Chemistry course outline for 2012-2013

Bellevue Christian School, Clyde Hill WA Mare Sullivan, joe.mare.sullivan@gmail.com 7/27/12 draft

Bold dates indicate 80 minute class periods; all other class periods are 45 minutes long

Date	Classroom Activity	
T 9/4	Mini- POGIL activity: Whoa! What's going on in chemistry?	Class periods are 40-45 minutes long; bold dates indicate longer 80 minute class periods
W 9/5	Mini-quiz; Lab 1-1: Burn, baby, burn!	Activities in bold green are labs.
Th9/6	Mini-Quiz; Significant Digits and Measurement	Activities in bold red are from <i>POGIL</i> <i>Activities for High School Chemistry</i> , Laura Trout, ed. (Flinn Scientific: Batavia IL) 2012
F 9/7	Mini-quiz: 3 words that describe how you are feeling about chemistry class Pre-Assessment: How much chemistry do you already know? (ACS-type practice exam – 40 q's/ 40 mins - answer ONLY the questions you know; mark the others as "X" = clueless or "?" = some idea, but confused)	For our end-of-course exam, we use the 2011 High School Chemistry Exam © American Chemical Society – Division of Chemistry Education – Examinations Institute. We use ACS-type questions on our quarter and semester exams to help students improve their speed, comprehension, and test-taking strategies over the duration of the course.

M 9/10	Lab 1-2: A Race to the finish	
T 9/11	Mini-Quiz	
	Organizing Data	
W 9/12	Mini-Quiz Practice using LabQuest probeware Lab 1-3: Feelin' the heat Song: <i>H</i> ₂ <i>O</i> song	All songs cited are used with permission of the songwriter, Michael Offutt
F 9/14	No class: HS retreat @ Lake Sammamish State park	

M 9/17	Significant Zeros	
	Song: Significant? I Don't Think So	
T 9/18	Mini-Quiz: SII	
	Lab 1-4: Mystery of the disappearing wax, Parts I and II	
W 9/19	Mini-Quiz	
	Lab 1-4: Mystery of the disappearing wax, Part III	
	Begin Lab 1-5: Further investigations of a burning candle	
	Each group chooses one of questions A – D to investigate; pool	
	data at end of experiment to draw conclusions	
F 9/21	Mini-Quiz	
	Lab 1-5: Further investigations of a burning candle	
	Draw conclusions from class data	

Date	Classroom Activity
M 9/24	Mini-Quiz
	Classification of Matter
	Song: Matter
T 9/25	Mini-Quiz
	Isotopes
	Ions
Th 9/27	Mini-Quiz
	Lab 1-6: Feelin' the heat – The sequel

M 10/1	
M 10/1	Juniors at UW
T 10/2	Mini-Quiz
	Average Atomic Mass
	Teachers at NWCSI Convention
M 10/8	CHAPTER 1 EXAM
T 10/9	Lab 2-1: A gas is a gas is a gas or is it?
	Mini-Lab: exploring P vs. V relationships, using LabQuests
	Each group chooses three different volumes and records
	corresponding pressures; pool data at end of experiment to draw
	conclusions
	JSong: Amadeo Avogadro
W 10/10	Mini-Quiz
	Relative Mass and the Mole
	Song: A Mole is a Unit
	Begin Mole Ratios
F 10/12	Mini-Quiz
	Mole Ratios

M 10/15	Mini-Quiz	
	Practice mol \rightarrow g and g \rightarrow mol problems, using the conversion	
	grid and/or the "mole hill" graphic	
T 10/16	Begin Inventory Time in the Chemistry Lab	Activities in bold blue are beta test
		versions of unpublished High School
W 10/17	No class: PLAN and PSAT exams	POGIL Initiative (HSPI) activities
Th 10/18	Mini-Quiz	or are activities written by Mare
	Finish Inventory Time in the Chemistry Lab	Sullivan
	Song: Stoichiometry Talking Blues	
F 10/19	CHAPTER 2 EXAM	

M 10/22	Lab 3-1: Chemical reactions and mole ratios -Day 1 Skim entire lab procedure; highlight start of each "Day"; highlight safety issues in red or pink	This is the lab we use for our 1 st semester Formal Lab Report (FLR)
T 10/23	Lab 3-1: Chemical reactions and mole ratios -Day 2	
W 10/24	Lab 3-1: Chemical reactions and mole ratios -Day 3	
	Limiting and Excess Reactants	
F 10/26	Lab 3-1: Chemical reactions and mole ratios -Day 4	
	Begin using graphic organizer to summarize the lab: sketches of procedures measured masses moles mole ratios particle	
	drawings, sources of error	

Date	Classroom Activity	
M 10/29	Lab 3-1: Chemical reactions and mole ratios -Day 5	
	Finish using graphic organizer to summarize the lab	
	Introduction to Formal Lab Report (FLR) requirements	
T 10/30	Peer review 9 th graders' FLRs	
	Begin writing FLR – Q & A time	
Th 11/1	Change You Can Believe In	Activities in bold purple are from the
		Target Inquiry project. They are
		available at no charge from this website:
		http://www.gvsu.edu/targetinquiry/

M 11/5	Begin Lab: The Only Thing Constant in Life Is Change	
T 11/6	Finish Lab: The Only Thing Constant in Life Is Change	
	Song: Change	
W 11/7	1 st QUARTER EXAM	
	40 ACS-type questions/60 minutes $(100\% = 20 \text{ correct})$	
F 11/9	No school: teacher workday	

M 11/12	No school: Veterans' Day
T 11/13	Review of the year so far, using Michael Offutt chemistry
	songs
W 11/14	FORMAL LAB REPORT due today (Lab 3-1)
	Mini-Quiz: SII
	Gas Variables
	♫Song: The Gas Laws
F 11/16	Lab 4-1: Bubble up! Can the volume of a gas product be
	predicted from the mass of a solid reactant?
	Preparation, safety issues, acid disposal
	Thanksgiving break
M 11/26	Lab 4-1: Bubble up!
	Assign each group a different mass of Mg to react?
T 11/27	Conduct lab again, if necessary
	Lab 4-1: Bubble un! Process and analyze data

	Lab 4-1: Bubble up: Process and analyze data	
Th 11/29	Mini-Quiz	
	Molar Volume; Barometers & Manometers; Partial Pressures;	
	Charles' Law; Absolute Zero; Kelvins	

M 12/3	Mini-Quiz	
	Evaporation, BP & Heat of Vaporization	
T 12/4	BP & Vapor Pressure, MP & Heat of Melting (Fusion)	
W 12/5	Mini-Quiz	
	Lab 5-1: How does the melting point of a pure	
	substance compare to the melting point of a mixture?	
	T of ice/water mixture vs. T of ice/saltwater mixture vs. T of	
	ice/alcohol mixture; assign 1/3 of groups to each mixture; pool	
	data at end of experiment to draw conclusions	
	BP of pure substances vs. mixtures	
	Saturated and Unsaturated Solutions	
F 12/7	Mini-Quiz	
	Begin Molarity	

Date	Classroom Activity	
M 12/10	Finish Molarity	
T 12/11	Mini-Quiz	
	Lab 5-2: To be or not to be an electrolyte!	
	Assign 1/3 of groups to each set of solutions; pool data at end of	
	experiment to draw conclusions	
W 12/12	Sweet and Salty Aren't Just Different Flavors	
	Ionic vs. molecular compounds in solution	
	Begin Lab 5-3: If you're not part of the solution, you're part	
T 10/11	of the precipitate!	
F 12/14	Finish Lab 5-3: If you're not part of the solution, you're part	
	of the precipitate!	
M 12/17	CHADTED 4 8-5 EVAM	
$\frac{1}{12/17}$		
1 12/18	Nehla Gasas (avaraisas A I)	
	Noble Gases (exercises $A = I$) Alkali Metals (exercises $I = I$)	
W 12/10	Aikan Metals (CAELESES J – L)	
VV 12/17	Halogens (exercises $M = N$)	
	Hydrogen (exercises $N = N$)	
	Begin Naming Ionic Compounds	
F 12/21	Finish Naming Ionic Compounds	
	Christmas Break	
M 1/7	Mini-Quiz	
	Begin Naming Molecular Compounds	
T 1/8	Finish Naming Molecular Compounds	
W 1/9	Mini-Quiz	
	Polyatomic Ions	
F 1/11	CHAPTER 6 EXAM	
	(Periodic table and inorganic compounds' nomenclature)	
M 1/14	Begin What's in a Name?	
	Hydrocarbon nomenclature	
T 1/15	Finish What's in a Name?	
W 1/16	Mini-Quiz	
	Empirical Formulas and Molecular Formulas	
F 1/17	Review for semester exam	
	JSong: Chemistry Nerd	
M 1/21	No school: MI K Ir holiday	
T 1/21	1 st SFMFSTFR FXAM	The ethics case study is based on the
1 1/44	40 ACS-type questions/50 minutes (100% - 25 correct)	DVD, Lorenzos' Oil, © 1992, 1994
	Desig Ethics Case Style DVD and note taking	It relates chemistry to an emotionally

40 ACS-type questions/50 minutes (100% = 25 correct)
Begin Ethics Case Study: DVD and note takingDVD, Lorenzos OH, © 1992, 1994
It relates chemistry to an emotionally
engaging real life situation.Th 1/24Ethics Case Study: DVD and note taking from DVDDVD

Date	Classroom Activity	
M 1/28	<i>Ethics Case Study</i> : DVD and note taking from DVD;	
	choose stakeholder position; choose controversial statement	
T 1/29	Ethics Case Study: highlight relevant concrete details for the	
or	essay; outline the 5paragrah essay to include a position	
W 1/30	statement and two concrete details per paragraph; write first	
or	draft of position paper (as much as you have time to finish)	
Th 1/31		

M 2/4	Mini-Lab: Rubber band stretching & contracting – to define exothermic and endothermic Begin How Much Energy Does It Take to Melt an Ice Cube?	
T 2/5	Finish How Much Energy Does It Take to Melt an Ice Cube?	
W 2/6	Lab 7-1: What is the heat of reaction? (Acid/base combinations; exothermic vs. endothermic) Assign each group one of the acid/base combinations; pool data at end of experiment to draw conclusions Begin Calorimetry	Highlighted = renumber these labs or chapters
F 2/7	Mini-Quiz Finish Calorimetry	

M 2/11	Mini-Quiz: SII	
	Begin Bond Energy	
T 2/12	Mini-Quiz	
	Finish Bond Energy	
	Introduce Hess's Law with a practice problem	
W 2/13	Lab 8-1: The Iodine Clock Reaction	We use the Flinn Scientific "Factors
	Assign 1/3 of student groups to each variable; pool data at end	Affecting Reaction Rates" Lab Kit
	of experiment to draw conclusions	
F 2/15	Mini-Quiz	
	Ch 8 Model 1: Eight Marbles in a Double-box System	
	Model 2: Reaction Coordinate Diagrams	

M 2/18	No school: Presidents' Day holiday	
& T 2/19		
W 2/20	Mini-Quiz	
	Ch 8 Theory of Reaction Rates	
	Model 3: Catalysts	
	Review for exam	
F 2/22	CHAPTER 7 & 8 EXAM	

Date	Classroom Activity	
M 2/25	Begin Lab 9-1: How can you detect the direction of a	
	chemical reaction?	
	Assign 1/3 of student groups to each System 1 - 3; pool data at	
	end of experiment to draw conclusions	
T 2/26	Finish Lab 9-1:	
	How can you detect the direction of a chemical reaction?	
	Equilibrium	
	♫Song: Dynamic Equilibrium	
Th 2/28	Mini-Quiz	
	Ch 9 LeChatelier's Principle and Dynamic Equilibrium; Read	
	This! Boxes; (exercises B – O)	
M 3/4	Mini-Quiz	
	Begin Solubility	
T 3/5	Mini-Quiz	
	Finish Solubility	
	Ch 10 Model 1: Mg(OH) ₂ is insoluble	
	Model 2: Solubility of Common Compounds in Water; using	
	solubility charts to predict solubility	
W 3/6	Mini-Quiz	
	Lab 10-1: What is the maximum amount of a salt that can	
	dissolve in water? (K _{sp})	
	Student groups design their own experiments; pool data at end	
	of experiment to draw conclusions	
	CH 10 Model 3: K _{sp}	
F 3/8	No school: Teacher in-service day	

M 3/11	Begin Net Ionic Equations	
T 3/12	Finish Net Ionic Equations	
	Practice using solubility charts to predict precipitation reactions;	
	practice writing complete chemical equations and net ionic	
	equations for those reactions	
W 3/13	CHAPTER 9 & 10 EXAM	
	Mini-Lab: Acid/base classification of common household	
	solutions (using red and blue litmus paper)	
	Begin Acids and Bases	
F 3/15	Mini-Quiz	
	Finish Acids and Bases	
	□ Song: Acids and Bases Have Two Different Faces	

Date	Classroom Activity	
M 3/18	Mini-Quiz	
	Begin Strong vs. Weak Acids	
T 3/19	Mini-Quiz	
	Finish Strong vs. Weak Acids	
	Ch 11 Model 1: Acid Concentration Table	
	Ch 11 Acid dissociation constant, K _a	
W 3/20	Mini-Quiz	
	Calculating pH	
	Ch 11 Model 2: Neutral, Acidic, & Basic	
F 3/22	CHAPTER 11 EXAM	

M 3/25		Naming Acids – optional activity for students preparing for AP or SAT II chem exams
T 3/26	Acids and Bases Lab Bonanza:	
	Lab 11-1: When you mix acids and bases, what are the heats	
	of reaction?	
	Lab 11-2: How can you use "pH Indicator Solutions" to	
	determine a solution's hydrogen ion concentration?	
	Assign $1/2$ of students at each bench to one of the labs;	
	pool data at end of experiment to draw conclusions	
Th 3/28	Oxidation and Reduction	
	JSong: <i>Redox Blues</i>	

M 4/1	3 rd QUARTER EXAM	
	40 ACS-type questions/40 minutes ($100\% = 30$ correct)	
T 4/2	Begin The Activity Series	
W 4/3	Finish The Activity Series	Ch 12 Metal Reactivity Series (if
	Batteries	time)
F 4/5	No school: grading day	
	Spring Break	
	Ch 12 Model 1: Anodes and Cathodes	
	Prepare for Lab 12-1: Which Metals Are Pushier?	
	Using LabQuest probes to measure differential voltage	
T 4/16	Lah 12-1: Which Metals Are Pushier?	

T 4/16	Lab 12-1: Which Metals Are Pushier?	
W 4/17	Each group of students has a different set of three metals to compare; pool data from all class periods at end of experiment to draw conclusions	This is the lab we use for our 2 nd semester FLR. I create a data table from all the pooled data and then email and provide a printed copy of the data table to each student.
F 4/19	Lab 12-1: Which Metals Are Pushier? Analyzing all periods' data table together – which data points should be excluded? How can we make sense of the data?	

Date	Classroom Activity	
M 4/22	Ch 12 Model 2: Oxidation Number Conventions	
T 4/23	Mini-Quiz	
	Lab 12-2: How does a lead storage battery work?	
	Each group of students designs two experiments to test how the	
	variables of charge time, charge rate, voltage generated, and	
	discharge time relate; pool data at end of experiment to draw	
	conclusions	
Th 4/25	CHAPTER 12 EXAM	
	Ch 12 Cell Voltage	
	Using a table of Standard Oxidation Potentials to design an	
	iPod [®] battery	
M 4/29	Ch 13 Dalton and Atomic Theory	
	Faraday & Electrolysis	
T 4/30	FORMAL LAB REPORT due today (Lab 12-1)	
	Mini-Quiz	
	"Magic Rays"; observing H ₂ , Ne, and Hg discharge tubes	
	Ch 13 Thomson and Cathode Rays; Plum Pudding Model	
W 5/1	Mini-Quiz	? Lab <mark>13-1</mark> : How do moles of
	Song: Alpha, Beta, Gamma Radiation	copper oxidized compare with
	Notes on ionizing radiation & basic nuclear decay, based on the	moles of electrons transferred
	song	in an electrolysis reaction?
	Rutherford's Gold Foil Experiment – online simulation and class	Each group of students chooses a
	discussion	different amount of time and
	JSong: Atomic Theory Polka	charge rate; pool data at end of
T 5/2	Intro to Bøhr's Shell Model of the Atom	experiment to draw conclusions
F 5/3	Ch 14: Begin Coulombic Attraction	
M 5/6	Mini Quiz	
IVI J/0	Finish Coulombic Attraction	
	Mini, I ab: Emission spectra	
	Use spectroscopes to observe emission spectra of sunlight	
	fluorescent light and light from H2 Ne and Hg discharge tubes	
T 5/7	Mini-Quiz	
1 0/ /	Use spectroscopes to observe emission spectra of sunlight	
	Begin Electron Energy and Light	
W 5/8	Finish Electron Energy and Light	
	Begin Electron Configuration	
	Song: <i>Quantum Number Rag</i> (only verse 1) – after Model 1	
F 5/10	Mini-Quiz	
	Finish Electron Configuration	
	Song: <i>Electron Configuration Polka</i> (between Models 2 and 3)	
	Practice electron configuration problems	

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Date	Classroom Activity	
M 5/13	Begin Cracking the Periodic Table Code	
T 5/14	Finish Cracking the Periodic Table Code	
	Song: Mendeleev	
W 5/15	Periodic Trends	
	Song: Electron Configuration Polka	
F 5/17	CHAPTER 13 & 14 EXAM	

M 5/20	Ch 15 Begin To Share or Not to Share: How Does It Shape	
	Thee?	
T 5/21	Finish To Share or Not to Share: How Does It Shape Thee?	
	Practice Lewis dot structures	
	Song: If It Isn't Love, What's Going On?	
W 5/22	Molecular Geometry	
	Mini-Lab: Molecular Shapes	
	Use large marshmallows as nuclei, small marshmallows as	
	electrons (different color for each type of atom's electrons), and	
	toothpicks as electron domains. Build models of all six	
	molecules in the activity.	
F 5/24	Practice drawing Lewis dot structures and predicting molecular	
	shape from molecular formulas	

M 5/27	No school: Memorial Day	
T 5/28	Types of Chemical Reactions	
Th 5/30	Fundamentals of Experimental Design	

M 6/3	ACS Exam review; test-taking strategies	
T 6/4	ACS exam review	
W 6/5	ACS EXAM	Students with extended time on a 504
	80 questions/80 minutes	plan/IEP answer the first 40 questions in
		60 minutes. Then I double their score as
		the final exam grade.
F 6/7	Partner Lab Research	All partner lab research is done during
	Choose partner, choose question, begin preparation for lab work	class time; there is no chemistry
	choose partner, choose question, begin preparation for hab work	homework during these ten days.

M 6/10	Partner Lab Research	
	Conduct lab experiments at least twice	
T 6/11	Partner Lab Research	
	Conduct lab experiments at least twice	
W 6/12	Partner Lab Research	
	Conduct lab experiments at least twice	
F 6/14	Partner Lab Research	
	Final data collection and clean up; begin research poster design	

M 6/17	Partner Lab Research	
	Final work on research poster	
T – Th	Chemistry Research Symposium:	
6/18-20	Presentation of Research Project Posters	