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Chemistry Lesson Plan

Teacher's Name Mr. Calderon Grade/Course Chemistry Site Silverado High

TIME FRAME	BIG IDEA/TOPIC	CASTANDARDS	ASSESSMENTS	INSTRUCTIONAL MATERIALS	VOCABULARY	NOTES
3-5 days	Safety/Course Introduction	*(not assessed)	SHS Safety Test	Safety Packet Laboratory safety Course Syllabus Safety Contract		
2 periods	Chapter 1: INTRODUCTION TO CHEMISTRY 1.1 Chemistry pp. 7 – 11 1.1.1 Identify five traditional areas of study in chemistry 1.1.2 Relate pure chemistry to applied chemistry 1.1.3 Identify reasons to study chemistry	*(not assessed)	SE Section 1.1 Assessment p. 11 Teacher Constructed Assessment	SE Inquiry Activity: Solid or Liquid? p. 6 TE Teacher Demo: Explaining the natural World p. 10 TE Class Activity: Chemistry in the New p. 11	• Matter • Chemistry • Organic chemistry • Inorganic chemistry • Biochemistry • Analytical chemistry • Physical chemistry • Pure chemistry • Applied chemistry • Technology	
2 periods	1.2 Chemistry Far and Wide pp. 12 – 19 1.2.1 Identify some areas affected by chemistry research 1.2.2 Describe some examples of research in chemistry 1.2.3 Distinguish between macroscopic and microscopic views	*(not assessed)	SE Section 1.2 Assessment p. 17 Teacher Constructed Assessment	TE Class Activity: Biodiesel p. 13 TE Class Activity: Studying Gasoline Additives p. 16 TE Class Activity: Composition of the Sun p. 17	• Macroscopic • Microscopic • Biotechnology • Pollutant	
2 periods	1.3 Thinking like a scientist pp. 20 – 27 1.3.1 Describe how	I & E: 1f	SE Section 1.3 Assessment p. 25 Teacher Constructed Assessment	SE Quick Lab: Bubbles! p. 23 SE Small-Scale lab: Laboratory Safety	• Scientific method • Observation • Hypothesis • Experiment • Manipulated variable	

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	Lavoisier transformed Chemistry 1.3.2 Identify three steps in the scientific method 1.3.3 Explain why collaboration and communication are important in science			pp. 26 – 27 TE Class Activity: Invisible Ink p. 21 TE Class Activity: Lorenzo's Oil p. 22 TE Class Activity: Researching Collaborative Science Projects p. 24	• Responding variable • Theory • Scientific law	
2 periods	1.4 Problem Solving in Chemistry pp. 28 – 32 1.4.1 Identify two general steps in problem solving 1.4.2 Describe three steps for solving numeric problems 1.4.3 Describe two steps for solving conceptual problems	*(not assessed)	SE Section 1.4 Assessment p. 32 Chapter Assessment SE Chapter assessment pp. 34 – 36 Standardized Test Prep SE Chapter 1 p. 37 Teacher Constructed Assessment	TE Teacher Demo: Fit an Ice Cube in a Soda Bottle p. 31		
2 periods	Chapter 2: MATTER AND CHANGE 2.1 Properties of matter pp. 39 - 43 2.1.1 identify Properties of matter as extensive or intensive 2.1.2 Define physical property and list several common physical properties of substances 2.1.3 Differentiate among three states of matter 2.1.4 Describe a physical change	*(not assessed)	SE Section 2.1 assessment p. 42 Teacher Constructed Assessment	SE Inquiry Activity: Classifying Matter p. 38 TE Teacher Demo: Volume & Mass p. 40 TE Teacher Demo: States of Chocolate p. 41 TE Class Activity: Comparing solids & liquids p 41	• Mass • Volume • Extensive Property • Intensive Property • Substance • Physical Property • Solid • Liquid • Gas • Vapor • Physical Change	
2 periods	2.2 Mixtures pp. 44 – 47	I & E: 1d	SE Section 2.2 Assessment p. 47	SE: Quick Lab Separating Mixtures p. 45	• Mixture	

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	2.2.1 Categorize a sample of matter as a substance or a mixture 2.2.2 Distinguish between homogeneous and heterogeneous samples of matter 2.2.3 Describe two ways that components of mixtures can be separated	6f	Teacher Constructed Assessment	TE: Teacher Demo: Metallic Breakfast p. 46	• Heterogeneous Mixture • Homogeneous Mixture • Solution • Phase • Filtration • Distillation	
2 periods	2.3 Elements and Compounds pp. 48 – 52 2.3.1 Explain the difference between an element and a compound 2.3.2 Distinguish between a substance and a mixture 2.3.3 Identify the chemical symbols of elements, and name elements, given their symbols	*(not assessed)	SE Section 2.3 Assessment p. 52 Teacher Constructed Assessment	TE Teacher Demo: Decomposition of Sugar p. 49 TE Class Activity: Substances p. 50	• Element • Compound • Chemical Change • Chemical Symbol	
2 periods	2.4 Chemical Reactions pp. 53 – 56 2.4.1 Describe what happens during a chemical change 2.4.2 Identify four possible clues that a chemical change has take place 2.4.3 Apply the law of conservations of mass to chemical reactions	I & E: 1d	SE Section 2.4 Assessment p. 55 SE Chapter Assessment pp. 58 – 60 Standardized Test Prep SE Chapter 2 p. 61 Teacher Constructed Assessment	SE Small-Scale Lab: 1+2+3=Black! p. 56 TE Teacher Demo: Identifying a Chemical Change p. 54	• Chemical Property • Chemical Reaction • Reactant • Product • Precipitate • Law of conservation of Mass	
2 periods	Chapter 3: SCIENTIFIC MEASUREMENT 3.1 Measurements and	*(not assessed)	SE Section 3.1 Assessment p. 72 Teacher Constructed Assessment	SE Inquiry activity: Exploring Density, p. 62 SE Quick Lab: Accuracy and	• Measurement • Scientific notation • Accuracy	

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	Their Uncertainty pp. 63 – 72 3.1.1 Convert measurement to scientific notation 3.1.2 Distinguish among accuracy, precision, and error of a measurement 3.1.3 Determine the number of significant figures in a measurement and in a calculated answer			Precision, p. 72 TE Class Activity: Precision and Accuracy p. 64 TE Class Activity: Significant Zeros p.68	• Precision, • Accepted value • Experimental value • Error • Percent error • Significant figures	
2 periods	3.2 The International System of Units (SI) pp. 73 -79 3.2.1 List SI units of measurement and common SI prefixes 3.2.2 Distinguish between the mass and weight of an object 3.2.3 Convert between the Celsius and Kelvin temperature scales	4e	SE Section 3.2 Assessment p. 79 Teacher Constructed Assessment	TE Teacher Demo: Volume Measurements p. 75 TE Class Activity: Mass of a Penny p. 76	• International System of Units (SI) • Meter (m) • Liter (L) • Kilogram (kg) • Gram (g) • Weight • Temperature • Celsius scale • Kelvin scale • Absolute zero • Energy • Joule (J) • Calorie (cal)	
2 periods	3.3 Conversion Problems pp. 80 – 88 3.3.1 Construct conversion factors from equivalent measurements 3.3.2 Apply the technique of dimensional analysis to a variety of conversion problems 3.3.3 Solve Problems by breaking the solution into steps 3.3.3 Convert complex units, using dimensional	*(not assessed)	SE Section 3.3 Assessment p. 87 Teacher Constructed Assessment	SE Quick Lab: Dimensional Analysis, p. 86 TE Class Activity : Expanding a recipe p.81 TE Class Activity: Sports Stats p. 84	• Conversion factor • Dimensional analysis	

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	analysis					
1 period	3.4 Density pp. 89 – 94 3.4.1 Calculate the density of a material from experimental data 3.4.2 Describe how density varies with temperature	I & E: 1d	SE Section 3.4 Assessment p. 93 Chapter Assessment SE Chapter Assessment pp. 96 – 98 Standardized Test Prep SE Chapter 3 p. 99 Teacher Constructed Assessment	SE Small-Scale Lab: Now What Will I Do? p. 94 TE Teacher Demo: Density Calculations p. 90 TE Teacher Demo: The Hydrometer p. 92	• Density	
2 periods	Chapter 4: ATOMIC STRUCTURE 4.1 Defining the Atom pp. 101 – 103 4.1.1 Describe Democritus' ideas about atoms 4.1.2 Explain Dalton's atomic theory 4.1.3 Identify what instrument is used to observe individual atoms	I & E: 1k	SE Section 4.1 Assessment p. 103 Teacher Constructed Assessment	SE Inquiry Activity: Electric Charge p. 100	• Atom • Dalton's Atomic Theory	
2 periods	4.2 Structure of the Nuclear Atom pp. 104 – 109 4.2.1 Identify three types of subatomic particles 4.2.2 Describe the structure of atoms according to the Rutherford atomic model	I & E: 1k 1e, 1h, 11g	SE Section 4.2 Assessment p. 108 Teacher Constructed Assessment	SE Quick lab: Using Inference: The Black Box p. 107 TE Teacher Demo: Observing Cathode Rays p. 105 TE Class Activity: Atomic Model Timeline p. 106	• Electrons • Cathode ray • Protons • Neutrons • Nucleus	
2 periods	4.3 Distinguishing between atoms pp. 110 – 120	I & E: 1b 1a, 1c	SE Section 4.3 Assessment p. 119 Chapter Assessment	SE Small-Scale lab: the Atomic Mass of Candium p. 120	• Atomic number • Mass number • Isotopes • Atomic mass unit (amu)	

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	4.3.1 Explain what makes elements and isotopes different from each other 4.3.2 Calculate the number of neutrons in an atom 4.3.3 Calculate the atomic mass of an element 4.3.4 Explain why chemists use the periodic table		SE Chapter Assessment pp. 122 – 124 Standardized Test Prep SE Chapter 4 p. 125 Teacher Constructed Assessment * 9 Week Assessment	TE Class Activity: Applications of Isotopes p. 112	• Atomic mass • Periodic table • Period group	
4 periods	Chapter 5: ELECTRONS IN ATOMS 5.1 Models of the Atom pp. 127 – 132 5.1.1 Identify the inadequacies in the Rutherford atomic model 5.1.2 Identify the new proposal in the Bohr model of the atom 5.1.3 Describe the energies and positions of electrons according to the quantum mechanical model 5.1.4 Describe how the shapes of orbitals related to different sub-levels differ	I & E: 1k, 1n 1g, 1i	SE Section 5.1 Assessment p. 132 Teacher Constructed Assessment	SE Inquiry Activity: Observing Light Emission from Wintergreen Mints p. 126 TE Teacher Demo: Quantized Energy p. 128 TE Teacher Demo: Energy and Energy Levels p. 129 TE Class Activity: The Shapes of Orbitals p. 130	• Energy levels • Quantum • Quantum mechanical model • Atomic orbital	
2 periods	5.2 Electron Arrangement in Atoms pp. 133 – 137 5.2.1 Describe how to write the electron configuration for an atom 5.2.2 Explain why the actual electron configurations for some	1g, 1j	SE Section 5.2 Assessment p. 136 Teacher Constructed Assessment	SE Small-Scale Lab: Atomic Emission Spectra p. 137 TE Class Activity: Writing Electron Configurations p. 134	• Electron configurations • Aufbau principle • Pauli exclusion principle • Hund's rule	

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	elements differ from those predicted by the Aufbau principle					
4 periods	5.3 Physics and the Quantum Mechanical Model pp. 138 – 147 5.3.1 Describe the relationship between the wavelength and frequency of light 5.3.2 Identify the source of atomic emission spectra 5.3.3 Explain how the frequencies of emitted light are related to changes in electron energies 5.3.4 Distinguish between quantum mechanics and classical mechanics	I & E: 1d, 1k, 1m, 1n 1h, 1i, 1j	SE Section 5.3 Assessment p. 146 Chapter Assessment SE Chapter Assessment pp. 149 – 152 Standardized Test Prep SE Chapter 5 p. 153 Teacher Constructed Assessment	SE Quick Lab: Flame Tests p. 142 TE Class Activity: Black Box Discovery p. 139 TE Class Activity: Properties of Waves p. 140 TE Class Activity: Atomic Scientists p. 145	• Amplitude • Wavelength • Frequency • Hertz • Electromagnetic radiation • Spectrum • Atomic emission spectrum • Ground state • Photons • Heisenberg uncertainty principle	
2 periods	Chapter 6: THE PERIODIC TABLE 6.1 Organizing the Elements pp. 155 – 160 6.1.1 Explain how elements are organized in a periodic table 6.1.2 Compare early and modern periodic tables 6.1.3 Identify three broad classes of elements	1a, 1b	SE Section 6.1 Assessment p. 160 Teacher Constructed Assessment	SE Inquiry Activity: Trends in Physical Properties p. 154 TE Teacher Demo: Organizing Elements p. 155 TE Class Activity: Name the Element p. 159	• Periodic law • Metals • Nonmetals • Metalloid	
2 periods	6.2 Classifying the Elements pp. 161 – 169 6.2.1 Describe the information in a periodic table	1b, 1c, 1f	SE Section 6.2 Assessment p. 167 Teacher Constructed Assessment	TE Teacher Demo: Observing Differences in Metals p. 165 TE Class Activity: Lanthanides in Consumer Products p. 166	• Alkali metals • Alkaline Earth metals • Halogens • Noble gases • Representative elements • Transition metal	

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	6.2.2 Classify elements based on electron configuration 6.2.3 Distinguish representative elements and transition metals				• Inner transition metal	
2 periods	6.3 Periodic Trends pp. 170 – 179 6.3.1 Describe trends among the elements for atomic size 6.3.2 Explain how ions form 6.3.3 Describe periodic trends for first ionization energy, ionic size, and electronegativity	I & E: 1d, 1g 1c, 2g	SE Section 6.3 Assessment p. 178 Chapter Assessment SE Chapter Assessment pp. 181 – 184 Standardized Test Prep SE Chapter 6 p. 185 Teacher Constructed Assessment	SE Quick Lab: Periodic Trends in Ionic Radii p. 175 SE Small-Scale Lab: Periodicity in Three Dimensions p. 179 TE Class Activity: Listing Elements p. 172 TE Class Activity: Effective Nuclear Charge and Electron Shielding p. 173 TE Teacher Demo: Predicting Reactivity p. 174 TE Teacher Demo: Trends in Ionic Size p. 176	• Atomic radius • Ion • Cation • Anion • Ionization energy • Electronegativity	
2 periods	Chapter 7: IONIC AND METALLIC BONDING 7.1 Ions pp. 187 – 193 7.1.1 Determine the number of valence electrons in an atom of a representative element 7.1.2 Explain how the octet rule applies to atoms of metallic and nonmetallic elements 7.1.3 Describe how cations form	1d, 1g, 2e	SE Section 7.1 Assessment p. 193 Teacher Constructed Assessment	SE Inquiry Activity: Shapes of Crystalline Materials p. 186 SE Class Activity: Forming Cations p. 190 TE Teacher Demo: Valence Electrons p. 188	• Valence electrons • Electron dot structures • Octet rule • Halide ions	

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	7.1.4 Explain how anions form					
2 periods	7.2 Ionic Bonds and Ionic Compounds pp. 194 – 200 7.2.1 Explain the electrical charge of an ionic compound 7.2.2 Describe three properties of ionic compounds	I & E: 1a, 1d 1g, 2a, 2c	SE Section 7.2 Assessment p. 199 Teacher Constructed Assessment	SE Quick lab: Solutions Containing Ions p. 199 SE Small-Scale lab: Analysis of Anions and Cations p. 200 TE Class Activity: "Hardness" of Water p. 196 TE Class Activity: Types of Ionic Compounds p. 197 TE Teacher Demo: Form and Structure of Crystals p. 197	• Ionic compounds • Ionic bonds • Chemical formula • Formula unit • Coordination number	
2 periods	7.3 Bonding in Metals pp. 201 – 205 7.3.1 Model the valence electrons of metal atoms 7.3.2 Describe the arrangement of atoms in a metal 7.3.3 Explain the importance of alloys	2a	SE Section 7.3 Assessment p. 203 Chapter Assessment SE Chapter Assessment pp. 207 – 210 Standardized Test Prep SE Chapter 7 p. 211 Teacher Constructed Assessment	TE Teacher Demo: Metals vs. Ionic Compounds p. 202 TE Teacher Demo: Types of Alloys p. 203 TE Teacher Demo: Making an Alloy p. 205	• Metallic bonds • Alloys	
2 periods	Chapter 8: COVALENT BONDING 8.1 Molecular Compounds pp. 213 – 216 8.1.1 Distinguish between the melting points and boiling points of molecular compounds and ionic	2a, 2b	SE Section 8.1 Assessment p. 216 Teacher Constructed Assessment	SE Inquiry Activity: Shapes of Molecules p. 212 TE Teacher Demo: Molecular Structures and Formulas p. 215	• Covalent bond • Molecule • Diatomic molecule • Molecular compound • Molecular formula	

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	compounds 8.1.2 Describe the information a molecular formula provides					
6 periods	8.2 The Nature of Covalent Bonding pp. 217 – 229 8.2.1 Describe how electrons are shared to form covalent bonds and identify exceptions to the octet rule 8.2.2 Demonstrate how electron dot structures represent shared electrons 8.2.3 Describe how atoms form double or triple covalent bonds 8.2.4 Distinguish between a covalent bond and coordinate covalent bond and describe how the strength of a covalent bond is related to its bonds dissociation energy 8.2.5 Describe how oxygen atoms are bonded in ozone	I & E: 1a, 1g 1g, 2a, 2b, 2e	SE Section 8.2 Assessment p. 229 Teacher Constructed Assessment	SE Quick Lab: Strengths of Covalent Bonds p. 226 TE Class Activity: Representing Molecules p. 218 TE Class Activity: Bonding for Second Row Elements p. 220 TE Teacher Demo: Bond Energies p. 225 TE Teacher Demo: A Resonance Hybrid p. 228	• Single covalent bond • Structural formula • Unshared pair • Double covalent bond • Triple covalent bond • Coordinate covalent bond Polyatomic ion • Bond dissociation energy • Resonance structure	
2 periods	8.3 Bonding Theories pp. 230 – 236 8.3.1 Describe the relationship between atomic and molecular orbitals 8.3.2 Describe how VSEPR theory helps predict the shapes of molecules 8.3.3 Identify ways in	2b, 2f	SE Section 8.3 Assessment p. 236 Teacher Constructed Assessment	TE Class Activity: Making Molecular Models p. 232	• Molecular orbitals • Bonding orbital • Sigma bond • Pi bond • Tetrahedral angle • VSEPR theory • Hybridization	

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	which orbital hybridization is useful in describing molecules					
4 periods	8.4 Polar Bonds and Molecules pp. 237 – 245 8.4.1 Describe how electronegativity values determine the distribution of charge in a polar molecule 8.4.2 Describe what happens to polar molecules when they are placed between oppositely charged metal plates 8.4.3 Evaluate the strength of intermolecular attractions compared with the strength of ionic and covalent bonds 8.4.4 Identify the reason why network solids have high melting points	I & E: 1d 2b, 2f, 2g, 2h, 6f	SE Section 8.4 Assessment p. 244 Chapter Assessment SE Chapter Assessment pp. 247 – 250 Standardized Test Prep SE Chapter 8 p. 251 Teacher Constructed Assessment	SE Small-Scale Lab: Paper Chromatography of Food dyes p. 245 TE Class Activity: A Magnetic Analogy p. 238 TE Teacher Demo: Observing Evidence of Polarity p. 240 TE Teacher Demo: Evidence of Hydrogen Bonding p. 243	• Nonpolar covalent bond • Polar covalent bond • Polar bond • Polar molecule • Dipole • Van der Walls forces • Dipole interactions • Dispersion forces • Hydrogen bonds • Network solids	
2 periods	Chapter 9: CHEMICAL NAMES AND FORMULAS 9.1 Naming Ions pp. 253 – 259 9.1.1 Identify the charges of monatomic ions by using the periodic table and name the ions 9.1.2 Define a polyatomic ion and write the names and formulas of the most common polyatomic ions 9.1.3 Identify the two common endings for the names of most polyatomic ions	*(not assessed)	SE Section 9.1 assessment p. 258 Teacher Constructed Assessment	SE Inquiry Activity: Element Name Search p. 252 TE Class Activity: Determining Ionic Charge p. 254 TE Teacher Demo: Colorful Ions p. 254 TE Class Activity: Symbols for Monatomic Ions p. 255 TE Class Activity: Shapes of Polyatomic Ions p. 258	• Monatomic ion • Polyatomic ion	

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2 periods	9.2 Naming and Writing Formulas for Ionic Compounds pp. 260 – 267 9.2.1 Apply the rules for naming and writing formulas for binary ionic compounds 9.2.2 Apply the rules for naming and writing formulas for compounds with polyatomic ions	I & E: 1d	SE Section 9.2 Assessment p. 266 Teacher Constructed Assessment	SE Small-Scale lab: names and Formulas for Ionic Compounds p. 267 TE Class Activity: Naming Ionic Binary Compounds p. 261 TE Teacher Demo: Making and Naming an Ionic Compound p. 262 TE Class Activity: Formulas for Binary Ionic Compounds p. 263 TE Teacher Demo: Making and Naming Lead Carbonate p. 264 TE Class Activity: Naming and Writing Formulas p. 265	• Binary compound	
2 periods	9.3 Naming and Writing Formulas for Molecular Compounds pp. 268 – 270 9.3.1 Interpret the prefixes in the names of molecular compounds in terms of their chemical formulas 9.3.2 Apply the rules for naming and writing formulas for binary molecular compounds	*(not assessed)	SE Section 9.3 Assessment Teacher Constructed Assessment	TE class Activity: Naming Binary Molecular Compounds p. 269		
1 period	9.4 Naming and Writing Formulas for Acids and Bases pp. 271 – 273 9.4.1 Apply three rules for naming acids 9.4.2 Apply the rules in	*(not assessed)	SE Section 9.3 Assessment Teacher Constructed Assessment		• Acid • Base	

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	reverse to write formulas of acids 9.4.3 Apply the rules for naming bases					
2 periods	9.5 The Laws Governing Formulas and Names pp. 274 – 279 9.5.1 Define the laws of definite proportions and multiple proportions 9.5.2 Apply the rules for naming chemical compounds by using a flowchart 9.5.3 Apply the rules for writing the formulas of chemical compounds by using a flowchart	I & E: 1d	SE Section 9.5 Assessment p. 279 Chapter Assessment SE Chapter Assessment pp. 281 – 284 Standardized Test Prep SE Chapter 9 p. 285 Teacher Constructed Assessment	SE Quick Lab: Making Ionic Compounds p. 279	• Law of definite proportions • Law of multiple proportions	
2 periods	Chapter 10: CHEMICAL QUANTITIES 10.1 The Mole: A Measurement of Matter pp. 287 - 296 10.1.1 Describe methods of measuring the amount of something 10.1.2 Define Avogadro's number as it relates to a mole of substance 10.1.3 Distinguish between the atomic mass of an element and its molar mass 10.1.4 Describe how the mass of a mole of a compound is calculated.	3b, 3c, 3d	SE Section 10.1 Assessment p. 296 Teacher Constructed Assessment *9 Week Assessment	SE Inquiry Activity: counting by Measuring Mass p. 286 TE Teacher Demo: Moles and Mass p. 294 TE Class Activity: Calculating Molar Mass p. 295	• Molar mass • Avogadro's number • Representative particle • Molar mass	
2 periods	10.2 Mole-Mass and Mole-	3d, 4d	SE Section 10.2 Assessment	SE Small-Scale Lab: Counting by		

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	Volume Relationships pp. 297 – 304 10.2.1 Describe how to convert the mass of a substance to the number of moles of a substance, and moles to mass. 10.2.2 Identify the volume of a quantity of gas at STP	I & E: 1d	p. 303 Teacher Constructed Assessment	Measuring Mass p. 304 TE Class Activity: Problem Solving p. 298 TE Teacher Demo: Molar Volume p. 301	• Avogadro's hypothesis • Standard temperature and pressure (STP) • Molar volume	
2 periods	10.3 Percent Composition and Chemical Formulas pp. 305 – 313 10.3.1 Describe how to calculate the percent by mass of an element in a compound 10.3.2 Interpret an empirical formula 10.3.3 Distinguish between empirical and molecular formulas	6f I & E: 1d	SE section 10.3 Assessment p. 312 Chapter Assessment SE Chapter assessment pp. 315 - 318 Standardized Test Prep SE Chapter 10 p. 319 Teacher Constructed Assessment	SE Quick Lab: Percent Composition p. 308 TE Class Activity: Empirical Formulas from Percent Composition p. 309 TE Teacher Demo: Paper Chromatography p. 313	• Percent composition • Empirical formula	
3 periods	Chapter 11: CHEMICAL REACTIONS 11.1 Describing Chemical Reactions pp. 321 - 329 11.1.1 Describe how to write a word equation 11.1.2 Describe how to write a skeleton equation 11.1.3 Describe the steps for writing a balanced chemical	I & E: 1d 3a	SE Section 11.1 Assessment p. 329 Teacher Constructed Assessment	SE Inquiry Activity: Modeling Chemical Reactions p. 320 SE Quick Lab: Removing Silver Tarnish p. 326 TE Teacher Demo: An Example of Chemical Change p. 325 TE Teacher Demo: Balance a Chemical Equation p. 327	• Chemical equation • Skeleton equation • Catalyst • Coefficients • Balanced equation	
2 periods	11.2 Types of Chemical Reactions pp. 330 – 341	*(not assessed)	SE Section 11.2 Assessment p. 339	TE Teacher Demo: Single-Replacement Reactions p. 333	• Combustion reaction • Decomposition reaction	

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	11.2.1 Describe the five general types of reactions 11.2.2 Predict the products of the five general types of reactions		Teacher Constructed Assessment	TE Teacher Demo: A Double-Replacement Reaction p. 334 TE Teacher Demo: Law of Conservations of Mass p. 335 TE Teacher Demo: Combustion of Iron p. 337 TE Teacher Demo: A Combination Reaction p. 338 TE Class Activity: Classifying Fires p. 340 TE Class Activity: Model a Fire Extinguisher p. 341	• Single-replacement reaction • Activity series • Double-replacement reaction • Combustion reaction	
3 periods	11.3 Reactions in Aqueous Solution pp. 342 – 345 11.3.1 Describe the information found in a net ionic equation 11.3.2 Predict the formation of a precipitate in a double replacement reaction	I & E: 1d 3a	SE section 11.3 Assessment p. 344 Chapter Assessment SE Chapter Assessment pp. 347 – 350 Standardized Test Prep SE Chapter 11 p. 351 Teacher Constructed Assessment	SE Small-Scale Lab: Precipitation Reactions: Formations of Solids p. 345	• Complete ionic equation • Spectator ion • Net ionic equation	
3 periods	Chapter 12: STOICHIOMETRY 12.1 The Arithmetic of Equations pp. 353 – 358 12.1.1 Explain how balanced equations apply to both chemistry and everyday life 12.1.2 Interpret balanced	3a	SE section 12.1 Assessment p. 358 Teacher Constructed Assessment	SE Inquiry Activity: How Many Can You Make? p. 352 TE Teacher Demo: Interpreting a Chemical Equation p. 357	• Stoichiometry	

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	chemical equations in terms of moles, representative particles, mass, and gas volume at STP 12.1.3 Identify the quantities that are always conserved in chemical reactions					
3 periods	12.2 Chemical Calculations pp. 359 – 367 12.2.1 Construct mole rations from balanced chemical equations and apply these ratios in stoichiometric calculations 12.2.2 Calculate stoichiometric quantities from balanced chemical equations using units of moles, mass, representative particles, and volumes of gases at STP	3e	SE section 12.2 Assessment p. 366 Teacher Constructed Assessment	SE Small-Scale Lab: Analysis of Baking Soda p. 367 TE Teacher Demo: Interpreting a Chemical Equation p. 361 TE Class Activity: Stoichiometric Flash Cards p. 365	• Mole ratio	
2 periods	12.3 Limiting Reagent and percent Yield pp. 368 – 377 12.3.1 Identify the limiting reagent in a reaction 12.3.2 Calculate theoretical yield, actual yield, or percent yield given appropriate information	I & E: 1a, 1d 3f	SE Section 12.3 Assessment p. 375 Chapter Assessment SE Chapter Assessment pp. 379 – 382 Standardized Test Prep SE Chapter 12 p. 383 Teacher Constructed Assessment	SE Quick Lab: Limiting Reagents p. 372 TE Teacher Demo: Limiting Factor p. 369 TE Class Activity: Actual Yield and heat p. 373	• Limiting reagent • Excess reagent • Theoretical yield • Actual yield • Percent yield	
3 periods	Chapter 13: STATES OF MATTER 13.1 The Nature of Gases	4a, 4d, 4f, 4g, 7a	SE Section 13.1 Assessment p. 389 Teacher Constructed Assessment	SE Inquiry Activity: Observing Gas Pressure p. 384	• Kinetic energy • Kinetic theory • Gas pressure • Vacuum	

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	pp. 385 – 389 13.1.1 Describe the assumptions of the kinetic theory as it applies to gases 13.1.2 Interpret gas pressure in terms of kinetic theory 13.1.3 Define the relationship between Kelvin temperature and average kinetic energy			TE Teacher Demo: Elastic Collisions p. 386 TE Teacher Demo: Air Pressure p. 387 TE Class Activity: Particle Motion and Pressure p. 388	• Atmospheric pressure • Barometer • Pascal (Pa) • Standard atmosphere (atm)	
3 periods	13.2 The Nature of Liquids pp. 390 – 395 13.2.1 Identify factors that determine physical properties of a liquid 13.2.2 Define evaporation in terms of kinetic energy 13.2.3 Describe the equilibrium between a liquid and its vapor 13.2.4 Identify the conditions at which boiling occurs	2d, 2h	SE Section 13.2 Assessment p. 395 Teacher Constructed Assessment	TE Teacher Demo: Vapor Pressure p. 392 TE Class Activity: Water Versus Alcohol p. 393 TE Class Activity: Temperature and Boiling p. 394	• Vaporization • Evaporation • Vapor pressure • Boiling point • Normal boiling point	
2 periods	13.3 The Nature of Solids pp. 396 – 400 13.3.1 Evaluate how the way particles are organized explains the properties of solids 13.3.2 Identify the factors that determine the shape of a crystal 13.3.3 Explain how allotropes of an element are different	I & E: 1d 2d, 2h	SE Section 13.3 Assessment p. 399 Teacher Constructed Assessment	SE Small-Scale Lab: The Behavior of Liquids and Solids p. 400 TE Teacher Demo: Crystalline Solid Model p. 397	• Melting point • Crystal • Unit cell • Allotropes • Amorphous solid • Glass	

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2 periods	13.4 Changes of State pp. 401 – 405 13.4.1 Identify the conditions necessary for sublimation 13.4.2 Describe how equilibrium conditions are represented in a phase diagram	*(not assessed)	SE Section 13.4 Assessment p. 404 Chapter Assessment SE Chapter Assessment pp. 407 – 410 Standardized Test Prep SE chapter 13 p. 411 Teacher Constructed Assessment	SE Quick Lab: Sublimation p. 402	• Sublimation • Phase diagram • Triple point	
2 periods	Chapter 14: THE BEHAVIOR OF GASES 14.1 Properties of Gases pp. 413 – 417 14.1.1 Explain why gases are easier to compress than solids or liquids are 14.1.2 Describe the three factors that affect gas pressure	*(not assessed)	SE Section 14.1 Assessment p. 417 Teacher Constructed Assessment	SE Inquiry Activity: Observing Volume Changes p. 412 TE Teacher Demo: Pressure and Particle Size p. 415	• Compressibility	
2 periods	14.2 The Gas Laws pp. 418 – 425 14.2.1 Describe the relationships among the temperature, pressure, and volume of a gas 14.2.2 Use the combined gas law to solve problems	4c	SE section 14.2 Assessment p. 425 Teacher Constructed Assessment	TE Teacher Demo: Pressure and Volume p. 419 TE Class Activity: Observing the Effect of Pressure on Temperature p. 422	• Boyle's law • Charles's law • Gay-Lussac's law • Combined gas law	
2 periods	14.3 Ideal Gases pp. 426 – 431 14.3.1 Compute the value of an unknown using the ideal gas law 14.3.2 Compare and contrast real and ideal gases	I & E: 1a, 1e 4c, 4h	SE Section 14.3 Assessment p. 429 Teacher Constructed Assessment	SE Quick Lab: Carbon Dioxide from Antacid Tablets p. 428	• Ideal gas constant • Ideal gas law	

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2 periods	14.4 Gases: Mixtures and Movements pp. 432 – 437 14.4.1 Relate the total pressure of a mixture of gases to the partial pressures of the component gases 14.4.2 Explain how the molar mass of a gas affects the rate at which the gas diffuses and effuses	I & E: 1d 4b, 4g, 4i	SE Section 14.4 Assessment p. 436 Chapter Assessment SE Chapter Assessment pp. 439 – 442 Standardized Test Prep SE Chapter 14 p. 443 Teacher Constructed Assessment	SE Small-Scale Lab: Diffusion p. 437 TE Class Activity: Model Partial Pressure p. 433 TE Class Activity: Effusion p. 435	• Partial pressure • Dalton's law of partial pressures • Diffusion • Effusion • Graham's law of effusion	
2 periods	Chapter 15: WATER AND AQUEOUS SYSTEMS 15.1 Water and Its Properties pp. 445 – 449 15.1.1 Explain the high surface tension and low vapor pressure of water in terms of the structure of the water molecule and hydrogen bonding 15.1.2 Describe the structure of ice	I & E: 1d	SE Section 15.1 Assessment p. 449 Teacher Constructed Assessment	SE Inquiry Activity: Observing Surface Tension p. 444 SE Quick Lab: Surfactants p. 448	• Surface tension • Surfactant	
2 periods	15.2 Homogeneous Aqueous Systems pp. 450 – 458 15.2.1 Distinguish between a solvent and a solute 15.2.2 Describe what happens in the solutions process 15.2.3 Explain why all ionic compounds are electrolytes	I & E: 1a 6a, 6b	SE Section 15.2 Assessment p. 457 Teacher Constructed Assessment	SE Small-Scale Lab: Electrolytes p. 458 TE Teacher Demo: Electrolytes p. 453 TE Teacher Demo: Magic Writing p. 454	• Aqueous solution • Solvent • Solute • Solvation • Electrolyte • Nonelectrolyte • Strong electrolyte • Weak electrolyte • Hydrate	

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	15.2.4 Demonstrate how the formula for a hydrate is written					
2 periods	15.3 Heterogeneous Aqueous Systems pp. 459 – 463 15.3.1 Distinguish between a suspension and a solution 15.3.2 Identify the distinguishing characteristic of a colloid	6d	SE Section 15.3 Assessment p. 462 Chapter Assessment SE Chapter Assessment pp. 465 – 468 Standardized Test Prep SE Chapter 15 p. 469 Teacher Constructed Assessment	TE Teacher Demo: Motion of Colloidal Particles p. 461	• Suspension • Colloid • Tyndall effect • Brownian motion • Emulsion	
2 periods	Chapter 16: SOLUTIONS 16.1 Properties of Solutions pp. 471 – 479 16.1.1 Identify the factors that determine the rate at which a solute dissolves 16.1.2 Identify the units usually used to express the solubility of a solute 16.1.3 Identify the factors that determine the mass of solute that will dissolve in a given mass of solute	6c	SE Section 16.1 Assessment p. 477 Teacher Constructed Assessment	SE Inquiry Activity: Salt and the Freezing Point of Water p. 470 TE Teacher Demo: Solubility of Gases p. 475	• Saturated solution • Solubility • Unsaturated solution • Miscible • Immiscible • Supersaturated solution • Henry's law	
2 periods	16.2 Concentrations of Solutions pp. 480 – 486 16.2.1 Solve problems involving the molarity of a solution 16.2.2 Describe the effect of dilution on the total moles of solute in solution	6d	SE Section 16.2 assessment p. 486 Teacher Constructed Assessment	TE Class Activity: Preparing Solutions p. 482 TE Class Activity: Solution Calculations p. 483 TE Teacher Demo: Serial Dilutions p. 485	• Concentration • Dilute solution • Concentrated solution • Molarity (*M*)	

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	16.2.3 Define percent by volume and percent by mass solutions					
2 periods	16.3 Colligative Properties of Solutions pp. 487 – 490 16.3.1 Identify three colligative properties of solutions 16.3.2 Explain why the vapor pressure, freezing point, and boiling point of a solution differ from those properties of the pure solvent	I & E: 1d	SE Section 16.3 Assessment p. 490 Teacher Constructed Assessment	SE Quick Lab: Solutions and Colloids p. 489 TE Class Activity: Freezing Point Depression p. 489	• Colligative property • Freezing-point depression • Boiling-point elevation	
2 periods	16.4 Calculations Involving Colligative Properties pp. 491 – 497 16.4.1 Solve Problems related to the molality and mole fraction of a solution 16.4.3 Describe how freezing-point depression and boiling-point elevation are related to molality	I & E: 1d 6d, 6e	SE Section 16.4 Assessment p. 496 Chapter Assessment SE Chapter Assessment pp. 499 – 502 Standardized Test Prep SE Chapter 16 p. 503 Teacher Constructed Assessment * 9 Week Assessment	SE Small-Scale Lab: Making a Solution p. 497 TE Class Activity: Diagramming Methods of Concentration Calculation p. 493	• Molality (*m*) • Mole fraction • Molal freezing-point depression constant (K_f) • Molal boiling-point elevation constant (K_b)	
2 periods	Chapter 17: THERMOCHEMISTRY 17.1 The Flow of Energy – Heat and Work pp. 505 – 510 17.1.1 Explain how energy, heat, and work are related 17.1.2 Classify processes as either exothermic or endothermic	7a, 7b	SE Section 17.1 Assessment p. 510 Teacher Constructed Assessment	SE Inquiry Activity: Observing Heat Flow p. 504 TE Teacher Demo: An Endothermic Reaction p. 506 TE Class Activity: Heat Transfer p. 508	• Thermochemistry • Chemical potential energy • Heat • System • Surroundings • Law of conservation of energy • Endothermic process • Exothermic process • Heat capacity • Specific heat	

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	17.1.3 Identify the units used to measure heat transfer 17.1.4 Distinguish between heat capacity and specific heat					
2 periods	17.2 Measuring and Expressing Enthalpy Changes pp. 511 – 519 17.2.1 Describe how calorimeters are used to measure heat flow 17.2.2 Construct thermochemical equations 17.2.3 Solve for enthalpy changes in chemical reactions by using heats of reaction	I & E; 1m 7d	SE Section 17.2 Assessment p. 517 Teacher Constructed Assessment	TE Class Activity: Calorimetry Measurements p. 512 TE Teacher Demo: an Exothermic Reaction p. 515	• Calorimetry • Calorimeter • Enthalpy • Thermochemical equation • Heat of Reaction • Heat of combustion	
2 periods	17.3 Heat in Changes of State pp. 520 – 526 17.3.1 Classify the enthalpy change that occurs when a substance melts, freezes, boils, condenses, or dissolves 17.3.2 Solve for the enthalpy change that occurs when a substance melts, freezes, boils, condenses, or dissolves	I & E: 1a, 1b, 1c 7c, 7d	SE Section 17.3 Assessment p. 526 Teacher Constructed Assessment	SE Quick lab: Heat of fusion of Ice p. 522 TE Class Activity: Melting and Boiling p. 521 TE Teacher Demo: Exothermic Solidification p. 523 TE Class Activity: Heating Curve for Ethanol p. 524 TE Class Activity: Hot and Cold Packs p. 525	• Molar heat of fusion • Molar heat of solidification • Molar heat of vaporization • Molar heat of condensation • Molar heat of solution	
2 periods	17.4 Calculating Heats of Reaction pp. 527 – 533 17.4.1 State Hess's law of	I & E: 1a 7b, 7e	SE Section 17.4 Assessment p. 532 Chapter Assessment SE Chapter Assessment	SE Small-Scale Lab: Heat of Combustion of a Candle p. 533	• Hess's law of heat summation • Standard heat of formation	

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	heat summation and describe how it is used in chemistry 17.4.2 Solve for enthalpy changes by using Hess' law or standard heats of formation		pp. 535 – 538 Standardized Test Prep SE Chapter 17 p. 539 Teacher Constructed Assessment			
2 periods	Chapter 18: REACTION RATES AND EQUILIBRIUM 18.1 Rates of Reaction pp. 541 – 548 18.1.1 Describe how to express the rate of chemical reaction 18.1.2 identify four factors that influence the rate of a chemical reaction	I & E: 1c, 1d 8a, 8b, 8c,8d	SE Section 18.1 Assessment p. 547 Teacher Constructed Assessment	SE Inquiry Activity: Temperature and Reaction Rates p. 540 SE Quick Lab: Does Steel Burn? p. 544 TE Teacher Demo: Use of Heat and Catalyst in a Reaction p. 546	• Rate • Collision theory • Activation energy • Activated complex • Transition state • Inhibitor	
2 periods	18.2 Reversible Reactions and Equilibrium pp. 549 – 559 18.2.1 Describe how the amounts of reactants and products change in a chemical system at equilibrium 18.2.2 Identify three stresses that can change the equilibrium position of a chemical system 18.2.3 Explain what the value of K_{eq} indicates about the position of equilibrium	8b, 9a, 9b, 9c	SE Section 18.2 Assessment p. 559 Teacher Constructed Assessment	TE Teacher Demo: Revisiting Banana Oil Demonstrations p. 552 TE Teacher Demo: Temperature and Equilibrium p. 555	• Reversible reaction • Chemical equilibrium • Equilibrium position • Le Chatelier's principle • Equilibrium constant	
2 periods	18.3 Solubility Equilibrium pp. 560 – 565	*(not assessed)	SE Section 18.3 Assessment p. 565 Teacher Constructed Assessment	TE Class Activity: Solubility Tables p. 561 TE Teacher Demo: Common Ion	• Solubility product constant • Common ion • Common ion effect	

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	18.3.1 Describe the relationship between the solubility product constant and the solubility of a compound 18.3.2 Predict whether precipitation will occur when two salt solution are mixed			Effect p. 562		
2 periods	18.4 Entropy and Free Energy pp. 566 – 574 18.4.1 Identify two characteristics of spontaneous reaction 18.4.2 Describe the role of entropy in chemical reactions 18.4.3 Identify two factors that determine the spontaneity of a reaction 18.4.4 Define Gibbs free-energy change	I & E: 1d 7e, 7f	SE Section 18.4 Assessment p. 573 Teacher Constructed Assessment	SE Small-Scale Lab: Enthalpy and Entropy p. 574 TE Class Activity: Research Photosynthesis p. 56 TE Teacher Demo: The Entropy of Water p. 570 TE Teacher Demo: Observing Spontaneous Reaction p. 572	• Free energy • Spontaneous reaction • Nonspontaneous reaction • Entropy • Law of disorder • Gibbs free-energy change	
2 periods	18.5 The Progress of Chemical Reactions pp. 575 – 579 18.5.1 Describe the general relationship between the value of the specific rate constant, *k*, and the speed of a chemical reaction 18.5.2 Interpret the hills and valley in a reaction progress curve	*(not assessed)	SE section 18.5 Assessment p. 579 Chapter Assessment SE Chapter Assessment pp. 581 – 584 Standardized Test Prep SE Chapter 18 p. 585 Teacher Constructed Assessment		• Rate law • Specific rate constant • First-order reaction • Elementary reaction • Reaction mechanism • Intermediate	
2 periods	Chapter 19: ACIDS, BASES, AND SALTS 19.1 Acid-Base Theories	I & E: 1k, 1n	SE section 19.1 Assessment p. 593 Teacher Constructed Assessment	SE Inquiry Activity: Effect of Foods on Baking Soda p. 586	• Monopropic acids • Diprotic acids • Triprotic acids	

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	pp. 587 – 593 19.1.1 **Define** the properties of acids and bases 19.1.2 **Compare and contrast** acids and bases as define by the theories of Arrhenius, Bronsted-Lowry, and Lewis	5a, 5b, 5e		TE Teacher Demo: Reactive Acids p. 588	• Conjugate acid • Conjugate base • Conjugate acid-base pair • Hydronium ion (H_3O^+) • Amphoteric • Lewis acid • Lewis base	
2 periods	19.2 Hydrogen Ions and Acidity pp. 594 -604 19.2.1 **Describe** How $[H^+]$ and $[OH^-]$ are related in an aqueous solution 19.2.2 **Classify** a solution as neutral, acidic, or basic given the hydrogen-ion or hydroxide-ion concentration 19.2.3 **Convert** hydrogen-ion concentrations in pH values and hydroxide-ion concentrations into pOH values 19.2.4 **Describe** the purpose of an acid-base pH indicator	I & E: 1d, 1e 5d, 5f	SE Section 19.2 Assessment p. 604 Teacher Constructed Assessment	SE Quick Lab: Indicators from Natural Sources p. 604 TE Class Activity: Using a pH Meter p. 595 TE Teacher Demo: pH Indicators p. 600 TE Teacher Demo: Observing pH Change p. 601 TE Class Activity: Comparing pH Indicators and pH Meters p. 603	• Self-ionization • Neutral solution • Ion-product Constant for water (K_w) • Acidic solution • Basic solution • Alkaline solutions • pH	
2 periods	19.3 Strengths of Acids and Bases pp. 605 – 611 19.3.1 **Define** strong acids and weak acids 19.3.2 **Describe** how an acid's strength is relate to the value of its acid dissociation constant 19.3.3 **Calculate** an acid dissociation constant (K_a)	5c	SE Section 19.3 Assessment p. 611 Teacher Constructed Assessment	TE Class Activity: Shampoo Survey p. 608	• Strong acids • Weak acids • Acid dissociation constant (K_a) • Strong bases • Weak bases • Base dissociation constant (K_b)	

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	from concentration and pOH measurements 19.3.4 Order acids by strength according to their acid dissociation constants (K_b)					
2 periods	19.4 Neutralization Reactions pp. 612 – 617 19.4.1 Define the products of an acid-base reaction 19.4.2 Explain how acid-base titration is used to calculate the concentration of an acid or a base 19.4.3 Explain the concept of equivalence in neutralization reactions 19.4.4 Describe the relationship between equivalence point and the end point of a titration	I & E: 1d 5d	SE Section 19.4 Assessment p. 616 Teacher Constructed Assessment	SE Small-Scale Lab: Ionization Constants of Weak Acids p. 617 TE Teacher Demo: Titration Using Indicators p. 613 TE Teacher Demo: Titration Using a pH Meter p. 615	• Neutralization reactions • Equivalence point • Titration • Standard solution • End point	
2 periods	19.5 Salts in Solution pp. 618 – 623 19.5.1 Describe when a solution of a salt is acidic or basic 19.5.2 Demonstrate with equations how buffers resist change in pH	5a, 5g	SE Section 19.5 Assessment p. 622 Chapter Assessment SE Chapter Assessment pp. 625 – 628 Standardized Test Prep SE Chapter 19 p. 629 Teacher Constructed Assessment	TE Teacher Demo: Predicting pH of Solutions p. 619 TE Teacher Demo: Comparing Commercial Buffers p. 620	• Salt hydrolysis • Buffer • Buffer capacity	
2 periods	Chapter 22: HYDROCARBON COMPOUNDS 22.1 Hydrocarbons pp. 693 – 701 22.1.1 Describe the	10b, 10d	SE section 22.1 Assessment p. 701 Teacher Constructed Assessment	SE Inquiry Activity: What Dissolves What? p. 692 TE Teacher Demo: Methane Shapes p. 694 TE Class Activity: Model of Ethane	• Hydrocarbons • Alkane • Straight-Chain alkanes • Homologous series • Condensed structural formula • Substituent	

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	relationship between the number of valence electrons and bonding in carbon 22.1.2 Define and describe alkanes 22.1.3 Relate the polarity of hydrocarbons to their solubility			p. 695 TE Teacher Demo: Alkane Structures p. 696 TE Teacher Demo: Properties of Alkanes p. 697 TE Teacher Demo: Mixing Oil and Water p. 700	• Alkyl group • Branched-chain alkane	
2 periods	22.2 Unsaturated Hydrocarbons pp. 702 – 703 22.2.1 Describe the difference between unsaturated and saturated hydrocarbons 22.2.2 Distinguish between the structures of alkenes and alkynes	2b, 10b, 10d	SE Section 22.2 Assessment p. 703 Teacher Constructed Assessment	TE Class Activity: Double Bond Rigidity p. 702	• Saturated compounds • Unsaturated compounds • Alkenes • Alkynes • Aliphatic hydrocarbons	
2 periods	22.3 Isomerism pp. 704 – 708 22.3.1 Explain why structural isomers have different properties 22.3.2 Describe the conditions under which geometric isomers are possible 22.3.3 Identify optical isomers	I & E: 1g 10b, 10d	SE Section 22.3 Assessment p. 707 Teacher Constructed Assessment	TE Class Activity: Modeling Isomers p. 704 SE Quick Lab: Structural Isomers of Heptane p. 706 SE Small-Scale Lab: Hydrocarbon Isomers p. 708	• Isomers • Structural isomers • Stereoisomer • Geometric isomers • *Trans* configuration • *Cis* configuration • Asymmetric carbon • Optical isomers	
2 periods	22.4 Hydrocarbon Rings pp. 709 – 711 22.4.1 Identify cyclic ring structures 22.4.2 Describe bonding in benzene	10b, 10d	SE Section 22.4 Assessment p. 711 Teacher Constructed Assessment		• Cyclic hydrocarbons • Aromatic compound	

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2 periods	22.5 Hydrocarbons from Earth's Crust pp. 712 – 717 22.5.1 **identify** three important fossil fuels and describe their origins 22.5.2 **Describe** the composition of natural gas, petroleum, and coal 22.5.3 **Describe** what happens when petroleum is refined	I & E: 1i	SE Section 22.5 Assessment p. 715 Chapter Assessment SE Chapter Assessment pp. 719 – 722 Standardized Test Prep SE Chapter 22 p. 723 Teacher Constructed Assessment	TE Class Activity: Crude Oil p. 713	• Cracking	
3 periods	Chapter 25: NUCLEAR CHEMISTRY 25.1 Nuclear Radiation pp. 799 – 802 25.1.1 **Explain** how an unstable nucleus releases energy 25.1.2 **Describe** the three main types of nuclear radiation	I & E: 1n 11c, 11d, 11e	SE Section 25.1 Assessment p. 802 Teacher Constructed Assessment	SE Inquiry Activity: Simulating Radioactive Decay p. 798 TE Teacher Demo: An Effect of Radiation p. 800	• Radioactivity • Radiation • Radioisotopes • Alpha particle • Beta particle • Gamma ray	
3 periods	25.2 Nuclear Transformations pp. 803 – 809 25.2.1 **Describe** the type of decay a radioisotope undergoes 25.2.2 **Solve** problems that involve half-life 25.2.3 **Identify** the two ways transmutation can occur	I & E: 1e, 1i 1f, 11a, 11c, 11f	SE Section 25.2 Assessment p. 808 Teacher Constructed Assessment	SE Small-Scale Lab: Radioactivity ad Half-Lives p. 809 TE Class Activity: Particle Accelerators p. 807	• Nuclear force • Band of stability • Positron • Half-life • Transmutation • Transuranium elements	
2 periods	25.3 Fission and Fusion	11b	SE Section 25.3 Assessment	TE Teacher Demo: Model a Chain	• Fission	

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	of Atomic Nuclei pp. 810 – 815 25.3.1 Describe what happens in a nuclear chain reaction 25.3.2 Explain the role of water in the storage of spent fuel rods 25.3.3 Distinguish fission reactions from fusion reactions		p. 813 Teacher Constructed Assessment	Reaction p. 811 TE Class Activity: Nuclear Fussion p. 812	• Neutron moderation • Neutron adsorption • Fusion	
2 periods	25.4 Radiation in Your Life pp. 816 – 819 25.4.1 Identify three devices that are used to detect radiation 25.4.2 Describe how radioisotopes are used in medicine	I & E: 1a, 1l	SE Section 25.4 Assessment p. 819 Chapter Assessment SE Chapter Assessment pp. 821 – 824 Standardized Test Prep SE Chapter 25 p. 825 Teacher Constructed Assessment * 9 Week Assessment	SE Quick Lab: Studying Inverse-Square Relationships p. 818 TE Teacher Demo: Background Radiation p. 817	• Ionizing radiation • Geiger counter • Scintillation counter • Film badge • Neutron activation analysis	