Chemistry Year-at-a-Glance Calendar

Hi! If you're reading this, this document is a jolly right MESS: I'm realigning the course to the evidence statements and PEs for NGSS Chemistry. This gonna be kinda sloppy for a few weeks. But, don't fret! If you want the old year at a glance, I can still send you a copy. But, just fair warning: this document's gonna be a little crazy until I get it finished. My year ends 5/17, so expect some new stuff soon. 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

Coming Soon (Okay, so soon-ISH) Supply lists for each unit with links! :D
Hey Linda! Add vocab activities. :)
OLD Version Here Want PreAP? here Template: here AP Physics 1 here OAIM here

Week	Topic	Week	Topic	Week	Topic	Week	Topic
1	Unit Zero: Intro to Science	10	Unit Two: Chemical Reactivity	19	Unit Five: Reaction Kinetics	28	Unit Seven: Stoichiometry
2	Unit Zero: Intro to Science	11	Unit Three: Properties of Matter	20	Unit Five: Reaction Kinetics	29	Unit Eight: Nuclear
3	Unit Zero: Intro to Science	12	Unit Three: Properties of Matter	21	Unit Five: Reaction Kinetics	30	Unit Eight: Nuclear
4	Unit One: Periodic Table and Trends	13	Unit Three: Properties of Matter	22	Unit Six: Equilibrium	31	Unit Eight: Nuclear
5	Unit One: Periodic Table and Trends	14	Unit Four: Thermo-chemistry	23	Unit Six: Equilibrium	32	Unit Nine: Light and Waves
6	Unit One: Periodic Table and Trends	15	Unit Four: Thermo-chemistry	24	Unit Six: Equilibrium	33	Unit Nine: Light and Waves
7	Unit Two: Chemical Reactivity	16	Unit Four: Thermo-chemistry	25	Unit Seven: Stoichiometry	34	Unit Nine: Light and Waves
8	Unit Two: Chemical Reactivity	17	(wiggle)	26	Unit Seven: Stoichiometry	35	(wiggle)
9	(wiggle)	18	(wiggle)	27	(wiggle)	36	(wiggle)

Bite-size NGSS Lesson Template: NGSS Investigations
Mapped Articles for NewsELA
ACT Science Practice:

https://docs.google.com/document/d/11iw44HSSCN2PjFX7mQSsuXVzgi1vxzXR-2Fnonw_H0I/
My Learner Improvement Plan (for students)

Chemistry Articles on NewsELA

(I'm gonna leave this here and pretend that I still use NewsELA… I hate this site, but my school wants us to use it…)

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

Wiggle Days

I have an issue: every year, I have about 30 days of "wiggle" built into my schedule. And every year, I end up using FAR more time than I intended. And, by the end of the year, I don't know where it all went! So, this year, I'm making a modification. I'm going to track when I add a wiggle day to a unit and why. I need to see if it's systemic (school related issues) or personal (I'm sick) or professional (a topic is taking a long time or I'm not anticipating remediation).

Day	**1**	**2**	**3**	**4**	**5**
Reason					
Systemic **Personal** **Professional**					
Day	**6**	**7**	**8**	**9**	**10**
Reason					
Systemic **Personal** **Professional**					
Day	**11**	**12**	**13**	**14**	**15**
Reason					
Systemic **Personal** **Professional**					
Day	**16**	**17**	**18**	**19**	**20**
Reason					
Systemic **Personal** **Professional**					
Day	**21**	**22**	**23**	**24**	**25**
Reason					
Systemic **Personal** **Professional**					
Day	**26**	**27**	**28**	**29**	**30**
Reason					
Systemic **Personal** **Professional**					

Unit Zero: Introduction to Science

DCIs	SEPs	CCCs

Standards

1. I can describe chemistry in a general sense.
2. I can identify the five areas of chemistry.
3. I can explain why the study of chemistry is important.
4. I can work in a lab setting following published safety guidelines.
5. I can use the steps of the scientific method to develop an experiment using the OAIM (Object, Action, Instrument, Measurement) method.
6. I can write a procedure, materials list, and data table.
7. I can evaluate the accuracy and precision of data sets.
8. I can evaluate and explain error sources within the lab.
9. I can address error sources within the lab.
10. I can identify limitations of an experiment.
11. I can explain what data is provided by different measurements and what data is NOT provided.
12. I can refine my experiment to produce more accurate, precise, and useful data.
13. I can answer a proposed question with experimental data using CER (Claim, Evidence, Reasoning).
14. Complete a lab write up using the Four Corner method.

Vocabulary to Know			

Notes	Worksheets/ Activities	Simulations	Labs	Quizzes/Test	Other
Accuracy v. Precision PP Handout HW	Density: A Mystery KEY	Density Simulation	Bubbles Lab (pg 23) Drops on a Penny Lab Density of a Penny Prelab Density of Water	Quiz: Precision vs. Accuracy and Density	

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		Day One: What is density? Density PhET
7		(Goes in notebook after grading) (I do) Day Two: Density of Known Objects (reg solids) Focus: Writing a procedure, materials list, and data table
8		(Goes in notebook after grading) (We do) Day Three: Density of Known Objects (irr solids) Focus: Writing a procedure, materials list, and data table
9		(Goes in notebook after grading) Day Four: (You Do) Density of Known Objects (liquids) Focus: Writing a procedure, materials list, and data table
10		Work Day
11		Quiz: Density Activity
12		Day Six: Identification of an Unknown Solid Focus: Conclusions (CER)

13		Day Seven: Temperature and Density of Liquids Focus: Conclusions (CER)
14		Work Day
15		Lab Report Quiz Grading Rubric

CER Rubric

WIN Activities

Day 1	Day 2	Day 3	Day 4
Safety Rem			

Unit One: Periodic Table and Trends
Tracking Sheet

DCIs	SEPs	CCCs
HS.PS.1-1	Developing and Using Models	Patterns Scale, Proportion, and Quantity

NGSS Standards with "I can" statements:

HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

(HS-PS1-1.1.a.i) (HS-PS1-1.2.a.ii) Using the periodic table, students can identify and describe the elements and their arrangement in the periodic table. [Note: Students are not expected to MEMORIZE the elements.]

1.1. Given clues about an element, I can identify it on the periodic table.
1.2. I can explain that the periodic table is arranged in periods and groups/families by atomic number (protons).
1.3. I can explain the significance of the information on the periodic table (number, name, symbol, average atomic mass).

(HS-PS1-1.1.a.ii) Students can identify and describe the charge, size, and location within an atom of the proton, neutron, and electron.

1.4. Using the bohr or quantum model, I can identify the location of the proton, neutron, and electron, their mass, and their charge. I can mathematically express these values as well.

(HS-PS1-1.1.a.iii) Students can identify and describe the valence shell of an atom.

1.5. I can define the shells of an atom, as well as the valence shells.
1.6. I can explain that the valence shell is the outermost shell.
1.7. I can explain that these are the bonding electrons.
1.8. I can draw the Lewis structure of a neutral atom.

(HS-PS1-1.1.a.iv) Students can identify and describe the number of protons, neutrons, and electrons within an atom.

1.9. For a given atom, I can identify in a model and calculate the number of protons, neutrons, electrons.

(HS-PS1-1.2.a.i) Students identify and describe how the arrangement of the main groups of the periodic table reflects the patterns of outermost electrons.

1.10. I can identify the valence electron pattern.
1.11. I can rank atoms based on the valence electron pattern.
1.12. I can predict the number of valence electrons based on its location on the periodic table.

(HS-PS1-1.3.a, HS-PS1-1.3.b.iii) Students use the periodic table to predict the reactivity of an atom based on its charge and its valence electrons. (HS-PS1-2.3.b) Students can justify with evidence and reasoning the causal relationship between the observable reactivity of elements in the periodic table and the patterns of outermost electrons for each atom and its relative electronegativity.

1.13. I can identify the reactivity pattern.
1.14. I can rank atoms based on the reactivity pattern.
1.15. I can predict the reactivity of an atom based on its location on the periodic table.
1.16. I can explain how valence electrons relate to reactivity.
1.17. I can explain how valence electrons relate to charge.

1.18. I can explain how charge relates to reactivity.

(HS-PS1-1.3.b.i) Students use the periodic table to predict the number and types of bonds formed (i.e. ionic, covalent, metallic) by an element and between elements.

1.19. I can define the three types of bonds (ionic, covalent, and metallic) and can identify the three types of bonds.

1.20. I can identify what types of bond an element is likely to form based on its location on the periodic table.

1.21. I can identify the number of bonds likely formed by an atom based on its location on the periodic table.

(HS-PS1-1.3.b.ii) Students use the periodic table to predict the number and charges in stable ions that form from atoms in a group of the periodic table.

1.22. I can identify the likely charges formed by atoms based on their valence electrons.

1.23. I can predict whether an atom would be stable or not at a given charge.

(HS-PS1-1.3.b.iii) Students use the periodic table to predict the trend in electronegativity of atoms down a group, and across a row in the periodic table, based on attractions of outermost (valence) electrons to the nucleus.

1.24. I can identify the electronegativity pattern.

1.25. I can rank atoms based on the electronegativity pattern.

1.26. I can predict the electronegativity of an atom based on its location on the periodic table.

1.27. I can explain how valence electrons impact electronegativity .

(HS-PS1-1.3.b.iv) Students use the periodic table to predict the relative sizes of atoms both across a row and down a group in the periodic table.

1.28. I can identify the atomic size pattern.

1.29. I can rank atoms based on the atomic size pattern.

1.30. I can predict the atomic size of an atom based on its location on the periodic table.

Vocabulary to Know

• atom • nucleus • atomic number • atomic mass • periodic law • metal • nonmetal • metalloid • ionization energy • electronegativity	• mass number • periodic table • Bohr Atom • alkali metal • alkaline earth metal • halogens • noble gases	• electron • neutron • isotope • period • transition metals • inner transition metals • atomic radius	• cathode ray • proton • atomic mass unit (amu) • group • ion • cation • anion • representative elements

Activity Schedule

Day	Standards Covered	Activity **Daily Bellwork Slides**
1	1, 2, 4	Prep Time U1 Student Tracking Sheet Notes 1.1, 1.2, 1.4 HW 1, 2, 4
2	1, 2, 4	**Build An Atom**
3	1, 2, 4	**Build An Atom** (day 2)
4	1, 2, 4	Quiz: 1.1, 1.2, 1.4
5	3, 5, 7, 8	Notes: 1.5, 1.3, 1.8, 1.7 HW 5, 3, 8, 7
6	3, 5, 7, 8	Cereal Ion Formation Source idea
7	3, 5, 7, 8	Loopy Lewis Structures
8	3, 5, 7, 8	Quiz: 1.5, 1.3, 1.8, 1.7
9	6, 9, 10	Notes: 1.6, 1.9, 1.10 HW 6, 9, 10
10	6, 9, 10	Color Me Periodic **PP: Families of the Periodic Table**
11	6, 9, 10	**Activity: Modeling Trends**
12	6, 9, 10	Graphing Trends
13	6, 9, 10	TCT: Periodic Trends Rubric and Quiz: 1.6, 1.9, 1.10
14	-all-	Remediation/Work Day
15	-all-	Test: Unit One

WIN Activities

Day 1	Day 2	Day 3	Day 4

Additional Items

Notes	**Worksheets/ Activities**	**Simulations**	**Labs**	**Quizzes/Test**	**Other**
Distinguishing Amongst Atoms Periodic Trends Notes Create a chart on Location, Mass, Charge **Review** **KEY** Background: How do ions form? Notes	Kahoot Jumble: Periodic Table and Trends	Isotope Mass and Atomic Mass	Periodic Table of Aliens	Pretest: PEN Count and Periodic Table Quiz 1 Quiz 2 Table and Trends Quiz on GC Quiz: Periodic Trends and Table (1-11) (note: that's front and back each on a separate page) KEY Test KEY	Take Two Ticket

Unit Two: Chemical Reactivity and Application of Trends   Timeline: 3 weeks

Naming and Writing Chemical Formulas			
DCIs	SEPs	CCCs	Textbook
HS.PS.1.2	Developing and Using Models, Constructing Explanations and Designing Solutions	Structure and Functions	

HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

1. (HS-PS1-2.1.a.i) (HS-PS1-2.2.a.ii) The student can use the law of conservation of matter to explain the outcome of a reaction. For a given reaction, student can prove that the law of conservation of matter is true.
    - 1.1. I can define the law of conservation of matter.
    - 1.2. I can explain how the law of conservation of matter is observed in reactions, even when it is not obvious (such as when the solid mass of reactants does not equal the solid mass of products).
2. (HS-PS1-2.1.a.ii) For a reaction, the student can explain the numbers and types of bonds (i.e., ionic, covalent) that each atom forms, based on valence electrons and/or electronegativity values.
    - 2.1. I can describe the original bonds of the reactants.
    - 2.2. I can write the chemical formula for reactants and products.
    - 2.3. I can identify which bonds change during the reaction.
    - 2.4. I can explain which bonds are formed for each reaction.
    - 2.5. I can explain WHY bonds were broken/reformed for the reaction.
    - 2.6. I can predict bond types based on electronegativity data.
    - 2.7. I can predict bond types based on valence electrons.
3. (HS-PS1-2.1.a.iii) For a reaction, the student can explain that the valence electrons of an atom are based on its location on the periodic table, not on its location as a product or reactant. (HS-PS1-2.2.a.i) Students can identify and describe the products and reactants of a chemical reaction, including their chemical formulas and the arrangement of their outermost (valence) electrons [Lewis structure].
    - 3.1. I can define the valence electron pattern.
    - 3.2. If given the argument that valence electrons are based on its location as a product or reactant, I could refute this.
    - 3.3. I can draw Lewis structures for reactants and products.
    - 3.4. I can explain the change in valence electrons between the reactants and the products.
4. (HS-PS1-2.1.a.iv) For a reaction, the student can predict the type of reaction that will take place.
    - 4.1. I can identify and define single replacement, double replacement, synthesis, combustion, decomposition, and acid/base reactions.
5. (HS-PS1-2.2.a.iii) For a given reaction, student can prove that the numbers and types of bonds (i.e., ionic, covalent) in both the reactants and the products remains constant.
    - 5.1. I can identify the starting bond types for compounds in a chemical reaction.
    - 5.2. I can identify the bond types of products in a reaction.
    - 5.3. I can justify the formation of bonds within the reaction.
6. (HS-PS1-2.2.a.iv) For a given reaction, students can use periodic trends (HS-PS1-1) to explain the products formed by the reactants. (HS-PS1-2.2.a.v) For a given reaction, students can explain that the

outermost (valence) electron configuration and the relative electronegativity of the atoms that make up both the reactants and the products of the reaction are based on their position in the periodic table. (Show that the reaction creates products with a more favorable electronegativity than the reactants.)

6.1. I can use the electronegativity trend to explain which products would be formed.
6.2. I can use the valence electron trend to explain which products would be formed.
6.3. I can apply electronegativity data to predict the most favorable products.

7. (HS-PS1-2.3.a) Students can justify with evidence and reasoning that the formats for the reaction types are constant (they will not change over time).
    7.1. I can identify the formats of the six reaction types.
    7.2. I can predict the products of each type of reaction.
    7.3. I can justify with experimental means that the formats are constant.
8. (HS-PS1-2.4.a) Given new evidence or context, students construct a revised or expanded explanation about the outcome of a chemical reaction and justify the revision.
    8.1. I can construct a revised or expanded explanation about the outcome of a chemical reaction and justify the revision. This would include explaining anomalies in products that are not obvious (example: loss of gas affecting mass, saying another product is present).
9. (HS-PS1-7.1.a.iii) The student can identify and describe, mathematically, the use of balanced chemical equation to find molar quantities of a reaction.
    9.1. I can balance a chemical equation.
    9.2. I can describe the quantities of reactants and products needed in terms of moles using a balanced chemical equation.

Vocabulary to Know			
• valence electron • electron dot structure • octet rule • chemical equation • skeleton equation • catalyst • coefficient	• ionic compounds • ionic bonds • chemical formula • formula unit • balanced equation • double replacement reaction	• monatomic ion • polyatomic ion • single replacement reaction • combination reaction	• list of polyatomic ions • combustion reaction • decomposition reaction

Additional Items

Notes	**Worksheets/ Activities**	**Simulations**	**Labs**	**Quizzes/Test**	**Other**
Binary video practice binary ionic compounds practice BW: Copy Ion Sheet on PT:Pg R54 DHMO Article and worksheet Flipped Intro Due EdPuzzles 1 2 3	Mixed Naming Egg Hunt Station Rotation: Naming BW Balancing Equations: Trashketball Binary Bingo HW: Transition Metal *Kahoot: Binary with Transitions* Whiteboard Practice HW: Polyatomics *Color Hop* *Mixed Ionic Naming* OR: Chemical Formula TicTacToe Unit Review Individual Review	ChemThink Independent Practice	Balancing Equations: Marbles Predicting Results: Single Replacements Lab Predicting Results: Activity	Quiz: Math for Chemistry Review #1 Quiz: Background to ions (Retest) KEY Quiz: Binary Paper version #2 Quiz: Formation, Binary (simple and trans) Test: Mixed Naming *Paper Version* Balancing Equations: Quiz Remediation: 1 KEY 2 KEY KEY Pop Quiz V2 Quiz: Predicting and Balancing **Unit Exam** **Standard**	Remediation Enrich: Flip on Trans Enrichment: Covalent Bonding Self Paced Remediation (based on Q#3) Naming Ionic Formulas Escape Room

Activity Schedule

Day	Standards Covered	Activity
1	**2.1, 2.11**	Prep/ Notes:Balancing Equations PP Handout (2.1) HW (2.11)HW
2		Review HW from previous day -Cover diatomic atoms (starts at 7, makes a seven, points to the 7th “1”) -Explain that a chemical amount is a mole. -Identify (g), (l), (s), and (aq) Balancing Equations: PhET HW (same as day 2)
3		Finish PhET
4		Quiz: 2.1, 2.11
5		Notes: 2.2, 2.3 Polyatomic ion chart
6		Formula Boards
7		Chemical Reactions with VE Gallery Walk
8		Quiz: 2.2, 2.3
9		Notes: 2.4, 2.9, 2.7, 2.8 PP *HW*
10		Racing Reactions (Two Days)
11		Racing Reactions (Two Days)
12		Predicting Results: Double Replacements Lab
13		Quiz: 2.4, 2.9, 2.7, 2.8
14		Remediation/Work Day
15		Test

WIN Activities

Day 1	Day 2	Day 3	Day 4

Unit Three: Properties of Matter Timeline: 3 weeks

Properties of Matter		
DCIs	SEPs	CCCs
HS.PS.1.3	Planning and Carrying Out Investigations	Patterns

Learning Targets

1. (HS-PS1-3.1.a) Students can explain the relation between a measurable property (e.g., melting point, boiling point, vapor pressure, surface tension) and the intermolecular forces of a substance.
   - 1.1. I can identify and describe the different types of intermolecular forces.
   - 1.2. I can define melting point, boiling point, vapor pressure, and surface tension.
   - 1.3. I can relate the measurable property to the IMF.
2. (HS-PS1-3.2.a) (HS-PS1-3.3.a.i-ii) (HS-PS1-3.4.a) Students can create and conduct an experiment in which they determine the relation between a measurable property (e.g., melting point, boiling point, vapor pressure, surface tension) and the intermolecular forces of a substance. For the investigation, the students will include a background explaining why this comparison will be used and a relevant procedure, materials, and data section.
   - 2.1. I know how to measure a causal relationship.
   - 2.2. I know how to measure boiling point, melting point, vapor pressure, and surface tension.
   - 2.3. I can create and describe a graphical relationship of each measurable property vs. IMF.
   - 2.4. I can explain why this comparison of property to IMF will be used.
3. (HS-PS1-3.2.b.i) Students describe how the data about the measurable property (e.g., melting point, boiling point, vapor pressure, surface tension) is related to the Kinetic Molecular Theory and the spacing of the particles of the chosen substances can change as a result of the experimental procedure even if the identity of the particles does not change (e.g., when water is boiled the molecules are still present but further apart).
   - 3.1. I can describe Kinetic Molecular Theory (KMT).
   - 3.2. I can explain how KMT impacts measurable properties.
   - 3.3. I can explain how data collected in the experiment is related to KMT.
   - 3.4. I can explain how KMT is related to the spacing of molecules/particles.
4. (HS-PS1-3.2.b.ii) Students describe how the data about the measurable property (e.g., melting point, boiling point, vapor pressure, surface tension) is related to the Kinetic Molecular Theory and thermal (kinetic) energy has an effect on the ability of the electrical attraction between particles to keep the particles close together. Thus, as more energy is added to the system, the forces of attraction between the particles can no longer keep the particles close together.
   - 4.1. I can explain how KMT is related to thermal and kinetic energy.
   - 4.2. I can explain how kinetic energy and thermal energy is related to electrical attraction.
   - 4.3. I can explain how added energy can impact the forces of attraction.
5. (HS-PS1-3.2.b.iii) Students describe how the data about the measurable property (e.g., melting point, boiling point, vapor pressure, surface tension) is related to the Kinetic Molecular Theory and the patterns of interactions between particles at the molecular scale are reflected in the patterns of behavior at the macroscopic scale.
   - 5.1. I can describe how KMT is related to molecular interactions.
   - 5.2. I can explain how KMT is observable at the macroscopic level.

6. (HS-PS1-3.2.b.iv) Students describe how the data about the measurable property (e.g., melting point, boiling point, vapor pressure, surface tension) is related to the Kinetic Molecular Theory and together, patterns observed at multiple scales can provide evidence of the causal relationships between the strength of the electrical forces between particles and the structure of substances at the bulk scale. 6.1. I can explain how KMT is related to the strength of electric forces at the bulk level.

Vocabulary to Know			
● 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

Additional Items

Notes	**Worksheets/ Activities**	**Simulations**	**Labs**	**Quizzes/Test**	**Other**

Activity Schedule

Day	Standards Covered	Activity
1		Properties of Matter Notes Day 1 Day 2 Homework Paper Version
2		Finish Properties of Matter notes
3		OAIM: Seperation of a Mixture (2 days)
4		OAIM: Seperation of a Mixture (2 days)
5	**1**	Intra- and Intermolecular Forces Notes Handout HW Additional Practice: 1 2
6		IMF Scavenger Hunt
7	**2**	Lab: Melting Point of Ionic vs. Covalent Compounds
8	**2**	OAIM: Surface Tension of Liquids
9	**3, 4, 5, 6**	Quiz: 1, 2
10		Kinetic Molecular Theory Notes
11		Use KMT to justify the melting point lab
12		Use KMT to justify the boiling point lab
13		Quiz: 3, 4, 5, 6
14		Remediation/Work Day
15		Test (weighted to 100 pts)

Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
	Finish Notes	(2, 3, 6, 10) White Powder Lab	(3, 4) Oobleck Lab (Version 2: Guided) Prop. HW Due	BW: Properties of Matter Pin-Up Oobleck Lab (Day 2)
(1, 8) Tie Dye Chromatography Lab OR (no shirt) Chromatography Simulation	(1-10) Forms Quiz: Properties of Matter *Less than a 70% must re-quiz* Paper Version with key (Heads up: it's the EXACT same)	(Whole Class) Wrong Answer Analysis: Properties of Matter Quiz	(1, 2, 3, 6, 7, 8) Properties of Matter Separation and Identification HW: Review Trashketball	(1, 8) Properties of Matter Separation and Identification Rubric Plan procedure
Separation Lab Con't Write Procedure in OAIM	Separation Lab Con't Do Lab	Separation Lab Con't Type it up.	Unit Review	**(1-10) Unit Exam** **KEY** **Notebook Check**

Unit Four: Thermochemistry Timeline: 3 weeks

Thermochemistry			
DCIs	SEPs	CCCs	
HS.PS.3.3, HS.PS.3.1, HS.PS.1.4.1.a.i	Constructing Explanations and Designing Solutions, Using Mathematics and Computational Thinking, Developing and Using Models	System and System Models Energy and Matter	

HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

1. (HS-PS1-4.1.a.i-vi) Students create an evidence based model of the laws of thermodynamics, in which they identify and describe the relevant components, including: The chemical reaction, the system, and the surroundings under study; the bonds that are broken during the course of the reaction; the bonds that are formed during the course of the reaction; the energy transfer between the systems and their components or the system and surroundings; the transformation of potential energy from the chemical system interactions to kinetic energy in the surroundings (or vice versa) by molecular collisions; and the relative potential energies of the reactants and the products.
   - 1.1. For a chemical reaction, I can identify and define the system and the surrounding.
   - 1.2. For a chemical reaction, I can identify the bonds that are broken during the course of the reaction.
   - 1.3. For a chemical reaction, I can identify the bonds that are formed during the course of the reaction.
   - 1.4. For a chemical reaction, I can identify the energy transfer between the systems and their components or the system and surroundings
   - 1.5. For a chemical reaction, I can identify the transformation of potential energy from the chemical system interactions to kinetic energy in the surroundings (or vice versa) by molecular collisions.
   - 1.6. For a chemical reaction, I can identify the relative potential energies of the reactants and the products.
2. (HS-PS1-4.2.a.i) In the model, students include and describe the net change of energy within the system and explains that this is the result of bonds that are broken and formed during the reaction (Note: This does not include calculating the total bond energy changes.)
   - 2.1. I can identify the energy of the reactants and products.
   - 2.2. If given a set of energies for the reactants and products, I could explain where the changes in energies came from.
3. (HS-PS1-4.2.a.ii) In the model, students include and describe the energy transfer between system and surroundings by molecular collisions.
   - 3.1. I can describe the energy transfer between system and surroundings by molecular collisions.
4. (HS-PS1-4.2.a.iii) In the model, students include and describe that the total energy change of the chemical reaction system is matched by an equal but opposite change of energy in the surroundings (Note: This does not include calculating the total bond energy changes.)
   - 4.1. I can explain that the total energy change of the chemical reaction system is matched by an equal but opposite change of energy in the surroundings.

5. (HS-PS1-4.2.a.iv) In the model, students include and describe the release or absorption of energy and that it depends on whether the relative potential energies of the reactants and products decrease or increase.
    5.1. I can describe the release or absorption of energy as endothermic or exothermic.
    5.2. I can explain that the change in energy depends on whether the relative potential energies of the reactants and products decrease or increase.
6. (HS-PS1-4.3.a.i) Using the model, students can show that the energy change within the system is accounted for by the change in the bond energies of the reactants and products. (Note: This does not include calculating the total bond energy changes.)
    6.1. I can prove that the energy change within the system is accounted for by the change in the bond energies of the reactants and products.
7. (HS-PS1-4.3.a.ii) Using the model, students can show that the breaking bonds requires an input of energy from the system or surroundings, and forming bonds releases energy to the system and the surroundings.
    7.1. I can explain that the breaking bonds requires an input of energy from the system or surroundings, and forming bonds releases energy to the system and the surroundings.
8. (HS-PS1-4.3.a.iii) Using the model, students can show that the energy transfer between systems and surroundings is the difference in energy between the bond energies of the reactants and the products.
    8.1. I can prove that the energy transfer between systems and surroundings is the difference in energy between the bond energies of the reactants and the products.
9. (HS-PS1-4.3.a.iv) Using the model, students can show that the overall energy of the system and surroundings is unchanged (conserved) during the reaction.
    9.1. I can prove that the overall energy of the system and surroundings is unchanged (conserved) during the reaction.
10. (HS-PS1-4.3.a.v) Using the model, students can show that the energy transfer occurs during molecular collisions.
    10.1. I can explain that the energy transfer occurs during molecular collisions.
11. (HS-PS1-4.3.a.vi) Using the model, students can show that the relative total potential energies of the reactants and products can be accounted for by the changes in bond energy
    11.1. I can explain that the relative total potential energies of the reactants and products can be accounted for by the changes in bond energy.

Vocabulary to Know			
• 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.

Additional Items

Notes	Worksheets/ Activities	Simulations	Labs	Quizzes/Test	Other

Activity Schedule

Day	Standards Covered	Activity
1		Flow of Energy PP Notes In class practice HW
2		BW Thermo Lab
3		Thermo Stations OR Shortened Stations (same questions)
4		Task Cards OR Worksheet (Same questions)
5		Thermo Exo/Endo Quiz Version 2
6		Calorimetry PP Notes
7		Enthalpy Worksheet Or Stations (Limited Internet)
8		BW The Energy of Food Lab
9		(finish lab)
10		Enthalpy Quiz KEY
11		
12		
13		
14		Remediation/Work Day
15		Test

Thermo Sim				

Unit Five: Reaction Kinetics

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	

HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

1. (HS-PS1-5.1.a.i-ii) Students construct an explanation that includes the idea that as the kinetic energy of colliding particles increases and the number of collisions increases, the reaction rate increases. Their explanation includes evidence of a pattern that increases in the molarity and/or temperature of reactants will lead to an increase in the reaction rate.
   - 1.1. I can define kinetic energy.
   - 1.2. I can define collision theory.
   - 1.3. I can explain how the kinetic energy of a particle impacts the number of collision and visa versa.
   - 1.4. I can define molarity and calculate molarity.
   - 1.5. I can design a solution and identify the parts of the solution, including the solute and the solvent.
   - 1.6. I can explain how the molarity of a solution will impact the reaction rate.
   - 1.7. I can explain how the temperature of a solution will impact the reaction rate.
2. (HS-PS1-5.2.a.i-v) When students describe changes of reaction rates, they can use and describe the following chain of reasoning and integrate evidence, facts, and scientific principles to construct a logical explanation: Molecules that collide can break bonds and form new bonds, producing new molecules; The probability of bonds breaking in the collision depends on the kinetic energy of the collision being sufficient to break the bond, since bond breaking requires energy; since temperature is a measure of average kinetic energy, a higher temperature means that molecular collisions will, on average, be more likely to break bonds and form new bonds; At a fixed concentration, molecules that are moving faster also collide more frequently, so molecules with higher kinetic energy are likely to collide more often; a high concentration means that there are more molecules in a given volume and thus more particle collisions per unit of time at the same temperature.
   - 2.1. I can explain that molecules that collide can break bonds and form new bonds, producing new molecules.
   - 2.2. I can explain that the probability of bonds breaking in the collision depends on the kinetic energy of the collision being sufficient to break the bond, since bond breaking requires energy.
   - 2.3. I can explain that since temperature is a measure of average kinetic energy, a higher temperature means that molecular collisions will, on average, be more likely to break bonds and form new bonds.
   - 2.4. I can explain that at a fixed concentration, molecules that are moving faster also collide more frequently, so molecules with higher kinetic energy are likely to collide more often.

2.5.	I can explain that a high concentration means that there are more molecules in a given volume and thus more particle collisions per unit of time at the same temperature.

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

Activity Schedule

Day	Standards Covered	Activity
1		Prep/ Inquiry Activity: Temperature and Reaction Rates (pg 540)
2		18.1: Rates of Reactions
3		Does Steel Burn? lab (pg 544)
4		Reaction Curve gallery walk
5		18.2 Reversible Reactions and Equilibrium
6		Practice: Equilibrium Constants
7		18.3 Solubility Equilibrium
8		Practice: K_{sp} and common ions
9		Quiz: 18.1-18.3
10		18.4 Entropy and Free Energy
11		Lab: Enthalpy and Entropy (pg 574)
12		18.5 The Progress of Chemical Reactions
13		Navigating Multi-step reaction curves practice
14		Remediation/Work Day
15		Test

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

Unit Six: Equilibrium Timeline: 3 weeks

Solutions			
DCIs	SEPs	CCCs	
HS.PS.1-6	Developing and Using Models, Constructing Explanations and Designing Solutions	Patterns Reaction Rates Structure and Functions	

HS-PS1-6. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.*

1. (HS-PS1-6.1.a) The student can identify and describe potential changes in a component of the given chemical reaction system that will increase the amounts of particular species at equilibrium.
   1.1. I can define LeChatlier's principle.
   1.2. I can identify and describe how changes in concentration will impact the reaction.
   1.3. I can identify and describe how changes in pressure will impact the reaction.
   1.4. I can identify and describe how changes in temperature will impact the reaction.
   1.5. I can identify and describe how adding a catalyst will impact the reaction.
2. (HS-PS1-6.1.a.i) The student can use evidence to describe the relative quantities of a product before and after changes to a given chemical reaction system (e.g., concentration increases, decreases, or stays the same), and will explicitly use Le Chatelier's principle to explain how, at a molecular level, a stress involving a change to one component of an equilibrium system affects other components.
   2.1. Given a system and a stressor, I can explain how the stressor would impact each component of the system at the molecular level.
3. (HS-PS1-6.1.a.ii) The student can use evidence to describe the relative quantities of a product before and after changes to a given chemical reaction system (e.g., concentration increases, decreases, or stays the same), and will explicitly use Le Chatelier's principle to explain that changing the concentration of one of the components of the equilibrium system will change the rate of the reaction (forward or backward) in which it is a reactant, until the forward and backward rates are again equal.
   3.1. I can explain that changing the concentration of one of the reactant of the equilibrium system will change the rate of the reaction until the forward and backward rates are again equal.
4. (HS-PS1-6.1.a.iii) The student can use evidence to describe the relative quantities of a product before and after changes to a given chemical reaction system (e.g., concentration increases, decreases, or stays the same), and will explicitly use Le Chatelier's principle to explain a description of a system at equilibrium that includes the idea that both the forward and backward reactions are occurring at the same rate, resulting in a system that appears stable at the macroscopic level.
   4.1. I can explain how the forward and backwards reaction for a system looks during equilibrium.
5. (HS-PS1-6.2.a) The student can describe the prioritized criteria and constraints for a chemical system, and quantify each when appropriate. Examples of constraints to be considered are cost, energy required to produce a product, hazardous nature and chemical properties of reactants and products, and availability of resources.
   5.1. I can identify and quantify likely criteria and constraints for a chemical system, when considering costs.
   5.2. I can identify and quantify likely criteria and constraints for a chemical system, when considering energy required to produce a product.

5.3. I can identify and quantify likely criteria and constraints for a chemical system, when considering hazardous nature of components.
5.4. I can identify and quantify likely criteria and constraints for a chemical system, when considering chemical properties of reactants and products.
5.5. I can identify and quantify likely criteria and constraints for a chemical system, when considering availability of resources.

6. (HS-PS1-6.3.a) Students systematically evaluate the proposed refinements to the design of the given chemical system. The potential refinements are evaluated by comparing the redesign to the list of criteria (i.e., increased product) and constraints (e.g., energy required, availability of resources).
    6.1. I can systematically evaluate the proposed refinements to the design of the given chemical system based on a list of criteria (i.e., increased product).
    6.2. I can systematically evaluate the proposed refinements to the design of the given chemical system based on a list of constraints (e.g., energy required, availability of resources)
7. (HS-PS1-6.4.a) Students refine the given designed system by making tradeoffs that would optimize the designed system to increase the amount of product, and describe the reasoning behind design decisions.
    7.1. I can refine the given designed system by making tradeoffs that would optimize the designed system to increase the amount of product.
    7.2. I can describe the reasoning behind design decisions.

Vocabulary to Know			
• vaporization • evaporation • vapor pressure • boiling point • normal boiling point • unsaturated solution • concentration • freezing-point depression • acidic • basic • acidic solution • basic solution • hydroxide • hydronium • Arrhenius base	• aqueous solution • solvent • solute • solvation • electrolyte • miscible • immiscible • dilute solution • boiling point elevation • Bronsted-Lowry acid • Bronsted-Lowry base • conjugate acid • conjugate base • Arrhenius acid	• nonelectrolyte • strong electrolyte • weak electrolyte • hydrate • suspension • supersaturated solution • concentrated solution • amphoteric • monoprotic • diprotic acid • triprotic acid • titration • neutralization • neutral	• colloid • Tyndall effect • Brownian motion • emulsion • saturated solution • solubility • Henry's Law • molarity (M) • colligative property • acid base pairs • Universal indicator solution. • strong base • strong acid • weak base • weak acid

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

Additional Items

Notes	Worksheets/ Activities	Simulations	Labs	Quizzes/Test	Other
Calculating Concentrations and dilutions (16.2) *No %volume or %mass Handout Homework	Calculating Concentrations Gallery Walk w/ET	Polarity	Making a Solution (page 497) Molarity Simulation PhET (HTML5) Concentration PhET Copper (II) Sulfate hydrate lab		

Activity Schedule

Day	Standards Covered	Activity
1		Prep/
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		Remediation/Work Day
15		Test

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(used)	Remediation Day
Properties of Solutions (16.1) Handout Homework Edpuzzle Take Home Demo	TCT: Salt Bath Grading Rubric (Teacher) KDE Annotations Rubric KDE Samples	Colligative Properties of Solutions (16.3) Handout Homework Articles Optional Demo: Ice cream in a bag	Quiz: 16.1-16.3KEY Article Quiz: 16.1 and 16.3 only	Remediation Day
Review Trashketball Review Worksheet Review Stations	Test: Solutions Modified			
Acid-Base Theory (19.1) and pH (19.2) PP Notes HW	Making a pH scale (pg 604) Open Inquiry	Acid Base PhET	Neutralization (19.4) and Salts (19.5) PP Notes HW	Quiz: Acids and Bases KEY
Virtual Titration	Virtual Titration	Acid Base Vocab Bingo	Gallery Walk Key	Test: Acids KEY Article

Notes	**Worksheets/ Activities**	**Simulations**	**Labs**	**Quizzes/Test**	**Other**
		pH Scale Basic			

Acid on hands video

Unit Seven: Stoichiometry.
Base Phenomenon: How do companies predict chemical yield?

Math for Chemistry			
DCIs	SEPs	CCCs	

HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

1. (HS-PS1-7.1.a.i) The student can identify and describe, mathematically, the quantities of reactants and products of a chemical reaction in terms of atoms, moles, and mass.
   1.1. I can calculate the quantities of reactants and products of a chemical reaction in terms of atoms
   1.2. I can calculate the quantities of reactants and products of a chemical reaction in terms of moles.
   1.3. I can calculate the quantities of reactants and products of a chemical reaction in terms of mass.
2. (HS-PS1-7.1.a.ii) The student can identify and describe, mathematically, the molar mass of all components of the reaction.
   2.1. I can calculate the molar mass of all components of the reaction.
3. (HS-PS1-7.1.a.iii) The student can identify and describe, mathematically, the use of balanced chemical equation to find molar quantities of a reaction.
   3.1. I can balance a chemical equation.
   3.2. I can describe the quantities of reactants and products needed in terms of moles using a balanced chemical equation.
4. (HS-PS1-7.1.a.iv) The student can prove mathematically that atoms, and therefore mass, are conserved during a chemical reaction.
   4.1. I can prove mathematically that atoms are conserved in a chemical reaction.
   4.2. I can prove mathematically that mass is conserved in a chemical reaction.
5. (HS-PS1-7.2.a) The student can use the mole to convert between the atomic and macroscopic scale in the analysis (ie: use of Avogadro’s number).
   5.1. I can use Avogadro’s number to convert between atoms and moles.
   5.2. I can use Avogadro’s number to convert between atoms and mass.
   5.3. I can use Avogadro’s number to convert between atoms and liters.
6. (HS-PS1-7.2.b.i) For a given chemical reaction, the student can mathematically predict the relative number of atoms in the reactants versus the products.
   6.1. I can use a balanced chemical equation to predict the atoms of reactants and products.
7. (HS-PS1-7.2.b.ii) For a given chemical reaction, the student can mathematically calculate the mass of any component of a reaction, given any other component.
   7.1. I can use a balanced chemical equation to predict the mass of reactants and products.
   7.2. I can calculate a limiting reactant.
   7.3. I can calculate a theoretical yield of product.
8. (HS-PS1-7.3.a) Students describe how the mathematical representations support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
   8.1. I can describe how mathematical means support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

9. (HS-PS1-7.3.b) Students describe how the mass of a substance can be used to determine the number of atoms, molecules, or ions using moles and mole relationships. 9.1. I can describe how the mass of a substance can be used to determine the number of atoms, molecules, or ions using moles and mole relationships.

Vocabulary to Know			
• measurement • scientific notation • accuracy • precision • accepted value • significant figures • mole • Avogadro's number	• International System of Units (SI) • meter • experimental value • error • avogadro's hypothesis • STP	• liter • gram • weight • temperature • celsius scale • percent error • percent composition • molar volume	• density • Kelvin scale • absolute zero • energy • joule • calorie • representative particle • molar mass

Additional Items

Notes	**Worksheets/ Activities**	**Simulations**	**Labs**	**Quizzes/Test**	**Other**
Dimensional Analysis HW video Edpuzzle Link Ladder Method more help Article: Calculating GPA	Measurements with Sig Figs stations Book Hunt: Measurement and Molar Conversions Dimensional Analysis Wkst generator Kahoot Review mixed practice Molar Conversions: VG	Density Stoic	Stations: Density Derby Accuracy vs. Precision SI Units and Conversions	Pretest: Math for Chemistry Test Follow Up Quiz Quiz Ver. 3	Remediation: Take Two Ticket AN MM Mixed Molar Con Card Enrichment: Fill my room with Packing Peanuts Remediation Stations: Math for Chemistry

Activity Schedule

Day	**Standards Covered**	**Activity**
1		Arithmetic of Equations PP Notes HW
2		Dimensional Analysis Brownies
3		Finish brownies (bake them today)
4		Molar Conversions: AN

		Video: How big is a mole?
5		Molar Conversions MM Practice:
6		Quiz: Molar Conversions
7		12.2 Chemical Calculations PP Notes HW
8		Analysis of Baking Soda (pg 367)
9		Work Day/Remediation
10		12.3 Limiting Reagent and Percent Yield PP Notes
11		Limiting Reagent Practice Answers
12		**LR** Practice
13		Limiting Reagent Lab (pg 372)
14		Remediation/Work Day
15		Test

Notebook Check

Unit Eight: Nuclear Chemistry Timeline: 5 weeks

Nuclear Reactions			
DCIs	SEPs	CCCs	
HS.ESS.1.1, HS.PS.1.8	Developing and Using Models	Patterns Scale, Proportion, and Quantity Cause and Effect	

HS-PS1-8. Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

1. (HS-PS1-8.1.a.i-iv) Students develop models of nuclear reactions in which they identify and describe an element by the number of protons; the number of protons and neutrons in the nucleus of an atom before and after the decay; the identity of the emitted particles (i.e., alpha, beta — both electrons and positrons, and gamma); the scale of energy changes associated with nuclear processes, relative to the scale of energy changes associated with chemical processes.
   - 1.1. I can identify an element by its number of protons.
   - 1.2. I can the number of protons and neutrons in the nucleus of an atom before the decay.
   - 1.3. I can the number of protons and neutrons in the nucleus of an atom after the decay.
   - 1.4. I can identity of the emitted particles (i.e., alpha, beta — both electrons and positrons, and gamma).
   - 1.5. I can identify the scale of energy changes associated with nuclear processes, relative to the scale of energy changes associated with chemical processes.
2. (HS-PS1-8.2.a-b) Students develop five distinct models to illustrate the relationships between components underlying the nuclear processes of 1) fission, 2) fusion, 3) alpha radiation, 4) beta radiation, and 5) gamma radiation. These models will include that the total number of neutrons plus protons is the same both before and after the nuclear process, although the total number of protons and the total number of neutrons may be different before and after and the scale of energy changes in a nuclear process is much larger (hundreds of thousands or even millions of times larger) than the scale of energy changes in a chemical process.
   - 2.1. I can develop a chemical model for a fission reaction.
   - 2.2. I can develop a chemical model for a fusion reaction.
   - 2.3. I can develop a chemical model for a alpha radiation.
   - 2.4. I can develop a chemical model for a beta radiation.
   - 2.5. I can develop a chemical model for a gamma radiation.
   - 2.6. My model will include that the total number of neutrons plus protons is the same both before and after the nuclear process, although the total number of protons and the total number of neutrons may be different before and after.
   - 2.7. My model will include that the scale of energy changes in a nuclear process is much larger (hundreds of thousands or even millions of times larger) than the scale of energy changes in a chemical process.
3. (HS-PS1-8.3.a) Students develop a fusion model that illustrates a process in which two nuclei merge to form a single, larger nucleus with a larger number of protons than were in either of the two original nuclei.

3.1. I can develop a fusion model in which two nuclei merge to form a single, larger nucleus with a larger number of protons than were in either of the two original nuclei.

4. (HS-PS1-8.3.b) Students develop a fission model that illustrates a process in which a nucleus splits into two or more fragments that each have a smaller number of protons than were in the original nucleus.
    4.1. I can develop a fission model that illustrates a process in which a nucleus splits into two or more fragments that each have a smaller number of protons than were in the original nucleus.
5. (HS-PS1-8.3.c) In both the fission and fusion models, students illustrate that these processes may release energy and may require initial energy for the reaction to take place.
    5.1. In both the fission and fusion models, I can explain that these processes may release energy and may require initial energy for the reaction to take place.
6. (HS-PS1-8.3.d) Students develop radioactive decay models that illustrate the differences in type of energy (e.g., kinetic energy, electromagnetic radiation) and type of particle (e.g., alpha particle, beta particle) released during alpha, beta, and gamma radioactive decay, and any change from one element to another that can occur due to the process.
    6.1. I can describe the different types of energy that can be released during alpha, beta, and gamma radioactive decay.
    6.2. I can describe the different types of particles that can be released during alpha, beta, and gamma radioactive decay.
    6.3. I can describe how an element can change from one to another due to a nuclear process.
7. (HS-PS1-8.3.e) Students develop radioactive decay models that describe that alpha particle emission is a type of fission reaction, and that beta and gamma emission are not.
    7.1. I can prove that an alpha emission is a type of fission reaction.
    7.2. I can prove that a beta emission and a gamma emission is NOT a type of fission reaction.

Vocabulary to Know			
• alpha particle • beta particle • fission • fusion	• gamma ray • half-life • neutron absorption	• positron • neutron moderation	• radiation • radioactivity • radioisotopes

Additional Items

Notes	**Worksheets/ Activities**	**Simulations**	**Labs**	**Quizzes/Test**	**Other**
	Check 3 Check 4				Work Day

Activity Schedule

Day	Standards Covered	Activity
1		The Gadget -Novel Assignment- Whole Book Assignment Chapter One Talking Points Hyperdoc (still building)
2		Chapter 2-3 Graded Assignment: Los Alamos
3		Types of Nuclear Radiation PP Notes HW Practice
4		Day 3: Chapter 4-5
5		Day 5: Chapter 6
6		Half-Life: It's About Flippin' Time! Lab
7		Day 6: Chapter 7 Chapter 8 Remediation Activity: Nuclear Balancing Speed
8		**Due: Chapter 1-6** Quiz: Nuclear Radiation Types and Balancing Nuclear Radiation Types and Balancing Quiz 2(Second chance)
9		Chapter 9-10
10		Chapter 11-12
11		Nuclear Fission and Fusion Chapter Tour OR PP Notes
12		Chapter 13-14
13		Chapter 15-16 **Chapters 7-12 Due**
14		Pros: Nuclear Power Nuclear Webquest Form
15		Cons: Nuclear Power Make A Websquest (PreAP) Premade Webquest paper

16		Chapter 17
17		Chapter 18-19
18		Quiz: Fission/Fusion KEY Modified Remediation: Balancing Eq
19		Remediation/Work Day
20		Test Modified **Chapters 13-19 Due** **Summary Activities Due**

(Time Permitting) Unit Nine: Light and Waves Timeline: 2 weeks
Base Phenomenon: Why can I see light?

Light and Waves		
DCIs	SEPs	CCCs
HS.PS.4.1, 4.3, 4.4, 4.5	Obtaining, Evaluating, and Communicating Information	Cause and Effect

HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

1. (HS-PS4-1.1.a.i) The student can identify and describe mathematical values for frequency, wavelength, and speed of waves traveling in various specified media.
   1.1. I can define frequency, wavelength, and speed of waves.
   1.2. I can identify and describe mathematical values for frequency, wavelength, and speed of waves traveling in various specified media.
2. (HS-PS4-1.1.a.ii) The student can identify and describe the mathematical relationships between frequency, wavelength, and speed of waves traveling in various specified media.
   2.1. I can identify and describe the mathematical relationships between frequency, wavelength, and speed of waves traveling in various specified media.
3. (HS-PS4-1.2.a) Students show that the product of the frequency and the wavelength of a particular type of wave in a given medium is constant, and identify this relationship as the wave speed according to the mathematical relationship $v = f\lambda$.
   3.1. I can show that the product of the frequency and the wavelength of a particular type of wave in a given medium is constant, and identify this relationship as the wave speed according to the mathematical relationship $v = f\lambda$.
4. (HS-PS4-1.2.b) Students use the data to show that the wave speed for a particular type of wave changes as the medium through which the wave travels changes.
   4.1. I can use experimental data to show that the wave speed for a particular type of wave changes as the medium through which the wave travels changes.
5. (HS-PS4-1.2.c) Students predict the relative change in the wavelength of a wave when it moves from one medium to another (thus different wave speeds using the mathematical relationship $v = f\lambda$). Students express the relative change in terms of cause (different media) and effect (different wavelengths but same frequency).
   5.1. I can predict the relative change in the wavelength of a wave when it moves from one medium to another (thus different wave speeds using the mathematical relationship $v = f\lambda$).
   5.2. I can express the relative change in terms of cause (different media) and effect (different wavelengths but same frequency).
6. (HS-PS4-1.3.a) Using the mathematical relationship $v = f\lambda$, students assess claims about any of the three quantities when the other two quantities are known for waves travelling in various specified media.
   6.1. Using the mathematical relationship $v = f\lambda$, I can assess claims about any of the three quantities when the other two quantities are known for waves travelling in various specified media.
7. (HS-PS4-1.4.a) Students use the mathematical relationships to distinguish between cause and correlation with respect to the supported claims.
   7.1. I can use the mathematical relationships for waves to distinguish between cause and correlation with respect to the supported claims.

Additional Items

Notes	Worksheets/ Activities	Simulations	Labs	Quizzes/Test	Other

Activity Schedule

Day	Standards Covered	Activity
1		23 Waves PP Notes HW BW
2		24 The Most dangerous colors TedED Video Flame Test Lab
3		Flame Test Day 2
4		BW Color Sort
5		BW Freq/Wavelength Practice
6		Light and Waves Quiz
7		
8		
9		
10		
11		
12		
13		
14		Remediation/Work Day
15		Test

Midterm

	Review	**Exam**
2017	Midterm Review Answer Key	**Midterm Exam** **Modified**
2018	**Review**	Midterm

Holiday Activities
Silver-Plated Bulbs

End of Year Review and Final Exam with Topics
Study Guide
Digital Print Review 2018-2019
SENIOR Final Exam (Version 1)
The Final Exam® 2017-2018
Mock Final 2018-2019 Key
Final Exam 2018-2019

Bingo: Acid/Base, Thermo, Nuclear
Math Review
Trashketball Review
Kahoot

Stations:

- (Unit Eight) Nuclear Reactions
- (Unit Four) Chemical Reactions
- Math for Chemistry
- Acid/Base and Solutions