**Warren County School District**

**PLANNED INSTRUCTION**

**COURSE DESCRIPTION**

**Course Title:** Advanced Placement Chemistry

**Course Number:** 00336

**Course Prerequisites:** Completion of Advanced Inorganic and Advance Organic Chemistry with an average of 80% or higher or permission of the principal.

**Course Description:**

Advanced Placement Chemistry provides able and motivated students with the opportunity to pursue college-level chemistry studies while still in high school. This course is a college-level laboratory program that enables students to receive college credit by passing the Advanced Placement Examination with appropriate scores in May of the school year.

**Suggested Grade Level:** Grades 11-12

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| **Length of Course:** |  [ ]  One Semester | [x]  Two Semesters | [ ]  Other (Describe) |

**Units of Credit:** 1(Insert ***None*** if appropriate)

**PDE *Certification and Staffing Policies and Guidelines* (CSPG) Required Teacher Certifications**:

CSPG 34 Chemistry

**Certification verified by WCSD Human Resources Department**: [x]  Yes [ ]  No

**TEXTBOOK AND SUPPLEMENTAL MATERIALS**

**Continue using Board approved textbook?** [x] Yes [ ]  No (*If yes, then complete the information below.*)

**Board Approved Textbooks, Software, Supplemental Materials:**

**Title: Chemistry: A Molecular Approach**

**Publisher: Pearson**

**ISBN #: 978-0-13-442903-8**

**Copyright Date: 2017**

**Date of WCSD Board Approval:**

**BOARD APPROVAL:**

**Date Written:** 2/28/18

**Date Approved:**

**Implementation Date:** 2018-2019

**SPECIAL EDUCATION AND GIFTED REQUIREMENTS**

The teacher shall make appropriate modification to instruction and assessment based on a student’s Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

**COURSE OVERVIEW**

(*List the content to be taught*)

**Common Core Standards:**

CC.3.5.11-12 Reading Informational Text

CC.3.6.11-12 Writing

**Science Standards:**

3.2.12.A: GRADE 12

3.2.12.B: GRADE 12

The content of this course has been structured around the Big Ideas and Scientific Practices (sourced from the AP Chemistry, College Board Website) listed below:

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| **Big Idea 1** | The chemical elements are fundamental building materials of matter, and all matter can be understood in terms of arrangements of atoms. These atoms retain their identity in chemical reactions. |
| **Big Idea 2** | 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. |
| **Big Idea 3** | Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons. |
| **Big Idea 4** | Rates of chemical reactions are determined by details of the molecular collisions. |
| **Big Idea 5** | The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter. |
| **Big Idea 6** | 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. |

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| **Science Practice 1** | The student can use representations and models to communicate scientific phenomena and solve scientific problems. |
| **Science Practice 2** | The student can use mathematics appropriately. |
| **Science Practice 3** | The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course. |
| **Science Practice 4** | The student can plan and implement data collection strategies in relation to a particular scientific question. [Note: Data can be collected from many different sources, e.g., investigations, scientific observations, the findings of others, historic reconstruction, and/or archived data.] |
| **Science Practice 5** | The student can perform data analysis and evaluation of evidence. |
| **Science Practice 6** | The student can work with scientific explanations and theories. |
| **Science Practice 7** | The student is able to connect and relate knowledge across various scales, concepts, andrepresentations in and across domains. |

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| **Unit (Chapter)** | **Big Ideas**  | **Learning Objectives** | **Topics Covered** |
| **Math in Chemistry\* (1)** | 1 | 1.2,1.3,1.18,1.19 | Review: Dimensional Analysis, Significant Digits, |
| **Isotopes, Ions, Names, and Formulas\* (2)** | 1 | 1.1,1.2,1.3,1.4,1.5 | Review: Isotopes, Ions, NomenclatureNew: Mass Spectroscopy |
| **Reactions (4)** | 3 | 1.17,2.9,3.1,3.2,3.5,3.6 | Review: Types of Reactions, Predicting Products, Net Ionic Equations |
| **Moles and Stoichiometry\* (3)** | 1,3 | 1.4,3.3,3.4,3.5,3.6  | Review: The Mole, Stoichiometry, Empirical Formula New: Molarity and Stoich |
| **Gases\* (5)** | 2 | 2.3,2.4,2.5,2.6,2.12,5.2 | Review: Kinetic Molecular Theory, Gas LawsNew: Graham’s Law, Real Gases, Collecting a Gas Over Water |
| **Thermochemistry (6, 9.10)** | 5 | 5.2,5.3,5.4,5.5,5.6,5.7,5.8 | New: Enthalpy, Phase Changes, Calorimetry, Hess’s Law,  |
| **Atomic Structure and Periodicity\* (7,8)** | 1 | 1.5,1.6,1.7,1.8,1.9,1.10,1.11,1.12,1.13,1.14 | Review: Electromagnetic Radiation, Bohr Model, Quantum Mechanical Model, PeriodicityNew: Energy of Light and Photons Calculations, Photoelectron Spectroscopy |
| **Bonding \* (9,10)** | 2 | 2.1,2.7,2.10,2.11,2.13, 2.14,2.17,2.18,2.19,2.20,2.21,2.22,2.23,2.24,2.26,2.27,2.28,2.29,2.30,3.10,5.1,5.95.10 | Review: Lewis Structures, VSEPR Theory, PolarityNew: Bond Formation, Lattice Energy, Coulomb’s Law, Resonance, Formal Charge, Hybridization |
| **Spectroscopy** | 1 | 1.15,1.16 | New: Electromagnetic Radiation, Spectroscopy, Concentration and Absorption, Beer’s Law |
| **Kinetics\*\* (14)** | 4 | 3.11,4.1,4.2,4.3,4.4,4.5,4.6,4.7,4.8,4.9 | Review: Energy Profiles, Mechanisms and Rate Laws, Method of Initial Rates, Factors Affecting RateNew: Integrated Rate Laws, Reaction Mechanisms |
| **Chemical Equilibrium\*\* (15)** | 6 | 6.1,6.2,6.3,6.4,6.5,6.6,6.7,6.8,6.9,6.10, | Review: Equilibrium, Equilibrium Constant, Reaction Quotient, LeChatelier’s PrincipleNew: Relationship Between K and Kp |
| **Acids and Bases\*\* (16)** | 6 | 1.20,2.2,3.7,6.11,6.12,6.13,6.14,6.15,6.16,6.17 | Review: Acid-Base Reactions, Bronsted-Lowry Theory, Strong and Weak , pH Calculations,TitrationsNew: Amines, Mixtures of Acids, pH of Salts  |
| **Buffers (17)** | 6 | 5.16,6.18,6.19,6.20 | New: Buffers, Common Ion Effect, pH of a Buffer, Buffer Capacity |
| **Titrations (17)** | 6 | 1.20, 6.12,6.13 | Review: Titration MethodNew: Titration Curves, Titration Calculations |
| **Precipitation Solubility\*\* (17)** | 6 | 5.16,6.21,6.22,6.23,6.24 | New: Precipitation and Equilibrium, Ksp, Predicting Precipitate Formation, Common Ion Effect |
| **Thermodynamics (18)** | 5 | 5.12,5.13,5.14,5.155.16,5.17,5.18 | New: Spontaneity, Entropy, Free Energy, Equilibrium |
| **Electrochemistry (19)** | 3  | 3.8,3.9,3.12,3.13,6.25 | New: Galvanic Cells, Balancing Redox, Cell Potential, Free Energy, Equilibrium, Electrolytic Cells |
| **States of Matter\* (12)** | 2 | 2.3,2.16,2.26,2.24,2.25,2.28,2.30,2.31,2.32,5.10,5.11 | Review: States and PropertiesNew: Representation and Properties of Metallic, Ionic, Covalent, and Molecular Solids |
| **Solutions\*\* (13)** | 2 | 2.7,2.8,2.9,2.10,2.15 | Review: Net Ionic Equations, Colligative Properties, Solubility and Temperature |

**Labs:**

 Lab experiments are integrated throughout the course. At least 25% of class time will be spent doing labs with additional time analyzing them.

**ASSESSMENT**

**Portfolio Assessment:** [ ] Yes [x]  No

**District-Wide Common Final Examination Required:** [x] Yes [ ]  No

**Course Challenge Assessment** (Describe)**:** Successful completion of the AP Chemistry Exam (3 or better) or the AP Chemistry Midterm and Final Exam (75% or better).

**WRITING TEAM:** Warren County School District Teachers

**WCSD STUDENT DATA SYSTEM INFORMATION**

1. Is there a required final examination? [x]  Yes [ ]  No

***\*Warren County School District Policy 9741 and9744 state, “All classes in grades 9-12 shall have a final exam.”***

1. Does this course issue a mark/grade for the report card? [x]  Yes [ ]  No
2. Does this course issue a Pass/Fail mark? [ ]  Yes [x]  No
3. Is the course mark/grade part of the GPA calculation? [x]  Yes [ ]  No
4. Is the course eligible for Honor Roll calculation? [x]  Yes [ ]  No
5. What is the academic weight of the course?

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| --- | --- | --- |
| [ ]  No weight/Non credit | [ ]  Standard weight | [x]  Enhanced weight |
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