

Chemistry 11
Unit 1
Safety in the Laboratory

Topic	Activities
Safety Equipment	Tour of the Lab reviewing where the emergency safety equipment is. A review of the operation of lab safety equipment. Read pages 1-5 of Student Workbook (SW)
Safety Hazards and Procedures	Review procedures to take in case of emergencies. Read pages 4-6 of SW. Do Exercises 1-8 of page 8 of SW.

Chemistry 11
Unit 2
Introduction to Chemistry

Topic	Activities
Units and Unit Conversions	Class explanation and Read pages 9-15 in SW. Do Exercise 2 a-e on Page 14 of SW.
S.I. Units	Brief Explanation of SI units and multiples. A brief review of Scientific (Exponential) Notation.
Metric Conversions	Class explanation and examples of Metric Conversions. Read pages 16-21 of SW. Do Exercise 17 a-j on page 21 of SW.
Density	Class review of density and density calculations. Read pages 24-25 of SW. Do Exercises 31-35 on page 26 of SW.
Significant Digits and Experimental Uncertainty	Class Explanation of Significant Digits. Define Accuracy and Precision. Read pages 26-29 of SW. Class Review of Reading Scales. Read pages 30-34 SW Class Explanation of Calculations involving significant digits. Read pages 37-40 SW. Do Exercises 57-58 on page 40 of SW.

Chemistry 11
Unit 2
Introduction to Chemistry

Topic	Activities
Graphing Techniques	Class Explanation of Graphing, Slope, Y-intercept and Equations of Straight Lines. (Read Tutorial 3 in handout from teacher) Do Worksheet on Graphing Do Experiment 3-A - Determining the Mass/Volume Relation for 3 Liquids.

Chemistry 11
Unit 3
Properties of Matter

Topic	Activities
Physical Properties of Matter	Define: Observation, Interpretation, Qualitative, Quantitative, Data, Experiment, Hypothesis, Theory, Laws, Matter, Chemistry, Physical and Chemical Properties, Malleability, Ductility, Lustre, Viscosity and Diffusion. Review the Phases of Matter. Read pages 41-46 SW. Do Exercise 1-6 on page 43 of SW.
Classification of Matter	Class demonstration of Classification of Matter. Read pages 49-52 of SW. Do Tutorial 1 from Teacher Handout. Do Experiment 2C-Elements, Compounds and Mixtures
Physical Separation of Mixtures	Do Experiment on Methods of Physical Separation of Mixtures Read and Make Notes on pages 53-58 of SW.

Chemistry 11
Unit 3
Properties of Matter

Phase Changes	<p>Define Physical and Chemical Changes</p> <p>Demonstration of Physical and Chemical Changes</p> <p>Review of Phase Changes</p> <p>Do Experiment 2A-Warming Behavior of Solid Paradichlorobenzene</p> <p>Read pages 60-61 of SW.</p> <p>Do Exercises 59-61 of page 61 of SW.</p>
Review and Test	Review of Units 1, 2 and 3 & Test on Units 1, 2 and 3.

Chemistry 11 – Unit 4—Names and Formulas for Compounds
Unit Outline

Topic	Activity
Elements	Brief Review of Element Symbols
Ions	Ion Charges (combining capacities) Monatomic and Polyatomic Ions
Writing Formulas for Ionic Compounds	Review of Writing Formulas for Ionic Compounds Read pp. 65-71 in SW. Do Ex. 4 on page 71 of SW
Naming Ionic Compounds	Review of Method for Writing Names for Ionic Compounds Read pp. 71-72 in SW Do Ex. 5 on page 72 of SW Explanation of Names and Formulas for Hydrates Read pp. 72-73 in SW Do Ex. 6 & 7 on page 73 of SW Do Hand-In Assignment on Formulas and Names for Ionic Compounds
Names and Formulas for Covalent Compounds	Explanation of the Prefix Method of Naming Covalent Compounds Read pp. 73-74 in SW Do Ex.8 & 9 on page 74 of SW
Names of Common Acids	Demonstration of the Properties of Acids and Bases Names and Formulas of some Common Acids
Review and Test on Unit 4	Selected Exercises from pages 75 and 76 of SW Test on Unit 4

Chemistry 11 – Unit 5—The Mole Concept
Unit Outline

Topic	Activity
Introduction to Unit 5	Hydrogen Bomb Demonstration using different H ₂ /air ratios.
History of Atomic Mass	Brief Explanation of Dalton's Relative Masses. See p. 77 SW. Gay-Lussac's Combining Volumes. See p. 77 SW. Avogadro's Hypothesis. See p. 77 SW. Do Ex. 3 & 4 on p. 78 of SW.
Definition of a Mole	Class Explanation of Definition of a Mole. See p. 83 SW.
Molar Mass & Moles	Definition of Molar Mass. See p. 79 SW. Calculations of Molar Mass using Atomic Masses. See p.79 SW. Do Ex. 6 (a-h) and 7 (a-b) on p. 80 of SW. Class Examples of Grams ⇌ Moles conversions. See p. 81 SW. Do Ex. 8 (a-d), 9 (a-f) and 10 (a-c) on p. 82 of SW. Do Experiment 4B—Moles of Iron and Copper
Molar Volume & Moles	Class Explanation of Standard Temperature and Pressure (STP) and Molar Volume of Gases. See p. 82-83 of SW. Do Ex. 11 (a-c) and 12 (a-c) on p. 83 of SW. Class Examples of Combination Mass ⇌ Mole ⇌ Volume Calculations. Hand-In Assignment # 4 – Mass-Mole-Volume Conversions Do Experiment 7B—The Molar Volume of a Gas
Moles, Molecules and Atoms	Class Explanation of Conversions between Moles ⇌ Molecules and between Molecules ⇌ Atoms. See p. 83-85 of SW. More Class Examples of Combination Mole Problems Do Ex. 15 (a-d), 16 (a-b), 17 (a-b), 18 (a-c) and 19 p. 84-85 SW. Class "Mole Conversion Diagram" and Multiple Mole Conversions. See p. 85-86 of SW. Do Ex. 22 (a-b), 23 (a-d) and 24 (a-d) on p. 86-87 of SW.
Density & Mole Calculations	Review of Density and Explanation of how it relates to Mole Calculations. See p. 87-88 of SW. Do Ex. 25, 27, 28 and 29 on p. 88 of SW.
Mole Conversion Summary	Do selected exercises from page 88-90 in SW. Hand-In Assignment #5 – Summary of Mole Conversions
Percent Composition and Empirical Formulas	See Examples on p. 90 of SW. See Tutorial 10.5 (Section on % Composition) – Handout Do Ex. 44 (a, g & n) and 45 (b) on p. 91 of SW. Go over the section on Empirical and Molecular Formulas in Tutorial 10.5. Do the Self-Test on Tutorial 10.5 See examples on pages 91-95 of SW. Do Ex. 46 (d, g & m) on p. 93 of SW. Do Ex. 48 and 52 on p. 95 of SW.

Topic	Activity
Molar Concentration	Class review of solutions, solutes and solvents. Explanation of Molar Concentration and Calculations. See p. 96-98 in SW. Do Ex. 59 (b, d & f), 60 (c & e), 62 & 64 on p. 98 of SW.
Dilution Calculations	Class Explanation of the Dilution Formula. See pages 100-101 in SW. Do Ex. 78, 82, 89, & 91 on p. 102-103 of SW. Do Hand-In Assignment #6—Percent Composition, Empirical and Molecular Formulas, Molarity and Dilution Calculations
Summary and Test	Do a Review of Unit 5 Test on Unit 5

Chemistry 11 – Unit 6—Chemical Reactions

Unit Outline

Topic	Activity
Introduction to Chemical Reactions and Equations	“World War III” demonstration. List the types of evidence which suggest a Chemical Reaction. Definition of Reactants, Products, Open and Closed Systems and the Conservation Laws. See p. 105-107 in SW.
Balancing Chemical Equations	Class Examples of Tricks to Balancing Chemical Equations. Read p. 107-110 in SW. Selected practice in balancing from Exercises 7-56 on p. 110-112 of SW. Examples of using phases (s), (l), (g) and (aq) in chemical equations. See p. 113 in SW. Writing Balanced Chemical Equations starting with Word Equations. Class Examples and see p. 113 in SW. Do Exercises 57 (a-e), 58, 59, 60 and 61 on p. 113-114 of SW. Hand-In Assignment #7—Chemical Equations
Types of Chemical Reactions	Class Notes, Examples and Demonstrations of Synthesis, Decomposition, Single Replacement, Double Replacement, Neutralization and Combustion Reactions. See p. 114-118 in SW. Do Experiment 5C—Types of Chemical Reactions Selected Exercises from 65, 66 and 67 on p. 118 of SW. Hand-In Assignment #8—Completing, Balancing and Classifying Chemical Equations. (CBC)
Energy Changes in Chemical Reactions	Demonstration of Exothermic and Endothermic Reactions

Topic	Activity
Energy Changes in Chemical Reactions	<p>Class Introduction to Enthalpy (H), Enthalpy Diagrams and ΔH. See p. 119-122 in SW.</p> <p>Do Ex. 76-80 on p. 122 of SW.</p> <p>Class Introduction to and notes on Calorimetry. (Not in SW.) Do Experiment 17B—Heat of Fusion of Ice</p> <p>Class Explanation and Examples of ΔH and Coefficients (Moles) in Chemical Equations.</p> <p>Hand-In Assignment #9—Energy in Chemical Reactions</p>
Summary and Test	<p>Class Review of Unit 6—Chemical Reactions</p> <p>Test on Unit 6</p>

Chemistry 11 – Unit 7—Stoichiometry
Unit Outline

Topic	Activity
Definition of Stoichiometry	Brief class introduction to Stoichiometry. See p. 121 SW.
Coefficients and Moles	<p>Class explanation of coefficients, molecules and mole ratios. See p. 123-124 in SW.</p> <p>Do Ex. 1 (a-d), 2 (a-d), & 3 on p. 124 SW.</p>
Moles \rightleftharpoons Mass and Mass \rightleftharpoons Mass Problems	<p>Class examples of problems with moles \rightleftharpoons mass and mass \rightleftharpoons mass conversions. See p. 125-126 in SW.</p> <p>Do Ex. 6 (a-b) and 7(a-b) on p. 127 of SW.</p> <p>Do Experiment 6A—Mass and Moles in a Chemical Reaction</p>
Volume \rightleftharpoons Mass and Volume \rightleftharpoons Volume Calculations	<p>Class examples of problems with moles \rightleftharpoons volume, mass \rightleftharpoons volume and volume \rightleftharpoons volume calculations. See p. 125-126 of SW.</p> <p>Do Ex. 6 (c-d) and 7 (c-f) on p. 127 of SW.</p>
Calculations Involving Molecules, Moles, Mass & Volume	<p>Class examples of calculations involving conversions to/from molecules to/from mass, moles or volume. See example “e” on p. 126 of SW.</p> <p>Do Ex. 8 (a-d), 9 (a-c) and 10 on p. 127 of SW.</p> <p>Do Hand-In Assignment # 10—Stoichiometry Problems</p>
Stoichiometry Involving Molarity	Class Review of Molarity Calculations. Class examples of Stoichiometry Problems involving Molarity. See p. 129-131 in SW.

Topic	Activity
Stoichiometry of Excess Quantities	Do Ex. 17-20 on p. 131 of SW. Class Explanation of Finding Excess Reactant and Limiting Reactant and Masses of Products Produced.
Percentage Yield Problems	Do Ex. 26-28 on p. 133 of SW. Class Explanation of Finding Percentage Yield. See SW. p. 134-137
Percentage Yield Problems	Do Ex. 33 c and 36 a-c on p. 137 of SW. Do Hand-In Assignment # 11—Molarity, Excess and Percentage Yield Problems.
Summary and Test	Class Review of Unit 7—Stoichiometry Test on Unit 7

Chemistry 11 – Unit 8—Atoms, Periodic Table and Bonding
Unit Outline

Topic	Activity
Historical Development of Atomic Models	Brief class introduction to the models of the atom proposed by the ancient Greeks, Dalton, Thomson, Rutherford and Bohr. Read pages 139-144 in SW. Video portraying early models of the atom and how they were developed.
Protons, Neutrons, and Electrons in Atoms and Ions	Class explanation of nuclear notation of isotopes and how to determine the number of protons, neutrons and electrons given nuclear notation or nuclear notation given numbers of P's, N's and e ⁻ 's. See pages 144-148 in SW. Do Ex. 15(a-f), 16(a-e), 17(a-d), 19, 22(a-e) (change "Atomic Mass" to "Mass Number" in 19 & 22!) on pages 146-149 of SW.
Isotope Abundances and Atomic Mass	Class Explanation of how Atomic Mass is calculated given relative natural abundances of isotopes. See p. 150 in SW. Do Ex. 23(a-d) on page 150 of SW.
Electronic Structure of the Atom	Class Explanation of the Wave Mechanical or Quantum Mechanical Model of the Atom. See p. 151-158 in SW. Videos on Bohr-Rutherford Models and the Wave Mechanical Model. Do Hand-In Assignment # 12—Electronic Structure of the Atom. (You will also need pages 287-300 in Heath Chemistry Text to help you with this assignment.) Video on the Atom

Topic	Activity
Early History of the Periodic Table	<p>Brief class introduction to early ordering of elements and Mendeleev's Periodic Table.</p> <p>Do Ex. 30 on page 160 of SW.</p>
The Modern Periodic Table	<p>Class Explanation of "Atomic Mass discrepancies" and how Atomic Number solved the problem.</p>
The Modern Periodic Table	<p>Class Introduction to the Major Divisions within the Periodic Table. See pages 161-164 of SW.</p> <p>Do Ex. 31-39 on pages 162-164 of SW.</p>
Trends on the Periodic Table	<p>Do Experiment on Trends in Reactivity of Elements.</p> <p>Do In-Class Activity on Trends on the Periodic Table</p>
Noble Gas Stability and Ion Formation Chemical Families	<p>Do Hand-In Assignment #13—Electron Arrangement and Ion Formation</p> <p>See Video on the Periodic Table</p>
Chemical Bonding	<p>Class Explanation of Valence Electrons and Electron-Dot Diagrams (Lewis Structures) for Atoms. Draw Electron Dot Structures for a variety of atoms.</p> <p>Class Explanation of Electronegativity and the nature of Ionic Bonding. See p. 172-175 of SW. Do Ex. 57 & 60-64 on p.172-175 of SW.</p> <p>Class Explanation of Covalent Bonding. See p. 176-179 of SW. Do Ex. 69-72 on p. 178-179 of SW. Class Explanation of Polar Covalent Bonding (like in a water molecule). Brief Class Explanation of London Forces. See p. 179-181 in SW.</p> <p>Class Explanation of Drawing Electron-Dot Diagrams for simple ionic and covalent compounds, including some with double and triple bonds.</p> <p>See Video on Chemical Bonding</p> <p>Do Hand-In Assignment #14—Chemical Bonding</p> <p>Do a Brief Class Review of Unit 8</p>
Summary and Test	<p>Test on Unit 8</p>

Chemistry 11 – Unit 9—Solution Chemistry
Unit Outline

Topic	Activity
Definitions and Types of Solutions	<p>Class Definitions of solute, solvent, solution, saturated, unsaturated and solubility.</p> <p>Class introduction to polar covalent and non-polar covalent solvents and ionic, polar covalent and non-polar covalent solutes.</p> <p>Experiment 16-A—Polar & Non-Polar Solutes and Solvents.</p>
Aqueous Solutions of Ionic and Covalent Compounds	<p>Class Demonstration of Conductivity of Ionic and Covalent Aqueous Solutions.</p> <p>Class Explanation of Conductivity of Ionic and Covalent Aqueous Solutions. See p. 205-206 and p. 209-210 in SW.</p>
Individual Ion Concentrations	<p>Class Explanation of dissociation and concentrations of individual ions in solution.</p> <p>Class Examples of calculations involving dilution, individual ion concentrations and mixtures of solutions.</p> <p>Do Ex. 30-33 and 36 on page 212 of SW.</p>
Precipitation Reactions	<p>Class Demonstration of Precipitation Reactions and Writing Formula, Complete Ionic and Net Ionic Equations for Precipitation Reactions. (See Tutorial 27)</p> <p>Experiment 16-D—Precipitation Reactions</p>
Acid-Base Neutralization Reactions and Titrations	<p>Class Examples of Writing Formula, Complete Ionic and Net Ionic Equations for Neutralization Reactions. (See Tutorial 28)</p> <p>Class Explanation of Acid-Base Titrations and Calculations.</p> <p>Experiment 20-C—Acid-Base Titrations</p> <p>Hand-In Assignment #15—Precipitation and Neutralization Reactions and Titrations</p>
Review and Test	<p>Short Class Review of Unit 9</p> <p>Test on Unit 9—Solution Chemistry</p>