Nov 27th and Friday Nov. 28th are University holidays. No classes will be held.

Course Grading:

Midquarter Exam	175 pts
Quizzes (5@30 pts)	150 pts
Recitation Assignments	350 pts
Homework Assignments	150 pts
Final Exam	175 pts
	1000 total

Carmen: *Carmen* is the Course Management system currently in use at OSU. You access *Carmen* via https://carmen.osu.edu/ and use your OSU username information (i.e. *lastname.#*). You will find your grades, class notes, assignments, practice exams, and many other important pieces of information in *Carmen*'s ***Content*** page.

Homework will be due every two weeks at the beginning of recitation. Assignments per chapter with due dates are available on *Carmen* as well as handed out the first day.

Quizzes:

- Six quizzes will be given (see schedule below). You will have the choice of taking them on-line using.
- There are **NO** make-up quizzes but you are allowed to miss one quiz without receiving a penalty. This addresses the inevitable personal /computer emergencies/ illnesses that often arise. If you take all of the quizzes, your lowest quiz score will be dropped.
- Quizzes will be multiple choice and short answer questions.
- Each week's quiz will cover the material we have covered in class the week before.
- These are **20 minute quizzes**.
- You may take the quiz only once (we include a random question generator so **everybody is taking a different quiz)**.

If you are taking it on-line make sure you have a working computer with a good reliable Internet connection which **allows pop-ups**. You will have a 48-hour window to commence taking the quiz. **The Carmen quiz windows will be 3:00 p.m. Tuesday to 3:00 p.m. Thursday.** Do not wait until 5 minutes before the window closes - you will have only 5 minutes for the quiz. Do not take it in between 1 - 5 a.m. This is historically when Carmen is doing maintenance work. **You are to work independently on the quizzes.** Carmen produces a log each time you do a quiz. It allows us to track you and other students so we can check and compare IP addresses and time spent. We can tell if you have logged onto the same computer as a friend, working together in the library, or if you are logged onto two different computers at the same time. This is considered academic misconduct, resulting in an E for the assignment or the course; plus it really ticks me off.

Quiz Schedule for Carmen (or during your regularly scheduled recitation):

The quiz windows will be 3:00 p.m. Tuesday to 3:00 p.m. Thursday

Quiz I Oct 7^{th} – 9^{th}	Quiz III Oct 28^{th} -30^{th}	Quiz V Nov 18^{th} – 20^{th}
Quiz II Oct 14^{th} – 16^{th}	Quiz IV Nov 11^{th} -13^{th}	Quiz VI Dec 3^{rd} – 4^{th}

Exams.

The midquarter will be given in class on **Tuesday November 4^{th}**, covering chapters 1, 6, 3, and half of 4. The Final exam is scheduled by the University Registrar for **Thursday December 11^{th} at 1:30 – 3:18** and will cover the rest of 4 plus 5, 11 and Forensics

Mandatory Recitations : There will be five assignments during the quarter worth a total of 300 points. There will also be one short oral report per person worth 10 points and a peer review worth a total of 40 points. More information about the recitation is given below.

Class Notes: A subset of the Power Point slides I will be using in class will be available in handout form on Carmen. You may print these and add your own notes from my lectures.

Important Notes:

- We will be working in groups in recitation. Therefore Presence, Promptness, and Preparedness in recitation are mandatory. Deficiencies in these areas will result in penalty points.
- You will need some sort of calculator (your phone calculator would not be a first choice).
- Working together on homework is encouraged; however, copying of assignments is not. It is called cheating. In addition, any information you glean from the Internet must be referenced. Not doing so is called plagiarism. Also, do not simply cut-and-paste your research from Internet or text sources. It will be pretty easy for me to tell so don't take the chance; it is not worth it. I don't expect you to become an expert. Suspicion of copying or plagiarism will result in referral of the case to the Committee on Academic Misconduct (COAM), and may result in a zero on the assignment or a lowered grade for the course. **Please refer to the attached page on academic integrity:**

EIGHT CARDINAL RULES OF **ACADEMIC INTEGRITY**

1. **Know Your Rights**. Do not let other students in your class diminish the value of your achievement by taking unfair advantage. Report any academic dishonesty you see.
2. **Acknowledge Your Sources**. Whenever you use words or ideas that are not your own when writing a paper, use quotation marks where appropriate and cite your source in a footnote, and back it up at the end with a list of sources consulted. Avoid the appearance of plagiarism.
3. **Protect Your Work.** In examinations, do not allow your neighbors to see what you have written; you are the only one who should receive credit for what you know.
4. **Avoid Suspicion.** Do not put yourself in a position where you can be suspected of having copied another person's work, or of having used unauthorized notes in an examination. Even the appearance of dishonesty may undermine your instructor's confidence in your work.
5. **Do your own work**. The purpose of assignments is to develop your skills and measure your progress. Letting someone else do your work defeats the purpose of your education, and may lead to serious charges against you.
6. **Never falsify a record** or permit another person to do so. Academic records are regularly audited and students whose grades have been altered put their entire transcript at risk.
7. **Never fabricate** data, citations, or experimental results. Many professional careers have ended in disgrace, even years after the fabrication first took place.
8. **Always tell the truth** when discussing your work with your instructor. Any attempt to deceive may destroy the relation of teacher and student.

http://www.northwestern.edu/uacc/8cards.html

Recitation for Chemistry 100

Recitation: Mon: 2:30 - 4:18 BE 0394; Wed. 1:30 – 3:18 EL 2002; Fri. 12:30 – 2:18 MP 1008. Teaching Assistant: **Seth Kerechanin** (skerecha@chemistry.ohio-state.edu)

The class will be, in large part, what you make of it. I hope you enjoy it.

According to many studies of corporate, philanthropic, higher education, and government leaders, substantial improvement in American undergraduate education is needed to prepare students to function successfully in current work environments. They have generated a **list of qualities of performance** which has often been quoted:

*High-level proficiency in communication, computation, technological literacy, and information retrieval to enable individuals to gain and apply new knowledge and skills as needed.
*The ability to arrive at informed judgments by effectively defining problems, gathering and evaluating information and developing workable solutions to complex issues.

We have an opportunity in this class to do two things: introduce principles and applications of chemistry to you and to give you the opportunity to develop your skills as problem-solvers by identifying chemistry in action in the real world. I will use the lectures to introduce chemical concepts and you are expected to ask questions. However, in recitation you will work in groups. I know you have all had experience in groups but maybe not on science topics. Too often students have the naïve view of learning in which the teacher is responsible for delivering content and the students are the passive receivers of knowledge. Or as one student put it, "Sometimes I felt the professor's notes became my notes without passing through either of our brains!" Working in a group offers an excellent opportunity for you to brainstorm, discuss ideas, and come to consensus. It has been proven over and over that good ideas come from people working together rather than from individuals working alone. Plus, group work can be a lot of fun and in the process you develop the interpersonal skills and practice in teamwork that future employers find invaluable.

Ground Rules

Important: Attendance to the recitation is mandatory and you must come to recitation prepared. Your group can establish other ground rules as long as everyone in the group agrees. Your group should also discuss consequences for members who break the rules. This is not *Lord of the Flies* but it will make things much smoother and less stressful if everyone knows the ramifications of disrespectful behavior. For example, group members who do not participate may be denied credit on an assignment (the group needs to let the TA or myself know of the situation) or can be expelled from a group either temporarily or permanently. You will be given an opportunity to evaluate (for major points) the contributions of each member of your group and these, together with the TA and instructor's observations will be used to give the participation grade at the end of the quarter.

The first week each group should **pick a name** for itself for ease of reference in class discussions. Be sure to share phone numbers and/or email addresses to contact each other. While most group work will be done in recitation, there may be occasions where you need to meet outside of class or perhaps get input before you move forward with your own work during the interim week.

In the interest of the sanity of your group, TA, and me: If you are late to recitation (over 10 minutes) you loose 5 pts. If you miss recitation you will get no points for that day though, with your group's permission, may still participate in the overall report and its points. The few folks that have managed to fail this course did so by skipping recitation repeatedly or not participating in the papers.

During an assignment each person in the group is expected to participate fully. To make sure this happens each member will be assigned a role to fulfill. These roles **will rotate** with each assignment or activity.

1. Discussion Leader: is responsible for moving the group forward in accomplishing the assignment: refocuses if the discussion goes astray and makes sure everyone has an opportunity to speak.
2. Recorder: is specifically responsible for notes on discussion and problem-solving strategies as well as the list of "Learning Issues" to be presented to the TA at the end of the recitation.
3.*Resource Person: checks materials and resources accrued by the group over the week for appropriateness and accuracy. This is especially important for web sources.
4.*Coach: checks group members on their understanding of concepts involved in problems.
5. Reporter: is responsible for presenting the group assignment to the recitation class. They must also submit a written summary to the TA using the 'drop box' in Carmen. Because this job is so large, they will not be responsible for a Learning Issue question for that assignment.
*** And the TA will be checking on you.**

General Modus Operandi for Projects:

1. **Before the first week's recitation:**

   - Give a cursory read of information provided under the specific topic in *Carmen's Content* page. (Save money on printing and just take a few notes). These are background links and there are a few articles and current links to give you direction and ideas (please let me know if a link is no longer valid or any other problems).

2. **At the first week's recitation:**

   - Bring your preparation research: notes and/or the source material you have found in *Carmen Content*. Someone in your group should bring a **textbook** (take turns).

   - Formulate a **Problem** or **Question** you wish to investigate or discuss the one given to you. For example," What if anything, should be done about Global Warming?". In another assignment, the group is expected come up with their own topic. For example, "How can Ohio Address its Air Pollution Problem?" or "How can China Address its Horrendous Air Pollution Problem?". Or for alternate energy topic: "Why is Wind Energy Growing Fastest Amongst the Renewables?" or "What is the Future of Nuclear Energy in the US?"

   - Your group will organize your ideas and your previous knowledge related to the **Problem** or **Question**. You come from a wide range of disciplines and this will make things more interesting. Attempt to define the broad nature of the problem. Identify the information needed to answer it, where and how to seek that information, and how to organize it in a meaningful way to communicate appropriately to others.

   - Throughout discussion, students pose "**Learning Issues**" that identify aspects of the area under discussion that they think is important to understanding or answering the **Problem** or **Question**. These **Leaning Issues** are recorded by the group and help generate and focus discussion. They must be handed in and approved by the TA.

     - For example "What is the air quality like in Ohio/China?" "What is being done by national government, local government about …" "Why are Trans Fats so much in the News?"

     - Note that you will be graded based upon participation and the quality of **Learning Issues** (see the Grading Rubric in *Carmen Content*)

- You should end up with at least one **Learning Issue** per group member (The Reporter is exempt because they will be responsible for the oral report at the second recitation as well as the written final report). Answering these **Learning Issues** questions constitutes your homework for the next recitation. **Do not simply use the materials provided.**

3. **At the second recitation**,

   - Each student responsible for a **Learning Issue** must be able to summarize and present their new knowledge. The Resource Person and Coach then berate them.

     - You may even modify your **Learning Issues** as you do research during the week. Just be sure you let the TA know because he will be collecting your **Learning Issues** and if one is not covered in the final report, you will probably loose points.

   - The group then works to use their knowledge to connect new concepts to old ones to come up with an answer or conclusion to the **Problem**. This will be presented orally and in a short paper.

   - The Reporter then will be expected to orally present the group's judgments, solutions, or informed opinions regarding the posed question at the end of this second recitation.

4. **Five days after the recitation**, the Reporter will be responsible for submitting a **one to two page final report** to **Carmen's "*Drop Box*".** Note that this is to be a ***cohesive*** paper; do not simply present each group member's individual research. The goal of the group discussion during the second recitation is to produce this paper. All group members should review the paper before its online submission because the group is given one overall grade. The report should include **reference sources**.

   See the **Grading Rubric** in *Carmen's Content*.

Assignment Schedule Week of	**Specific Topics for Questions/Problems**	**Some Background Links**	**Assessment Exercises**
Sept 22nd , 29th & Oct 6th ▪ Air Pollution	Student Groups formulate a **Question or Problem** based on: Past, Present, and **Future** Air Quality Issues in one of the following: ✶ Columbus ✶ Ohio ✶ The U.S. as a whole ✶ Globally (as a whole or pick another country –the Summer Olympics brought global attention to air quality issues in China, for example)	▪ The *Clean Air Act* and *Acid Rain Amendment* ▪ *Clear Skies Initiative* (White House) ▪ *Clean Air Interstate Rule* (Federal EPA)	***Quiz I*** week of Oct 6th
Oct. 13th & 20th ▪ Climate Change	**What can and should we do, if anything, about Global Warming and the subsequent climate changes (often called Climate Extremes)?**	▪ IPCC 4th Report ▪ Socolow's Wedge Theory ▪ *Economist* Synopsis ▪ *Wikipedia* on Controversy ▪ *National Geo.* Synopsis	***Quiz II*** week of Oct 13th

Oct. 27th & Nov 3rd ▪ Alternative Energy Sources	Choose one of the following: ▪ **"Benign by Design"** Pose a question or problem on the topic of (an) alternative source(s) of energy. Example, What are its risks, costs, benefits, future? **Or** ▪ What Impact Can Conservation Have?	▪ EPA Sites ▪ Sierra Club ▪ 2007 Federal Energy Bill	***Quiz III*** week of Oct 22nd ***Midquarter Exam*** In class on Tuesday November 4th
Nov 10th ▪ Water **This is a one week session assignment – Start Learning Issues aspect week of Nov 3rd**	Students Groups formulate the **Question or Problem** **Ideas** ▪ Evaluating Columbus Drinking Water ▪ Preservation vs. Development: Example: Big Darby Creek ▪ Investigate the Health of an Ohio Waterway: Ex. Lake Erie, Olentangy River, Scioto River, Muskingum River or Ohio River ▪ Bottled vs. Tap Water: Compare and Contrast ▪ Cradle-to-Grave: The Impact of a Water Bottle ▪ Source and Effect of Harmful Impurities in drinking water such as Pb, NO_3^-, and Hg ▪ International Needs for Potable Water	▪ Safe Water Drinking Act (SWDA) ▪ Clean Water Act (CWA) ▪ EPA Sites ▪ International Bottled Water Association (IBWA) ▪ National Resources Defense Council (NRDC)	***Quiz IV*** week of Nov 10th
Nov 17th & Dec 1st ▪ Nutrition ****No Recitation Week of 11/24**	Students Groups formulate the **Question or Problem** **Ideas** ▪ The College Student's Diet ▪ "Functional" Foods/Vitamins and Minerals ▪ Types of Fats and Health ▪ U.S. Nutrition ▪ Popular Diets ▪ Global Needs Today and the '60's Green Revolution ▪ Chemical Preservatives/Food Irradiation ▪ Chinese Imports Controversy	▪ HHR Dietary Guidelines ▪ FDA Site	***Quiz V*** week of Nov 17th ***Quiz VI*** week of Dec 1st

** Tuesday Nov. 11th, Thursday Nov 27th and Friday Nov. 28th are University holidays. No classes will be held.

Manage Content

Manage Content | New Module | New Topic | Add Multiple Topics | Re-Order

Add Learning Object

Search For: Search Show Search Options

Pappas EG Practice

- I. Important Information
  - A. Syllabus
  - B. Recitation Syllabus
  - C. Recitation Grading Rubric
- II. Module 1; The Air
  - A. Air Lecture Slides 3/page
  - B. Air Lecture Slides 6/page
  - C. Introduction
    - 1. Introduction and Dimensional Analysis
    - 2. Significan Figures and Scientific Notation
    - 3. Worked Problems
      - a. Worked Problem: Conversion Factors-1-AirVol
      - b. Worked Problem: Conversion Factors:1-Ncomp
      - c. Worked Problem: Scientific Notation-1
      - d. Worked Problems - Conversion Factors 1-Arcomp
      - e. Worked Problem Scientific Notation 1-scinot
      - f. Worked Problem Scientific Notation 1-scino2
      - g. Worked Problem Standard Notation 1-stdnot
      - h. Worked Problem for Standard Notation 1-stdno2
    - 4. Mini-Assessment 1
    - 5. Mini-Assessment-2
  - D. Risk Assessment
    - 1. Lecture on Risk Assessment
  - E. Good News and Bad News
    - 1. Lecture on the Good and the Bad News
  - F. Classifying Matter and Modern Atomic Theory
    - 1. Classifying Matter and Modern Atomic Theory
  - G. Periodic Table
    - 1. Periodic Table

- 2. Interactive Periodic Table
- 3. Reaction to form NaCl
- 4. The Periodic Table

H. Molecules and Ionic Compounds

- 1. Molecules and Ionic Compounds
- 2. Worked Problems
  - a. Worked Problem Calc num of molecules 1-molnum
  - b. Worked Problem Molar Mass 1-masCH4
  - c. Worked Problem Molar Mass 2 1-molpd

I. Nomenclature, Chemical Equations

- 1. Nomenclature and Chemical Equations
- 2. Worked Problems
  - a. Worked Problem Molecular Names 1-molnam
  - b. Worked Problems Molecular Formulas 1-molfor
  - c. Worked Problem Ionic Names 1-ionnam
  - d. Worked Problem Balancing Eqns1 1-balsuf
  - e. Worked Problem Balancing Eqns2 1-balins
  - f. Worked Problems Balancing Eqns3 1-balalc

J. Air Quality

- 1. Local, Regional, and National Air Quality

K. Module 1 Quiz

III. Module 2; Acid Rain

- A. weak acid ionization
- B. Acid Rain
- C. pH Scale
- D. Titration of Weak Acid - 122

E. What is an acid?

- 1. 2acid dissociation
- 2. acid base reactions
- 3. Neutralization of HNO3 - QT
- 4. Neutralization of HNO3 - Flash
- 5. neutralization
- 6. Worked Problem
  - a. Worked Problem Eqn for Neutralization 6-neutrl

F. What is a mole?

- 1. Worked Problems
  - a. Worked Problem Molarity 6-molar

G. What is Acid Rain?

- 1. Worked Problems
  - a. Worked Problem Calc pH
  - b. Worked Problem Calc[H+] from pH 6-pHdif
- H. What Does Acid Rain Do?
- I. Controlling Acid Rain
- J. Introduction

IV. Module 3; Chemistry of Global Warming

- A. Climate Over Time and the Greenhouse Effect
  - 1. Greenhouse Effect
- B. Greenhouse Gases and Molecular Geometry
  - 1. Lewis Dot Diagrams
  - 2. Molecular Motion
  - 3. Vibrational Modes
  - 4. Worked Problems
    - a. Worked Problem Lewis Structures 3-LSmeth
    - b. Worked Problem Lewis Structure Water 3-LSwatr
  - 5. Instructional Videos
- C. The Carbon Cycle and the Combustion of Fossil Fuels
  - 1. Carbon Cycle
- D. The Scientific Method and Current Scientific Studies
- E. Climate Projections and Policies

V. Module 4; Energy

- A. Introduction
  - 1. Introduction and Thermodynamics
  - 2. Worked Problems
    - a. Worked Problem Units 4-julcal
- B. Enthalpy
  - 1. Worked Problems
    - a. Worked Problem Enthalpy of a Rxn 4-rocket
    - b. Worked Problem Enthalpy of Rxn 4-hetrxn
    - c. Worked Problem for Bond Energies 4-engrxn
    - d. Worked Problem Bond Energies 4-enrxn2
- C. Fossil Fuels and other Carbon-based Fuels
  - 1. Worked Problems
    - a. Worked Problem Elemental Composition 3-FVCH4
    - b. Worked Problem Elemental Composition 3-FVcoal
    - c. Worked Problem Elemental Composition 3-FVpetr
- D. Alternative Energies Nuclear and Batteries

- 1. Energy Alternatives 1
- E. Alternative Energies Renewables
- VI. Module 5; Water
  - A. Introduction to Water
    - 1. Introduction Lecture
    - 2. Microscopic Properties of Water
    - 3. Polarity of Water
    - 4. Water and Ammonia Mixture QT
    - 5. Water and Ammonia Mixture - Flash
    - 6. Intermolecular Forces
  - B. Microscopic vs. Macroscopic Properties
    - 1. Microscopic vs. Macroscopic Properties of Water
  - C. Like Dissolves Like
    - 1. Like Dissolves Like
    - 2. Worked Problems
      - a. Worked Problems Ionic Formulas 5-ioform
      - b. Worked Problem Ionic Names 5-ionnam
  - D. Drinking Water
    - 1. The Water We Drink
  - E. Local, Regional and National Water Quality
    - 1. Local, Regional, and National Water Quality
  - F. Bottled vs. Tap
    - 1. Bottled vs. Tap Water
- VII. Module 6; Nutrition
  - A. Introduction to Nutrition
    - 1. Introduction to Nutrition
    - 2. Estimating Enthalpy Change using Bond Energies
    - 3. Supplementary videos
      - a. energy activation
      - b. Worked Problem Calories
  - B. Carbohydrates
    - 1. Carbohydrates Lecture
  - C. Fats
    - 1. Fats Lecture
  - D. Proteins
    - 1. Proteins Lecture
    - 2. Mini Assessment Proteins
  - E. Micronutrients

- 1. Micronutrients Lecture
- F. Everyday Nutrition
  - 1. Lecture for Everyday Nutrition
- G. Feeding the World
  - 1. Feeding the World

VIII. Module 7; Forensics

IX. URL Catalog for Streaming Videos

Homework Assignments
- A. HW Wi08 PDF type file

X. Class Slides 3/Page
- A. Acid Rain Lecture Slides 3/page
- B. Global Warming Lecture Slides 3/page
- C. Energy Lecture Slides 3/page
- D. Water Lecture Slides 3/page
- E. Nutrition Lecture Slides 3/page
- F. Forensics Lecture Slides 3/page

XI. Class Slides 6/Page
- A. Acid Rain Lecture Slides 6/page
- B. Global Warming Lecture Slides 6/page
- C. Energy Lecture Slides 6/page
- D. Water Lecture Slides 6/page
- E. Nutrition Lecture Slides 6/page
- F. Forensics Lecture Slides 6/page

XII. Handouts
- A. Properties of Metals and Nonmetals
- B. Chapter 1 Flow Chart
- C. Periodic Table with Names
- D. Periodic Table with Names - smaller jpeg file

XIII. Recitation
- A. Information Literacy Tutorial
- B. Environmental Science and Technology ACS Peer Reviewed
- C. Science Magazine
- D. Science and Engineering Library (SEL)
- E. Chemical & Engineering News (SEL)
- F. Ohio Library and Information Network (OhioLINK)
- G. OSU Libraries (including E-Journals and Resources)
- H. Air
  - 1. Air Quality Assignment 2008

- 2. Clean Air Act - EPA
- 3. Clean Air Act Primer
- 4. Muskie - CAA Basic Objectives Restated
- 5. Clear Skies Initiative - White House
- 6. Clean Air Interstate Rule (CAIR) - EPA
- 7. Clear Skies Initiative - Sierra Club
- 8. Comparing CAA vs. CSI
- 9. New Source Review rejected
- 10. White House Accomplishment List 2_06
- 11. About the EPA's TRI Databases
- 12. EPA Toxic Release Inventory - State and County Search
- 13. Ohio Air Quality - Columbus
- 14. Clear Skies - Washington Monthly
- 15. China: Choking Growth
- 16. EPA State Summary Tables
- 17. National Density Maps 2001
- 18. National Trends Acidic (Title IV) Pollutants
- 19. Lantern Article

I. Climate Change

- 1. Climate Change Assignment
- 2. ACS Climate Change Links
- 3. White House on Climate Change May 2007
- 4. White House on Climate Change May 2005
- 5. BBC Kyoto Q&A
- 6. IPCC 4th Report '07 Summary for Policy Makers
- 7. IPCC 4th Report '07 Frequently Asked Questions
- 8. IPCC 4th Report Technical Summary
- 9. IPCC 4th Report '07 Peer Reviews
- 10. OSU Connection: Lonnie Thompson and the Ohio State University's Byrd Polar Research Cen
- 11. Dr. Thompson of OSU, NAS Speech
- 12. National Geographic Synopsis 2004
- 13. Economist Synopsis (only)
- 14. Global Warming Controversy Wikipedia
- 15. Socolow's Wedge Theory
- 16. Dr. James Hansen NASA Report on Climate Change
- 17. Real Climate Blog
- 18. Climate Audit Blog
- 19. Exxon and Global Warming 2005

- 20. Exxon and Global Warming 2007
- 21. Bali Conference Dec 07
- 22. Greenland 1_08
- 23. States Defy EPA on Car Emissions 12_07

J. Energy and Benign by Design

- 1. Alternative Energies Assignment
- 2. National Petroleum Council "Hard Truths" Global Energy July'07
- 3. ACRL Alternative Energy Internet Resources
- 4. National Geographic Short Overview with Links
- 5. Dr. Kammen and RAEL Publications
- 6. Geothermal Primer
- 7. U.S. DOE Renewable Energy Site
- 8. Hansen (NASA) Link to Report on Alt. Energy
- 9. Hansen (NASA) Report on Alt Energies and Efficiency
- 10. Green Power EPA
- 11. Rocky Mountain Institute Energy Innovations
- 12. Carbon Footprint
  - a. EPA Calculator
  - b. myfootprint.org calculator
  - c. carbonfootprint.com calculator
  - d. Reducing Carbon Footprint - EPA
  - e. "Going Green" Energy Savers
  - f. "Going green" Energy Star
- 13. Exxon Size and Profitability 1
- 14. Link to CNN Report on Exxon Profitability 1
- 15. Link to Exxon Profitibility 2
- 16. Energy Bill 2007 Fuel Stds
- 17. Coal Primer from Dept. of Energy

K. Water

- 1. EPA Safe Drinking Water Information
- 2. Clean Water Act - EPA
- 3. NRDC Water
- 4. Water Pollution Source Guide Wikipedia
- 5. NRCD Bottled Water
- 6. IBWA Response to NRDC Report
- 7. SF DPH Comparison of Bottled vs Tap
- 8. On Tap Magazine
- 9. Why Worry About Water in Ohio

- 10. TMDL Ohio Waters EPA
- 11. Ohio EPA Drinking Water
- 12. Columbus Water Supply Report:Open the pdf
- 13. Olentangy River
- 14. Big Darby Creek - Still Fighting
- 15. Ohio River Valley
- 16. Licking and Miami Rivers - Success Story
- 17. What are Columbus Major Polluters?
- 18. Ganges River India Pollution

L. Nutrition

- 1. Nutrition Assignment
- 2. Food Intake Log
- 3. Personal Nutrition Evaluation Questionaire
- 4. HHR Dietary Guidelines Report 2005
- 5. HHR Dietary Guidelines 2005 Pamphlet
- 6. FDA Calories per Day
- 7. Nutrition and Phytochemicals/Functional Foods
- 8. Vitamins & Minerals Supplements Role in Chronic Disease Prevention
- 9. Functional ("Super") Foods
- 10. How Useful Are Food Labels?
- 11. Nutritional Food Labels
- 12. Irradiating Foods Article
- 13. N. Borlaug's Green Revolution 1 Billion People

XIV. Useful Links

- A. Adobe Reader
- B. NuttyNomenclature - Warning Rated R
- C. Useful Educational modules
- D. Tutorials
- E. Textbook's Webpage (Consider This, Practice Quizzes)
- F. NBC How the Climate is changin 4-07
- G. CBS Rachel Carson's legacy
- H. Carbon Cycle ChemTours
- I. NaCl Rxn ChemTours
- J. Lewis Dot Structures ChemTours
- K. Greenhouse Effect ChemTours
- L. Acid Rain Chemtours
- M. pH Scale

XV. PP Lectures

- A. Chapter 1 PP
- B. Chapter 11 PP
- C. Chapter 3 PP
- D. Chapter 5 PP
- E. Chapter 6 PP
- F. Water Dispatch 2-24-07
- G. Chapter 11 2007
- H. Forensics
- I. Murder
- J. Chapter 4
- K. Chapter 1 Au07 with intro
- L. Chpater 6 Au07
- M. Chapter 3 PP Wi08

- XVI. eLearning Stuff
  - A. CCAlive! Water Specific Heat 8.6c
  - B. Chemtours
    - 1. Fuel Cells
    - 2. Cell Potential
    - 3. Free Energy Potential of an electrochemical cell
    - 4. NiCad Battery
    - 5. Zinc Copper Cell
    - 6. Crystal Field Splitting
    - 7. Big Bang
  - C. CCAlive! Suchocki
  - D. McGrawHill Media Library
    - 1. chemical reactions
      - a. 1 ionic_covalent
      - b. 2 ionic_covalent
      - c. 2 precipitation
      - d. 2redox
      - e. Group I and II rxns
      - f. reaction types
      - g. silver mirror
    - 2. acids and bases
    - 3. matter
      - a. matter states
    - 4. chemical bonding
      - a. Electronegativity

- b. ionic vs covalent
- c. VSEPR
  - a. Linear
  - b. Trigonal Planar
  - c. Tetrahedral
  - d. Trigonal Pyramidal
  - e. Bent
- 5. intermolecular forces
  - a. Polarity Dipole Moments
    - a. Diatomics
    - b. Linear Polyatomic
    - c. Ammonia
    - d. Tetrahedral Symmetric
    - e. Tetrahedral Asymmetric
- 6. chemical kinetics
- 7. water

E. PrenticeHall Pearson Media Library

F. Chemistry of Everything

1. Gases
2. water chapter hydrogen bonding
3. water dipole dipole

XVII. Misc

A. Intro to Nutrition (Video File)

B. Nutrition Intro Streaming(old)

XVIII. Transcriptions of Worked Problems

A. Transcripts