**CHEMISTRY PACING GUIDE**

**2020-21 - BLOCK SCHEDULE**

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| **Unit 1: Properties of Matter** | **Unit 2: Introduction to the Periodic Table** | **Unit 3: Introduction to the Atom** | **Unit 4: Chemical Bonding** | **Unit 5: The Mole Concept** | **Unit 6: Chemical Reactions** | **Unit 7: Solutions** | **Unit 8: Acids and Bases** |
| Physical and chemical propertiesClassification of matterSolutionsPhases of matterExothermic vs. endothermic | Groups and periodsMetals vs. non-metalsAtomic numberAtomic mass | Protons, neutrons, electronsenergy levelsIons, isotopes average atomic massIntroduction to Bohr models | Types of bondingValence electrons and oxidation numbersNomenclature | Intro to the moleMolar massMolar conversionsEmpirical formula  | Chemical vs. Physical ChangesWriting chemical equationsBalancing equationsTypes of reactions | Calculations – molarityDilution calculationsNet ionic equations/solubility rules | Properties of acidic and basic solutionsDistinguish between concentration (molarity) and strength pH scale/calculationsneutralization; titrations |
| **3.2.4, 3.2.5, 3.2.6,** **2.1.1, 2.1.3, 2.1.2, 3.2.6** | **1.3.1, 1.3.2, 1.1.1** | **1.1.1, 1.1.2, 1.1.3** | **1.2.1,1.3.1,1.2.4** | **2.2.4, 2.2.5** | **2.2.2, 2.2.3** | **3.2.3, 2.2.3** | **3.2.1, 3.2.2, 2.2.3, 3.2.3** |
| **8 days** | **5 days** | **5 days** | **5 days** | **5 days** | **5 days** | **5 days** | **5 days** |

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| **Unit 9: Stoichiometry** | **Unit 10: The Atom Revisited** | **Unit 11: Periodic Trends** | **Unit 12: Chemical Bonding Revisited** | **Unit 13: States of Matter** | **Unit 14: Thermal Energy** | **Unit 15: Kinetics and equilibrium** |
| Reviewing balancing equationsUse mole rations; mass, volume, molarityEnrichment- limiting reactant & percent yield | Bohr model and quantum mechanical modelElectromagnetic radiationRadioactivity | Electron configurationsAtomic radiusIonization energyElectronegativity | Use position on PT, physical properties and electronegativity difference to predict bond typeLewis structures: VSEPR theoryIntra vs. inter-molecular forces | Relationship between pressure, volume, and temperature (revisit phase diagrams)Gas lawsSummarize colligative properties (revisit phase diagrams) | Heat vs. TemperatureSpecific heat calculationsHeat of fusion/vaporization calculationsRevisit endo/exothermic reactionsCalorimetry | Collision Theory & potential energy diagramsFactors that affect rates of reactionEquilibrium and LeChatelier’s principle |
| **2.2.3, 2.2.4** | **1.1.2, 1.1.3, 1.1.4** | **1.1.2, 1.2.1, 1.3.3, 1.3.2** | **1.2.2, 1.2.1, 1.2.5, 1.2.3** | **2.1.1, 2.1.2, 2.1.3, 2.1.5, 3.2.6 3.2.4** | **2.1.1, 2.1.2, 2.1.4** | **2.2.1, 3.1.1, 3.1.2, 3.1.3** |
| **8 days** | **5 days** | **5 days** | **8 days** | **7 days** | **5 days** | **7 days** |

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| **Review** & **Testing** |
| All |
| **5 Days** |

**HIGH SCHOOL CHEMISTRY ESSENTIAL STANDARDS – BY STRAND**

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| **MATTER, PROPERTIES AND CHANGE** | **ENERGY: CONSERVATATION AND TRANSFER** | **INTERACTIONS OF MATTER AND ENERGY** |
| **Chm.1.1** | **Analyze the structure of atoms and ions.** | **Chm.2.1** | **Understand the relationship among pressure, temperature, volume, and phase.** | **Chm.3.1** | **Understand the factors affecting rate of reaction and chemical equilibrium.** |
| Chm.1.1.1 | Analyze the structure of atoms, isotopes, and ions. | Chm.2.1.1 | Explain the energetic nature of phase changes. | Chm.3.1.1 | Explain the factors that affect the rate of a reaction (temperature, concentration, particle size and presence of a catalyst). |
| Chm.1.1.2 | Analyze an atom in terms of the location of electrons. | Chm.2.1.2 | Explain heating and cooling curves (heat of fusion, heat of vaporization, heat, melting point, and boiling point). | Chm.3.1.2 | Explain the conditions of a system at equilibrium. |
| Chm.1.1.3 | Explain the emission of electromagnetic radiation in spectral form in terms of the Bohr model. | Chm.2.1.3 | Interpret the data presented in phase diagrams. | Chm.3.1.3 | Infer the shift in equilibrium when a stress is applied to a chemical system (Le Chatelier’s Principle). |
| Chm.1.1.4 | Explain the process of radioactive decay by the use of nuclear equations and half-life. | Chm.2.1.4 | Infer simple calorimetric calculations based on the concepts of heat lost equals heat gained and specific heat. | Chm.3.2 | Understand solutions and the solution process. |
| **Chm.1.2** | **Understand the bonding that occurs in simple compounds in terms of bond type, strength, and properties.** | Chm.2.1.5 | Explain the relationships between pressure, temperature, volume, and quantity of gas both qualitative and quantitative. | Chm.3.2.1 | Classify substances using the hydronium and hydroxide ion concentrations. |
| Chm.1.2.1 | Compare (qualitatively) the relative strengths of ionic, covalent, and metallic bonds. | **Chm.2.2** | **Analyze chemical reactions in terms of quantities, product formation, and energy.** | Chm.3.2.2 | Summarize the properties of acids and bases. |
| Chm.1.2.2 | Infer the type of bond and chemical formula formed between atoms. | Chm.2.2.1 | Explain the energy content of a chemical reaction. | Chm.3.2.3 | Infer the quantitative nature of a solution (molarity, dilution, and titration with a 1:1 molar ratio). |
| Chm.1.2.3 | Compare inter- and intra- particle forces. | Chm.2.2.2 | Analyze the evidence of chemical change. | Chm.3.2.4 | Summarize the properties of solutions. |
| Chm.1.2.4 | Interpret the name and formula of compounds using IUPAC convention. | Chm.2.2.3 | Analyze the Law of Conservation of Matter and how it applies to various types of chemical equations (synthesis, decomposition, single replacement, double replacement, and combustion). | Chm.3.2.5 | Interpret solubility diagrams. |
| Chm.1.2.5 | Compare the properties of ionic, covalent, metallic, and network compounds. | Chm.2.2.4 | Analyze the stoichiometric relationships inherent in a chemical reaction.  | Chm.3.2.6 | Explain the solution process. |
| **Chm.1.3** | **Understand the physical and chemical properties of atoms based on their position in the Periodic Table.** | Chm.2.2.5 | Analyze quantitatively the composition of a substance (empirical formula, molecular formula, percent composition, and hydrates). |  |
| Chm.1.3.1 | Classify the components of a periodic table (period, group, metal, metalloid, nonmetal, transition). |  |
| Chm.1.3.2 | Infer the physical properties (atomic radius, metallic and nonmetallic characteristics) of an element based on its position on the Periodic Table.  |
| Chm 1.3.3 | Infer the atomic size, reactivity, electronegativity, and ionization energy of an element from its position in the Periodic Table. |