Curriculum Map
High School Honors Chemistry

Unit Course Outline	Unit 1 Structure and Properties of Matter (10 weeks)	Unit 2 Conservation of Matter (8 weeks)	Unit 3 Reaction Rates and Chemical Equilibrium (7 weeks)	Unit 4 Nuclear Chemistry (5 weeks)	Unit 5 Applications of Chemistry (5 weeks)
NGSS Disciplinary Core Ideas (DCI)	HS.PS1.A, HS.PS1.C, HS.PS2.B, HS.LS1.C, HS.ESS2.C	HS.PS1.B, HS.PS1.A, HS.PS3.A, HS.PS3.B, HS.PS3.D, HS.LS1.C, HS.LS2.B, HS.ESS2.C, HS.ETSI.B, HS.ETSI.C	HS.PS1.A, HS.PS1.B, HS.PS3.A, HS.PS3.B, HS.PS3.D, HS.LS1.C, HS.LS2.B, HS.ESS2.C, HS.ETSI.B, HS.ETSI.C	HS.PS1.C, HS.PS1.B,	HS.PS1.C, HS.PS2.B, HS. PS2.C, HS.ETS1.C
Performance Expectations	HS-PS1-1, HS-PS1-3, HS-PS1-2	HS-PS1-2, HS-PS1-7, HS-PS1-4, HS-PS1-5, HS-PS1-6, HS-PS1-1 ,HS-PS1-3	HS-PS1-4, HS- PS1-5, HS-PS1-6,HS-PS1-7,HS-PS1-1, HS-PS1-2, HS-PS1-3,	HS-PS1-8, HS-ESS1-1	HS-PS3-3, HS-ESS16
Common Core Language Arts	RST.9-10.7, RST.11- 12.1, WHST.9- 12.2, WHST.9-12.5, WHST.9- 12.7, WHST.11- 12.8, WHST.9-12.9	RST.9-10.7, RST.11- 12.1, WHST.9- 12.2, WHST.9-12.5, WHST.9-12.7, WHST.11- 12.8, WHST.9-12.9, SL.11-12.5	RST.9-10.7, RST.11- 12.1, WHST.9- 12.2, WHST.9-12.5, WHST.9- 12.7, WHST.11- 12.8, WHST.9-12.9, SL.11-12.5	RST.11-12.1, WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, SL.11-12.5	RST.11-12.1, WHST.9-12.2, WHST.9-12.5, WHST.9-12.7
Mathematics	MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, HSN-Q.A.3, HSF-IF.B.5, HSS-ID.B.6	MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, HSN-Q.A.3,	MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, HSN-Q.A.3,	MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, HSN-Q.A.3,	MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, HSN-Q.A.3,
Computer Science and Design Thinking	8.1.12.CS.1-4 8.1.12.NI.1-4 8.1.12.IC.1-3 8.1.12.DA.1-6 8.1.12.AP1-9 8.2.12.ED.1-6 8.2.12.ITH.1-3 8.2.12.NT.1-2	8.1.12.CS.1-4 8.1.12.NI.1-4 8.1.12.IC.1-3 8.1.12.DA.1-6 8.1.12.AP1-9 8.2.12.ED.1-6 8.2.12.ITH.1-3 8.2.12.NT.1-2	8.1.12.CS.1-4 8.1.12.NI.1-4 8.1.12.IC.1-3 8.1.12.DA.1-6 8.1.12.AP1-9 8.2.12.ED.1-6 8.2.12.ITH.1-3 8.2.12.NT.1-2	8.1.12.CS.1-4 8.1.12.NI.1-4 8.1.12.IC.1-3 8.1.12.DA.1-6 8.1.12.AP1-9 8.2.12.ED.1-6 8.2.12.ITH.1-3 8.2.12.NT.1-2	8.1.12.CS.1-4 8.1.12.NI.1-4 8.1.12.IC.1-3 8.1.12.DA.1-6 8.1.12.AP1-9 8.2.12.ED.1-6 8.2.12.ITH.1-3 8.2.12.NT.1-2

	8.2.12.ETW.1-3	8.2.12.ETW.1-3	8.2.12.ETW.1-3	8.2.12.ETW.1-3	8.2.12.ETW.1-3
Career Readiness, Life Literacies, and Key Skills	9.1.12.FP.1-3 9.4.12.CI.1,2 9.4.12.CT.1 9.4.12.DC.1-4 9.4.12.GCA.1 9.4.12.IML.1-4 9.4.12.TL.1,2	9.1.12.FP.1-3 9.4.12.CI.1,2 9.4.12.CT.1 9.4.12.DC.1-4 9.4.12.GCA.1 9.4.12.IML.1-4 9.4.12.TL.1,2	9.1.12.FP.1-3 9.4.12.CI.1,2 9.4.12.CT.1 9.4.12.DC.1-4 9.4.12.GCA.1 9.4.12.IML.1-4 9.4.12.TL.1,2	9.1.12.FP.1-3 9.4.12.CI.1,2 9.4.12.CT.1 9.4.12.DC.1-4 9.4.12.GCA.1 9.4.12.IML.1-4 9.4.12.TL.1,2	9.1.12.FP.1-3 9.4.12.CI.1,2 9.4.12.CT.1 9.4.12.DC.1-4 9.4.12.GCA.1 9.4.12.IML.1-4 9.4.12.TL.1,2
Clarification Statements:	Focus is on the reasons electrons and neutrons do not determine the element: Electrons can be gained and lost which change the element into an ion with different properties from the parent element. The number of neutrons can vary for the same element, giving rise to isotopes which have similar properties but different masses. Focus is on the dual properties of electrons that are described as both a particle (photon) and a wave as electromagnetic waves lead to fundamental insights into the electron configuration of atoms' electrons. The energy states of an atom's electrons are	Examples of chemical reactions could include the reaction of sodium and chlorine, of carbon and oxygen, or of carbon and hydrogen. The classification of chemical reactions should focus more on observable patterns rather than memorization of definitions of reaction types. Students need to be able to recognize synthesis, decomposition, combustion, single and double replacement reactions to predict the result of the reaction when these reactions occur. Emphasis is on using mathematical ideas to communicate the	Emphasis is on the idea that a chemical reaction is a system that affects the energy change. Examples of models could include molecular-level drawings and diagrams of reactions, graphs showing the relative energies of reactants and products, and representations showing energy is conserved. Emphasis is on student reasoning that focuses on the number and energy of collisions between molecules. Perturbations include change of mass, moles, volume, temperature, pressure, and addition of a catalyst.	Emphasis is on the differences in energy changes and the idea that chemical reactions involve the rearrangement of atoms and their valence electrons, while nuclear reactions involve changes in the nucleus. Emphasis is on the four main types of nucleus radiation that involve alpha, beta, gamma and positron emission and include how to balance the nuclear reactions. Emphasis is on simple qualitative models, such as pictures or diagrams, and on the scale of energy released in nuclear processes relative to other kinds of transformations.	Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, and generators. Examples of constraints could include use of renewable energy forms and efficiency. Emphasis is on using available evidence within the solar system to reconstruct the early history of Earth, which formed along with the rest of the solar system 4.6 billion years ago. Examples of evidence include the absolute ages of ancient materials (obtained by radiometric dating of meteorites, moon

	quantized and described by their electron configurations. Focus is on the organization of the elements on the Periodic Table, which has evolved over time and is ultimately determined by the electron configurations of the elements. When the elements are arranged by increasing atomic number, there are repeating patterns and periods of chemical and physical properties of the elements (such as atomic radius, electronegativity, ionization energy) known as trends. Focus is on the number of electrons or unfilled energy levels available for bonding in atoms and to combine in different ratios in compounds. Examples of properties that could be predicted from patterns could include reactivity of metals, types of bonds formed, numbers	proportional relationships between masses of atoms in the reactants and the products, and the translation of these relationships to the macroscopic scale using the mole as the conversion from the atomic to the macroscopic scale. Emphasis is on assessing students' use of mathematical thinking and not on memorization and rote application of problem-solving techniques. Emphasis is on assessing students' use of mathematical thinking and not on memorization and rote application of stoichiometry problem-solving techniques. Emphasis is on equilibrium resulting from an equality between the rates of the forward and reverse reactions, at which point Q = K.	Emphasis is on the application of Le Chatelier's Principle and on refining designs of chemical reaction systems, including descriptions of the connection between changes made at the macroscopic level and what happens at the molecular level. Examples of designs could include different ways to increase product formation including adding reactants or removing products.	Emphasis is on the energy transfer mechanisms that allow energy from nuclear fusion in the sun's core to reach Earth. Examples of evidence for the model include observations of the masses and lifetimes of other stars, as well as the ways that the sun's radiation varies due to sudden solar flares ("space weather"), the 11-year sunspot cycle, and non-cyclic variations over centuries. Emphasis is on the energy transfer mechanisms of fission reaction and how fission nuclear reaction is important in the production of nuclear energy in nuclear plants. Emphasis is on the nuclear stability from which some atoms undergo radioactive decay and the resulting half-life of the atom can be calculated.	rocks, and Earth's oldest minerals), the sizes and compositions of solar system objects, and the impact cratering record of planetary surfaces. Modification of conditions includes dilution of or addition or removal of reactants or products by physical or chemical means. Comparisons of relative strengths of aqueous acid or base solutions made from similar acid or base substances is limited to arguments based on periodic properties of elements, electronegativity model of electron distribution, empirical dipole moments, and molecular geometry. Emphasis is on solutions that relate with the solubility of a solute, concentration, temperature and colligative properties that have many practical applications in everyday life.

	of bonds formed, and reactions with oxygen. Focus is on the energy required to overcome bonds of attraction in the liquid and or solid state during evaporation and melting, and that condensation and freezing release heat to the surroundings as internal energy is reduced and bonds of attraction are formed. Emphasis is on understanding the strengths of forces between particles (intermolecular forces) such as London dispersion forces, dipole-dipole, and hydrogen bonds. Examples of particles could include ions, atoms, molecules (including the shape of the molecules) and networked materials (such as graphite). Examples of bulk properties of substances could include the melting point and boiling point, vapor pressure, and surface tension.				Emphasis is on oxidation and reduction reactions that involve the transfer of electrons during a chemical reaction and is often described in batteries, corrosion, tarnish, rust.

Assessment Boundary:	Assessment is limited to main group elements. Assessment does not include quantitative understanding of ionization energy beyond relative trends. Assessment does not include Raoult's law calculations of vapor pressure.	Assessment is limited to chemical reactions involving main group elements and combustion reactions. Assessment does not include complex chemical reactions.	Assessment does not include calculating the total bond energy changes during a chemical reaction from the bond energies of reactants and products. Assessment is limited to simple reactions in which there are only two reactants; evidence from temperature, concentration, and rate data; and qualitative relationships between rate and temperature. Assessment is limited to specifying the change in only one variable at a time. Assessment does not include calculating equilibrium constants and concentrations.	Assessment does not include quantitative calculation of energy released. Assessment is limited to alpha, beta, and gamma radioactive decays. Assessment does not include details of the atomic and subatomic processes involved with the sun's nuclear fusion.	Assessment for quantitative evaluations is limited to total output for a given input. Assessment is limited to devices constructed with materials provided to students. Reactions are limited to Arrhenius and Bronsted-Lowry acid-base reaction patterns with monoprotic acids. Acid or base strength comparisons are limited to homologous series.
Teacher Notes:					
Activities	1. Origami atoms and molecules 2. Cartoon elements 3. Color coding sections of the periodic table 4. Element t-shirt/scavenger hunt 5. Alien periodic table	1. Lab activity: Chemical Reactions 2. Lab activity Rainbow Lab: Measuring mixtures 3. Lab activity Chromatography: Separating mixtures	1. Collision Theory Web Quest 2. Lab activity: Rate of Reactions 3. Reaction rate simulation activity 4. Gas Law Simulation activity	1. Chain reaction model using dominoes 2. Cell Phone Radiation: How Close is Too Close? 3. Radiation and Cancer: Cure or Cause?	1. Lab activity: Solid or Liquid 2. Lab activity: Acidity of foods and household products 3. Lab Activity: Quality control at the Pickle Factory

	6. Lab activity: Metal, Nonmetals, Metalloids 7. Organizing items into a Periodic Table activity 8. Ionic Compound Web Quest 9. Lab activity: Reactivity of Halide Ions 10. Lab activity: Properties of Ionic and Covalent Compounds 11. Chemical Bonding Web Quest 12. Engineering and The Periodic Table activity 13. Lab activity: Candy Compounds 14. Lab activity: Ionic and Covalent Bonds 15. Periodic Table Trends activity 16. Ionic Bonding Puzzle-Poster activity 17. Bohr model activity 18. Laboratory Activity Density Lab 19. Flame Test Activity Lab 20. Lab activity: Atomic Emission Spectrum 21. Lab activity: Rearrange the Periodic Table (Electron Configuration) 22. Lab Activity: Beanium (Isotop)	4. Chromatography forensics 5. Chromatography flowers and butterflies activity 6. Mole Web Quest 7. Mole lab 8. Mole decoding activity 9. Lab activity: Law of conservation of matter 10. Lab: Conservation of mass of gum 11. Lab activity: Combustion and Rusting 12. Lab activity: Stoichiometry of Balloons	5. Lab Activity: Energy in Chemical Reactions 6. Le Chatelier's Lab	4. Investigating the Safety of Nuclear Energy Using Real Radioactivity Data Example of Interdisciplinary with Math 5. Mathematical Modeling Using Real Radioactivity Data 6. Half-life of Puzzlium Lab Activity 7. Argumentative Writing: "Does the World Need Nuclear Energy?"	4. History of Earth Timeline Activity Example of Interdisciplinary with Social Studies 5. Research project: Renewable vs. nonrenewable energy resources 6. Research project: Relate with climate change and pollution

	23. Molecular Shape Phet Lab Activity 24. Writing Research: The phenomena of Aurora Borealis 25. Periodic Trends in Reactivity Lab				
Interdisciplinary Examples	RST.9-10.7: Lab Activity: Density Lab: Students will formulate a hypothesis and write a lab report expressing the quantitative information obtained through data tables and graph analysis. RST.9-10.9: Lab Activity: Ionic and Covalent Bonds - Students will perform laboratory experiments and compare and contrast ionic and covalent bonds through lab report. Findings will be compared with evidence from other scientific resources.	HSN-Q.A.1: Lab activity: Chemical Reactions - Students will use multi-step chemical reactions to understand and develop a solution. HSN-Q.A.3: Mole decoding activity - Students will practice their skills with converting moles, mass, and molecules using appropriate limitations in measurement when reporting quantities.	HSN-Q.A.1: Lab Activity: Rate of Reactions - Students will measure how fast or slow different chemical reactions occur. Calculations will be made with consistent units used in formulas. HSN-Q.A.2: Gas law simulation activity - Students will investigate gas laws using online simulation. Quantities obtained will be used in modeling such as data tables and graphs.	RST.11-12.1: Radiation and Cancer: Cure or Cause? - Students will cite evidence to support their claim between the relationship of radiation and cancer. MP.4: Mathematical Modeling Using Real Radioactivity Data - Students will analyze radioactivity data and mathematically draw conclusions using models, formulas, graphs, etc.	HSN-Q.A.2: Lab Activity: Acidity of foods and household products - Students will measure the pH of certain products and quantify the acids vs. bases using descriptive modeling. RST.9-10.9: Lab Activity: Solid or Liquid - Students will perform experiment and compare the solids and liquids. Findings will be compared from other scientific resources.
Evaluation/ Formative Assessments	-Lab reports -Projects and web quests -Quizzes/tests -Do Nows -Class Discussions -Class Assignments -Constructed Response	-Lab reports -Projects and web quests -Quizzes/tests -Do Nows -Class Discussions -Class Assignments - Constructed Response	-Lab reports -Projects and web quests -Quizzes/tests -Do Nows -Class Discussions -Class Assignments -Constructed Response	-Lab reports -Projects and web quests -Quizzes/tests -Do Nows -Class Discussions -Class Assignments -Exit Tickets	-Lab reports -Projects and web quests -Quizzes/tests -Do Nows -Class Discussions -Class Assignments -Exit Tickets

	--Benchmark Assessment: Plan an experiment -Exit Tickets -Homework	--**Chemical Bond cartoon project** **Chemical Formula Assessment** **Type of reactions Assessment** -Exit Tickets -Homework	--Benchmark Assessment: Students draw graphs showing the release of energy in endothermic and exothermic reactions -Exit Tickets -Homework	-Homework	-Homework
Resources	1. Discovery Education Techbook 2. *Science World* Magazine (Scholastic publication) 3. bozemanscience.com/ 4. sciencespot.net/ 5. phet.colorado.edu/ 6.youtube.com/results?search_query=crash+course+chemistry 7.gpb.org/chemistry-physics/students/all 8.mw.concord.org/modeler/index.html 9.sciencecases.lib.buffalo.edu/cs/	1. Discovery Education Techbook 2. *Science World* Magazine (Scholastic publication) 3. bozemanscience.com/ 4. sciencespot.net/ 5. phet.colorado.edu/ 6youtube.com/results?search_query=crash+course+chemistry 7.msed.iit.edu/ids/curriculum/chemistry/model_lessons/12-%20Chem%20Cohort%201/Q4%20Chemistry/Unit_4_ConservationofMass061308.doc 8.www.gpb.org/chemistry-physics/students/all 9.mw.concord.org/modeler/index.html 10.sciencecases.lib.buffalo.edu/cs/	1. Discovery Education Techbook 2. *Science World* Magazine (Scholastic publication) 3. bozemanscience.com/ 4. sciencespot.net/ 5. phet.colorado.edu/ 6.youtube.com/results?search_query=crash+course+chemistry 7.org/chemistry-physics/students/all 8.mw.concord.org/modeler/index.html 9.sciencecases.lib.buffalo.edu/cs/	1. Discovery Education Techbook 2. *Science World* Magazine (Scholastic publication) 3. bozemanscience.com/ 4. sciencespot.net/ 5. phet.colorado.edu/ 6.youtube.com/results?search_query=crash+course+chemistry 7.gpb.org/chemistry-physics/students/all 8.ilabcentral.org/radioactivity 9.mw.concord.org/modeler/index.html 10.sciencecases.lib.buffalo.edu/cs/	1. Discovery Education Techbook 2. *Science World* Magazine (Scholastic publication) 3. bozemanscience.com/ 4. sciencespot.net/ 5. phet.colorado.edu/ 6.youtube.com/results?search_query=crash+course+chemistry 7.gpb.org/chemistry-physics/students/all 8.mw.concord.org/modeler/index.html 9.sciencecases.lib.buffalo.edu/cs/
Common Accommoda-tions	Extra time, chunking, modeling, frequent breaks, assigned seats, guided notes, use of models, digital text, text can read to students, graphic organizers, checklist, daily do-now, exit ticket, monthly outlook, study guides, require notebook/chromebook for class, oral responses acceptable as needed, word bank as needed, read tests aloud as needed, options to refine ideas, assigned/preferential seating additional time as needed, daily SEL activities				