

GCS Curriculum Map for Chemistry Year at a Glance

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Quarter/Module	1	2	3
Module Title	Atoms	Periodic Table	Chemical Bonds
Time Frame	2-3 weeks	2-3 weeks	3 weeks
Standards	PS.Chem.1.1 PS.Chem.1.2 PS.Chem.1.3	PS.Chem.2.1 PS.Chem.2.2	PS.Chem.3.1 PS.Chem.3.2 PS.Chem.3.3
ELD Standards (Content)	ELD-SC.9-12.Explain.Interpretive ELD-SC.9-12 Explain.Expressive	ELD-SC.9-12.Explain.Interpretive ELD-SC.9-12 Explain.Expressive	ELD-SC.9-12.Explain.Interpretive ELD-SC.9-12 Explain.Expressive
Essential Questions	When considering the historical developments of the atomic theory it is important to understand the models and indirect evidence that developed them. We can predict the particles within atoms, ions and isotopes based on the relationships of the atomic structure. The evidence shows _____ type of nuclear decay based on the principles of _____. The model shows the unpredictability of electrons within a system.	Drawing connections between elements and their placement on the periodic table it can be concluded the vast properties of that element. I believe based on the following data about the element _____ that the following patterns will occur.	Based on the evidence of properties from the differing bond types it can be argued that _____ bonds are present. We can predict the relationships between the intermolecular forces based on the polarity of the molecule. Based on the rules of nomenclature, I can predict the compound names and formulas.
Performance Events	Chemistry Review Game		Intermolecular Art

GCS Curriculum Map for

Module	4	5
Module Title	Reactions	Solutions & Particle Movement
Time Frame	4-5 weeks	4-5 weeks
Standards	PS.Chem.5.1 PS.Chem.4.1 PS.Chem.4.2 PS.Chem.4.3 PS.Chem.4.4 PS.Chem.5.2	PS.Chem.6.1 PS.Chem.7.1 PS.Chem.7.2 PS.Chem.6.2 PS.Chem.6.3 PS.Chem.7.3
ELD Standards (Content)	ELD-SC.9-12.Explain.Interpretive ELD-SC.9-12 Explain.Expressive	ELD-SC.9-12. Explain.Interpretive ELD-SC.9-12 Explain.Expressive ELD-SC.9-12 Argue.Expressive
Essential Questions	We can predict the energy throughout a reaction from the potential energy diagrams. We can predict the type of Chemical equation based on the properties of its reactants and products. The calculations can be made from the stoichiometric properties of compounds and reactions.	We can predict the heat quantity from the properties of its chemical reaction. The measurements can be determined for volume, pressure and temperature from the relationships of the gas laws. Based on my observations of evidence, the following _____ can be classified as _____ given the following properties: _____.
Performance Events	N/A	Soda Maker Challenge

Module 1: Atoms Essential Questions: When considering the historical developments of the atomic theory it is important to understand the models and indirect evidence that developed them. We can predict the particles within atoms, ions and isotopes based on the relationships of the atomic structure. The evidence shows _____ type of nuclear decay based on the principles of _____. The model shows the unpredictability of electrons within a system.		Timeline: 2-3 weeks
Performance Event: Chemistry Review Game		
SWBAT: (Mastery Objectives) 1. Explain protons, neutrons, and electrons by location, charge, mass. 2. Explain isotopes in terms of notations, atomic mass, and atomic numbers. 3. Classify the Bohr model with the correct placement of subatomic particles and the emission of the electromagnetic radiation in spectral form.. 4. Describe the electron cloud in terms of probability. 5. Explain the process of radioactive decay using nuclear equations and half-life.		
Vertical Alignment		
Previous Grade Level Standards	Grade Level Standards	Next Grade Level Standards
PS.8.1 Understand the properties of matter and changes that occur when matter interacts in open and closed systems. PS.PSc.1 Understand types, properties, and structure of matter.	PS.Chm.1 Analyze the structure of atoms and isotopes. PS.Chm.1.1 Use models to explain how the scientific understanding of atomic structure has evolved. PS.Chm.1.2 Use models to compare nuclear reactions including alpha decay, beta decay and gamma decay; nuclear fusion and nuclear fission. PS.Chm.1.3 Use models to explain how electrons are distributed in atoms.	N/A
Instructional Resources		
Tier III Vocabulary: 1.1 proton, electron, neutron,	Performance Tasks:	Additional Resources

atom, matter, elements, atomic number, atomic symbol, atomic mass, mass number, nucleus, isotope, periodic table, infer, indirect evidence, model, electron cloud, volume, electric charge 1.2 Fission, fusion, radioactive decay, alpha particle, beta particle, gamma ray, half-life, isotope, strong force, energy, transmutation, penetration, spontaneous, induced, starting amount, amount remaining, total time of decay, parent isotope, daughter isotope, radiation, radioactivity 1.3 Excited state, ground state, absorption, emission, electromagnetic spectrum, wavelength, frequency, orbital, sublevel, energy level, noble gas, orbital diagram, ion, electron configuration, filling order, aufbau principle, Pauli's exclusion principle, Hund's rule, violation, electron spin, s-block, p-block, d-block, f-block	Atomic Theory Timeline Atom Investigation Stop Motion Bohr Models Isotope Lab Electron Probability Lab Flame Lab Nuclear Chemistry Rotations Half-life Lab	
Remediation Skills, Extensions and Considerations: • Remediation: • Extension: • Considerations:		

ELD Standard 1: Social and Instructional Language Multilingual Learners communicate for Social and Instructional purposes within the school setting.

ELD-SI.4-12.Narrate

ELD-SI.4-12.Inform

ELD-SI.4-12.Explain

ELD-SI.4-12.Argue

ELD Standard 4:

ELD-SC.9-12.Explain.Interpretive

ELD-SC.9-12 Explain.Expressive

LIS Strategies

Reading Materials: Obtain, Evaluate, and Communicate Information

Academic Language and Vocabulary: Ask Questions

Comprehension: Discussion and Writing: Engage in Argument from Evidence

Comprehension: Strategy Instruction: Use Mathematical and Computational

Thinking Comprehension: Knowledge-building: Analyze and Interpret Data

Writing: Construct Explanations and Develop and Use Models

Observation and Assessment: Plan and Carry Out Investigations

Engagement: Define Problems and Design Solutions

Module 2: Periodic Table Essential Questions: Drawing connections between elements and their placement on the periodic table it can be concluded the vast properties of that element.		Timeline: 2-3 weeks
I believe based on the following data about the element _____ that the following patterns will occur.		
Performance Event: Chemistry Review Game		
SWBAT: (Mastery Objectives) 1. Explain how groups and periods are arranged on the periodic table by classifying metals, nonmetals, metalloids, and families based on an element's position. 2. Identify key properties, valence electrons and oxidation numbers in the same family. 3. Explain the reasoning behind the specific trends on the periodic table. 4. Identify the s,p,d,f blocks on the periodic table and write an electron configuration,noble gas notation, and orbital notation for the elements on the periodic table.		
Vertical Alignment		
Previous Grade Level Standards	Grade Level Standards	Next Grade Level Standards
PS.8.1 Understand the properties of matter and changes that occur when matter interacts in open and closed systems. PS.PSc.1 Understand types, properties, and structure of matter.	PS.Chm.2 Understand the physical and chemical properties of atoms based on their position in the Periodic Table. PS.Chm.2.1 Use the Periodic Table as a model to predict the relative properties of elements based on the pattern of valence electrons in the outermost energy levels of atoms. PS.Chm.2.2 Construct an explanation to infer the atomic size, reactivity, electronegativity, and ionization energy of an element based on its position in the Periodic Table.	N/A
Instructional Resources		
Tier III Vocabulary: 2.1 periodic law, representative element, monovalent, multivalent, oxidation number, malleability,	Performance Tasks: Alien Periodic Table Review Periodic Trend Lab Drawing Lab with Trends	Additional Resources

ductility, phase (vs state), luster, reactivity, period (row), group/family (column), alkali metal, alkaline-earth metal, halogen, noble gas, transition metal, inner transition metals, lanthanide, actinide, valence electrons, energy levels, metallic, nonmetallic, first ionization energy 2.2 intramolecular, mechanism, molecular, covalent, ionic, octet rule, electron dot diagram, Lewis structure, chemical bond, shared pair, lone pair, conductivity, electronegativity, ionization energy, single bond, double bond, triple bond, bond length, bond strength, transfer, share, particle diagram	Hog Hilton	
Remediation Skills, Extensions and Considerations: • Remediation: • Extension: • Considerations:		
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Academic Language and Vocabulary: Ask Questions

Comprehension: Discussion and Writing: Engage in Argument from Evidence

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Thinking Comprehension: Knowledge-building: Analyze and Interpret Data

Writing: Construct Explanations and Develop and Use Models

Observation and Assessment: Plan and Carry Out Investigations

Engagement: Define Problems and Design Solutions

Module 3: Chemical Bonds Essential Questions: Based on the evidence of properties from the differing bond types it can be argued that _____ bonds are present. We can predict the relationships between the intermolecular forces based on the polarity of the molecule. Based on the rules of nomenclature, I can predict the compound names and formulas.		Timeline: 3 weeks
Performance Event: Intermolecular Art		
SWBAT: (Mastery Objectives) 1. Compare and Contrast Ionic, Covalent, and Metallic Compounds based on composition and properties. 2. Draw the electron dot diagrams and Lewis Structures for Ionic and Covalent Compounds. 3. Label and Explain Lewis Structures for Covalent Compounds according to the VSEPR theory. (Teacher) 4. Explain H-bonding, dipole-dipole, and London Dispersion Theory. Explain energy required in terms on bond lengths. 5. Explain polarity in terms of a compounds molecular shape.		
Vertical Alignment		
Previous Grade Level Standards	Grade Level Standards	Next Grade Level Standards
PS.PSc.2 Analyze interactions of matter within a chemical system.	PS.Chm.3 Understand the bonding that occurs in simple compounds in terms of bond type, strength, and properties. PS.Chm.3.1 Analyze and interpret data to explain the mechanisms and properties of the two main types of intramolecular (ionic and covalent) bonds. PS.Chm.3.2 Construct an explanation to summarize the influences intermolecular forces have on the properties of chemical compounds. PS.Chm.3.3 Use models to predict chemical names and formulas including ionic (binary & ternary), acidic, and binary covalent compounds.	N/A
Instructional Resources		

Tier III Vocabulary: 3.1 intramolecular, mechanism, molecular, covalent, ionic, octet rule, electron dot diagram, Lewis structure, chemical bond, shared pair, lone pair, conductivity, electronegativity, ionization energy, single bond, double bond, triple bond, bond length, bond strength, transfer, share, particle diagram 3.2 intermolecular, intramolecular, hydrogen bond, dipole-dipole interaction, (London) dispersion force, attraction, vapor pressure, solubility, polar, nonpolar, solvent, solubility rules 3.3 Binary, ternary, polyatomic ion, monatomic, nomenclature, Roman numerals, mono-, di-, tri-, tetra-, penta-, hexa-, hepta-, octa-, nona-, deca-, hydrochloric acid, nitric acid, sulfuric acid, acetic acid, phosphoric acid, subscript, charge, transfer, share, least common multiple, particle diagram	Performance Tasks: Types of Bonding VSEPR Theory Lewis Structure Candy Lab	Additional Resources
Remediation Skills, Extensions and Considerations: • Remediation: • Extension: • Considerations:		
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LIS Strategies <u>Reading Materials:</u> Obtain, Evaluate, and Communicate Information <u>Academic Language and Vocabulary:</u> Ask Questions <u>Comprehension: Discussion and Writing:</u> Engage in Argument from Evidence <u>Comprehension: Strategy Instruction:</u> Use Mathematical and Computational <u>Thinking Comprehension:</u> Knowledge-building: Analyze and Interpret Data <u>Writing:</u> Construct Explanations and Develop and Use Models <u>Observation and Assessment:</u> Plan and Carry Out Investigations <u>Engagement:</u> Define Problems and Design Solutions

Module 4: Reactions Essential Questions: We can predict the energy throughout a reaction from the potential energy diagrams. We can predict the type of Chemical equation based on the properties of its reactants and products. The calculations can be made from the stoichiometric properties of compounds and reactions.	Timeline: 4-5 weeks
Performance Event: N/A	
SWBAT: (Mastery Objectives) 1. Write and Name Ionic Compounds 2. Write and Name Covalent Compounds 3. Write and Name Acids and Bases 4. Contrast Acid and Base chemical and physical properties. Teacher 5. Calculate pH, pOH, [H ⁺], and [OH ⁻] Teacher	

6. Explain the collision theory and activation energy
7. Discuss and Compare potential energy diagrams for Endothermic and Exothermic Reactions.
8. Explain determining factors used as indicators that a chemical reaction has occurred.
9. Explain the factors that affect the rate of reactions. (Temperature, Concentration, Particle Size, and Presence of Catalyst)
10. Balance Chemical Equations; labeling the specific type of reaction that has taken place.
11. Predict the products for all types of Chemical Reactions with the use of reference sheets.
12. Explain using the Performance Task series and solubility rules whether a chemical reaction will take place.
13. Explain and Calculate quantitatively the composition of a substance. (Empirical Formula, Molecular Formula, Percent Composition, and Hydrates)

Vertical Alignment

Previous Grade Level Standards	Grade Level Standards	Next Grade Level Standards
PS.PSc.2 Analyze interactions of matter within a chemical system.	PS.Chm.4 Analyze chemical reactions in terms of quantities, product formation, and energy. PS.Chm.4.1 Use models to explain the exothermic or endothermic nature of chemical changes. PS.Chm.4.2 Carry out investigations to predict the outcome of simple chemical reactions that obey the Law of Conservation of Mass. PS.Chm.4.3 Use mathematics and computational thinking to analyze quantitatively the composition of a substance (empirical formula, molecular formula, percent composition, and mole conversions). PS.Chm.4.4 Use mathematics and computational thinking to apply the mole concept in the stoichiometric relationships inherent in chemical reactions.	N/A

Instructional Resources

Tier III Vocabulary: 5.1 collision, concentration, catalyst, activation energy, surface area, reaction rate, kinetic energy,	Performance Tasks: Nomenclature Fun Reaction Rates Lab Balancing Equations	Additional Resources
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temperature, energy diagram, endothermic, exothermic, pressure 4.1 Δ (delta), exothermic, endothermic, potential energy, kinetic energy, collision, enthalpy, catalyst, activated complex, activation energy, heat of reaction 4.2 coefficient, subscript, chemical reaction, activity series, synthesis (or combination), decomposition, replacement (or displacement), combustion, precipitate, aqueous, neutralization, law of conservation of mass, dilution, hydrocarbon, balanced, soluble, insoluble, diatomic molecules 4.3 mole, percent composition, empirical formula, molecular formula, formula units, molecules, atoms, ions, representative particles, ratio, molar mass, formula mass, subscript, Avogadro's number 4.4 molar volume, STP (standard temperature and pressure), coefficients, mole, ratio, particle diagram, stoichiometry, representative particle, molar mass	Chemical Reaction Lab Stoichiometry Activities Mole Lab S'mores Lab Cartesian Diver Lab	
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5.2 Equilibrium, concentration, reactant, product, heat, endothermic, exothermic, pressure, gaseous, forward, reverse, rate, Le Chatelier's Principle, shift, disturbance		
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Module 5: Solutions & Particle Movement Essential Questions: We can predict the heat quantity from the properties of its chemical reaction. The measurements can be determined for volume, pressure and temperature from the relationships of the gas laws. Based on my observations of evidence, the following _____ can be classified as _____ given the following properties: _____.		Timeline: 4-5weeks
Performance Event: Soda Maker Challenge		
SWBAT: (Mastery Objectives) 1. Discuss the types of solutions. [Solid, Liquid, Gas, Aqueous, Homogeneous mixtures, electrolytic, and non-electrolytic] 2. Summarize colligative properties. [Vapor pressure reduction, boiling point elevation, freezing point depression, and osmotic pressure] 3. Explain and use solubility diagrams. Explain the solution process - key terms solubility, solute, solvent. 4. Explain physical equilibrium using liquid water to water vapor as your primary example. 5. Explain specific portions of phase changes: how energy of particles change; how pressure and temperature act as determining factors in phase change 6. Contrast Heat and Temperature 7. Explain heating and cooling curves: heat of fusion, heat of vaporization, specific heat, melting point, and boiling point. Draw and Discuss Phase Change Diagrams. (Primary Examples- Water and Carbon Dioxide) 8. Calculate Specific Heat Problems. .		
Vertical Alignment		
Previous Grade Level Standards	Grade Level Standards	Next Grade Level Standards
PS.PSc.2 Analyze interactions of matter within a chemical system. PS.PSc.7 Analyze energy transfers and transformations within a mechanical system.	PS.Chm.6 Understand solutions and the solution process. PS.Chm.6.1 Carry out investigations to summarize the factors that affect the formation and properties of solutions. PS.Chm.6.2 Use models to explain the quantitative nature of a solution (molarity, dilution, titration). PS.Chm.6.3 Carry out investigations to compare properties and behaviors (qualitative and quantitative) of acids and	N/A

	bases. PS.Chm.7 Understand the relationship among pressure, temperature, volume, and phase. PS.Chm.7.1 Use models to explain how changes in energy affect the arrangement and movement of the particles in solids, liquids, and gases, as well as the relative strengths of their intermolecular forces. PS.Chm.7.2 Use mathematics and computational thinking to execute simple calorimetric calculations based on the Law of Conservation of Energy. PS.Chm.7.3 Use mathematics and computational thinking to explain the relationships among pressure, temperature, volume, and quantity of gas, both qualitatively and quantitatively.	
Instructional Resources		
Tier III Vocabulary: 6.1 dissociation, dissolution, solute, solvent, solution, solubility, dilute, concentrated, polar, nonpolar, ion, electrolytic, non electrolytic, homogeneous, heterogeneous, agitation, temperature, surface area, endothermic, exothermic, saturated, unsaturated, supersaturated 7.1 kinetic energy, potential energy, heat, temperature, phase, phase change, melting, freezing, vaporization, boiling, evaporation, condensation, endothermic processes, exothermic processes, intermolecular forces, fusion	Performance Tasks: Solubility Curve Lab Phase Change Diagrams Heat of Fusion Lab Specific Heat Lab Acid/ Base Lab	Additional Resources

(physical process), vapor pressure 7.2 calorimetry, calorimeter, system, surroundings, endothermic, exothermic, Law of Conservation of Energy, temperature, heat, specific heat, heat of fusion, heat of vaporization, latent heat, Joules, Celsius, thermal energy, Calorie (food calorie), calorie 6.2 molarity, concentration, titration, dilution, equivalence point, neutralization, titrant, end point, buret, stopcock, indicator, pH/pOH 6.3 ionization, conductivity, pH, pOH, $[H^+]$, $[OH^-]$, logarithm, indicator, phenolphthalein, litmus, concentration, strength, acid, base, neutral, Arrhenius 7.3 Kelvin, Celsius, kinetic molecular theory, ideal gas, STP, kPa, atm, mm Hg, torr, pressure, temperature, volume, ideal gas constant (R), real gas		
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Writing: Construct Explanations and Develop and Use Models

Observation and Assessment: Plan and Carry Out Investigations

Engagement: Define Problems and Design Solutions