CHEMISTRY
2021 – 2022 PACING GUIDE

WEST BOLIVAR CONSOLIDATED SCHOOL DISTRICT

BIG GOAL: Students will formulate explanations about the natural world to increase the depth of understanding based on evidence, logic, and innovation. Students will be prepared for careers in science, technology, engineering, integrated STEM activities, and mathematics. Chemistry explores empirical concepts central to all areas of science.

FIRST NINE WEEKS				
WEEKS	**INSTRUCTIONAL DAYS**	**PERFROMACNCE OBJ(S).**	**ACADEMIC FOCUS**	**OBJECTIVE STATEMENTS – MS CCRS**
AUG 5 – 13	**7**	**SEP(s)**	**Introduction to Chemistry** **Properties of Matter**	Define chemistry. List examples of branches of chemistry. • Distinguish between the physical and chemical properties of matter. • Explain the gas, liquid, and solid states in terms of particles. • Explain how the law of conservation of energy applies to changes in matter. • Distinguish between a mixture and a pure substance.
AUG 16 – 20	**5**	**CHE 1.1**	**UNIT 1:** **Lab Safety & Tools** **Mathematics & Computational Analysis**	• Select and use appropriate tools or instruments to collect data and represent data in an appropriate form. **ADD:** safety symbols/procedures & standard SI measurement. • Use dimensional analysis (factor/label) and significant figures to convert units and solve problems. • Scientific notation/Significant figures/Metric System Conversions
3 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
AUG 23 – SEPT 3	**10**	**CHE 1.2** **CHE 1.3**	**UNIT 2:** **Science & Engineering Practices** **Mathematics & Computational Analysis**	**CHE.1.2** Design and conduct experiments using appropriate measurements, significant figures, graphical analysis to analyze data. **CHE.1.3** Enrichment: Research information from multiple appropriate sources and assess the credibility, accuracy, possible bias, and conclusions of each publication.
8 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
SEPT 6 – 24	**15**	**CHE 2.1** **CHE 2.2** **CHE 2.3** **CHE 2.4**	**UNIT 3:** **Atomic Theory & Structure**	**CHE.2.1** Investigate the historical progression leading to the modern atomic theory, including, but not limited to, work done by Dalton, Rutherford's gold foil experiment, Thomson's cathode ray experiment, Millikan's oil drop experiment, and Bohr's interpretation of bright line spectra. **CHE.2.2** Construct models (e.g., ball and stick, online simulations, mathematical computations) of atomic nuclei to explain the abundance weighted average (relative mass) of elements and isotopes on the published mass of elements.

				CHE.2.3 Investigate absorption and emission spectra to interpret explanations of electrons at discrete energy levels using tools such as online simulations, spectrometers, prisms, flame tests, and discharge tubes. Explore both laboratory experiments and real-world examples. **CHE.2.4** Research appropriate sources to evaluate the way absorption and emission spectra are used to study astronomy and the formation of the universe.
12 INSTRUCTIONAL DAYS; UNIT REVIEW – 2 DAYS; UNIT EXAM – 1 DAY				
SEPT 27 - OCT 1	**5**	**REVIEW**		**REVIEW – PROPERTIES OF MATTER (1 DAY)** **REVIEW – MATHEMATICS AND COMPUTATIONAL ANALYSIS (2 DAYS)** **REVIEW – ATOMIC THEORY AND STRUCTURE (2 DAYS)**
OCT 4 – 8	**1ST TERM BENCHMARK** **(CUMULATIVE UP TO THIS POINT)**			

SECOND NINE WEEKS				
WEEKS	**INSTRUCTIONAL DAYS**	**PERFROMACNCE OBJ(S).**	**ACADEMIC FOCUS**	**OBJECTIVE STATEMENTS – MS CCRS**
OCT 11 – 22	**7**	**CHE 3.1**	**UNIT 1:** **Periodic Table Organization**	**CHE 3.1** Explore and communicate the organization of the periodic table, including history, groups, families, family names, metals, nonmetals, metalloids, and transition metals. **NOTE: Discuss the history and organization of the periodic table, basic characteristics of metals, nonmetals, etc., characteristics of elements in the same family, period, etc.**
5 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
OCT 25 – NOV 5	**10**	**CHE 3.3** **CHE 3.2**	**UNIT 2:** **The Periodic Table & Electron Configuration** **Properties of Atoms & Ions**	**CHE 3.3** Analyze the periodic table to identify quantum numbers (e.g., valence shell electrons, energy level, orbitals, sublevels, and oxidation numbers). **CHE 3.2** Analyze properties of atoms and ions (e.g., metal/nonmetal/metalloid behavior, electrical/heat conductivity, electronegativity and electron affinity, ionization energy, and atomic/ionic radii) using periodic trends of elements based on the periodic table.
8 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
NOV 8 – 19	**10**	**CHE 4.1** **CHE 4.2** **CHE 4.3** **CHE 4.4.** **CHE 4.5** **CHE 4.6** **CHE 4.7** **CHE 4.8**	**UNIT 3:** **Chemical Bonding & Molecular Geometry** **Ionic Bonds** **Covalent Bonds** **Metallic Bonds**	**CHE.4.1** Develop and use models (e.g., Lewis dot, 3-D ball-stick, 3-D printing, or simulation programs such as PhET) to predict the type of bonding between atoms and the shape of simple compounds. **CHE.4.2** Use models such as Lewis structures and ball and stick models to depict the valence electrons and their role in the formation of ionic and covalent bonds. **CHE.4.3** Predict the ionic or covalent nature of different atoms based on electronegativity trends and/or position on the periodic table. **CHE.4.4** Use models and oxidation numbers to predict the type of bond, shape of the compound, and the polarity of the compound. **CHE.4.5** Use models of simple hydrocarbons to exemplify structural isomerism.
8 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
NOV 22 – 26 **THANKSGIVING BREAK**				
NOV 29 – DEC 7	**7**	**CHE 5.1** **CHE 5.2** **CHE 5.3**	**UNIT 4:** **(Nomenclature) Naming Compounds**	**CHE.5.1** Use the periodic table and a list of common polyatomic ions as a model to derive chemical compound formulas from compound names and compound names from chemical formulas. **CHE.5.2** Generate formulas of ionic and covalent compounds from compound names. Discuss compounds in everyday life and compile lists and uses of these chemicals. **CHE.5.3** Generate names of ionic and covalent compounds from their formulas. Name binary compounds, binary acids, stock compounds, ternary compounds, and ternary acids.
5 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
DEC 8 – 14	**5**	**REVIEW**	→	**REVIEW – PERIODIC TABLE BASICS (1 DAY)** **REVIEW – REVIEW PROPERTIES OF ATOMS AND BONDING (2 DAYS)** **REVIEW – REVIEW NAMING COMPOUNDS (2 DAYS)**
DEC 15 – 21	**2ND TERM ASSESSMENT** **(CUMULATIVE UP TO THIS POINT)**			
DEC 22 – JAN 4 **WINTER BREAK**				

THIRD NINE WEEKS				
WEEKS	**INSTRUCTIONAL DAYS**	**PERFROMACNCE OBJ(S).**	**ACADEMIC FOCUS**	**OBJECTIVE STATEMENTS – MS CCRS**
JAN 5 – 14	**8**	**CHE 6.1** **CHE 6.2**	**UNIT 1:** **Chemical Reactions**	**CHE.6.1** Develop and use models to predict the products of chemical reactions (e.g., synthesis reactions; single replacement; double displacement; and decomposition, including exceptions such as decomposition of hydroxides, chlorates, carbonates, and acids). Discuss and/or compile lists of reactions used in everyday life. **CHE.6.2** Plan, conduct, and communicate the results of investigations to demonstrate different types of simple chemical reactions.
6 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
JAN 17 – 28	**10**	**CHE.4.6** **CHE.4.7** **CHE.4.8**	**UNIT 2:** **Chemical Quantitates**	**CHE.4.6** Use mathematical and computational analysis to determine the empirical formula and the percent composition of compounds. **CHE.4.7** Use scientific investigation to determine the percentage of composition for a substance (e.g., sugar in gum, water and/or unpopped kernels in popcorn, percent water in a hydrate). Compare results to justify conclusions based on experimental evidence. **CHE.4.8** Plan and conduct controlled scientific investigations to produce mathematical evidence of the empirical composition of a compound.
8 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
JAN 31 – FEB 11	**10**	**CHE 6.3**	**UNIT 3:** **Stoichiometry**	**CHE.6.3** Use mathematics and computational analysis to represent the ratio of reactants and products in terms of masses, molecules, and moles (stoichiometry).
8 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
FEB 14 – 25	**10**	**CHE 7.1** **CHE 7.2** **CHE 7.3** **CHE 7.4**	**UNIT 4:** **Gas Laws**	**CHE.7.1** Analyze the behavior of ideal and real gases in terms of pressure, volume, temperature, and number of particles. **CHE.7.2** Enrichment: Use an engineering design process to develop models (e.g., online simulations or student interactive activities) to explain and predict the behavior of each state of matter using the movement of particles and intermolecular forces to explain the behavior of matter.* **CHE.7.3** Analyze and interpret heating curve graphs to explain the energy relationship between states of matter (e.g., thermochemistry-water heating from -20o C to 120o C). **CHE.7.4** Use mathematical computations to describe the relationships comparing pressure, temperature, volume, and number of particles, including Boyle's law, Charles's law, Dalton's law, combined gas laws, and ideal gas laws.
8 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
FEB 28 – MAR 4	**REVIEW** **3RD TERM ASSESSMENT**			
MAR 7 – 11	**5**	**REVIEW SEPs**		
MAR 14 – 18 **SPRING BREAK**				

FOURTH NINE WEEKS				
WEEKS	**INSTRUCTIONAL DAYS**	**PERFROMACNCE OBJ(S).**	**ACADEMIC FOCUS**	**OBJECTIVE STATEMENTS – MS CCRS**
MAR 21 – APR 1	**10**	**CHE 7.5** **CHE 7.6** **CHE 7.7** **CHE 7.8**	**UNIT 1:** **Gas Laws**	**CHE.7.5** Enrichment: Use an engineering design process and online simulations or lab investigations to design and model the results of controlled scientific investigations to produce mathematical evidence that confirms the gas-laws relationships.* **CHE.7.6** Use the ideal gas law to support the prediction of volume, mass, and number of particles produced in chemical reactions (i.e., gas stoichiometry). **CHE.7.7** Plan and conduct controlled scientific investigations to produce mathematical evidence that confirms that reactions involving gases conform to the law of conservation of mass. **CHE.7.8** Enrichment: Using gas stoichiometry, calculate the volume of carbon dioxide needed to inflate a balloon to occupy a specific volume. Use an engineering design process to design, construct, evaluate, and improve a simulated air bag.*
8 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
APR 4 – 15	**10**	**CHE 8.1** **CHE 8.2** **CHE 8.3** **CHE 8.4**	**UNIT 2:** **Solutions**	**CHE.8.1** Use mathematical and computational analysis to quantitatively express the concentration of solutions using the concepts such as molarity, percent by mass, and dilution. **CHE.8.2** Develop and use models (e.g., online simulations, games, or video representations) to explain the dissolving process in solvents on the molecular level. **CHE.8.3** Analyze and interpret data to predict the effect of temperature and pressure on solids and gases dissolved in water. **CHE.8.4** Design, conduct, and communicate the results of experiments to test the conductivity of common ionic and covalent compounds in solution.
8 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
APRIL 18 – 29	**10**	**CHE 9.1** **CHE 9.2** **CHE 9.3** **CHE 9.4** **CHE 9.5** **CHE 9.5** **CHE 9.6**	**UNIT 3:** **Acids and Bases**	**CHE.9.1 Enrichment**: Analyze and interpret data to describe the properties of acids, bases, and salts. **CHE.9.2 Enrichment**: Analyze and interpret data to identify differences between strong and weak acids and bases (i.e., dissociation). **CHE.9.3 Enrichment**: Plan and conduct investigations using the pH scale to classify acid and base solutions. **CHE.9.4 Enrichment**: Analyze and evaluate the Arrhenius, Bronsted-Lowry, and Lewis acid-base definitions. **CHE.9.5 Enrichment:** Use mathematical and computational thinking to calculate pH from the hydrogen ion concentration. **CHE.9.6 Enrichment:** Obtain, evaluate, and communicate information about how buffers stabilize pH in acid-base reactions.
8 INSTRUCTIONAL DAYS; UNIT REVIEW – 1 DAY; UNIT EXAM – 1 DAY				
MAY 2 – 6	**5**	**REVIEW**		**REVIEW – GAS LAWS**
MAY 9 – 13	**5**	**REVIEW**		**REVIEW – ACIDS AND BASES (3 DAYS)** **REVIEW – SOLUTIONS (2 DAYS)**
MAY 16 – 20	**REVIEW** **4TH TERM ASSSESSMENT/FINAL EXAM**			

Students should be provided a safe environment for failure without consequence, which is one of the most powerful drivers in learning. Providing many opportunities for students to fail, learn, and try again, with appropriate levels of support, fosters a deeper level of understanding and greater student interest and engagement. (MS CCRS, p. 13)