

**CHEM 1A**  
Lecture Schedule for Fall 2013

Homework must be submitted by 8:59 am on Wednesdays.

<b>UNIT 1 MATTER:</b> The properties of matter depend on the types and arrangements of atoms, ions, and molecules					
1	F 8/30	<b><i>Fine Art:</i></b> <i>Representing Molecules</i>	Matter is composed of atoms bonded together in specific patterns.		
	M 9/2	Labor Day			
2	W 9/4	<b><i>Eight is Enough:</i></b> <i>Periodic Table</i>	The ratio of elements in a compound depends on the number of valence electrons.	HW 1 due W 9 am	Discussion 1 Introduction W 9/4-Tu 9/10
3	F 9/6	<b><i>Electron Glue:</i></b> <i>Chemical Bonds</i>	Properties of matter depend on the type of bonds.		
4	M 9/9	<b><i>Shape Matters:</i></b> <i>Molecular Shape</i>	Properties of molecules depend on their shape and polarity.		
5	W 9/11	<b><i>My Space:</i></b> <i>Orbitals</i>	The locations of electrons in an atom are described in terms of atomic and hybrid orbitals.	HW 2&3 due W 9 am	Discussion 2 Types of bonding W 9/11 - Tu 9/17
6	F 9/13	<b><i>Molecules in Motion:</i></b> <i>Ideal Gases</i>	Atoms and molecules are in constant motion.		
7	M 9/16	<b><i>It's Just a Phase:</i></b> <i>Phase Changes</i>	When molecules condense, density increases and motion becomes restricted.		
8	W 9/18	<b><i>Attractive Molecules:</i></b> <i>Liquids</i>	Existence of liquids is a consequence of intermolecular attractions.	HW 4 due W 9 am	Discussion 3 Unit 1: Matter
9	F 9/20	<b><i>Mixing Matter:</i></b> <i>Properties of Solutions</i>	The properties of water change depending on the quantity and type of substance that dissolves.		

10	M 9/23	<b>Big Molecules:</b> <i>Solids</i>	Solids consist of atoms bonded in large clusters, chains, layers, or networks.		Review W 9/18 – Tu 9/24
Midterm 1 (Lectures 1-9): Tuesday, September 24, 7-9 pm					

<b>UNIT 2 CHANGE:</b> Chemical reactions involve reorganization of atoms, ions, and molecules that can be affected by external conditions.					
11	W 9/25	<b>What's Your Reaction:</b> <i>Chemical Equations</i>	Chemical change involves exchange of ions, atoms, and/or electrons between substances.	HW 5 due W 9 am	Discussion 4 Review of Midterm 1 W 9/25 - Tu 10/1
12	F 9/27	<b>Head-on Collision:</b> <i>Rates of Reactions</i>	Reactions occur when collisions between atoms, ions, and molecules lead to different substances.		
13	M 9/30	<b>Back It Up:</b> <i>Reversibility</i>	Most reactions proceed simultaneously in both directions. At equilibrium, the rates in both directions are the same.		
14	W 10/2	<b>Basically Weak:</b> <i>Equilibrium Constant</i>	The degree of dissociation of weak acids is expressed by the equilibrium constant.	HW 6 due W 9 am	Discussion 5 Reversibility and Equilibrium W 10/2 - Tu 10/8
15	F 10/4	<b>Special K:</b> <i>LeChatelier's Principle</i>	The equilibrium constant, K, is the same for a specific reaction, regardless of the starting conditions.		
16	M 10/7	<b>Neutral Territory:</b> <i>Acid-Base Reactions</i>	Acids react with bases to form products that are "neutral."		
17	W 10/9	<b>How Resilient:</b> <i>Buffers</i>	Buffers resist changes in pH upon addition of acids or bases.	HW 7 due W 9 am	Discussion 6 Acid Base Chemistry and Titrations
18	F 10/11	<b>Like It or Not:</b> <i>Solubility Equilibria</i>	The solubility equilibrium constant is a measure of the maximum amount of solute that dissolves in a solvent.		

19	M 10/14	<b>Finding Solutions:</b> <i>Solubility Product</i>	Solubility product equilibrium constants can be used to predict the solubility of ionic compounds.		W 10/9 - Tu 10/15
20	W 10/16	<b>Separation Anxiety:</b> <i>Separating Mixtures</i>	Equilibrium considerations can be used to design methods for separating components of mixtures.	HW 8 due W 9 am	Discussion 7

<b>UNIT 3 ENERGY:</b> Energy is the currency (or coin) exchanged in the making and breaking of bonds					
21	F 10/18	<b>Point of View:</b> <i>Heat Transfer</i>	Chemical change is associated with exchange of energy.		Discussion 7 Unit 2 Change Review W 10/16 –Tu 10/22
22	M 10/21	<b>The Heat is On:</b> <i>Thermal Equilibrium</i>	Hot objects transfer heat to colder objects until both are at the same temperature.		
Midterm 2 (Lectures 11-20): Tuesday, October 22, 7-9 pm					
23	W 10/23	<b>Make It or Break It:</b> <i>Bond Energy</i>	Energy is required to break bonds. Energy is released when bonds are formed.	HW 9 due W 9 am	Discussion 8 Review of Midterm 2 W 10/23 - Tu 10/29
24	F 10/25	<b>Compound Interest:</b> <i>Heats of Reactions</i>	Heats of reaction can be measured by calorimetry or calculated using tabulated heats of formation.		
25	M 10/28	<b>What a Mess:</b> <i>Energy Dispersal</i>	There is a natural tendency for energy to disperse.		
26	W 10/30	<b>Which Way:</b> <i>Enthalpy vs. Entropy</i>	Reactions that are exothermic and increase entropy favor products. Other reactions that are either exothermic or increase entropy may also favor products.	HW 10 due W 9 am	Discussion 9 Potential energy W 10/30 – Tu 11/3
27	F 11/1	<b>How Far:</b> <i>Gibb's Free Energy</i>	The position of an equilibrium of a reaction depends on the magnitude and sign of the reaction enthalpy and entropy.		
28	M 11/4	<b>Make It Work:</b> <i>Heat and Work</i>	Chemical energy can be converted into work and used to move objects.		

29	W 11/6	<b>Got Electrons?</b> <i>Redox Reactions</i>	The direction of electron transfer in redox reactions can be determined from electron energies, expressed as electrode potentials.	HW 11 due W 9 am	Discussion 10 Gibbs Free Energy W 11/4 - Tu 11/12 <b>Mon sections rescheduling TBA</b>
30	F 11/8	<b>Energizer Bunny:</b> <i>Batteries</i>	Electrochemical cells are used as portable power sources.		
	M 11/11	Veteran's Day			
31	W 11/13	<b>Feel the Power:</b> <i>Energy Sources</i>	The power we use in our daily lives comes at a cost.	HW 12 due W 9 am	Discussion 11

<b>UNIT 4 LIGHT:</b> Shining light on matter reveals its underlying composition and structure						
32	F 11/15	<b>All Aglow:</b> <i>Light Energy</i>	Energy associated with movement of electrons can be converted into light.		Discussion 11 Unit 3: Energy Review W 11/13 - Tu 11/19	
33	M 11/18	<b>How Absorbing:</b> <i>Light and Color</i>	Colors of compounds are a result of absorption of a portion of the visible spectrum of light.			
	Midterm 3 (Lectures 21-31): Tuesday, November 19, 7-9 pm					
34	W 11/20	<b>Now You See:</b> <i>Spectroscopy</i>	Spectroscopy is a powerful tool for learning about atoms and molecules.	HW 13 due W 9 am	Discussion 12 Review of Midterm 3 W 11/20 - Tu 11/26	
35	F 11/22	<b>Photo Opportunity:</b> <i>Subshell Model</i>	High energy photons can be used to eject electrons from atoms.			
36	M 11/25	<b>Electron Clouds:</b> <i>Quantum Model</i>	The locations of electrons in an atom are described in terms of a wave model and probabilities.			
	W 11/27	<b>Breaking the Code:</b> Periodic Trends (worksheet, no lecture)			HW 14 due W 9 am	

	F 11/29	Thanksgiving			
37	M 12/02	<b>Technicolor Atoms:</b> <i>Line Spectra</i>	When electrons relocate from one orbital to another, they absorb or emit a specific amount of energy.		Discussion 13 Color and Light 11/26-11/30
38	W 12/04	<b>Housing Co-op:</b> <i>Molecular Orbitals</i>	Bonds between atoms can be described in terms of overlap of atomic orbitals.		
39	F 12/06	<b>Dying to Know:</b> <i>Colorful Molecules</i>	Colors of molecules reflect the transitions of electrons between molecular orbitals when light is absorbed.		

	M 12/9	RRR Week		HW 15 due M 9 am	
	W 12/11	RRR Week			
	F 12/13	RRR Week			
	Final Exam: Monday, December 16, 3-6 pm				