COURSE DESCRIPTION

Course Title: Chemistry College Preparatory

Course Number: 00331

Course Prerequisites: Successful completion of Algebra I CP or Algebra 1 B

Course Description:
The science of chemistry deals with the structure of matter, its properties and the changes it undergoes. Chemistry College Preparatory describes matter using both words and numbers. Students will be required to utilize higher math skills frequently. Current enrollment in or completion of Algebra II College Preparatory is strongly recommended for success in CP Chemistry. This course will meet 6 class periods per week with one of those periods designated for laboratory exploration.

Suggested Grade Level: Grades 10-12

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 Matter and Change
Publisher: McGraw Hill Education
ISBN #: 978 – 0 – 07 – 677460 - 9
Copyright Date: 2017
Date of WCSD Board Approval:

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*)

PA Science Standards:

3.1.C.A: CHEMISTRY
3.1.C.B: CHEMISTRY
3.1.C.C: CHEMISTRY
3.2.C.A: CHEMISTRY
3.2.C.B: CHEMISTRY
3.3.C.A: CHEMISTRY
3.3.C.B: CHEMISTRY

Common Core Standards:

CC.3.5.11-12 Reading Informational Text
CC.3.6.11-12 Writing

Content:

I. Measurements in Chemistry
    A. Scientific Measurement
        1. Qualitative vs. Quantitative measurement
        2. Use of and meaning of significant figures
        3. Metric system
        4. Scientific notation
        5. Lab Safety and Equipment
        6. Percent Error
    B. Density
    C. Graphing

II. Matter and Changes
    A. Types of Matter and Separations
    B. Physical
        1. Properties (Intensive and Extensive)
        2. Changes
    C. Chemical

          1. Properties
          2. Changes

III. Formula Writing and Nomenclature
    A. Ionic
          1. Binary
          2. Ternary – Polyatomic ions
          3. Roman numerals
    B. Molecular (Covalent)
    C. Acids, Bases and Characteristics
    D. Oxidation Numbers

IV. The Mole
    A. Problem solving with factor label/dimensional analysis
    B. Avogadro's Number
    C. Molar Mass
    D. Molar Volume

V. Applications of the Mole
    A. Percent Composition
    B. Empirical Formulas
    C. Molecular Formulas
    D. Molarity

VI. Chemical Reactions
    A. Balancing
          1. Law of Conservation of Mass
          2. Skeleton equations
    B. Reaction Types
          1. Single Replacement
          2. Double Replacement
          3. Synthesis (Combination)
          4. Decomposition
          5. Combustion
    C. Predicting Products of Reactions
    D. Factors That Affect Reaction Rate

VII. Stoichiometry
    A. Mass
    B. Volume
    C. Energy
          1. Endothermic
          2. Exothermic

VIII. Reaction Completion?
    A. Limiting Reactants
          1. Theoretical yield
          2. Percent Yield
    B. Equilibrium
          1. Reversible reactions
          2. LeChatalier Principle
              a. Concentration
              b. Pressure

c. Temperature

IX. Atomic Theory **7**
    A. Development of Atomic Theory
        1. Dalton's Atomic Theory
        2. Thomson
        3. Rutherford
    B. Atomic Particles
    C. Isotopes
    D. Nuclear Particles and Reactions

X. Quantum Theory
    A. Quantization of Energy
    B. Bohr and Heisenberg
    C. Electron Cloud Model
        1. Define Quantum Numbers
        2. Aufbau, Pauli, and Hund
    D. Electron Configurations
    E. Orbital Notation

XI. The Period Table
    A. History and Organization
        1. Element Stability and Configurations
        2. Groups, Periods, and Configuration
    B. Periodic Trends and Their Influencing Factors
        1. Atomic and Ionic Radius
        2. Ionization Energy
        3. Reactivity

XII. Bonding
    A. Electronegativity
    B. Bond Types and Lewis Dot Structures
        1. Ionic
        2. Polar Covalent
        3. Nonpolar Covalent
        4. Metallic
    C. Multiple Bonds
    D. Properties

XIII. Molecular Shapes and Polarity
    A. VSEPR Theory
    B. Polarity
    C. Intermolecular Forces
        1. Dipole
        2. Dispersion
        3. Hydrogen Bonding

XIV. Gases
    A. Kinetic Molecular Theory
        1. Gas Pressure
        2. Atmospheric Pressure
        3. Temperature

B. Gas Laws
     1. Boyle's, Charles', and Combined Gas Laws
     2. Dalton's Law of Partial Pressures
     3. Ideal Gas Law

XV. Heat and Phase Changes
    A. Heat and Specific Heat
    B. Calculating Heat
    C. Calculating Heat in a System
    D. Calculating Heat in a Phase Change

XVI. Laboratory

Objectives:

1. Recognize that everything is made of matter

2. Assess changes in matter and energy

3. Determine chemical bonding using attractive forces between particles

4. Predict physical and chemical properties based on periodic trends in the properties of atoms

5. Predict chemical reactions

<div align="center">ASSESSMENT</div>

Portfolio Assessment: ☐ Yes ☒ No

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

Course Challenge Assessment (Describe)**:** must score a minimum of 80% on final exam

WRITING TEAM: Warren County School District Teachers

<div align="center">WCSD STUDENT DATA SYSTEM INFORMATION</div>

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