

**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

**Length of Course:**    ☐ One Semester                      ☒ 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:** ☒ Yes    ☐ No

**TEXTBOOK AND SUPPLEMENTAL MATERIALS**

**Continue using Board approved textbook?** ☒ 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:

<b>Big Idea 1</b>	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.
<b>Big Idea 2</b>	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.
<b>Big Idea 3</b>	Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.
<b>Big Idea 4</b>	Rates of chemical reactions are determined by details of the molecular collisions.
<b>Big Idea 5</b>	The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter.
<b>Big Idea 6</b>	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.

<b>Science Practice 1</b>	The student can use representations and models to communicate scientific phenomena and solve scientific problems.
<b>Science Practice 2</b>	The student can use mathematics appropriately.
<b>Science Practice 3</b>	The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course.
<b>Science Practice 4</b>	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.]
<b>Science Practice 5</b>	The student can perform data analysis and evaluation of evidence.
<b>Science Practice 6</b>	The student can work with scientific explanations and theories.
<b>Science Practice 7</b>	The student is able to connect and relate knowledge across various scales, concepts, and representations in and across domains.

Unit (Chapter)	Big Ideas	Learning Objectives	Topics Covered
<b>Math in Chemistry* (1)</b>	1	1.2,1.3, 1.18,1.19	Review: Dimensional Analysis, Significant Digits,
<b>Isotopes, Ions, Names, and Formulas* (2)</b>	1	1.1,1.2,1.3, 1.4,1.5	Review: Isotopes, Ions, Nomenclature New: Mass Spectroscopy
<b>Reactions (4)</b>	3	1.17,2.9,3.1,3.2, 3.5, 3.6	Review: Types of Reactions, Predicting Products, Net Ionic Equations
<b>Moles and Stoichiometry* (3)</b>	1,3	1.4, 3.3,3.4,3.5, 3.6	Review: The Mole, Stoichiometry, Empirical Formula New: Molarity and Stoich
<b>Gases* (5)</b>	2	2.3,2.4,2.5, 2.6,2.12,5.2	Review: Kinetic Molecular Theory, Gas Laws New: Graham's Law, Real Gases, Collecting a Gas Over Water
<b>Thermochemistry (6, 9,10)</b>	5	5.2,5.3,5.4, 5.5,5.6,5.7, 5.8	New: Enthalpy, Phase Changes, Calorimetry, Hess's Law,
<b>Atomic Structure and Periodicity* (7,8)</b>	1	1.5,1.6,1.7, 1.8,1.9,1.10,1.1 1.1.12, 1.13,1.14	Review: Electromagnetic Radiation, Bohr Model, Quantum Mechanical Model, Periodicity New: Energy of Light and Photons Calculations, Photoelectron Spectroscopy
<b>Bonding * (9,10)</b>	2	2.1,2.7,2.10,2.1 1,2.13, 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, 3.10,5.1,5.9,5.10	Review: Lewis Structures, VSEPR Theory, Polarity New: Bond Formation, Lattice Energy, Coulomb's Law, Resonance, Formal Charge, Hybridization
<b>Spectroscopy</b>	1	1.15,1.16	New: Electromagnetic Radiation, Spectroscopy, Concentration and Absorption, Beer's Law
<b>Kinetics** (14)</b>	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 Rate New: Integrated Rate Laws, Reaction Mechanisms
<b>Chemical Equilibrium** (15)</b>	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 Principle New: Relationship Between K and K <sub>p</sub>
<b>Acids and Bases*** (16)</b>	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, Titrations New: Amines, Mixtures of Acids, pH of Salts
<b>Buffers (17)</b>	6	5.16,6.18,6.19, 6.20	New: Buffers, Common Ion Effect, pH of a Buffer, Buffer Capacity
<b>Titrations (17)</b>	6	1.20, 6.12,6.13	Review: Titration Method New: Titration Curves, Titration Calculations
<b>Precipitation Solubility** (17)</b>	6	5.16,6.21,6.22, 6.23,6.24	New: Precipitation and Equilibrium, K <sub>sp</sub> , Predicting Precipitate Formation, Common Ion Effect
<b>Thermodynamics (18)</b>	5	5.12,5.13, 5.14,5.15,5.16,5. 17,5.18	New: Spontaneity, Entropy, Free Energy, Equilibrium
<b>Electrochemistry (19)</b>	3	3.8,3.9,3.12,3.1 3,6.25	New: Galvanic Cells, Balancing Redox, Cell Potential, Free Energy, Equilibrium, Electrolytic Cells

<b>States of Matter* (12)</b>	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 Properties New: Representation and Properties of Metallic, Ionic, Covalent, and Molecular Solids
<b>Solutions** (13)</b>	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 ☒ No

**District-Wide Common Final Examination Required:** ☒ 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? ☒ Yes ☐ No

*\*Warren County School District Policy 9741 and 9744 state, "All classes in grades 9-12 shall have a final exam."*

2. Does this course issue a mark/grade for the report card? ☒ Yes ☐ No

3. Does this course issue a Pass/Fail mark? ☐ Yes ☒ No

4. Is the course mark/grade part of the GPA calculation? ☒ Yes ☐ No

5. Is the course eligible for Honor Roll calculation? ☒ Yes ☐ No

6. What is the academic weight of the course?

☐ No weight/Non credit

☐ Standard weight

☒ Enhanced weight