Cobb County School District 2018-2019

AP Chemistry Teaching & Learning Framework

(for detailed information and course descriptions, and pacing options refer to http://apcentral.collegeboard.com/apc/public/courses/teachers_corner/2119.html?excmpid=MTG243-PR-22-cd

College Board Big Idea 1	College Board Big Idea 2	College Board Big Idea 3	College Board Big Idea 4	College Board Big Idea 5	College Board Big Idea 6	SLO & AP Exam
The chemical elements are fundamental building blocks of matter, and all matter can be understood in terms of arrangements of atoms. These atoms retain their identity in chemical reactions.	Chemical and physical properties of materials can be explained by the structure and the arrangement of atoms, ions, or molecules and the forces between them. Changes in matter involve the rearrangement and/or reorganization of atoms or the transfer of electrons.	Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.	Rates of chemical reactions are determined by details of the molecular collisions.	The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter.	Any bond or intermolecular attraction that can be formed can be broken. These two processes are in a dynamic competition, sensitive to initial conditions and external perturbations.	
Enduring Understandings: 1.A: All matter is made of atoms. There are a limited number of types of atoms; these are the elements. 1.B: The atoms of each element have unique structures arising from interactions between electrons and nuclei. 1.C: Elements display periodicity in their properties when the elements are organized according to increasing atomic number……. 1.D: Atoms are so small that they are difficult to study directly; atomic models are constructed to explain experimental data on collections of atoms. 1.E: Atoms are conserved in physical and chemical processes.	**Enduring Understandings:** 2.A: Matter can be described by its physical properties. The physical properties of a substance generally depend on the spacing between the particles (atoms, molecules, ions) that make up the substance and the forces of attraction among them. 2.B: Forces of attraction between particles are important in determining many macroscopic properties of a substance, including how the observable physical state changes with temperature. 2.C: The strong electrostatic forces of attraction holding atoms together in a unit are called chemical bonds. 2.D: The type of bonding in the solid state can be deduced from the properties of the solid state.	**Enduring Understandings:** 3.A: Chemical changes are represented by a balanced chemical equation that identifies the ratios with which reactants react & products form. 3.B: Chemical reactions can be classified by considering what the reactants are, what the products are, or how they change from one into the other. Classes of chemical reactions include synthesis, decomposition, acid-base, and oxidation-reduction reactions. 3.C: Chemical and physical transformations may be observed in several ways and typically involve a change in energy	**Enduring Understandings:** 4.A: Reaction rates that depend on temperature and other environmental factors are determined by measuring changes in concentrations of reactants or products over time. 4.B: Elementary reactions are mediated by collisions between molecules. Only collisions having sufficient energy and proper relative orientation of reactants lead to products. 4.C: Many reactions proceed via a series of elementary reactions. 4.D: Reaction rates may be increased by the presence of a catalyst. Essential knowledge	**Enduring Understandings:** 5.A: Two systems with different temperatures that are in thermal contact will exchange energy. The quantity of thermal energy transferred from one system to another is called heat. g 5.B: Energy is neither created nor destroyed, but only transformed from one form to another. 5.C: Breaking bonds requires energy, and making bonds releases energy. g 5.D: Electrostatic forces exist between molecules as well as between atoms or ions, and breaking the resultant intermolecular interactions requires energy. 5.E: Chemical or physical processes are driven by a decrease in enthalpy or an increase in entropy, or both.	**Enduring Understandings:** 6.A: Chemical equilibrium is a dynamic, reversible state in which rates of opposing processes are equal. 6.B: Systems at equilibrium are responsive to external perturbations, with the response leading to a change in the composition of the system. g 6.C: Chemical equilibrium plays an important role in acid-base chemistry and in solubility. Essential knowledge g 6.D: The equilibrium constant is related to temperature and the difference in Gibbs free energy between reactants and products.	

For AP courses, the College Board provides multiple options for teachers with respect to course planning and pacing. Teachers are encouraged to adopt the framework that best fits their school and students. AP instruction is also infused with Scientific Practices. Scientific Practices provide ways for students to coordinate knowledge and skills and establish lines of evidence which they can use them to develop and refine testable explanations and predictions of natural phenomena.