General Course Information

<table>
<tr><td colspan="2">Course Name: AP Chemistry</td></tr>
<tr><td>Department: Science</td><td>Grade Level(s): 11-12</td></tr>
<tr><td>Duration/Credits: 1 Year/1 Credit</td><td>Prerequisites: Successful Completion or Concurrent Enrollment in College Algebra and/or Pre-Calculus and successful completion of Chemistry or Honors Chemistry, including
Multi-step dimensional analysis
Algebraic manipulations of 3-variable equations
Exponential understanding
Perform stoichiometry problems
Writing and balancing chemical equations</td></tr>
<tr><td>BOE Approval Date:December 2022</td><td>Course Code: H3281W</td></tr>
<tr><td colspan="2">Course Description:</td></tr>
<tr><td colspan="2">This course is designed to be the equivalent of the general chemistry course usually taken during the first year of college. For some students, this course enables them to undertake, as freshmen, second-year work in the chemistry sequence at their institution or to register for courses in other fields where general chemistry is a prerequisite. For other students, the AP Chemistry course fulfills the laboratory science requirement and frees time for other courses.</td></tr>
<tr><td colspan="2">Course Rationale:</td></tr>
<tr><td colspan="2">Given the speed with which scientific discoveries and research continuously expand scientific knowledge, many educators are faced with the challenge of balancing breadth of content coverage with depth of understanding. The AP® Chemistry course addresses this challenge by focusing on a model of instruction which promotes enduring, conceptual understandings and the content that supports them. This approach enables students to spend less time on factual recall and more time on inquiry-based learning of essential concepts, and helps them develop the reasoning skills necessary to engage in the science practices used throughout their study of AP Chemistry.

To foster this deeper level of learning, the breadth of content coverage in AP</td></tr>
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Chemistry is defined in a way that distinguishes content essential to support the enduring understandings from the many examples or applications that can overburden the course. Illustrative examples are provided that offer teachers a variety of optional instructional contexts to help their students achieve deeper understanding. Additionally, content that is outside the scope of the course and exam is also identified.

The student who takes an AP Chemistry course, designed with this curriculum framework as its foundation, will also develop advanced inquiry and reasoning skills, such as designing a plan for collecting data, analyzing data, applying mathematical routines, and connecting concepts in and across domains. The result will be readiness for the study of advanced topics in subsequent college courses — a goal of every AP course.

Course Objectives:

Big Idea 1: Scale, Proportion, and Quantity
Quantities in chemistry are expressed at both the macroscopic and atomic scale. Explanations, predictions, and other forms of argumentation in chemistry require understanding the meaning of these quantities, and the relationship between quantities at the same scale and across scales.

Big Idea 2: Structure and Properties
Properties of substances observable at the macroscopic scale emerge from the structures of atoms and molecules and the interactions between them. Chemical reasoning moves in both directions across these scales. Properties are predicted from known aspects of the structures and interactions at the atomic scale. Observed properties are used to infer aspects of the structures and interactions.

Big Idea 3: Transformations
At its heart, chemistry is about the rearrangement of matter. UNderstanding the details of these transformations requires reasoning at many levels as one must quantify what is occurring both macroscopically and at the atomic level during the process. This reasoning can be as simple as monitoring amounts of products made or as complex as visualizing the intermolecular forces among the species in a mixture. The rate of a transformation is also of interest, as particles must move and collide to initiate reaction events.

Big Idea 4: Energy
Energy has two important roles in characterizing and controlling chemical systems. The first is accounting for the distribution of energy among the components of a system and the ways that heat exchanges, chemical reactions, and phase transitions redistribute this energy. The second is considering the enthalpic and entropic driving forces for a chemical process. These are closely related to the dynamic

equilibrium present in many chemical systems and the ways in which changes in experimental conditions alter the positions of these equilibria.
Standards Alignment:
AP Course and Exam Description (Chemistry) 2019