PreAP Chemistry Year At a Glance Calendar

Hi! My school year starts August 14th. This is ACTUALLY my lesson plan document. So, if you see things changing or moving or new things added, it's because I'm looking at this thing EVERY DAY. A lot of the online only assignments will have paper alternatives and a lot of the paper assignments will gain online options. This will hopefully allow for some more choice in my room.

As the year goes on, if you need help, email me: linda.detwiler@webster.kyschools.us. Don't hesitate to reach out! I love to help people.

Good luck this year. -Linda

Hey Linda! Add vocab activities. :) Want Standard? Go here Template: here AP Physics 1 here OAIM here

Week	Topic	Week	Topic	Week	Topic	Week	Topic
1	Unit One: Intro to Advanced Chemistry	10	Unit Five: Electrons	19	Unit Eight: Chemical Reactions	28	Unit Eleven: Reaction Kinetics
2		11	Unit Five: Electrons	20	Unit Eight: Chemical Reactions	29	Unit Eleven: Reaction Kinetics
3		12	Unit Five: Electrons	21	Unit Eight: Chemical Reactions	30	Unit Twelve: Solutions
4		13	Unit Six: Periodic Table and Trends	22	Unit Eight: Chemical Reactions	31	Unit Twelve: Solutions
5	Unit Three: Matter	14	Unit Six: Periodic Table and Trends	23	Unit Nine: The Mole	32	Unit Twelve: Solutions
6	Unit Three: Matter	15	Unit Seven: Nomenclature	24	Unit Ten: Stoichiometry	33	Unit Thirteen: Acid/Base
7	Unit Three: Matter	16	Unit Seven: Nomenclature	25	Unit Ten: Stoichiometry	34	Unit Thirteen: Acid/Base
8	Unit Four: The Atom	17	Unit Seven: Nomenclature	26	Unit Ten: Stoichiometry	35	Unit Sixteen: Nuclear (optional)
9	Unit Four: The Atom	18	Midterm	27	Unit Eleven: Reaction Kinetics	36	Final Exam

Melissa Gable's Pacing Guide
Coverage levels for CB Alignment, PreAP to AP

Resources for Breakout Rooms: here My First Breakout!

MC Questions w/ Answers (You'll need to type them up…) here here here

John Erickson's Worksheets here

ACT Science Practice:
https://docs.google.com/document/d/11iw44HSSCN2PjFX7mQSsuXVzgi1vxzXR-2Fnonw_H0I/

Key Terms

1. PH: Prentice Hall Chemistry
    a. Wilbraham, Antony C. Prentice Hall Chemistry. Pearson/Prentice Hall, 2008.
2. LO: Learning Objects
    a. Adrian Dingle's List of LOs for AP Chemistry
3.

Midterm

Review (1-7)

Midterm 2017

Midterm 2018 **(1-7)**

Unit One: Introduction to Advanced Chemistry

Time: 4 Week

DCIs	SEPs	CCCs	College Board
ETS1.1, ETS1.2, ETS1.3, ETS1.4	Asking questions Planning and carrying out investigations, Using mathematics and computational thinking	Cause and Effect, Scale, Proportion, and Quantity	---

Textbook Sections	
Zumdahl	**Prentice Hall**
1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.9	1.1, 1.2, 1.3, Appendix D, 3.1-3.4, Appendix C

Learning Targets: By the end of the unit, a student in this course should be able to...

1. Describe chemistry in a general sense.
2. Identify the five areas of chemistry.
3. Explain why the study of chemistry is important.
4. Explain how chemists impact multiple studies.
5. Work in a lab setting following published safety guidelines.
6. Use the steps of the scientific method to develop an experiment using the OAIM (Object, Action, Instrument, Measurement) method.
7. Answer a proposed question with experimental data using CER (Claim, Evidence, Reasoning).
8. complete a lab write up using the Four Corner method.
9. evaluate the accuracy and precision of a set of measurements.
10. report numbers to the correct number of significant figures, both measurements and calculations.
11. express numbers in scientific notation and complete calculations in scientific notation WITHOUT a calculator.
12. write measurements using the correct number of significant figures.
13. convert between similar units.
14. experimentally determine the density of solids and liquids.
15. identify an unknown substance using density.

Experiment

1. work with measurements EXCLUSIVELY in the metric system, with emphasis on length, volume, mass, temperature, and energy.
2. perform dimensional analysis.

Vocabulary

• matter • chemistry • organic chemistry • inorganic chemistry • biochemistry • analytical chemistry • measurement • scientific notation • accuracy • precision • accepted value	• physical chemistry • technology • macroscopic • microscopic • biotechnology • pollutant • green chemistry • International System of Units (SI) • meter • experimental value	• scientific method • observation • hypothesis • experiment • liter • gram • weight • temperature • celsius scale • percent error • significant figures	• independent variable • dependent variable • theory • scientific law • density • Kelvin scale • absolute zero • energy • joule • calorie • error

Activity Schedule

Day	Standards Covered	Activity Bellwork Slides for the Unit
1		Opening Activities/ Syllabus/ Course Expectations PP Notes: Course Highlights Make a 3 column chart in notebook - Topic - Highlights - Why this is important HW: Letter to me
2		Finish Course Expectations
3		Safety Contract Spanish English (20 minutes) Notes: Safety Highlights - Series of T-charts: Topic on top, bottom left: Overview Bottom Right: Why is this important (20 minutes) Safety quiz Safety Pretest Spanish (Department policy requires an 80% or better for work in wet labs)
4		What is chemistry? Notes Article: (Worksheet) Who invented "sticky notes?"
5		The Scientific Method Notes OAIM Lab Format (For Teachers: How to OAIM) Claim-Evidence-Reasoning
6		Pretest: Math for Chemistry
7		Day One: What is density? Density PhET
8		Measurements with Sig Figs
9		(Goes in notebook after grading) (I do) Day Two: Density of Known Objects (reg solids) Focus: Writing a procedure, materials list, and data table
10		(Goes in notebook after grading) (We do) Day Three: Density of Known Objects (irr solids) Focus: Writing a procedure, materials list, and data table
11		(Goes in notebook after grading) Day Four: (You Do) Density of Known Objects (liquids) Focus: Writing a procedure, materials list, and data table
12		Work Day
13		Quiz: Density Activity

14		Day Six: Identification of an Unknown Solid Focus: Conclusions (CER)
15		Day Seven: Temperature and Density of Liquids Focus: Conclusions (CER)
16		Dimensional Analysis video video for introduction Ladder Method more help Practice
17		Lab Report Quiz Grading Rubric
18		SI Units and Conversions
19		Work Day/ Remediation
20		Math for Chemistry Review (assign for HW) KEY TEST KEY Version 2 KEY

CER Rubric **Math for Chem folder**

Activities/Worksheets	Notes	Labs	Quizzes/Tests
Safety First Fundamentals of Experimental Design Scientific Process Significant Digits and Measurement Significant Zeros Density Exit Ticket Conversion HW Book Hunt: Measurement and Molar Conversions 2 3 4 5 Acc vs Prec HW SciNot 1 2 3 4 5 6 Roadtrip Rem/En: Math for Chem Percent Error 1 2 Sig Figs 1 2 3 4 5 Density: A Mystery Introduction KEY	Starting with Safety Accuracy vs. Precision Metric Handout Sig Figs SI Units	Acc vs. Prec Acc vs. Prec 2 Accuracy vs. Precision Lab (2 days) HW	Flinn Safety Quiz

Unit Two: Properties of Matter

Timeline: 3 Weeks

Properties of Matter			
DCIs	SEPs	CCCs	College Board
HS.PS.1.3	Planning and Carrying Out Investigations	Patterns	2.7, 2.10, 3.10,

Textbook Sections	
Zumdahl	**Prentice Hall**
1.10	2.1-2.4

Learning Targets: By the end of the unit, a student in this course should be able to...

1. use physical and chemical properties of matter to classify matter.
2. distinguish between the three states of matter.
3. classify a change as physical or chemical.
4. design an experiment to separate mixtures of substances based on bulk properties.
5. classify mixtures.
6. describe and perform multiple methods of chemical separation.
7.
8. identify when a reaction is occuring.
9. apply the law of conservation of matter.

Experimental

1. distinguish between the multiple types of matter.

College Board

1. (2.7) The student is able to explain how solutes can be separated by chromatography based on intermolecular interactions.
2. (2.10) The student can design and/or interpret the results of a separation experiment (filtration, paper chromatography, column chromatography, or distillation) in terms of the relative strength of interactions among and between the components.
3. (3.10) The student is able to evaluate the classification of a process as a physical change, chemical change, or ambiguous change based on both macroscopic observations and the distinction between rearrangement of covalent interactions and noncovalent interactions.

Vocabulary			
• mass • volume • physical change • mixture • solution • law of conservation of matter	• extensive property • intensive property • heterogeneous mixture • homogeneous mixture • product • reactant	• substance • physical property • distillation • chromatography • element • compound • precipitate • filtration	• solid • liquid • gas • vapor • chemical change • physical change • chemical property • chemical reaction • phase

Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
Properties of Matter Notes Handout Homework	*(Paused: Remediate Unit Two… Rewrote the test)*	*(Paused: Remediate Unit Two… Reteach/Analyze the questions)*	*(Paused: Remediate Unit Two… Retest: Unit Two)*	Properties of Matter Day 2 Handout
White Powder Lab HW: Properties of Matter on GC	(1-10) Quiz: Properties of Matter *Less than a 70% must re-quiz*	BW: Properties of Matter Pin-Up Oobleck Lab Prop. HW Due	Notes: Chromatography and Distillation HW (link)	***(HAHAHAHA… Sub day…)*** *Kids worked on Chromatography HW*
(2, 3, 6, 8) Tie Dye Chromatography Lab *Be careful with RED. It will die EVERYTHING in the vinegar wash. (about a 15% soln is fine) OR (no shirt) Chromatography Simulation	Properties of Matter Separation and Identification Rubric	Properties of Matter Separation and Identification	Unit Review	 **Unit Exam** Key *Don't get too spoiled. I don't normally type up my keys like this… :) **(Question 10)** Notebook Check

Properties of Matter Folder

Additional Assignments			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**
Classification of Matter Matter Remediation Stations: Matter	Nature of Science	Classifying Matter 1+2+3=Black! Table Separation Lab	Matter Quiz Matter Quiz (Forms) Quiz: Properties of Matter

Unit Four: The Atom

Time: 2 Week

The Atom			
DCIs	**SEPs**	**CCCs**	**College Board**
HS.PS.1-1 HS.PS.1.2	Developing and Using Models Constructing Explanations and Designing Solutions	Patterns Scale, Proportion, and Quantity	1.1, 1.17, 3.5, 3.6

Textbook Sections	
Zumdahl	**Prentice Hall**
2.1, 2.2, 2.3, 2.4, 2.5	4.1-4.3

Learning Targets: By the end of the unit, a student in this course should be able to...

1. describe the historical process by which the atom was discovered and refined.
2. describe the structure of the atom and explain the experiments done that discovered each part.
3. distinguish among atoms, based on protons, neutrons, electrons, atomic mass, atomic number, and/or charge.
4. calculate average atomic mass.

College Board

1. (1.1) The student can justify the observation that the ratio of the masses of the constituent elements in any pure sample of that compound is always identical on the basis of the atomic molecular theory.
2. (1.17) The student is able to express the law of conservation of mass quantitatively and qualitatively using symbolic representations and particulate drawings.

Vocabulary			
• atom • nucleus • atomic number • atomic mass • Democritus • Ernest Rutherford • Cathode Ray Experiment • Dalton's atomic model	• Dalton's Atomic Theory • mass number • periodic table • John Dalton • Louis de Broglie • Plum Pudding model • Bohr Atom	• electron • neutron • isotope • period • JJ Thomson • Werner Heisenberg • Rutherford's atomic model	• cathode ray • proton • atomic mass unit (amu) • group • Hantaro Nagaoka • James Chadwick • Erwin Schrodinger • Schrodinger's atom

Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
Discovery Square Activity Teacher	History of the Atom PP Project (see Option 2) Option 1	History of the Atom Distinguishing Among Atoms Homework	Quiz: PEN Count and Periodic Table (Paper Version) **Build An Atom**	**Build An Atom**
	Remediation Day Wrong Answer Analysis	Average Atomic Mass Calculations Notes	Atomic Mass of Candium Activity	Exam: The Atom Review Notebook Check Retest: Atom Math
(Remediation) Day 1: Atomic Theory	(Remediation) Day 2: Percent Abundance edpuzzle wkst	(Remediation) Day 3: Percent Composition edpuzzle wkst		

The Atom folder

Additional Assignments			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**
PEN Count Rem. PEN Count Enrichment			

Unit Five: The Electron

Time: 2 Week

The Electron			
DCIs	SEPs	CCCs	College Board
HS.PS.1.3	Developing and using models	Systems and System Models	1.9, 1.10, 1.12, 1.15, 1.13,

Textbook Sections	
Zumdahl	**Prentice Hall**
7.1, 7.5-7.9, 7.11	5.1-5.3

Learning Targets: By the end of the unit, a student in this course should be able to...

1. explain the development of the atomic model, with emphasis on the shape of the electron cloud.
2. explain how the quantum mechanical model of the atom explains the electrons of an atom.
3. describe an atom based on its principal energy levels.
4. write the electron configuration- including orbital notation, energy levels, standard electron configuration, Lewis Structure, and noble gas configuration- of an atom using Aufbau's principle, Pauli Exclusion Principle, and Hund's Rule.
5. identify an element based on its electron configuration(s).
6. describe the atomic emission spectra and explain how the atomic emission spectra is used in chemistry.
7. I can describe and apply the relationship between wavelength, frequency, and energy of light.

College Board

1. LO 1.5 The student is able to explain the distribution of electrons in an atom or ion based upon data.
2. LO 1.12 The student is able to explain why a given set of data suggests, or does not suggest, the need to refine the atomic model from a classical shell model with the quantum mechanical model.
3. LO 1.13 Given information about a particular model of the atom, the student is able to determine if the model is consistent with specified evidence.
4. LO 1.15 The student can justify the selection of a particular type of spectroscopy to measure properties associated with vibrational or electronic motions of molecules.

Vocabulary			
• energy level • quantum • quantum mechanical model • Heisenberg Uncertainty Principle	• electron configuration • aufbau principle • Pauli exclusion principle • atomic orbital	• Hund's Rule • amplitude • wavelength • frequency • hertz	• electromagnetic radiation • spectrum • atomic emission spectrum • ground state • photons

Calendar

Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Reteach: U4	Reteach: U4	Reteach: U4	.23 Electron Configuration PP Notes HW Write the full electron configuration, full orbital notation, noble gas configuration, and noble gas orbital notation for elements 1-30.	24 Annberg Learner: Electron Configuration
25 Intro Video Quantum Mechanics PP Notes Write the quantum number set for every electron in elements 1-15.	26 Quantum Mechanics Bingo 1 2 OR Quantum Practice	29 Waves and Photons PP Notes Practice	30 Flame Test Lab	QUIZ: Part 1: Retest Unit 3 Part 2: Electron Configuration, QN, and Light Math
	XXXX	31 The Electron Breakout Room		2 Review Electron Test

The Electron Folder The Wave folder

Additional Assignments			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**
Ions Electron Configuration Molecular Geometry Battleship! Practice Exit Ticket 1 2 3 Card Sort 8 Practice Practice Arrangements	Electron Configuration Chart Rules for Electron Config		Lewis Structures **PES:** **https://www.youtube.com/watch?v=7ofqZ9h5-t0** Test Question

Unit Six: Periodic Table and Trends

Timeline: 2 weeks

Periodic Table and Trends			
DCIs	**SEPs**	**CCCs**	**College Board**
HS.PS.1.2	Constructing Explanations and Designing Solutions	Patterns	1.5, 1.6, 1.7, 1.9, 1.10, 1.13, 1.15, 2.17, 1.11,

Textbook Sections	
Zumdahl	**Prentice Hall**
2.7,7.11, 7.12, 7.13, Chapter 20-22	6.1-6.3, Appendix A

Learning Targets: By the end of the unit, a student in this course should be able to...

1. I can identify trends in ionization energy, electronegativity, and the relative sizes of atoms and ions.
2. I can identify the different parts of the periodic table: metals, nonmetals, metalloids, representative elements, alkali metals, alkaline earth metals, halogens, noble gases, transition metals and the lanthanide and actinide series.
3. I can predict the relative sizes of neutral atoms in comparison to their positive or negative ions.
4. I can identify the probable charge on the ion of a main group of elements based upon its position on the periodic table.
5. I can identify the number of valence electrons in any element on the periodic table.

College Board

1. LO 1.6 The student is able to analyze data relating to electron energies for patterns and relationships.
2. LO 1.7 The student is able to describe the electronic structure of the atom, using PES data, ionization energy data, and/or Coulomb's Law to construct explanations of how the energies of electrons within shells in atoms vary.
3. LO 1.9 The student is able to predict and/or justify trends in atomic properties based on location on the periodic table and/or the shell model.
4. LO 1.10 Students can justify with evidence the arrangement of the periodic table and can apply periodic properties to chemical reactivity.
5. LO 1.11 The student can analyze data, based on periodicity and the properties of binary compounds, to identify patterns and generate hypotheses related to the molecular design of compounds for which data are not supplied.
6. LO 1.13 Given information about a particular model of the atom, the student is able to determine if the model is consistent with specified evidence.
7. LO 1.15 The student can justify the selection of a particular type of spectroscopy to measure properties associated with vibrational or electronic motions of molecules.
8. LO 2.17 The student can predict the type of bonding present between two atoms in a binary compound based on position in the periodic table and the electronegativity of the elements.

Vocabulary			
• periodic law • metal • nonmetal • metalloid • ionization energy • electronegativity	• alkali metal • alkaline earth metal • halogens • noble gases	• transition metals • inner transition metals • atomic radius	• ion • cation • anion • representative elements

Extra Time: Periodic Table of Aliens https://phet.colorado.edu/sims/html/build-an-atom/latest/build-an-atom_en.html

Collab connection: True Colors 168-169

FRQs:http://bhs.bellvilleisd.org/UserFiles/Servers/Server_1204/File/Schumann/Atomic%20Theory%20&%20Periodicity%20FR%20worksheet.pdf

Answers:
http://www.docstover.org/uploads/3/7/2/3/37233997/answers_to_frq_practice_on_atomic_theory.docx

Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
19 Flip it: Video ***Color Me Periodic*** **PP: Families of the Periodic Table**	20			
26 Pop Quiz: Periodic Table Periodicity Notes PP Notes HW: Table and Trends Quiz on GC	27 **Activity: Modeling Trends**	**28** TCT: Periodic Trends Rubric	29 ACT Day	30 Review Test *Abbreviated Test*

Periodic Table and Trends folder

Additional Assignments			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**
Personal Practice: Kahoot Jumble: Periodic Table and Trends	Periodic Trends Videos 1 2 3	**Activity: Graphing Trends**	Quiz: Periodic Trends OR Quiz from NMSI

Unit Seven: Nomenclature

3 Weeks

<table>
<tr><th colspan="4">Naming and Writing Chemical Formulas</th></tr>
<tr><td>DCIs</td><td>SEPs</td><td>CCCs</td><td>College Board</td></tr>
<tr><td>HS.PS.1.2
HS.PS.1.3
HS.PS.1.4</td><td>Developing and Using Models, Constructing Explanations and Designing Solutions</td><td>Structure and Functions</td><td>none</td></tr>
<tr><th colspan="4">Textbook Sections</th></tr>
<tr><th colspan="2">Zumdahl</th><th colspan="2">Prentice Hall</th></tr>
<tr><td colspan="2">2.8</td><td colspan="2">9.1-9.5</td></tr>
<tr><td colspan="4">Learning Targets: By the end of the unit, a student in this course should be able to...
1. I can understand that the drive for atoms to form bonds is based on the stability of the noble gases and the octet rule.
2. I can describe the formation of an ionic bond.
3. I can describe the formation of an anion or cation from its neutral atom.
4. I can determine the correct ratio of cations to anions needed to form a neutral ionic compound.
5. I can explain the difference between a monatomic and polyatomic ion.
6. I can develop a flowchart that can be used to name and write chemical formulas.
7. I can state and apply the octet rule.
8. I can distinguish between ionic compounds and binary molecular compounds.
9. I can name and write formulas for ionic compounds using IUPAC nomenclature (naming) rules.
10. I can name and write formulas for binary molecular compounds.</td></tr>
<tr><th colspan="4">Vocabulary</th></tr>
<tr><td>• valence electron
• electron dot structure
• octet rule</td><td>• ionic compounds
• ionic bonds
• chemical formula
• formula unit</td><td>• monatomic ion
• polyatomic ion</td><td>• list of polyatomic ions</td></tr>
</table>

Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
Background: How do ions form? Notes Homework: Explain the ion formations for Elements #1-18 (No noble gases)	Ionic Naming: Simple Binary Homework Polyatomic Atoms Homework Optional Homework	Ionic Naming: Practice Binary Naming Quizizz	Ionic Naming: Transition Binary Homework	Ionic Nomenclature Practice Must earn at least 25 points on the mix.
Quiz: Ionic Naming Quiz Locked Copy (it's mine for in class use)	DHMO Article and worksheet	Mixed Nomenclature Practice Must earn at least 25 points on the mix of Covalent and ionic.		

Analysis of Anions and Cations pg 200

Nomenclature folder

Additional Assignments			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**
binary ionic compounds practice BW: Name/Write binary ionic (post to Google Classroom) Binary Bingo HW: Transition Metal *Kahoot: Binary with Transitions* HW: Polyatomics *Color Hop* *Mixed Ionic Naming* Chemical Formula TicTacToe Mixed Naming Egg Hunt Station Rotation: Naming Nomenclature Packet Interactive Practice Ionic Compounds	Binary video practice Flip on Trans Copy Ion Sheet on PT:Pg R54 Enrichment: Covalent Bonding		Quiz: Background to ions (Retest) KEY Quiz: Binary Retest Quiz: Mixed Naming

Unit Eight: Chemical Reactions

Writing and Balancing Chemical Equations			
DCIs	SEPs	CCCs	College Board
HS.PS.1.7.1.a, HS.PS.1.7.1.b, HS.PS.1.7.1.c, HS.PS.1.2.1, HS.PS.1.2.2	Constructing Explanations and Designing Solutions, Using Mathematics and Computational Thinking	Patterns Systems and System Models	1.4, 1.17, 1.18, 3.1, 3.5, 3.6, 3.10

Textbook Sections	
Zumdahl	**Prentice Hall**
3.8, 3.9, 4.4, 4.5, 4.6,	11.1-11.3

Learning Targets: By the end of the unit, a student in this course should be able to...

1. I can identify reactants and products in a chemical reaction.
2. I can write a balanced equation when given the names or formulas of all reactants and products in a chemical reaction.
3. I can classify a reaction as synthesis, decomposition, combustion, single replacement or double replacement.
4. I can use the appropriate symbol to indicate a reactant or product as a solid, liquid, gas, or aqueous.
5. I can predict the products of single and double replacement reactions types using appropriate references, such as the activity series or solubility rules.
6. I can prove that conservation of mass occurs during a chemical reaction.
7. I can understand that coefficients in a chemical reaction describe the quantities of individual particles (atoms, molecules, and formula units) and moles of the substances involved.
8. I can write a net ionic equation.

College Board

1. LO 1.17 The student is able to express the law of conservation of mass quantitatively and qualitatively using symbolic representations and particulate drawings.
2. LO 1.18 The student is able to apply conservation of atoms to the rearrangement of atoms in various processes.
3. LO 3.1 Students can translate among macroscopic observations of change, chemical equations, and particle views.
4. (3.5) The student is able to design a plan in order to collect data on the synthesis or decomposition of a compound to confirm the conservation of matter and the law of definite proportions.
5. (3.6) The student is able to use data from synthesis or decomposition of a compound to confirm the conservation of matter and the law of definite proportions.
6. LO 3.10 The student is able to evaluate the classification of a process as a physical change, chemical change, or ambiguous change based on both macroscopic observations and the distinction between rearrangement of covalent interactions and noncovalent interactions.

Vocabulary			
• chemical equation • skeleton equation • catalyst • coefficient • net ionic equation	• balanced equation • combination reaction • decomposition reaction	• single replacement reaction • double replacement reaction	• combustion reaction • activity series • complete ionic equation • spectator ion

Calendar

			(Jan 3) Balancing Equations EdPuzzles 1 2 3 PP Notes HW 4 Ans Balance each equation, then write the reaction sentence for each equation.	Review HW from previous day -Cover diatomic atoms -Identify (g), (l), (s), and (aq) HW Ans (same as day 2)
Balancing Equations: PhET	Independent Practice	Balancing Equations Quiz 1 KEY 2 KEY KEY Quiz (GradeCam Comp)	Reaction Types PP Notes HW	Double Replacement Lab
Racing Reactions	Racing Reactions	Single Replacements Lab	(work day)	Quiz: Reaction Types and Predicting Reactions
No School	Individual Review	TCT: Chemical Reactions	Unit Eight Exam: Chemical Reactions Notebook Check	

Additional Assignments Chemical Reactions Folder			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**
Exit Ticket 1 2 3 4 Practice 1 2 3 Predicting Practice Reaction Type Practice Task Cards Trashketball Practice 6 Ans 7 Ans Unit Review Handout HW Net Ionic Equations Breakout (partners) Remediation	Combustion Reactions Video Notes (Video was taken down) Bozeman Review Flipped Intro Flipped Intro: Net Ionic Notes	Modeling Reactions M&M Balancing Synthesis: CaOH → $CaCO_3$	

Unit Nine: The Mole

Timeline: 2 weeks

Math for Chemistry			
DCIs	SEPs	CCCs	College Board
HS.PS.1.7.1.a, HS.PS.1.7.2.a, HS.PS.1.7.2.b	Using Mathematics and Computational Thinking	Energy and Matter	1.1, 1.2, 1.3, 1.4, 1.14, 3.6

Textbook Sections	
Zumdahl	**Prentice Hall**
3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7	10.1-10.3

Learning Targets: By the end of the unit, a student in this course should be able to...

1. I can calculate the number of atoms, molecules, ions, formula units, etc. in a sample of material using the mole concept.
2. I can define Avogadro's number as one mole equals 6.02 x 1023 particles (atoms, formula units, ions, or molecules).
3. I can define molar mass and use the periodic table to obtain or calculate the molar mass for any given substance.
4. I can complete molar conversions from moles, grams, liters, and atoms.
5. I can apply standard temperature and pressure to molar situations.
6. I can create a flowchart to understand the conversions possible using moles
7. I can calculate and compare the percent by mass of elements, the empirical formula, and the molecule formula for a compound.

College Board

1. LO 1.1 The student can justify the observation that the ratio of the masses of the constituent elements in any pure sample of that compound is always identical on the basis of the atomic molecular theory.
2. LO 1.2 The student is able to select and apply mathematical routines to mass data to identify or infer the composition of pure substances and/or mixtures.
3. LO 1.3 The student is able to select and apply mathematical relationships to mass data in order to justify a claim regarding the identity and/or estimated purity of a substance.
4. LO 1.4 The student is able to connect the number of particles, moles, mass, and volume of substances to one another, both qualitatively and quantitatively.
5. LO 1.14 The student is able to use data from mass spectrometry to identify the elements and the masses of individual atoms of a specific element.
6. LO 3.6 The student is able to use data from synthesis or decomposition of a compound to confirm the conservation of matter and the law of definite proportions.

Vocabulary

• mole • Avogadro's number	• avogadro's hypothesis • STP	• percent composition • molar volume	• representative particle • empirical formula • molar mass

Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
				Introduction: Dimensional Analysis Brownies
Dimensional Analysis Brownies	(Jan 25) Mole Concept Video: How big is a mole? AN Conversions	Molar Mass conversions MM	Expansion of gases (molar gas conversions)	Quiz: Molar Conversions
Remediation: Take Two Ticket AN VG MM Mixed Molar Con Card Enrichment: Fill my room with Packing Peanuts	Day 2	Day 3	Requiz: Follow Up Quiz	

Additional Assignments The Mole folder			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**
mixed practice Kahoot Review			Quiz Ver. 3

Unit Ten: Stoichiometry

Base Phenomenon: How do companies predict chemical yield?

<table>
<tr><th colspan="4">Stoichiometry</th></tr>
<tr><td>DCIs</td><td>SEPs</td><td>CCCs</td><td>College Board</td></tr>
<tr><td>HS.PS.1.7.1.a,
HS.PS.1.7.2.a,
HS.PS.1.7.2.b</td><td>Using Mathematics and Computational Thinking</td><td>Energy and Matter</td><td>1.19, 3.3, 3.4</td></tr>
<tr><th colspan="4">Textbook Sections</th></tr>
<tr><th colspan="2">Zumdahl</th><th colspan="2">Prentice Hall</th></tr>
<tr><td colspan="2">3.10, 3.11</td><td colspan="2">12.1-12.3</td></tr>
<tr><td colspan="4">Learning Targets: Essentials are highlighted
1. I can use a balanced chemical reaction to determine quantities before, during, and after a chemical reactions.
2. I can use molar quantities and molar ratios for chemical calculations.
3. I can perform stoichiometric calculations to determine mass and/or mole relationships between reactants and products and calculations for limiting reactants and percent yield.
College Board
1. LO 1.19 The student can design, and/or interpret data from, an experiment that uses gravimetric analysis to determine the concentration of an analyte in a solution.
2. LO 3.3 The student is able to use stoichiometric calculations to predict the results of performing a reaction in the laboratory and/or to analyze deviations from the expected results.
3. LO 3.4 The student is able to relate quantities (measured mass of substances, volumes of solutions, or volumes and pressures of gases) to identify stoichiometric relationships for a reaction, including situations involving limiting reactants and situations in which the reaction has not gone to completion.</td></tr>
<tr><th colspan="4">Vocabulary</th></tr>
<tr><td>• limiting reagent
• excess reagent</td><td>• stoichiometry
• mole ratio</td><td>• actual yield
• percent yield</td><td>• theoretical yield</td></tr>
</table>

Calendar

Pages reference Prentice Hall

Monday	Tuesday	Wednesday	Thursday	Friday
(Feb 5) 12.1 The Arithmetic of Equations PP Notes HW	Dimensional Analysis Brownies	12.2 Chemical Calculations PP Notes HW	Analysis of Baking Soda (pg 367)	Stoic Practice 1 Option 2 Key 3 4
Stoic Practice Option 5 Option 6	Quiz: 12.1-12.2	Remediation	Quiz: V2	12.3 Limiting Reagent and Percent Yield PP Notes
Limiting Reagent Practice Answers	Practice	Limiting Reagent Lab (pg 372)	Work Day	Quiz: Limiting Reagents KEY

Stoic Folder

Additional Assignments			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**
		Synthesis Lab: Magnesium Oxide Resources 1 2 3 4	

SKIPPED **Unit Eleven: Reaction Kinetics**

Time: 3 Week

Reaction Kinetics			
DCIs	SEPs	CCCs	College Board
HS.PS.1.5	Analyzing and interpreting data Using mathematics and computational thinking	Energy and Matter: Flows, Cycles, and Conservation	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9,

Textbook Sections	
Zumdahl	**Prentice Hall**
12.1-12.7 (emphasis 12.2-12.7)	18.1-18.5

Learning Targets: By the end of the unit, a student in this course should be able to…

1. Express the rate of a chemical change and identify the four factors that influence the rate of a chemical reaction.
2. explain how amounts of reactants and products change in a chemical system at equilibrium, including the impact of the three common chemical stresses.
3. use K_{eq} to determine the equilibrium position of a reaction.
4. explain the relationship between the solubility product constant and the solubility of a compound.
5. predict whether a precipitation will occur when two salt solutions are mixed.
6. identify the two characteristics of a spontaneous reaction and the two factors that determine the spontaneity of a reaction.
7. explain the role of entropy in a chemical reaction.
8. identify the Gibbs free-energy change for a spontaneous process.
9. identify the general relationship between the value of the specific rate constant, k, and the speed of the reaction.
10. explain the significance of hills and valleys in a reaction progress curve.

College Board

1. LO 4.1 The student is able to design and/or interpret the results of an experiment regarding the factors (i.e., temperature, concentration, surface area) that may influence the rate of a reaction.
2. LO 4.2 The student is able to analyze concentration vs. time data to determine the rate law for a zeroth-, first-, or second-order reaction.
3. LO 4.3 The student is able to connect the half-life of a reaction to the rate constant of a first-order reaction and justify the use of this relation in terms of the reaction being a first-order reaction.
4. LO 4.4 The student is able to connect the rate law for an elementary reaction to the frequency and success of molecular collisions, including connecting the frequency and success to the order and rate constant, respectively.
5. LO 4.5 The student is able to explain the difference between collisions that convert reactants to products and those that do not in terms of energy distributions and molecular orientation.
6. LO 4.6 The student is able to use representations of the energy profile for an elementary reaction (from the reactants, through the transition state, to the products) to make qualitative predictions regarding the relative temperature dependence of the reaction rate.
7. LO 4.7 The student is able to evaluate alternative explanations, as expressed by reaction mechanisms, to determine which are consistent with data regarding the overall rate of a reaction, and data that can be used to infer the presence of a reaction intermediate.
8. LO 4.8 The student can translate among reaction energy profile representations, particulate representations, and symbolic representations (chemical equations) of a chemical reaction occurring in the presence and absence of a catalyst.

9. LO 4.9 The student is able to explain changes in reaction rates arising from the use of acid-base catalysts, surface catalysts, or enzyme catalysts, including selecting appropriate mechanisms with or without the catalyst present.

Vocabulary			
• rate • collision theory • activation energy • activated complex • transition state • inhibitor • nonspontaneous reaction • first-order reaction	• reversible reaction • chemical equilibrium • equilibrium position • entropy • law of disorder • elementary reaction	• Le Chatelier's principle • equilibrium constant • free energy • Gibbs free-energy change • reaction mechanism	• solubility product constant • common ion • common ion effect • spontaneous reaction • rate law • specific rate law • intermediate

Calendar

References are for Prentice Hall

Monday	Tuesday	Wednesday	Thursday	Friday
(Feb 25) Inquiry Activity: Temperature and Reaction Rates (pg 540)	18.1: Rates of Reactions	Does Steel Burn? lab (pg 544)	Reaction Curve gallery walk	18.2 Reversible Reactions and Equilibrium
Practice: Equilibrium Constants	18.3 Solubility Equilibrium	Practice: K_{sp} and common ions	Quiz: 18.1-18.3	18.4 Entropy and Free Energy
Lab: Enthalpy and Entropy (pg 574)	18.5 The Progress of Chemical Reactions	Navigating Multi-step reaction curves practice	Review	Exam

Additional Assignments			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**

Unit Twelve: Solutions

Time: 2 weeks

Solutions			
DCIs	SEPs	CCCs	College Board
HS.PS.1.5, HS.PS.1.4, HS.PS.1.1, HS.PS.1.2, HS.PS.1.3, HS.PS.1.6	Developing and Using Models, Constructing Explanations and Designing Solutions	Patterns Reaction Rates Structure and Functions	1.4, 1.11, 2.1, 2.3, 2.8, 2.9, 2.11, 2.14, 2.15, 5.9, 5.10, 5.11

Textbook Sections	
Zumdahl	**Prentice Hall**
4.1, 4.2, 4.3, 10.1, 10.2, 11.1-11.8	13.2, 15.1-15.3, 16.1-16.4

Learning Targets: By the end of the unit, a student in this course should be able to...

1. (13.2.1, 13.2.2, 13.2.3, 13.2.4) I can describe and explain the nature of liquids.
2. (15.2.1-4) I can explain phenomenon based on homogeneous aqueous solutions.
3. (15.3.1-2) I can develop a method to distinguish between suspensions, colloids, substances, ionic solutions, and covalent solutions.
4. (16.1.1-3) I can describe the properties of a solution and how to make a solution with efficiency based on graphical data and best lab practices.
5. (16.2.1-2) I can describe a solution based on its molarity and I can use this molarity to form diluted or concentrated solutions, in theory and in practice.
6. (16.3.1-2) I can describe the colligative properties of a solution and make qualitative predictions of boiling points, freezing points, and given solutions of given solutions.

College Board

1. LO 1.4 The student is able to connect the number of particles, moles, mass, and volume of substances to one another, both qualitatively and quantitatively.
2. LO 1.11 The student can analyze data, based on periodicity and the properties of binary compounds, to identify patterns and generate hypotheses related to the molecular design of compounds for which data are not supplied.
3. LO 2.1 Students can predict properties of substances based on their chemical formulas, and provide explanations of their properties based on particle views.
4. LO 2.3 The student is able to use aspects of particulate models (i.e., particle spacing, motion, and forces of attraction) to reason about observed differences between solid and liquid phases and among solid and liquid materials.
5. LO 2.8 The student can draw and/or interpret representations of solutions that show the interactions between the solute and solvent.
6. LO 2.9 The student is able to create or interpret representations that link the concept of molarity with particle views of solutions.
7. LO 2.11 The student is able to explain the trends in properties and/or predict properties of samples consisting of particles with no permanent dipole on the basis of London dispersion forces.
8. LO 2.14 The student is able to apply Coulomb's Law qualitatively (including using representations) to describe the interactions of ions, and the attractions between ions and solvents to explain the factors that contribute to the solubility of ionic compounds.
9. LO 2.15 The student is able to explain observations regarding the solubility of ionic solids and molecules in water and other solvents on the basis of particle views that include intermolecular interactions and entropic effects.
10. LO 5.9 The student is able to make claims and/or predictions regarding relative magnitudes of the forces acting within collections of interacting molecules based on the distribution of electrons within the

molecules and the types of intermolecular forces through which the molecules interact.

11. LO 5.10 The student can support the claim about whether a process is a chemical or physical change (or may be classified as both) based on whether the process involves changes in intramolecular versus intermolecular interactions.
12. LO 5.11 The student is able to identify the noncovalent interactions within and between large molecules, and/or connect the shape and function of the large molecule to the presence and magnitude of these interactions.

Vocabulary			
• vaporization • evaporation • vapor pressure • boiling point • normal boiling point • unsaturated solution • concentration • freezing-point depression	• aqueous solution • solvent • solute • solvation • electrolyte • miscible • immiscible • dilute solution • boiling point elevation	• nonelectrolyte • strong electrolyte • weak electrolyte • hydrate • suspension • supersaturated solution • concentrated solution	• colloid • Tyndall effect • Brownian motion • emulsion • saturated solution • solubility • Henry's Law • molarity (M) • colligative property

Activity idea: Antacid properties link
https://drive.google.com/drive/folders/0B6ZrbqR7SC74ZExnalgyeTBncmM

Copper (II) Sulfate hydrate lab

Calendar

	The nature of liquids (13.2) Handout Homework (Both are the same) - GF - Worksheet	Homogeneous aqueous solutions (15.2) and Properties of Ionic Solutions (196-198) Handout Homework	Electrolyte? Lab Pg 199	Heterogeneous Aqueous Solutions (15.3) Handout Homework
Quiz: 13.2, 15.2, 15.3 Article Quiz Ver. 2 Quiz Analysis: V2	Properties of Solutions (16.1) Handout Homework Take Home Demo	TCT: Salt Bath Grading Rubric (Teacher) KDE Annotations Rubric KDE Samples	Calculating Concentrations and dilutions (16.2) *No %volume or %mass Handout Homework	Calculating Concentrations Gallery Walk w/ET
Making a Solution (page 497) OR Molarity Simulation PhET (HTML5) Concentration PhET	Colligative Properties of Solutions (16.3) Handout Homework Articles Optional Demo: Ice cream in a bag	Quiz: 16.1-16.3 KEY Article	Review Trashketball Review Worksheet Review Stations	KEY: Solutions Modified

Solutions folder

Unit Thirteen: Acid/Base

Time: 2.5 weeks

Acids and Bases			
DCIs	SEPs	CCCs	College Board
HS.PS.1.5, HS.PS.1.4, HS.PS.1.1, HS.PS.1.2, HS.PS.1.3	Developing and Using Models, Constructing Explanations and Designing Solutions	Patterns Reaction Rates Structure and Functions	2.2, 6.1, 6.11, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20,
Textbook Sections			
Zumdahl		**Prentice Hall**	
4.8, 14.1-14.3, 14.6-14.8, 14.11, 15.1, 15.2, 15.5		19.1-19.5	

Learning Targets: By the end of the unit, a student in this course should be able to...

1. (19.1.1-3) I can apply the Arrhenius, Bronsted-Lowry, and Lewis theories to acids and bases.
2. (19.2.1-3) I can apply my knowledge of H+ and OH- concentrations to determine if a substance is neutral, acidic, or basic, and select an appropriate indicator for the substance.
3. (19.4.1-2) I can describe the neutralization of an acid and a base based on its titration.
4. (19.5.1-2) I can describe salt hydrolysis and buffer systems.

College Board

1. LO 2.2 The student is able to explain the relative strengths of acids and bases based on molecular structure, interparticle forces, and solution equilibrium.
2. LO 6.1 The student is able to, given a set of experimental observations regarding physical, chemical, biological, or environmental processes that are reversible, construct an explanation that connects the observations to the reversibility of the underlying chemical reactions or processes
3. LO 6.11 The student can generate or use a particulate representation of an acid (strong or weak or polyprotic) and a strong base to explain the species that will have large versus small concentrations at equilibrium.
4. LO 6.14 The student can, based on the dependence of Kw on temperature, reason that neutrality requires [H+] = [OH–] as opposed to requiring pH = 7, including especially the applications to biological systems.
5. LO 6.15 The student can identify a given solution as containing a mixture of strong acids and/or bases and calculate or estimate the pH (and concentrations of all chemical species) in the resulting solution.
6. LO 6.16 The student can identify a given solution as being the solution of a monoprotic weak acid or base (including salts in which one ion is a weak acid or base), calculate the pH and concentration of all species in the solution, and/or infer the relative strengths of the weak acids or bases from given equilibrium concentrations.
7. LO 6.17 The student can, given an arbitrary mixture of weak and strong acids and bases (including polyprotic systems), determine which species will react strongly with one another (i.e., with K >1) and what species will be present in large concentrations at equilibrium.
8. LO 6.18 The student can design a buffer solution with a target pH and buffer capacity by selecting an appropriate conjugate acid-base pair and estimating the concentrations needed to achieve the desired capacity.
9. LO 6.19 The student can relate the predominant form of a chemical species involving a labile proton (i.e., protonated/deprotonated form of a weak acid) to the pH of a solution and the pKa associated with the labile proton.
10. LO 6.20 The student can identify a solution as being a buffer solution and explain the buffer mechanism in terms of the reactions that would occur on addition of acid or base.

Vocabulary

• acidic • basic • acidic solution • basic solution • hydroxide • hydronium • Arrhenius base	• Bronsted-Lowry acid • Bronsted-Lowry base • conjugate acid • conjugate base • Arrhenius acid	• amphoteric • monoprotic • diprotic acid • triprotic acid • titration • neutralization • neutral	• acid base pairs • Universal indicator solution. • strong base • strong acid • weak base • weak acid

Calendar

Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Acid-Base Theory (19.1) and pH (19.2) PP Notes HW	Indicators from Natural Sources pH Lab	Acid Base PhET	Neutralization (19.4) and Salts (19.5) PP Notes HW	Acid/Base Quiz KEY
Virtual Titration	Virtual Titration	Acid Base Vocab Bingo	Gallery Walk Key	Test: Acids KEY Article

Acid Base folder

Additional Assignments			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**
Naming Acids Naming Acids Worksheet Acids and Bases Strong vs. Weak Calculating pH		Natural Indicators Open Inquiry	Test Bank

SKIPPED Unit Fourteen: Gases

Time: 3 Week

Gases			
DCIs	SEPs	CCCs	College Board
ETS1.1, ETS1.2, ETS1.3, ETS1.4	Using mathematics and computational thinking Developing and using models	Cause and effect: Mechanism and explanation	1.3, 2.4, 2.5, 2.6, 3.4, 5.2

Textbook Sections	
Zumdahl	**Prentice Hall**
5.1-5.7	13.1, 14.1-14.4

Learning Targets: By the end of the unit, a student in this course should be able to...

1. identify the three assumptions of the kinetic theory as it applies to gases.
2. explain how KMT explains gas pressure.
3. explain the relationship between temperature and kinetic energy of the gas molecules.
4. explain why gases are easier than solids or liquids to compress.
5. identify the factors impacting gas pressure.
6. identify, explain, and apply Boyle's law, Charles' law, Gay-Lussac's law, and the combined gas law.
7. identify, explain, and apply the ideal gas law.
8. explain the limitations of the ideal gas law.
9. determine the partial pressure of gases in a mixture.
10. explain how molecular mass of a gas impacts effusion and diffusion.

College Board

1. LO 1.3 The student is able to select and apply mathematical relationships to mass data in order to justify a claim regarding the identity and/or estimated purity of a substance.
2. LO 2.4 The student is able to use KMT and concepts of intermolecular forces to make predictions about the macroscopic properties of gases, including both ideal and nonideal behaviors.
3. LO 2.5 The student is able to refine multiple representations of a sample of matter in the gas phase to accurately represent the effect of changes in macroscopic properties on the sample.
4. LO 2.6 The student can apply mathematical relationships or estimation to determine macroscopic variables for ideal gases.
5. LO 3.4 The student is able to relate quantities (measured mass of substances, volumes of solutions, or volumes and pressures of gases) to identify stoichiometric relationships for a reaction, including situations involving limiting reactants and situations in which the reaction has not gone to completion.
6. LO 5.2 The student is able to relate temperature to the motions of particles, either via particulate representations, such as drawings of particles with arrows indicating velocities, and/or via representations of average kinetic energy and distribution of kinetic energies of the particles, such as plots of the Maxwell-Boltzmann distribution.

Vocabulary

• kinetic energy • kinetic molecular theory (KMT) • gas pressure • vacuum • atmospheric pressure	• barometer • pascal (Pa) • standard atmosphere (atm) • Graham's law of effusion	• compressibility • Boyle's Law • Charles' Law • Gay-Lussac's Law • Combined gas law • ideal gas law	• ideal gas constant • partial pressure • Dalton's law of partial pressures • diffusion • effusion

Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
Inquiry Activity: Observing Gas Pressure (pg 384)	13.1 Nature of Gases	14.1 Properties of Gases	14.2 Gas Laws	Ideal Gas Law Simulation (justify the laws graphically)
Ideal Gas Law Simulation (justify the laws graphically)	Gas Law Practice	14.3 Ideal Gas Law	Carbon Dioxide from Antacid Tablet (pg 428)	Ideal Gas Law practice
The Science of Diving (430-431)	14.4 Gas Mixtures	Lab: Diffusion (pg 437)	Review	Test

Gases Folder

Additional Assignments			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**

Unit Fifteen: Thermochemistry

Thermochemistry			
DCIs	SEPs	CCCs	College Board
HS.PS.3.3, HS.PS.3.1, HS.PS.1.4.1.a.i, HS.PS.3.4	Constructing Explanations and Designing Solutions, Using Mathematics and Computational Thinking, Developing and Using Models	System and System Models Energy and Matter	2.13, 3.11, 5.3, 5.4, 5.5, 5.6

Textbook Sections	
Zumdahl	**Prentice Hall**
6.1-6.5	17.1-17.4

Learning Targets: By the end of the unit, a student in this course should be able to...

1. I can identify a reaction as endothermic or exothermic depending upon the location of the energy term in the chemical equation.
2. I can understand that “burns in air” means that the substance reacts with oxygen.
3. I can identify a reaction as exothermic or endothermic using a potential energy diagram (page 527 in Glencoe book).
4. I can identify a reaction as exothermic or endothermic when given a value of change in enthalpy (delta H).
5. I can understand that all chemical reactions either produce energy (exothermic) or absorb energy (endothermic) as a result of the breaking and making of chemical bonds.
6. I can use the equation q = mc(Tf-Ti) to calculate the heat, mass, specific heat, or change in temperature of a substance when given the other three variables.
7. I can determine if the reaction is endothermic or exothermic based on the sign (+/-) of “q”.
8. I can explain how a calorimeter is used to measure the specific heat of a metal.
9. I can predict if the energy is flowing from system to surroundings (exothermic) or surroundings to system (endothermic).
10. I can explain the difference between heat and temperature.

College Board

1. LO 2.13 The student is able to describe the relationships between the structural features of polar molecules and the forces of attraction between the particles.
2. LO 3.11 The student is able to interpret observations regarding macroscopic energy changes associated with a reaction or process to generate a relevant symbolic and/or graphical representation of the energy changes.
3. LO 5.3 The student can generate explanations or make predictions about the transfer of thermal energy between systems based on this transfer being due to a kinetic energy transfer between systems arising from molecular collisions.
4. LO 5.4 The student is able to use conservation of energy to relate the magnitudes of the energy changes occurring in two or more interacting systems, including identification of the systems, the type (heat versus work), or the direction of energy flow.
5. LO 5.5 The student is able to use conservation of energy to relate the magnitudes of the energy changes when two nonreacting substances are mixed or brought into contact with one another.
6. LO 5.6 The student is able to use calculations or estimations to relate energy changes associated with heating/cooling a substance to the heat capacity, relate energy changes associated with a phase transition to the enthalpy of fusion/vaporization, relate energy changes associated with a chemical reaction to the enthalpy of the reaction, and relate energy changes to $P\Delta V$ work.

Vocabulary

• calorimetry • calorimeter • chemical potential energy • endothermic process • enthalpy • exothermic process	• heat of reaction • law of conservation of energy • molar heat of condensation • molar heat of fusion	• molar heat of vaporization • specific heat • surrounding • system • thermochemical equation • thermochemistry	• heat • heat capacity • heat of combustion • molar heat of solidification • molar heat of solution

Endo/Exo Lab: Students will be given five white salts. They will measure the temperature changes for each salt and calculate the heat given or absorbed off by each salt. Then, the student will identify an unknown salt.

Calendar

Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
9 Flow of Energy PP Notes In class practice HW	10 BW Thermo Lab	11 Thermo Stations Shortened Stations (same questions)	12 Task Cards OR Worksheet (Same questions)	13 Thermo Exo/Endo Quiz
16 Calorimetry PP Notes	17 Enthalpy Worksheet Or Stations (Limited Internet)	18 BW The Energy of Food Lab	19 Finish the energy lab (Limited Internet)	20 Enthalpy Quiz KEY (Limited Internet)
Thermo Sim				

Thermo folder

Additional Assignments			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**

Unit Sixteen: Nuclear Chemistry

<table>
<tr><th colspan="4">Nuclear Reactions</th></tr>
<tr><td>DCIs</td><td>SEPs</td><td>CCCs</td><td>College Board</td></tr>
<tr><td>HS.PS.1.8</td><td>Developing and Using Models</td><td>Patterns
Scale, Proportion, and Quantity
Cause and Effect</td><td>4.3</td></tr>
<tr><th colspan="4">Textbook Sections</th></tr>
<tr><th colspan="2">Zumdahl</th><th colspan="2">Prentice Hall</th></tr>
<tr><td colspan="2">19.1-19.7</td><td colspan="2">25.1-25.4</td></tr>
<tr><td colspan="4">Learning Targets: By the end of the unit, a student in this course should be able to...
1. I can recognize isotopes of an element given number of subatomic particles, mass number, or shorthand notation.
2. I can calculate the atomic mass number given percent abundance of naturally occurring isotopes.
3. I can describe the radioactive decay process.
4. I can compare and contrast alpha, beta, and gamma radiation.
5. I can compare and contrast fission and fusion reactions.
6. I can write balanced alpha, beta, positron, and electron capture decay reactions.
7. I can calculate half-life problems using an equation and logical thinking.
College Board
1. LO 4.3 The student is able to connect the half-life of a reaction to the rate constant of a first-order reaction and justify the use of this relation in terms of the reaction being a first-order reaction.</td></tr>
<tr><th colspan="4">Vocabulary</th></tr>
<tr><td>• alpha particle
• beta particle
• fission
• fusion</td><td>• gamma ray
• half-life
• neutron absorption</td><td>• positron
• neutron moderation</td><td>• radiation
• radioactivity
• radioisotopes</td></tr>
</table>

Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
Types of Nuclear Radiation PP Notes HW Practice	Half-Life: It's About Flippin' Time! Lab	Nuclear Fission and Fusion Chapter Tour OR PP Notes	Pros: Nuclear Power Make A Websquest (PreAP)	 Test

Nuclear folder

Additional Assignments			
Activities/Worksheets	**Notes**	**Labs**	**Quizzes/Tests**
			Fission/Fusion Quiz KEY

End of Year Review and Final Exam with Topics

Print Review

Digital Review

Mock Final Exam Annotated Key

Final Exam

Standards Check-In

Final Review: (Standards are aligned for standard chem, but it’s the same content typically.)

- Math for Chemistry
- Acid/Base and Solutions
- Chemical Reactions
- Nuclear Reactions

Chemistry Articles on NewsELA

Unit	Topic	Articles
One	Review: Parts of the Atom and Safety	Science writer,
	Periodic Table and Trends	Periodic Table History, History of Chemistry,
	Properties of Matter	Mars: The Red Planet, Senses,
Two	Formulas and Naming	forensic chemist,
	Balancing Equations	Reaction Type: Oxidation,
Three	Math for Chemistry: Sig Figs, Density, % Error	Space Mining,
	Unit and Mole Conversions	Calculating GPA, "limiting" the common cold
Midterm		
Four	Reactions in Solution (including Acid/Base)	Properties of water, water cycle,
	Covalent Structures	What is carbon?, crystals: snowflake,
Five	Nuclear Reactions	Marie Curie, radiation,
	Thermochemistry	thermometers, thermal systems engineer, the sun
Six	Light and Waves	Bioluminescence, electricity experiments,
	Gases	Atmospheric Chemist,