#520

Evolution of Miramar College's Online Allied Health Chemistry Course

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Outline

- SDCCD and Miramar College
- History and Conception
- Student Learning Outcomes
- Chem 100 Lecture
- Chem 100 Lab
- Online vs. Traditional

Abstract

The on-line allied health chemistry courses, chemistry 100 has been offered at San Diego Miramar College since fall 2001 (5-years), and the lab has been offered since spring 2003 (3.5 years). Both uses a WebCT platform, but there is also a mirror website also outside of WebCT . This presentation will cover the conception and evolution of these courses and how these courses are assess. Assignment for the lecture is based on quizzes, homework, special project, discussion-board participation, midterm and a final. The assessment for the lab are based on problem set exercises, experiments conduct at home, lab notebook entry, a safety quiz, a midterm quiz and a final quiz. Studies will also be presented on how the online course compares to the traditional on-campus course.

Miramar College

- San Diego Community College District: Second largest in California and 6th largest in the nation serving over 100,000 students. Miramar College is one of three campuses. The other sister colleges are San Diego City College and Mesa College. Students generally transfer to UCSD, SDSU, Cal San Marcos. Students pay $3/unit in the California community college system.

- Miramar College: There is a general population of 14,000 students of which 1763 are enrolled in chemistry. MMC offers variety of vocational program and AS degrees. Demographics: 49-F 51-M, 44%-Caucasian 14.1%-Asian-Pacific, 12.5%-Hispanic 11.4%-Filipino 6%-African-American. Age group 25-49 median age 32. Educational objective: further education (transfer) 43%, undecided 37%, vocational 21%.

- Natural Science: Prop-S 655 Million expand our department from 2 labs to eight with expansion to 6 more labs in 2-3 yrs. Strong biotech program and instrumentation holdings; NMR, AA, LCMS, Fluorolog-3, FTIR, Vernier, Cary-50...

- Chemistry Program: Faculty of 2 chemist to 5.5 in 2 yrs. Dept that had only offered allied health chem, prep and GChem now has full organic and analytical chem program which means students can earn an AS in chemistry.

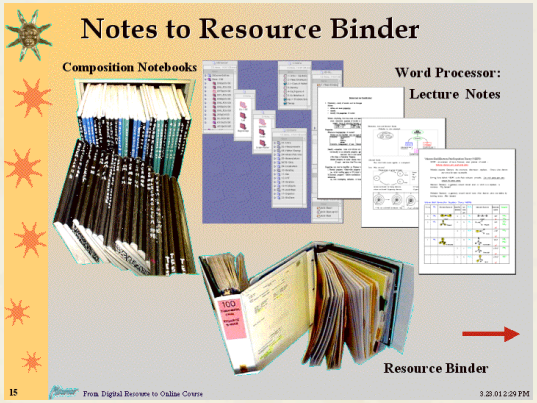
Student Learning Outcomes

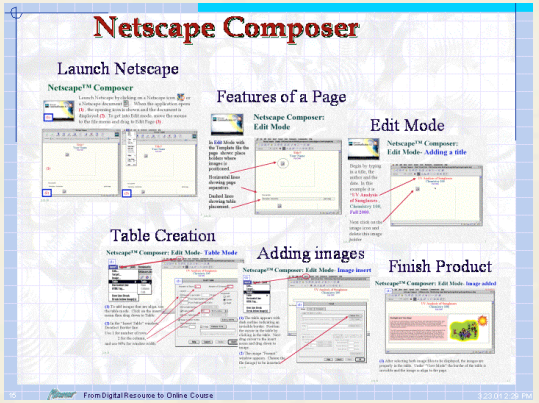
- Understand how Scientific Method is used in science
- Understand and explain the properties of matter and its transformation
- Apply SI, English and metric units when making measurements
- Understand key concept in the development of atomic theory
- Understand and explain the role of valence electrons in periodic trends, bonding, molecular geometry and molecular properties
- Understand and explain important features of the periodic table
- Name and write chemical names and chemical formulas
- Identify and classify different type of chemical reactions
- Understand the role of the "mole" in stoichiometry calculations
- Understand and explain Gas laws in terms of gas behavior
- Understand the concepts of solution chemistry including concentration calculations and dilution problems
- Understand the properties of acid-base concept and pH calculations
- Understand and explain the principle behind equilibrium and LeChatelier's Principle
- Understand the concept of nuclear reactions and nuclear processes
- Understand work on organic nomenclature and recognition of functional groups.

Currently being updated

History and Conception …

- Lecture Notes to Digital Resource to Online Course





Pacific Basin 12/00 "Resource Binder to WWW Resource"

155th 2YC³ 03/01 "Digital Resource to Online Course"

221 ACS Meeting 03/01 "Converting Documents to Web Pages"

Chem100 Lecture F06

http://webct.sdccd.net/

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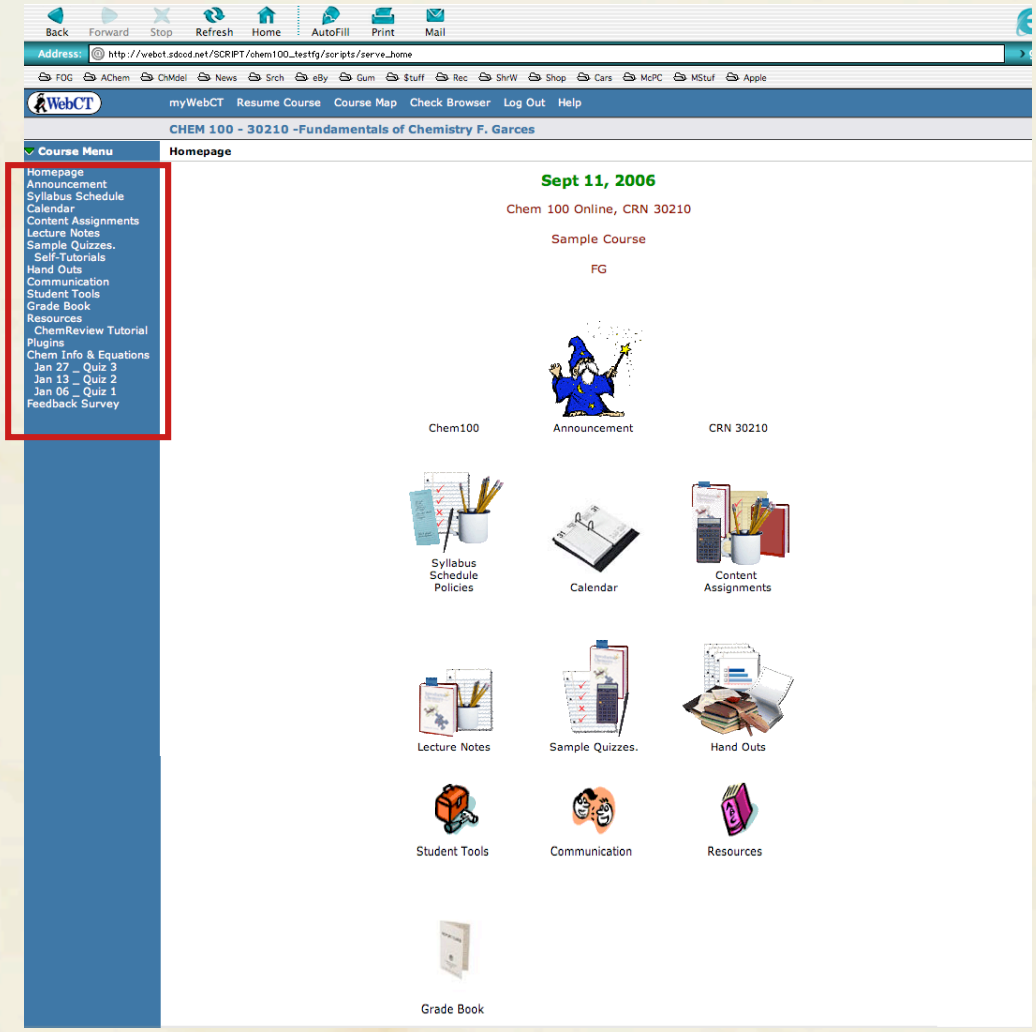
- Syllabus Schedule
- Calendar
- Course Assignment
- Lecture Notes
- Sample Quizzes
  - Self-Quizzes
- Hands Out
- Student Tools
- Communication
- Resource
- Grade Book
- ChemReview Tutorial
- Plugins
- ChemInfo & Eqn
- Quick Link



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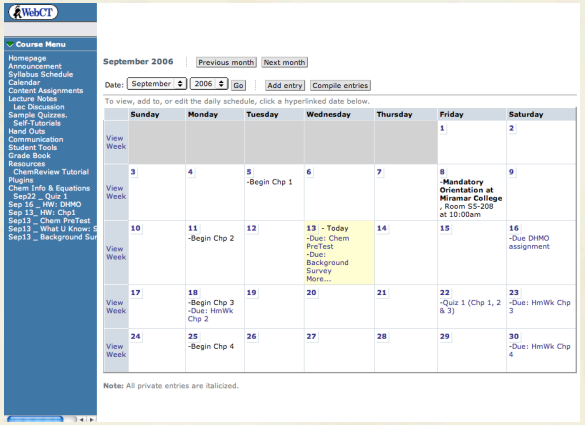
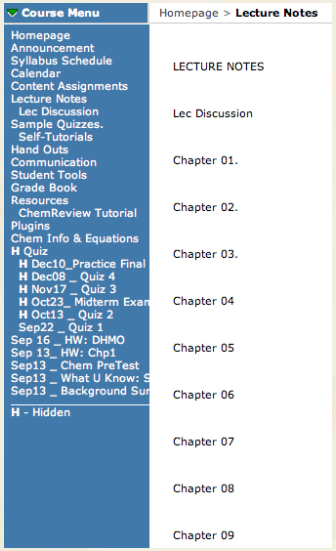
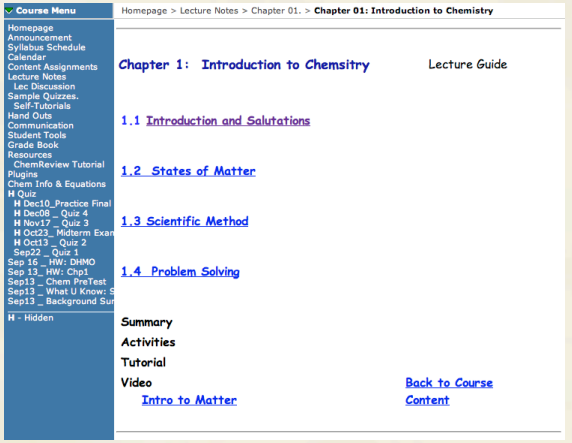


Lecture Notes



Chp1 Lecture Notes



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- Activities & Exercise
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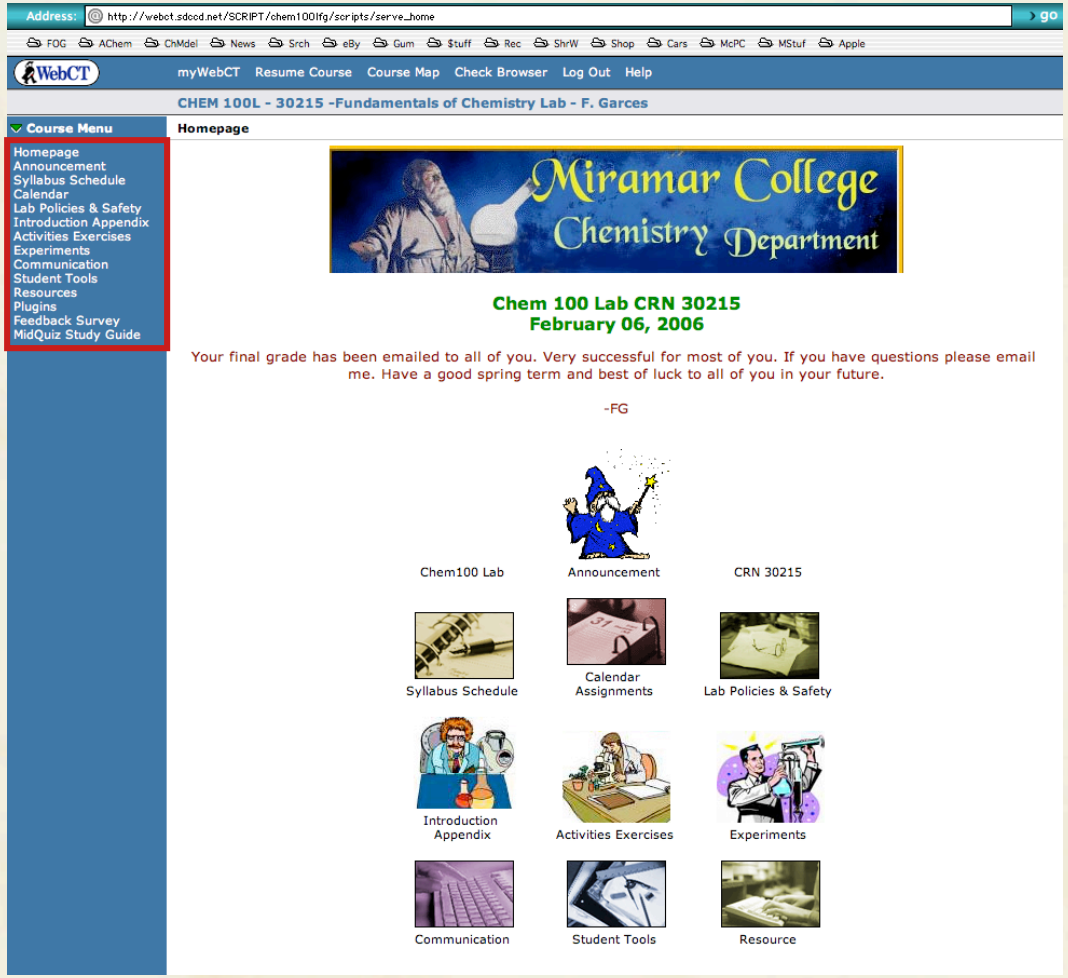

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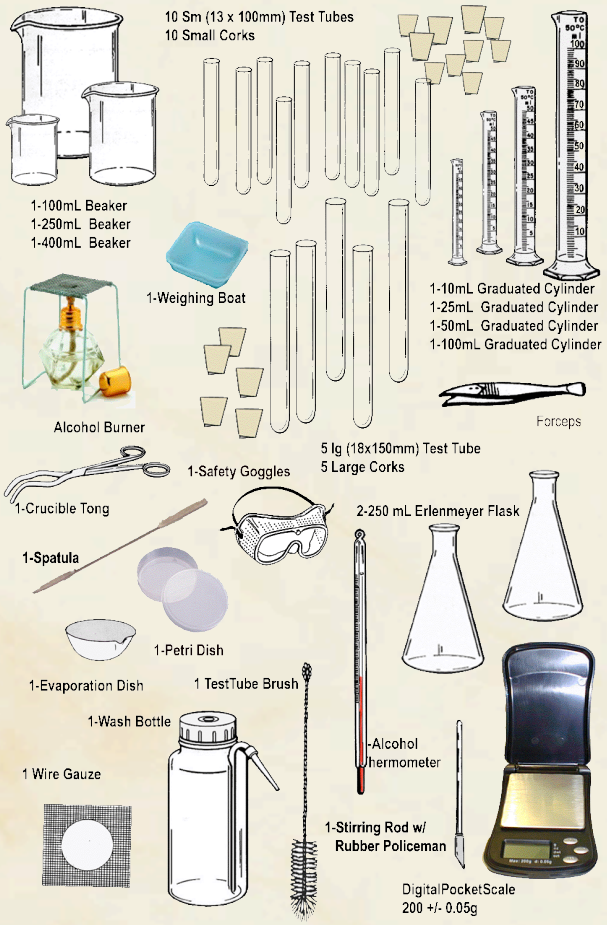
Lab Equipment Kit

KLM Supply List Fall 06

#	Qty	Description
1	1	Alcohol Lamp (Burner)
2	2	Beaker (100ml)
3	1	Beaker (250ml)
4	2	Beaker (400ml)
5	1	Crucible Tong
6	1	Cylinder (10ml)
7	1	Cylinder 25ml)
8	1	Cylinder (50ml)
9	1	Cylinder (100ml)
10	1	Evaporating dish
11	2	Flask Erlenmeyer (250ml)
12	1	Forceps (Tweezers)
13	1	Petri dish
14	5	Pipets (plastic droppers)
15	1	Safety Goggles
16	1	Scale & weights (200+ .05g)
17	1	Spatula
18	1	Stirring rod with Policeman
19	10	Test tube (13x100)
20	5	Test tube (20x150)
21	10	Test tube stopper (13x100)
22	5	Test tube stopper (20x150)
23	1	Test tube brush
24	1	Thermometer, Alcohol
25	1	Wash bottle (250 mL)
26	1	Weigh boat (2")
27	1	Wire gauze

illustration



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Lab Supply list

Material, Chemicals and Equipment **O n l ine Chem 100 Laboratory** **Fall 06**

Scroll to end of document to see illustration of equipment and Supplies

Experiment #1: A Penny for Your Thought; Scientific Method Introduction

Equipment (Total Time 60 – 90 min.)

Lab Kit Contains:	Digital Pocket Scale	Forceps	50-ml graduated cylinder
Lab supply	1 M HCl		
You supply:	metric ruler	Pennies	Shear metal cutter or file

Experiment #02: Measurements, Metric System and Density of Irregular Object

Equipment and Chemicals (Total Time 90 – 120 min.)

Lab Kit Contains:	Alcohol Thermometer	100mL beaker	250 mL beakers
	25 mL grad cylinder	50 mL graduated cylinder	Cork (for 20 x 150 mm)
Lab supply	Marble		
You supply:	String	Empty 2-L Soda bottle with cap	Metric ruler
	Zumdahl Textbook		

Experiment #3: Separation of a Ternary Mixture

Equipment and Chemicals (Total Time 60 – 90 min.)

Lab Kit Contains:	250mL glass beaker	400mL glass beaker	Forceps
	Evaporating dish	Scoopula	Alcohol burner
Lab supply	Cobalt(II) chloride	Iodine crystals	sand
You supply:	Burner from stove	Distilled water	Ice cube

Experiment #4: Observing Signs of a Chemical Reaction

Equipment and Chemicals (Total Time 90 – 120 min.)

Lab Kit Contains:	Test tube (13 x 100) small	Test tube cork (13 x 100)	Berel Pipet
	Evaporating dish	Forceps	scoopula
	Alcohol burner & stand	400ml Beaker	Beaker 100mL
Lab supply	calcium oxide (lime water)	ethanol	magnesium metal strip
	copper shots	Straw	
You supply:	acetic acid (vinegar)	sucrose (table sugar)	sodium chloride (table salt)
	sodium bicarbonate (baking soda)	9-V Battery	spoon
	oven-mits		

Experiment #5: Studying Chemical reactions (See Experiment #5)

Experiment 06: Counting by Weighing via the Mole

Equipment and Chemicals (Total Time 60 – 90 min.)

Lab Kit Contains:	Digital Pocket Scale	50-ml graduated cylinder	Forceps
Lab supply	HexNuts	Bolt	Bean Rice in a Bag
	Bolt-HexNut	Bolt-(HexNut)2	Bolt-(HexNut)3
	Bolt-(HexNut)4	Marble	Packet of sugar
WebCT information	BagA (HexNut Unknown)	BagB (BN Unknown)	BagC (Bean-Rice Unknown)
	BagD (BN_n Unknown)	BagE (BN_n Unknown)	

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Safety

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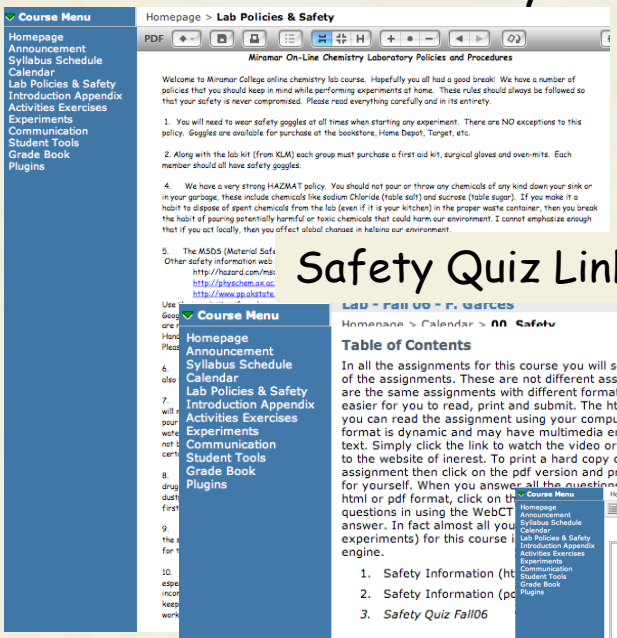
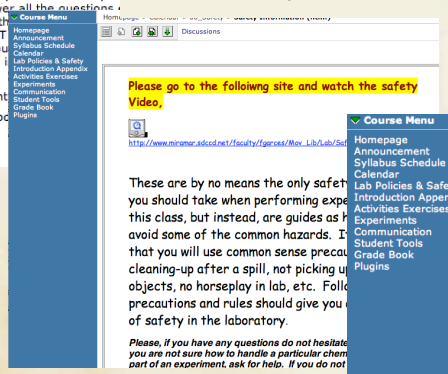
Lab Policies and Safety



Safety Quiz Link

Html - format



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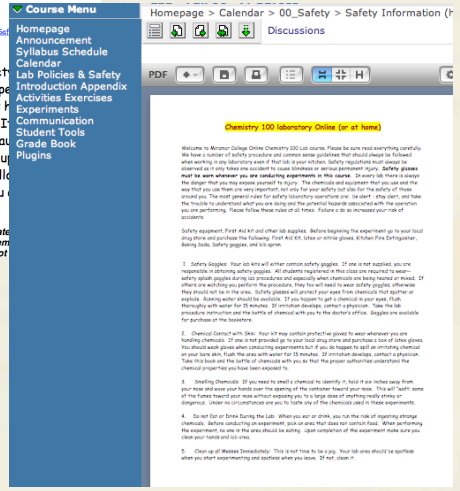

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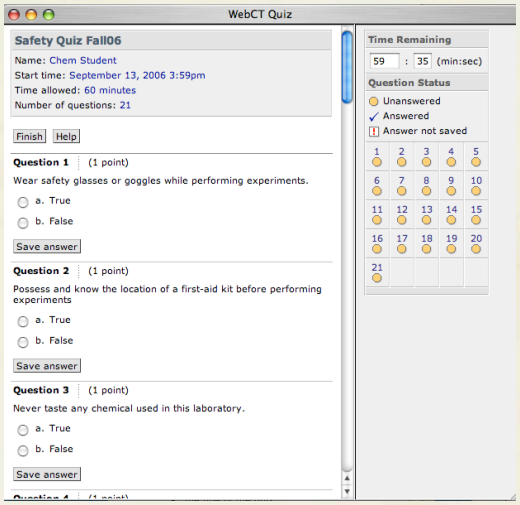
Safety Quiz



Safety Photos

C_N.jpeg | Cambell.JPG | Chemistry.jpg

KateDiane.jpeg | Kylse.jpeg | lab pic.bmp

Lim.jpeg | Tran.jpeg | WaltKevin.jpeg

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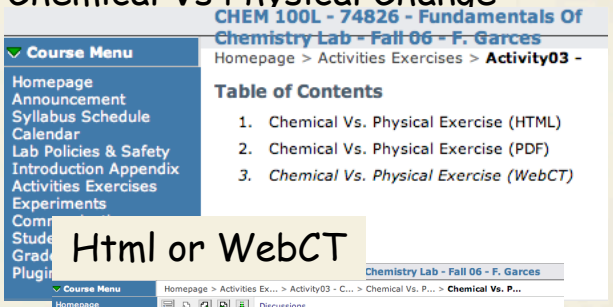
Activities and Exercise

- Math Basic
- Dimensional Analysis
- Chemical Vs. Physical change
- Electron Configuration
- Chemical Nomenclature
- Building Molecular Models
- Balancing Chemical Equations
- Stoichiometry Exercise
- Modeling IMF
- Concentration Calculations
- Chemical Equilibrium
- pH Acid Base Calculations

Chemical Vs Physical Change



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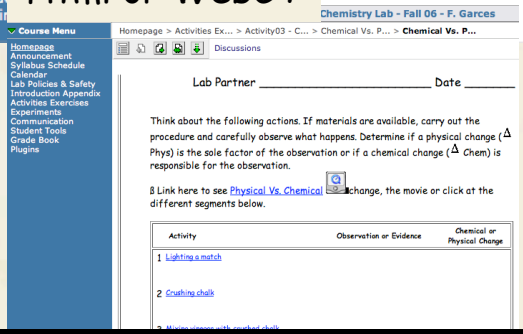

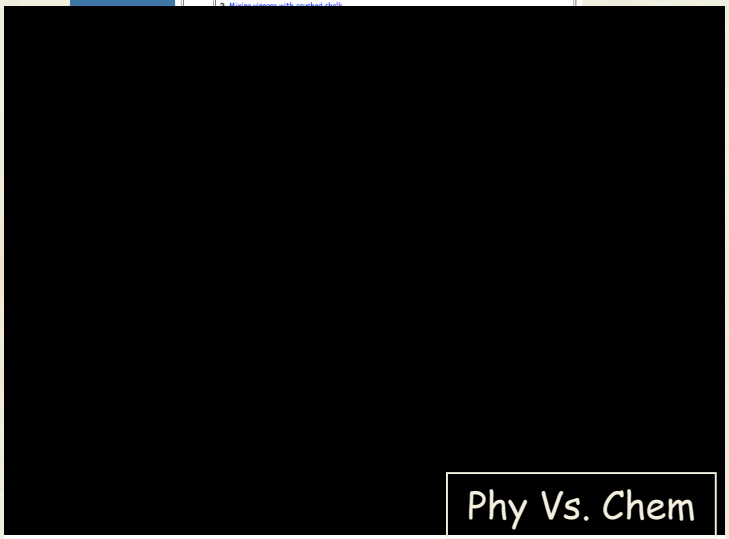

Phy Vs. Chem

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Experiments

Penny for your thought, Scientific Method

Mass, Volume Measurement

Separation of Ternary Mixture

Observations of Chemical Reactions

Studying and Writing Chemical Reactions

Counting by Weighing via the Mole

Causes of Intermolecular Forces

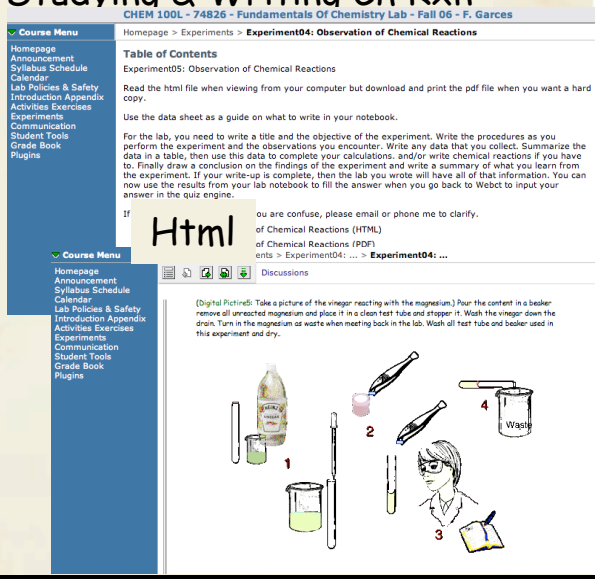
Density Solubility and Miscibility

Total Dissolve Solids (TDS) Conc.

Reactions at Equilibrium

pH Scale using Indicators

Studying & Writing Ch Rxn



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Sample Photos: Results

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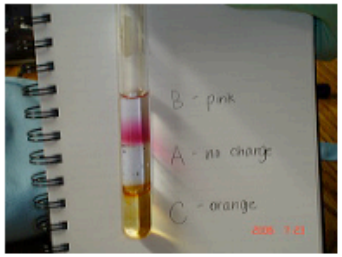

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1.jpg

Chem100 Lab F06

Lab Notebook

Keeping a Lab Notebook.

The lab notebook required for this part of the lab is shown to the right. You can purchase this type of composition notebook from any Staples, Office Depot, Target, Longs Drugs or Wal-Mart.

The following is the format for keeping a lab notebook of the experiments that you will be doing in this class. The idea of a laboratory notebook is that this is your record of experiments performed and phenomena observed.

Although the laboratory notebook does not have to be perfectly pristine, it is certainly desirable that it should be as organized as possible. Some time and though spent in planning before beginning an experiment, will result in a better notebook and a more successful experiment.

Notebook Format:

I. Heading
For each experiment in clued the following at the very top line of each page
1. Title – The title of the experiment. Use the same title as that of the lab manual
2. Date & Time – Write the date and time in which that particular page of the notebook is complete
3. Lab Partner – Write the name of the co-investigator who helped you completing this experiment.

II Objective - Write the purpose of the experiment. You can reword the objective as written it the lab manual.

III. Procedure – Briefly write what you did in this experiment. How did you set up the experiment? Did you have to modify the directions? What problems did you encounter if any? You should also include a description of what materials you used, whether the lab kit supplied the equipment, was obtained from the lab locker in A117, or was purchase by you. It is also recommended that you sketch a diagram of the setup.

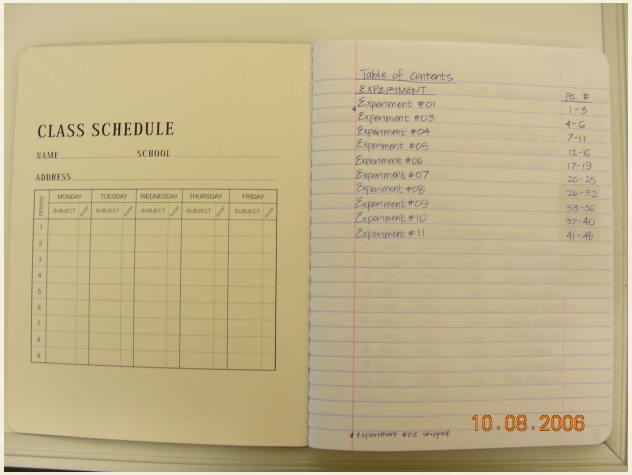
IV. Data and observation - Write down what you observed while performing the experiment. Write down results of the experiment as the experiment unfolds. Try not to arrive at any conclusions as to why the result that you are seeing is occurring. Simply write what you see and the data that the experiment generated.

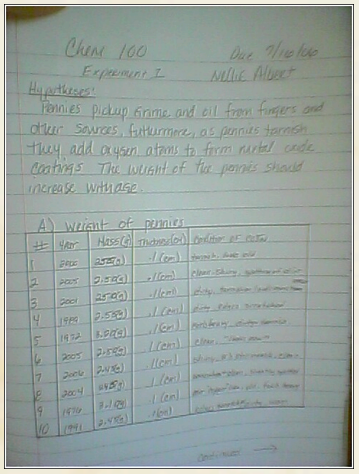
VI. Results and Calculations – Calculate the results, or compile a table of results summarizing the findings of this experiment. Try to present the result in an organized table.

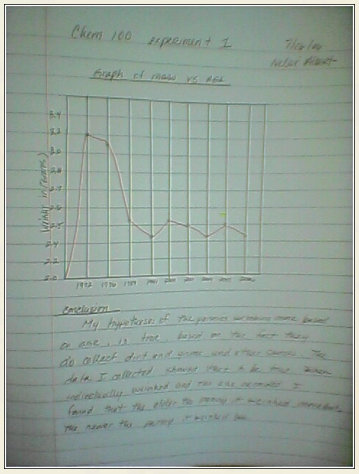
VI. Interpretation of results – Write how you would interpret the results. What do the results mean in the context of the objective of this experiment. Write the conclusions can you draw from the results of the experiment.

V. Summary – Write a summary of the overall experiment.
1. What did you learn?
2. What difficulties did you encounter?
3. How long was the duration of the experiment

V. Improvement suggestions – Write what you liked about the experiment and why you liked it and what you disliked about the experiment and why you disliked it. Give the experiment a score of 0 to 5. .
0 (Not worth doing, didn't learn anything) - 3 (Average) - 5 (Pretty cool experiment, learned a lot.)







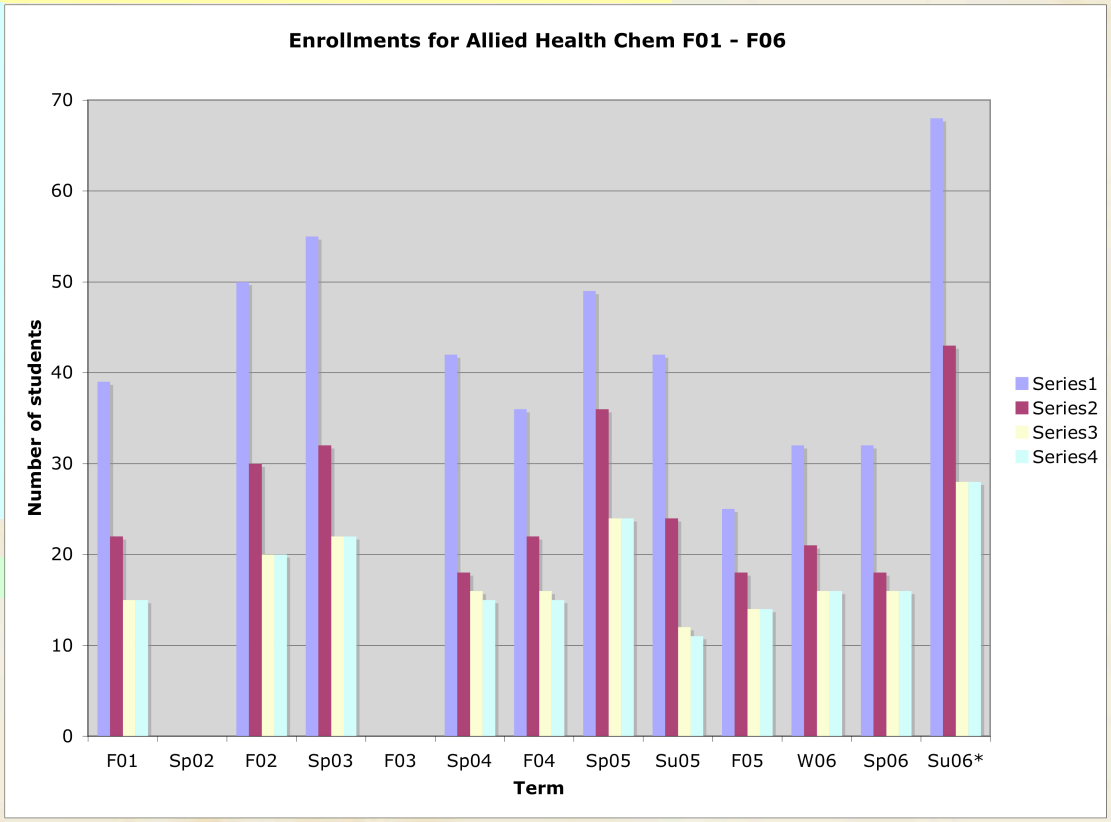
Chem100 Lecture ... Lab

- **Lecture F01**
  - HW 15%
  - Portfolio 20%
  - 4 Exam^{OL} 40%
  - Final Exam^{OL} 25%
- **Lecture F06**
  - HW / Participation 20%
  - Project 5%
  - 4 Quiz^{OL} 20%
  - MidTerm^{MMC} 25%
  - Final Exam^{MMC} 30%
- **Lab F03**
  - 12 Experiment 60%
  - 13 Activity 26%
  - 3 Quiz 12.5%
  - LabTech 1.5%
- **Lab F06**
  - 10 Experiment 40%
  - 13 Activity 32.5%
  - 3 Quiz 17.5%
  - Notebook 5%
  - LabTech 5%

Enrollments Statistics

Chem 100 Lecture Online F01 - Su06 11-Terms

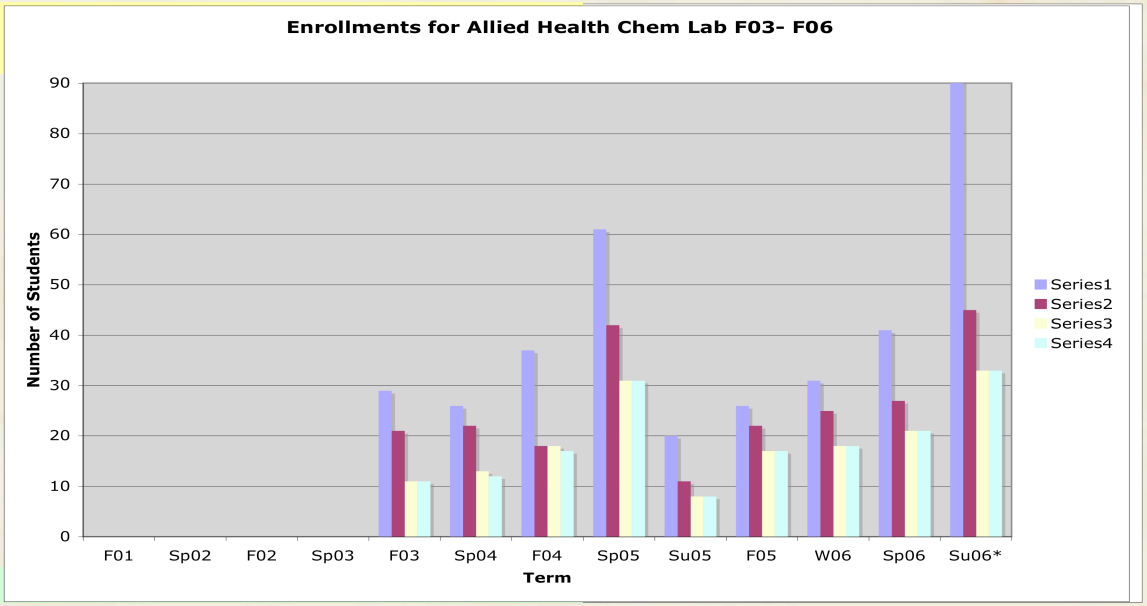
Lecture	Year	Total Enroll	at census	Withdrawl	Grade	% Retn	A	B	C	D	F	I
	F01	39	22	15	15	68						
	Sp02											
	F02	50	30	20	20	67						
	Sp03	55	32	22	22	69						
	F03											
	Sp04	42	18	16	15	83						
	F04	36	22	16	15	68						
	Sp05	49	36	24	24	67						
	Su05	42	24	12	11	46						
	F05	25	18	14	14	78						
	W06	32	21	16	16	76						
	Sp06	32	18	16	16	89						
	Su06*	68	43	28	28	65						
	F06											
Total	13 Term	470	284	199	196	69						



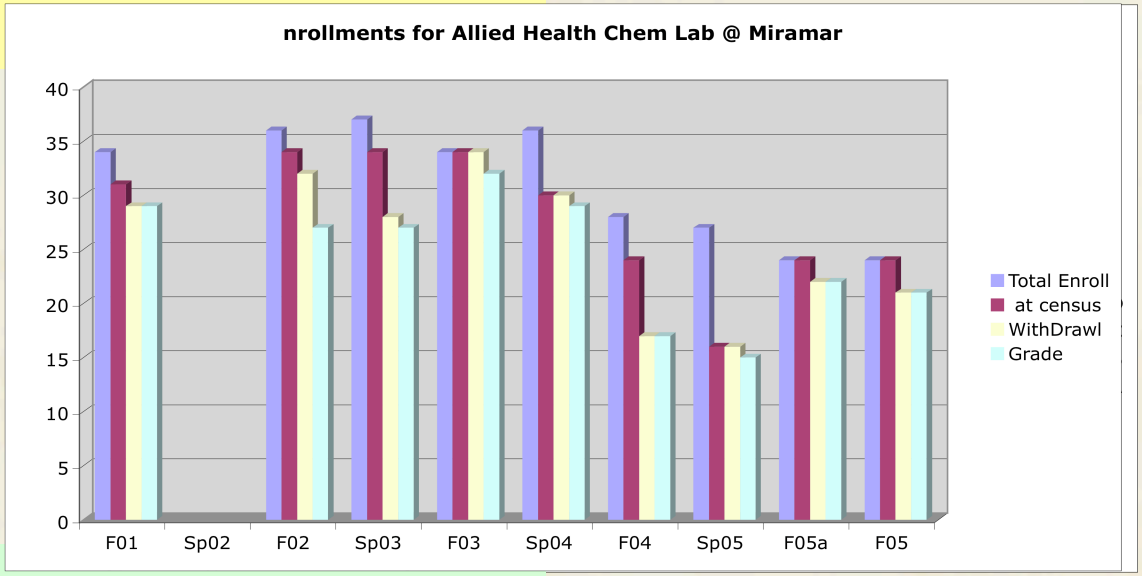
Enrollments Statistics

Chem 100 Online Lab F03 - Su06; 9-Terms

Lab	Year	Total Enroll	at census	With-drawl	Grade	% Retn
	F01					
	Sp02					
	F02					
	Sp03					
	F03	29	21	11	11	52
	Sp04	26	22	13	12	59
	F04	37	18	18	17	100
	Sp05	61	42	31	31	74
	Su05	20	11	8	8	73
	F05	26	22	17	17	77
	W06	31	25	18	18	72
	Sp06	41	27	21	21	78
	Su06*	91	45	33	33	73
	F06					
Total	9 Terms	362	233	170	168	73



Ch100	Year	Total Enroll	at census	With drawl	Grade	% Retn
MMC	F01	34	31	29	29	94
	Sp02					
	F02	36	34	32	27	79
	Sp03	37	34	28	27	79
	F03	34	34	34	32	94
	Sp04	36	30	30	29	97
	F04	28	24	17	17	71
	Sp05	27	16	16	15	94
	F05a	24	24	22	22	92
	F05	24	24	21	21	88
	W06					
	Sp06					
	Su06*					
	F06					
Total	9 Terms	173	152	140	136	89



Traditional Vs. Online

- In general, there is a bigger attrition rate for students online (16% increase)
- The educational experience for both online and traditional students are about the same. It depends on what the students put into the course.
- Online students benefit greatly with extra face to face meetings and review sessions.
- Online courses are a work in progress and need constant adjustments

Acknowledgements

Natural Science

Sandra Slivka Daphne Figueroa Ric Matthews

Online Colleagues

Teressa Toto Mary Bernard Berta Cuaron

SDCCD Online

Judy Baker Mary Kingsley Peter Miles