**Danville Area School District**
**Course Overview and Scope and Sequence**

**Course Title: Advanced Placement Chemistry**
**Content Area: Science**
**Grade Level: 11-12**
**Date Developed:** 8/11/2023

COURSE OVERVIEW: The AP Chemistry course provides students with a college-level foundation to support future advanced coursework in chemistry. Students cultivate their understanding of chemistry through inquiry-based investigations, as they explore content such as: atomic structure, intermolecular forces and bonding, chemical reactions, kinetics, thermodynamics, and equilibrium.
Science Practices:

1. Describe models and representations, including across scales.
2. Determine scientific questions and methods.
3. Create representations or models of chemical phenomena.
4. Analyze and interpret models and representations on a single scale or across multiple scales.
5. Solve problems using mathematical relationships.
6. Develop an explanation or scientific argument.

ANCHOR STANDARDS:
BIG IDEA 1: SCALE, PROPORTION, AND QUANTITY (SPQ) 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 (SAP) 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 (TRA) At its heart, chemistry is about the rearrangement of matter. Understanding the details

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| 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.<br>BIG IDEA 4: ENERGY (ENE) 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 in 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. |
| KEY COURSE TEXT AND MATERIALS: College Board Materials; Teacher Created Supplemental Materials |
| KEY ASSESSMENTS:<br>Diagnostic: Keystone Biology<br>Formative: Quizzes, Labs, Unit Exams, Personal Progress Checks<br>Summative: AP Chemistry Exam |

| SCOPE AND SEQUENCE | | | | | |
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| Unit | PRIORITY STANDARDS | SUPPORTING STANDARDS | ASSESSMENT | MATERIALS | TIMEFRAME |
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| **Atomic Structure and Properties** | SPQ-1<br>SPQ-2<br>SAP-1<br>SAP-2 | 5.B<br>5.D<br>2.A<br>5.A<br>1.A<br>4.B<br>4.A<br>4.C | Labs; Personal Progress Check; Quizzes, Unit Exam | Supplemental Text; Teacher Created Materials; College Board Materials | 9-10 Class Periods |

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| Molecular and Ionic Compound Structure and Properties | SAP-3<br>SAP-4 | 6.A<br>3.A<br>4.C<br>3.B<br>6.C | Labs; Personal Progress Check; Quizzes, Unit Exam | Supplemental Text; Teacher Created Materials; College Board Materials | 12-13 Class Periods |
| Intermolecular Forces and Properties | SAP-5<br>SAP-6<br>SAP-7<br>SPQ-3<br>SAP-8 | 4.D<br>4.C<br>3.C<br>5.C<br>4.A<br>6.E<br>5.F<br>3.C<br>2.C<br>4.D | Labs; Personal Progress Check; Quizzes, Unit Exam | Supplemental Text; Teacher Created Materials; College Board Materials | 14-15 Class Periods |
| Chemical Reactions | TRA-1<br>SPQ-4<br>TRA-2 | 2.B<br>5.E<br>3.B<br>6.B<br>5.C<br>3.A<br>1.B | Labs; Personal Progress Check; Quizzes, Unit Exam | Supplemental Text; Teacher Created Materials; College Board Materials | 14-15 Class Periods |
| Kinetics | TRA-3<br>TRA-4<br>TRA-5<br>ENE-1 | 6.E<br>5.C<br>5.B<br>5.E<br>3.B<br>1.B | Labs; Personal Progress Check; Quizzes, Unit Exam | Supplemental Text; Teacher Created Materials; College Board Materials | 13-14 Class Periods |
| Thermodynamics | ENE-2<br>ENE-3 | 6.D<br>3.A<br>6.E<br>2.D | Labs; Personal Progress Check; Quizzes, Unit Exam | Supplemental Text; Teacher Created Materials; College Board Materials | 10-11 Class Periods |

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| | | 1.B<br>5.F<br>5.A | | | |
| Equilibrium | TRA-6<br>TRA-7<br>TRA-8<br>SPQ-5 | 6.D<br>4.D<br>3.A<br>5.C<br>5.A<br>3.C<br>6.F<br>5.F<br>5.B<br>2.F<br>2.D | Labs; Personal Progress Check; Quizzes, Unit Exam | Supplemental Text; Teacher Created Materials; College Board Materials | 14-16 Class Periods |
| Acids and Bases | SAP-9<br>SAP-10 | 5.B<br>5.C<br>5.F<br>5.D<br>6.C<br>2.D<br>6.D<br>6.G | Labs; Personal Progress Check; Quizzes, Unit Exam | Supplemental Text; Teacher Created Materials; College Board Materials | 14-15 Class Periods |
| Applications of Thermodynamics | ENE-4<br>ENE-5<br>ENE-6 | 6.C<br>5.F<br>6.E<br>6.D<br>4.D<br>2.F<br>5.F<br>5.B | Labs; Personal Progress Check; Quizzes, Unit Exam | Supplemental Text; Teacher Created Materials; College Board Materials | 10-13 Class Periods |