Ganado Unified School District #20
(Chemistry)

PACING Guide SY 2022-2023

Time Line & Resources (Identify textbook, page number or website link & etc.)	**Academic Standards**	**Essential Question (HESS Matrix)**	**Learning Goal**	**Vocabulary (Content/Academic)**
First Quarter				
Structures and Properties of Matter - Matter and Change - Atomic Structure - Electrons in Atoms - The Periodic Table *Textbook:* *Pearson Chemistry* *Pages: 32 – 48, 100 – 112, 126 – 138, 158 – 174*	**P1: All matter in the Universe is made of very small particles.** **Essential HS. P1U1.1** Develop and use models to explain the relationship of the structure of atoms to patterns and properties observed within the Periodic Table and describe how these models are revised with new evidence	How is matter classified according to its composition? How are elements, compounds, mixtures different? How does the structure of matter relate to its properties? What are physical and chemical properties? How do chemical and physical changes differ? How does the law of conservation of matter apply to chemical changes? How have historic experiments led to the development of the modern model of the atom? How is the modern model of an atom	I will be able to: -define chemistry as it relates to the classification of matter and changes of state. -compare and contrast elements, compounds, and mixtures. -identify two types of mixtures. -explain how a pure substance is different from a mixture. -define physical and chemical properties and changes. I will be able to: -discuss the timeline which led to the development of the modern atomic theory. -investigate experimental evidence and contributions of influential scientists including	chemistry matter mass property scientific model qualitative quantitative substance mixture alloy solute solvent aqueous solution element compound formula atom atomic theory law of definite proportions hypothesis theory scientific law atomic mass unit

		different from previous models? What information is available in an element block of the periodic table? How does the electron relate to modern atomic theory? How do electron energy levels in an atom differ from one another? How are Lewis dot diagrams used to illustrate valence electrons? What are the steps in the historical development of the periodic table? How is the periodic table used to predict similarities in properties of the elements? How does an element's valence electron structure relate to its position in the periodic table? How is the periodic table used to classify an element as a metal, nonmetal, or metalloid? What are the properties of metals, nonmetals, and metalloids?	Lavoisier, Proust, Dalton, Thomson, and Rutherford. -describe the electromagnetic spectrum and how it relates to elemental emission spectra. -investigate valence electron structure and describe procedures for drawing Lewis dot diagrams. I will be able to: -explain the structure of the periodic table. -compare the properties of metals, nonmetals, and metalloids with the number of their valence electrons. -discuss the use of metalloids in semiconductors.	electromagnetic spectrum emission spectrum energy level electron cloud valence electron Lewis dot diagram period periodicity periodic law noble gas transition element lanthanide actinide metalloid semiconductor

Second Quarter				
Chemical Reactions - Ionic and Metallic Bonding - Covalent Bonding - Chemical Names and Formulas - Chemical Reactions *Textbook:* *Pearson Chemistry* *Pages:192 – 209, 220 – 247, 262 – 289, 344 - 369*	**P1: All matter in the Universe is made of very small particles.** **Essential HS. P1U1.2** Develop and use models for the transfer of sharing of electrons to predict the formation of ions, molecules and compounds in both natural and synthetic processes	How does the position of main group elements on the periodic table relate to their electron configuration? How does an element's electron configuration and atomic size relate to its chemical behavior? What are the chemical behaviors of transition elements in the periodic table? How are the properties of compounds different from those of the elements of which the compounds are composed? In what ways are the properties of sodium chloride, water, and carbon dioxide similar? How are they different? How can the formation of ionic and covalent compounds be modeled at the submicroscopic level? How do atoms achieve chemical stability by bonding? How do the physical properties of covalent	I will be able to: -discuss the properties of the main group elements and how they relate to electron configuration and atomic size. -examine the properties of several of the most important transition elements in group 3-12 and relate them to their electron configurations. -discuss how the inner transition elements are characterized by f sublevels, and describe a few of the most important elements I will be able to: -relate the formation of ionic and covalent compounds to the submicroscopic structure of the constituent elements. -discuss the general characteristics of ionic and covalent compounds and relate them to the type of bonding. I will be able to: -define the rules for writing formulas and naming ionic compounds. -explain how to interpret chemical formulas and relate	binary compound formula unit oxidation number polyatomic ion hydrate hygroscopic deliquescent anhydrous distillation molecular element allotrope organic compound inorganic compound hydrocarbon reactant product coefficient synthesis decomposition single displacement double displacement combustion equilibrium soluble insoluble activation energy catalyst enzyme inhibitor electronegativity shielding effect polar covalent bond malleable ductile conductivity

		compounds compare to those of ionic compounds? If charges of ions are known, how can proper formulas be written for ionic compounds? How can the formula of an ionic compound be determined from the name for the compound? What kind of information can be gathered from a chemical formula? How do the properties of covalent substances compare with those of ionic substances? How can a formula of a covalent compound be used to generate a name for the compound? How do chemical equations describe chemical reactions? How are chemical reactions balanced by changing coefficients? How are the five major types of chemical reactions classified? What factors influence the direction of a reaction? How are ionic, covalent, and polar covalent bonds similar? How are they different?	them to the individual charges of ions combining within the compound. -compare and contrast ionic and covalent compounds. -identify the rules to follow in naming binary compounds, common acids and bases, and hydrocarbons. I will be able to: -use the law of conservation of mass to write and balance chemical equations. -describe the five reaction types in detail and identify examples of each type. -investigate the reactants and products for each of these reactions and emphasize how they can be used to interpret the reaction. -define reversible reaction and relate this concept to equilibrium I will be able to: -define electronegativity as a key to differentiate between covalent, polar covalent, and ionic bonds. -examine Lewis dot diagrams of molecules and analyze electron-pair repulsions in order to determine molecular geometries and polarities. -discuss properties of covalent compounds and compare it to the properties of ionic compounds.	metallic bond double bond triple bond polar molecule

		How can a Lewis dot diagram be used to formulate the three-dimensional geometry of a molecule?		
Third Quarter				
Chemical Reactions - Solutions - Thermochemistry - Reaction Rates and Equilibrium - Acids, Bases and Salts - Oxidation – Reduction Reactions *Textbook:* *Pearson Chemistry* *Pages: 516 – 538, 592 – 627, 644 – 676, 690 – 707*	**P1: All matter in the Universe is made of very small particles.** **Essential HS. P1U1.3** Ask questions, plan and carry out investigations to explore the cause and effect relationship between reaction rate factors	What properties distinguish acids from bases? How do strong acids and bases compare to weak acids and bases in terms of degree of dissociation or ionization? How is pH related to the acidity of a solution?	I will be able to: -explore the properties of acids and bases and relate their reactions in water. -explain the difference between strong and weak acids and bases and relayed to the degree of ionization or dissociation of the compounds. -learn about the pH scale and relate to the concentrations of hydronium and hydroxide ions. I will be able to: -define oxidation-reduction reactions and identify characteristics of these reactions. I will be able to: -use energy diagrams to examine exothermic and endothermic reactions. -explain activation energy and the effects of catalysts on chemical reactions. -describe entropy as a measure of	acid hydronium ion acidic hydrogen ionization base acidic anhydride basic anhydride strong base strong acid weak acid weak base pH oxidation reduction oxidizing agent reducing agent heat law of conservation of energy fossil fuel entropy

			how dispersed the energy of a system is, and explain how this relates to reaction spontaneity	
Fourth Quarter				
Nuclear Processes and Applications of Chemistry - Nuclear Radiation - Nuclear Transformations - Fission and Fusion - Radiation in Your Life *Textbook:* *Pearson Chemistry* *Pages: 874, 876 – 879, 880 – 887, 888 – 893, 894*	**P1: All matter in the Universe is made of very small particles.** **Essential HS. P1U1.4** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/ or political implications.	How was radioactivity discovered? What are the properties of alpha, beta, and gamma radiation? How are the half-lives of various radioactive elements used to date materials? How do nuclear fission and nuclear fusion compare and contrast?	I will be able to: -discuss the discovery and early study of radioactivity by Becquerel and Curies. -learn nuclear notation and use it in the explanation of alpha, beta, and gamma decay. -describe the characteristics and detection of the three types of radiation. -explain half-life and its use in radioactive dating.	radioactivity alpha particle beta particle gamma ray half-life nuclear fission nuclear reactor nuclear fusion deuterium tritium