Hesperia Community Schools

Course: Chemical Science
Grade Level: 9th Grade

Timeline	HSCE's/ GLCE's and CCSS	Content—the "WHAT" of teaching. Specific themes, units & topics.	Essential Skills: the "Important Details/Essential Questions" you are teaching (How & essential of What)	Content Vocabulary	Assessment: the products & performances of learning	Resources
Unit: Introduction to Chemistry A **# of Weeks**: 1 and ongoing ***Physical Science*, Holt © 2008** **Reference**: CH 1	**C1.1A**: Generate new questions that can be investigated in the laboratory or field. **C1.1B**: Evaluate the uncertainties or validity of scientific conclusions using an understanding of sources of measurement error, the challenges of controlling variables, accuracy of data analysis, logic of argument, logic of experimental design, and/or the dependence on underlying assumptions. **C1.1C**: Conduct scientific investigations using appropriate tools and techniques (e.g., selecting an instrument that measures the desired quantity—length, volume, weight, time interval, temperature—with the appropriate level of precision). **C1.1D**: Identify patterns in data and relate them to theoretical models. **C1.1E**: Describe a reason for a given conclusion using evidence from an investigation. **C1.1f**: Predict what would happen if the variables, methods, or timing of an investigation were changed. **C1.1g**: Based on empirical evidence, explain and critique the reasoning used to draw a scientific conclusion or explanation. **C1.1h**: Design and conduct a systematic scientific investigation that tests a hypothesis. Draw conclusions from data presented in charts or tables. **C1.2A**: Critique whether or not specific questions can be answered through scientific investigations.	• The Nature of Science (Section 1) • The Way Science Works (Section 2) • Organizing Data (Section 3)	• How Science Takes Place (CH 1, Sect. 1) • Science Skills (CH 1, Sect. 2) • Units of Measurement (CH 1, Sect. 2) • Presenting Scientific Data (CH 1, Sect.3)	Independent variable, dependent variable,	Iron in Total Cereal Lab Report Heating and Cooling of Water Lab	Mystery Box Edible "Candle" Demo Analysis of Penny Lab BrainPoP: Science Projects Flinn Think Tube Activity & Worksheet

Hesperia Community Schools

	C1.2B: Identify and critique arguments about personal or societal issues based on scientific evidence.					
Unit: Matter **Weeks**: 2 – 5 ***Physical Science*, Holt © 2008 Reference**: CH 2	**P4.p2A**: Distinguish between an element, compound, or mixture based on drawings or formulae. (prerequisite) **P4.p2B**: Identify a pure substance (element or compound) based on unique chemical and physical properties. (prerequisite) **P4.p2C**: Separate mixtures based on the differences in physical properties of the individual components. (prerequisite) **P4.p2D**: Recognize that the properties of a compound differ from those of its individual elements. (prerequisite)	• Classifying Matter (Section 1) • Properties of Matter (Section 2) • Changes of Matter (Section 3)	• What is Matter? (CH 2, Sect. 1) • Elements (CH 2, Sect. 1) • Compounds (CH 2, Sect. 1) • Pure Substances & Mixtures (CH 2, Sect. 1) • Physical Properties (CH 2, Sect. 2) • Chemical Properties (CH 2, Sect. 2) • Physical Changes (CH 2, Sect. 3) • Chemical Changes (CH 2, Sect. 3) • Breaking Down Mixtures & Compounds (CH 2, Sect. 3)	Matter Element Atom Molecule Compound Pure substance Mixture Melting point Boiling point Density Reactivity Physical change Chemical change	How Thick is Aluminum Foil? Lab Matter Dichotomous Key Lab Iron in Total Cereal Lab Density Challenge Performance Assessment CH 2 Unit Test: Matter	Aloha! Chemical Sunset Demo Mass of Gases Demo BrainPoP: 1. Measuring Matter, 2. Cons. Of Matter Flinn Matter ID Activity w/ Chart Does the Candle Sink or Float? Demo
Unit: States of Matter **Weeks**: 6 – 8 ***Physical Science*, Holt © 2008 Reference**: CH 3	**P4.p1A**: For a substance that can exist in all three phases, describe the relative motion of the particles in each of the phases. (prerequisite) **P4.p1B** : For a substance that can exist in all three phases, make a drawing that shows the arrangement and relative spacing of the particles in each of the phases. (prerequisite) **C4.3A**: Recognize that substances that are solid at room temperature have stronger attractive forces than liquids at room temperature, which have stronger attractive forces than gases at room temperature. **C4.3B**: Recognize that solids have a more ordered, regular arrangement of their particles than liquids and that liquids are more ordered than gases. **C4.5a**: Provide macroscopic examples, atomic and molecular explanations, and mathematical representations (graphs and equations) for the	• Matter and Energy (Section 1) • Changes of State (Section 2) • Fluids (Section 3) • Behavior of Gases (Section 4)	• Kinetic Theory (CH 3, Sect. 1) • States of Matter (CH 3, Sect. 1) • Energy's Role (CH 3, Sect. 1) • Energy & Changes of State (CH 3, Sect. 2) • Conservation of Mass & Energy (CH 3, Sect. 2) • Pressure (CH 3, Sect. 3) • Buoyant Force (CH 3, Sect. 3) • Pascal's Principle (CH 3, Sect. 3) • Fluids in Motion (CH 3, Sect. 3) • Properties of Gases (CH 3, Sect. 4)	Fluid Plasma Energy Temperature Thermal energy Evaporation Sublimation Condensation Pressure Pascal Buoyant force Viscosity Gas laws	Gas Laws & Pressure Principles Cube Activity Pressure Quiz	Making Smores Activity States of Matter: Search & Rescue Activity Bill Nye: Pressure Video & Worksheet Self-Starting Siphon Demo MindPoint Quiz Show Game BrainPoP: States of Matter Fluid Notes

	pressure-volume relationship in gases. **C4.5b**: Provide macroscopic examples, atomic and molecular explanations, and mathematical representations (graphs and equations) for the pressure-temperature relationship in gases. **C4.5c**: Provide macroscopic examples, atomic and molecular explanations, and mathematical representations (graphs and equations) for the temperature-volume relationship in gases.		• Gas Laws (CH 3, Sect. 4)			Evaporation Demo Boiling Water Demo States of Matter Comparison Chart
Unit: Atoms & The Periodic Table **Weeks**: 9 – 11 ***Physical Science*, Holt © 2008 Reference**: CH 4 & 5	**C1.2C**: Develop an understanding of a scientific concept by accessing information from multiple sources. Evaluate the scientific accuracy and significance of the information. **C4.10A**: List the number of protons, neutrons, and electrons for any given ion or isotope. **C4.10B**: Recognize that an element always contains the same number of protons. **C4.10e**: Write the symbol for an isotope, X Z A , where Z is the atomic number, A is the mass number, and X is the symbol for the element. **C4.9A**: Identify elements with similar chemical and physical properties using the periodic table. **C4.9b**: Identify metals, non-metals, and metalloids using the periodic table. **C4.9c**: Predict general trends in atomic radius, first ionization energy, and electonegativity of the elements using the periodic table.	• The Development of Atomic Theory (CH 4, Section 1) • The Structure of Atoms (CH 4, Section 2) • Organizing the Elements (CH 5, Section 1) • Exploring the Periodic Table (CH 5, Section 2) • Families of Elements (CH 5, Section 3)	• The Beginnings of Atomic Theory (CH 4, Sect. 1) • Dalton's Atomic Theory (CH 4, Sect. 1) • Thomson's Model of the Atom (CH 4, Sect. 1) • Rutherford's Model of the Atom (CH 4, Sect. 1) • What is an Atom? (CH 4, Sect. 2) • Atomic Number & Mass Number (CH 4, Sect. 2) • Isotopes (CH 4, Sect. 2) • Atomic Masses (CH 4, Sect. 2) • Recognizing a Pattern (CH 5, Sect. 1) • Changing the Arrangement (CH 5, Sect. 1) • The Periodic Table of the Elements (CH 5, Sect. 1) • The Role of Electrons (CH 5, Sect. 2) • Ion Formation (CH 5, Sect. 2) • How Are Elements	Electron Electron cloud Proton Neutron Atomic number Mass number Isotope Atomic mass unit Mole Orbital Valence electron Proton Periodic law Period Group Ion Metal Nonmetal Semiconductor Alkali metal Alkaline-earth metal Transition metal Noble gas Halogen	Beanium Isotope Lab Elements Go to College Activity Paint Chip Lab CH 4 & 5 Unit Test: Atoms & the Periodic Table CH 4 & 5 Quiz: Atoms & the Periodic Table	BrainPoP: 1. Atoms, 2. Isotopes, 3. Ions, 4. Periodic Table Atoms Family WS Atomic Structure Drawings # 1 – 20 Ion Drawings # 1 -20 e^- Dot Diagrams # 1 – 20 Periodic Table Coloring Project e^- Dot Diagrams on Classroom Periodic Table Activity Isotope/Ions WS White Board Review Activity with Bohr Model Cards Youtube.com Video: Reactivity of Alkali Metals

			Classified? (CH 5, Sect. 2) • Classifying Elements Further (CH 5, Sect. 3) • Metals (CH 5, Sect. 3) • Nonmetals (CH 5, Sect. 3) • Semiconductors (CH 5, Sect. 3)			Periodic Table of Cereal Project (optional)
Unit: Structure of Matter **Weeks**: 12 – 14 ***Physical Science*, Holt © 2008** **Reference**: CH 6	**C4.2A**: Name simple binary compounds using their formulae. **C4.2B**: Given the name, write the formula of simple binary compounds. **C4.2c**: Given a formula, name the compound. **C4.2d**: Given the name, write the formula of ionic and molecular compounds.	• Compounds & Molecules (Section 1) • Ionic and Covalent Bonding (Section 2) • Compound Names & Formulas (Section 3)	• Chemical Bonds (CH 6, Sect. 1) • Chemical Structure (CH 6, Sect. 1) • How Does Structure Affect Properties? (CH 6, Sect. 1) • Why Do Chemical Bonds Form? (CH 6, Sect. 2) • Ionic Bonds (CH 6, Sect. 2) • Covalent Bonds (CH 6, Sect. 2) • Naming Ionic Compounds (CH 6, Sect. 3) • Naming Covalent Compounds (CH 6, Sect. 3)	Chemical bond Chemical structure Bond length Bond angle Ionic bond Covalent bond Metallic bond Polyatomic ion	White Board Activity – Writing Names or Writing Formulas White Board Activity – Drawing Covalent Bonding Structure CH 6 Unit Test: Chemical Bonding Creating Models of Ionic Compounds Project "My Ion" Activity VENN Diagram: Ionic vs. Covalent	Vocab Table (CH 6 – 1) Bond Angle with Models Demo BrainPoP: Chemical Bonds Melting Salt & Sugar Lab Bonding Basics Notes Types of Bonds Notes Making Ionic Compounds WS Conductivity Demo Polyatomic Ion Notes Polyatomic & Ionic Compound Naming WS Polar vs. Non-polar (Balloon & Stream of Water) Demo

Hesperia Community Schools

Unit: Chemical Reactions **Weeks**: 15 – 16 ***Physical Science*, Holt © 2008** **Reference**: CH 7	**C3.4A**: Use the terms endothermic and exothermic correctly to describe chemical reactions in the laboratory. **C3.4B**: Explain why chemical reactions will either release or absorb energy. **C3.5a**: Explain why matter is not conserved in nuclear reactions. **P3.p1A**: Explain that the amount of energy necessary to heat a substance will be the same as the amount of energy released when the substance is cooled to the original temperature. (prerequisite) **P3.p2A**: Trace (or diagram) energy transfers involving various types of energy including nuclear, chemical, electrical, sound, and light. (prerequisite)	• The Nature of Chemical Reactions (Section 1) • Chemical Equations (Section 2) • Reaction Types (Section 3)	• Chemical Reactions (CH 7, Sect. 1) • Energy & Reactions (CH 7, Sect. 1) • Describing Reactions (CH 7, Sect. 2) • Balanced Equations (CH 7, Sect. 1) • Classifying Reactions (CH 7, Sect. 3) • Electrons & Chemical Reactions (CH 7, Sect. 3)	Reactant Product Chemical energy Exothermic reaction Endothermic reaction Chemical reaction	Balancing Equations Activity with Paperclips Venn Diagram: Exothermic vs. Endothermic Balancing Equation Quiz Snowman Balancing Equations Challenge Activity CH 7 Unit Test: Chemical Reactions	Balancing Equations Website: "Classic Chem Balancer" Balancing Equations Demo w/ Magnetic Models Chemical Equations WS: Conceptual Representation Whoosh Bottle Demo Chemical Reaction Notes Exothermic Reaction Demo ($CaCl_2 + H_20$)
Unit: Acids & Bases **Weeks**: 17 – 18 ***Physical Science*, Holt © 2008** **Reference**: CH 9	**C5.7A**: Recognize formulas for common inorganic acids, carboxylic acids, and bases formed from families I and II. **C5.7B**: Predict products of an acid-based neutralization. **C5.7C**: Describe tests that can be used to distinguish an acid from a base. **C5.7D**: Classify various solutions as acidic or basic, given their pH.	• Acids, Bases & pH (Section 1) • Reactions of Acids & Bases (Section 2)	• Acids (CH 9, Sect. 1) • Bases (CH 9, Sect. 1) • pH (CH 9, Sect. 1) • Acid-Base Reactions (CH 9, Sect. 2)	Acid Base pH Electrolyte Indicator Neutralization	Crayola Color Change Marker Lab Acids & Bases Quiz	Magic Coloring Book Demo Acids, Bases & Salts Notes Acids & Bases WS BrainPoP: 1. Acids & Bases, 2. pH