

Wilson Area School District Planned Course Guide

Title of planned course: Applied Chemistry

Subject Area: Science

Grade Level: 10

Course Description: This Chemistry course is designed to provide basic principles of Chemistry through the use of technology and applications. Matter and various chemical processes are taught through a conceptual approach to chemistry. Students will perform independent/group investigations leading to discovery of chemical principles. This course is strongly recommended for students planning technical careers.

Time/Credit for this Course: one credit – one full year

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Wilson Area School District Planned Course Materials

Course Title: Applied Chemistry

Textbook: Chemistry Concepts and Applications (title)
Glencoe Science (publisher)
2005 (copyright date)
chemistryca.com (web address)

Supplemental Books/CDs:

- *Chemistry Matter and Change*; Glencoe McGraw-Hill; 2002
- *Environment the Science Behind the Stories*; Pearson Education Inc; 2008
- Exam View Pro Test Maker CD-ROM - *Chemistry Concepts and Applications*
- Teacher Works CD-ROM – *Chemistry Concepts and Applications*

Teacher Resources:

- <http://teachertube.com>
- <http://streamingdiscoveryeducation.com>

Curriculum Map

August:	Science Basics
September:	Science Basics The Study of Matter
October:	The World of Atoms
November:	The Periodic Table
December:	Introduction to Bonding
January:	Types of Compounds
February:	Chemical Reactions and Equations
March:	Chemical Reactions and Equations The Mole
April:	The Kinetic Theory of Matter
May:	The Gas Laws
June:	Review

Curriculum Scope & Sequence

Planned Course: Applied Chemistry

Unit: Science Basics

Time Frame: 2 weeks

State Standards: 3.1.10.D, 3.2.10.A, 3.2.10.C, 3.2.10.B

Anchors: S11.A.2.1.1, S11.A.2.1.3, S11.A.2.2.1, S11.A.3.1.1

Essential Content/Objectives: At the end of the unit students will be able to:

- Construct, interpret and analyze graphs
- Define quantities of SI units of measurement
- Convert units using dimensional analysis
- Apply rules to determine the proper amount of significant figures when solving mathematical problems
- Apply the rules to write numbers in scientific notation
- Use laboratory equipment accurately and precisely when measuring quantities

Core Activities: Students will complete/participate in the following:

- Graphing project using the book *If the World were a Village*
- Scientific notation, significant figures, measuring liquids, and unit conversion worksheets
- Graphic organizer
- Lab (determining number of significant figures when measuring, mass of pennies graph, drops of water | 1 mL, determining the volume of a solid)

Extensions: Appendix A practice problems

Remediation:

- Teacher directed after school
- Reinforcement worksheets
- Practice online

Instructional Methods:

- Inquiry based labs
- Student demonstrations
- Online video clips
- Student graphic organizers
- Cooperative learning groups

Materials & Resources:

- Graphic organizer
- *If the World Were a Village*
- Lab manual
- Video clips
- Worksheets

Assessments:

- Test
- Lab write up
- Journal
- Homework/worksheets
- Class participation

Curriculum Scope & Sequence

Planned Course: Applied Chemistry

Unit: Study of Matter

Time Frame: 3 - 4 weeks

State Standards: 3.2.10.A, 3.2.10.C, 3.4.10.A.1, 3.4.10.A.8

Anchors: S11.A.1.1.1, S11.A.1.1.2, S11.A.1.1.5, S11.A.2.1.1, S11.A.2.1.5, S11.A.2.2.1, S11.A.2.2.2, S11.C.1.1.1, S11.C.1.1.2

Essential Content/Objectives: At the end of the unit students will be able to:

- Classify elements, compounds, homogeneous mixtures and heterogeneous mixtures
- Observe qualitative, quantitative, direct and indirect and intensive and extensive properties of matter
- Analyze the structure and properties of matter
- Compare/contrast physical and chemical properties and changes of matter
- Interpret the Law of Conservation of Matter

Core Activities: Students will complete/participate in the following:

- Vocabulary sentences
- Candle lab
- Worksheets: compound/element, compound/mixture, classification of matter, density
- Kitchen chemical lab

Extensions:

- Career connection: Forensic Science
- Jules Verne and icebergs
- Natural versus synthetic chemicals

Remediation:

- Teacher directed after school
- Reinforcement worksheets
- Practice problems Chapter 1

Instructional Methods:

- Graphic organizer
- Cooperative learning groups
- Milk separation student demonstration
- Inquiry based labs
- Density video clip

Materials & Resources:

- Lab manual
- Textbook and CD
- Internet video clips

Assessments:

- Test
- Vocabulary sentences
- Vocabulary quiz
- Lab write up
- Journal
- Homework/worksheets
- Class participation

Curriculum Scope & Sequence

Planned Course: Applied Chemistry

Unit: The World of Atoms

Time Frame: 4 weeks

State Standards: 3.2.10.A, 3.4.10.C, 3.4.10.A.1, 3.4.10.D.1

Anchors: S11.A.1.1.1, S11.A.1.1.2, S11.A.1.1.4, S11.A.1.1.5, S11.A.2.1.1, S11.A.2.2.2, S11.A.3.2.2, S11.A.3.2.3, S11.A.3.3.2, S11.A.3.3.3, S11.C.1.1.1, S11.C.2.1.1

Essential Content/Objectives: At the end of the unit students will be able to:

- Summarize the history of the model of an atom
- Construct an atom of an element using atomic number, atomic mass, protons, neutrons and electrons
- Determine isotopes of elements
- Summarize light as it relates to the electrons in an atom
- Interpret the Electromagnetic Spectrum
- Draw the electron dot model for an element

Core Activities: Students will complete/participate in the following:

- Group project on Electromagnetic Spectrum
- Emission Spectrum lab
- Element 119-Beanium lab
- Atomic structure newspaper article report
- Worksheets: mass # and atomic mass, isotopes, Lewis dot diagrams
- Vocabulary sentences

Extensions:

- Recycling glass
- Aurora Borealis
- Fireworks video

Remediation:

- Practice problems Chapter 2
- Teacher directed after school
- Reinforcement worksheets

Instructional Methods:

- Atom video
- Student demonstration of Rutherford's experiment
- Graphic organizers
- Inquiry based labs
- Cooperative learning groups
- Differentiated instruction

Materials & Resources:

- Textbook and CD
- Lab manual
- Internet
- Video clips

Assessments:

- Test
- Vocabulary sentences
- Vocabulary quiz
- Lab write up
- Group projects
- Journal
- Homework/worksheets
- Class participation

Curriculum Scope & Sequence

Planned Course: Applied Chemistry

Unit: The Periodic Table

Time Frame: 3 weeks

State Standards: 3.2.10.A, 3.2.10.C, 3.4.10.A.2

Anchors: S11.A.1.1.1, S11.A.1.1.5, S11.A.2.1.1, S11.A.2.1.4, S11.A.3.2.1, S11.A.3.3.3, S11.C.1.1.2, S11.C.1.1.4

Essential Content/Objectives: At the end of the unit students will be able to:

- Demonstrate understanding of periodicity and trends in the periodic table
- Classify properties of matter as intensive or extensive
- Determine the stability of an atom's structure by using Aufbau Principle, Pauli Exclusion Principle and Hund's Rule

Core Activities: Students will complete/participate in the following:

- Discover the element web quest
- Food Periodic Table lab
- Reactivity of elements with acids lab
- Determining element by using density lab
- Determining electrical conductivity of metals, nonmetals, and metalloid lab
- Reaction of metals with CuCl_2 lab
- Periodic Table element card
- Vocabulary sentences
- Worksheets: Periodic Table of elements, recognizing elements, identifying elements, Gold Dust Kid, using the Periodic Table

Extensions:

- Make your own Periodic Table
- Element names packet
- Metals that untwist
- Metallic money

Remediation:

- Practice problems Chapter 3
- Teacher directed after school
- Reinforcement worksheets

Instructional Methods:

- Graphic organizers
- Inquiry based labs
- Cooperative learning groups
- Teacher demonstration of reactivity of alkali metals

Materials & Resources:

- Textbook and CD
- Lab manual
- Internet
- Classroom Periodic Table

Assessments:

- Test
- Vocabulary sentences
- Vocabulary quiz
- Lab write up
- Group projects
- Journal
- Homework/worksheets
- Class participation

Curriculum Scope & Sequence

Planned Course: Applied Chemistry

Unit: Instructions to Bonding

Time Frame: 3 weeks

State Standards: 3.2.10.A, 3.2.10.C, 3.4.10.A.5

Anchors: S11.A.1.1.5, S11.A.1.3.1, S11.A.1.3.3, S11.A.1.3.4, S11.A.2.1.1, S11.A.2.1.3, S11.A.2.2.2, S11.A.3.2.3, S11.b.1.1.1, S11.B.3.1.5, S11.C.1.1.1, S11.C.1.1.2, S11.C.1.1.3, S11.C.1.1.4

Essential Content/Objectives: At the end of the unit students will be able to:

- Conclude the bonding between atoms occurs between the valence electrons
- Demonstrate how atoms are bonded together through Lewis Dot diagrams
- Compare the physical properties of an element with its type of bonding (ionic or covalent)
- Analyze water using indicators such as hardness, pH, dissolved oxygen, turbidity, and temperature to determine the quality of water sources
- Understand the depletion of ground water and what can be done to alleviate the problem

Core Activities: Students will complete/participate in the following:

- Water: The Highway of Life video clip
- Rusting of iron lab
- Difference between melting of ionic and covalent compounds lab
- Electrical conductivity of compounds lab
- Shape/atomic level relationship lab
- The melting of Lauric acid lab
- The formation of ionic compounds lab
- Worksheets: Valence Electron, Ion, Ionic Bond, Structure of Sodium Chloride, The Octet Rule, Variety of Compounds

Extensions:

- Food pyramid elements of life
- The Rain Forest Pharmacy

Remediation:

- Practice problems Chapter 4
- Teacher directed after school
- Reinforcement worksheets

Instructional Methods:

- Graphic organizers
- Inquiry based labs
- Cooperative learning groups
- Differentiated instruction

Materials & Resources:

- Textbook and CD
- Lab manual
- Internet video clips

Assessments:

- Test
- Vocabulary sentences
- Vocabulary quiz
- Lab write up
- Journal
- Homework/worksheets
- Class participation

Curriculum Scope & Sequence

Planned Course: Applied Chemistry

Unit: Types of Compounds

Time Frame: 4 weeks

State Standards: 3.2.10.A, 3.2.10.C, 3.4.10.A.5, 3.4.10.1.6, 3.4.10.A.9

Anchors: S11.A.1.1.1, S11.A.1.1.2, S11.A.2.1.1, S11.A.3.3.1, S11.A.3.3.3, S11.B.1.1.1, S11.C.1.1.2, S11.C.1.1.3

Essential Content/Objectives: At the end of the unit students will be able to:

- Determine the polarity based on distribution of electrons
- Distinguish between covalent, polar covalent and ionic bonding
- Apply rules to write formulas and name ionic and covalent compounds
- Interpret the Law of Multiple Proportions

Core Activities: Students will complete/participate in the following:

- Making models of compounds lab
- Video clip on distillation
- Popcorn hydrate lab
- Intermolecular forces of milk lab
- Dissection of a diaper lab
- Formulas and oxidation numbers lab
- Worksheets: Naming Ionic Compounds, Naming Covalent Compounds, Charges of Common Ions, Writing Chemical Formulas, Ionic Clues to Atomic Identity, Oxidation Numbers of Groups, Order of Operations
- Sulfur: Using Earth's Yellow Mineral
- Vocabulary sentences

Extensions:

- Hard water
- China's porcelain
- How it Works: Cement
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Remediation:

- Practice problems Chapter 5
- Teacher directed after school
- Reinforcement worksheets

Instructional Methods:

- Student demonstration with NaCl
- Graphic organizers
- Inquiry based labs
- Cooperative learning groups

Materials & Resources:

- Textbook and CD
- Lab manual
- Video clips

Assessments:

- Test
- Vocabulary sentences
- Vocabulary quiz
- Lab write up
- Journal
- Homework/worksheets
- Class participation

Curriculum Scope & Sequence

Planned Course: Applied Chemistry

Unit: Chemical Reactions and Equations

Time Frame: 5 weeks

State Standards: 3.2.10.A, 3.2.10.C, 3.4.10.A.5, 3.4.10.A.7, 3.4.10.B.1, 3.4.10.B.3

Anchors: S11.A.1.1.2, S11.A.1.1.4, S11.A.1.1.5, S11.A.1.3.1, S11.A.1.3.2, S11.A.2.1.1, S11.A.2.1.2, S11.A.2.1.3, S11.A.2.1.4, S11.A.3.1.2, S11.C.1.1.3, S11.C.2.1.2

Essential Content/Objectives: At the end of the unit students will be able to:

- Predict products of chemical reactions and balance the equations
- Examine and determine if reactions are Synthesis, Decomposition, Single Replacement, Double Replacement or Combustion
- Using the Law of Conservation of Matter determine the mass of products or reactants in a chemical reaction
- Describe Limiting Reactants and explain how they control equilibrium
- Compare/contrast exothermic and endothermic reactions

Core Activities: Students will complete/participate in the following:

- Vocabulary sentences
- Single/Double Replacement lab
- Endo/Exothermic lab
- Equilibrium lab
- Worksheets: A Chemical Equation, Types of Chemical Equations, Writing Balanced Equations, Balancing Equations, Classification of Chemical Reactions
- The Making of Ammonia

Extensions:

- Whitening Whites
- How emergency light sticks work
- Flameless ration heaters

Remediation:

- Practice problems Chapter 6
- Teacher directed after school
- Reinforcement worksheets

Instructional Methods:

- Graphic organizers
- Inquiry based labs
- Cooperative learning groups

Materials & Resources:

- Textbook and CD
- Lab manual
- Video clips

Assessments:

- Test
- Vocabulary sentences
- Vocabulary quiz
- Lab write up
- Journal
- Homework/worksheets
- Class participation

Curriculum Scope & Sequence

Planned Course: Applied Chemistry

Unit: The Mole

Time Frame: 3 weeks

State Standards: 3.2.10.A, 3.2.10.C, 3.4.10.B.2

Anchors: S11.A.1.3.1, S11.A.2.1.1, S11.A.2.1.3, S11.A.2.1.4, S11.A.3.1.1, S11.A.3.1.3, S11.A.3.2.1

Essential Content/Objectives: At the end of the unit students will be able to:

- Describe the mole using Avogadro's number and mass
- Use dimensional analysis to determine simple stoichiometric relationships
- Predict the amount of product or reactant needed using mole relationships
- Solve for percent yield using limiting reactants

Core Activities: Students will complete/participate in the following:

- Mole video
- What is a Mole Activity?
- Split pea mole lab
- Percent sugar in bubble gum lab
- Stoichiometry problem worksheets

Extensions:

- Improving percent yield and chemical synthesis
- Air bags

Remediation:

- Practice problems Chapter 12
- Teacher directed after school
- Reinforcement worksheets

Instructional Methods:

- Graphic organizers
- Inquiry based labs
- Cooperative learning groups
- Share and pair

Materials & Resources:

- Textbook and CD
- Lab manual
- Video

Assessments:

- Test
- Lab write up
- Journal
- Homework/worksheets
- Class participation

Curriculum Scope & Sequence

Planned Course: Applied Chemistry

Unit: The Kinetic Theory of Matter

Time Frame: 3 weeks

State Standards: 3.2.10.A, 3.4.10.C, 3.4.10.A.4

Anchors: S11.A.1.1.2, S11.A.1.1.5, S11.A.2.1.3, S11.A.2.1.4, S11.C.1.1.5, S11.A.2.1.1, S11.C.2.2.1, S11.C.2.2.2

Essential Content/Objectives: At the end of the unit students will be able to:

- Relate and describe state of matter using kinetic energy theory
- Relate the effects of temperature and pressure on changes of state
- Solve for Celsius and Kelvin temperatures
- Compare/contrast heat of fusion/heat of vaporization

Core Activities: Students will complete/participate in the following:

- State of matter video clip
- Vocabulary sentences
- Solid or liquid lab
- Kinetic energy of a gas lab
- Surface tension lab
- Air pressure vs. water pressure lab
- Freezing and boiling point graph
- State of matter group project
- Worksheets: Temperature Conversion, Pressure Conversion

Extensions:

- Glass sculptures
- Pressure Cookers
- Fractional of air

Remediation:

- Practice problems Chapter 10
- Teacher directed after school
- Reinforcement worksheets

Instructional Methods:

- Graphic organizers
- Inquiry based labs
- Cooperative learning groups

Materials & Resources:

- Textbook and CD
- Lab manual
- Video clips

Assessments:

- Test
- Vocabulary sentences
- Vocabulary quiz
- Lab write up
- Journal
- Group project
- Homework/worksheets
- Class participation

Curriculum Scope & Sequence

Planned Course: Applied Chemistry

Unit: The Gas Laws

Time Frame: 4 weeks

State Standards: 3.2.10.1, 3.2.10.A, 3.4.10.A.4,

Anchors: S11.A.1.1.4, S11.A.2.1.1, S11.A.3.1.2, S11.A.3.1.3, S11.A.3.2.1, S11.C.1.1.5

Essential Content/Objectives: At the end of the unit students will be able to:

- Describe and solve for temperature, pressure, amount or volume using Boyle's Law, Charles's Law and Combined Gas Law
- Convert pressures into units using dimensional analysis

Core Activities: Students will complete/participate in the following:

- Charles's Law lab
- Fire extinguisher lab
- Pressure/temperature lab
- Boyle's Law lab
- Graphic organizer
- Vocabulary sentences
- Atmospheric graphing activity
- Worksheets: Charles's Law, Boyle's Law

Extensions:

- How a tire pressure gauge works
- Weather balloons
- Hyperbaric oxygen chambers
- Blood pressure
- Ozone hole online

Remediation:

- Practice problems Chapter 11
- Teacher directed after school
- Reinforcement worksheets

Instructional Methods:

- Graphic organizers
- Inquiry based labs
- Gas Law student demonstrations
- Hot air balloon video clip

Materials & Resources:

- Textbook and CD
- Lab manual
- Video clip

Assessments:

- Test
- Vocabulary sentences
- Vocabulary quiz
- Lab write up
- Journal
- Homework/worksheets
- Class participation