MOSCOW SCHOOL DISTRICT
CURRICULUM GUIDE
Subject/Course: Chemistry
Grades 11/12

2 Semesters - Prerequisite: Algebra
An introduction to chemical concepts and principles. Topics discussed include atomic structure, periodic Law, chemical bonds, state of matter, formulas and equations, chemical solutions, organic chemistry. Chemistry is designed for students who have an interest in science and preparing for college work. Successful completion of semester 1 is a must for continuation in semester 2.

Below are representative examples of objectives and curriculum that are not all inclusive of the Chemistry program at MHS.

Unit 1: Chemistry and You and Mathematics

Goal – The student will:	*Objectives (to be reached by completion of Chemistry— 11th or 12th grade)*	*Samples of Applications*	*Curriculum Materials (including technological resources)*	*Key Vocabulary*
Goal 1.1: What is Chemistry?	1.1.1 Explain why knowledge of chemistry is central to many human endeavors.		.	
Goal 1.2 The Scientific Method	1.2.1 List and describe and be able to use the steps of the scientific method. 1.2.2 Be able to identify the critical components of a well-designed experiment by being able to use Scientific Method. (This objective does not address the lab report but rather the actual experiment.) 1.2.3 Know that a hypothesis for this chemistry class is written in an "if, if, then" statement. 1.2.4 Be able to write up an experiment using the format provided by the teacher. 1.2.5 Know that in the discussion portion of a laboratory write-up that you must begin with; "My hypothesis was (correct/incorrect) based upon the following data from my data section ……" 1.2.6 Develop a general procedure for solving problems.	Simple experiment with pop cans.	Classification of Matter Lab	Scientific method Hypothesis Theory Law

Goal 1.3. Safety in the Laboratory	1.3.1 Be able to recognize the safety signs and symbols for the laboratory. 1.3.2 Be able to describe safety in the laboratory.	Safety symbols posted around lab.		Beaker Erlenmeyer Graduated cylinder Watch glass
Goal 1.4 Units of Measurement	1.4.1Be able to identify and use metric units of measurements in chemistry. 1.4.2Be able to distinguish between precision and accuracy.	Measure tabletops and chair heights and compare to others'.		Gram Milligram Centrigram Milliliter Centimeter Meter Cubic centimeter
Goal 1.5 Uncertainty in Measurement	1.5.1Explain what causes uncertainty in measurements. 1.5.2Compare accuracy and precision.		Exactly How, How Exact? Measurement Lab	Accuracy Precision
Goal 1.6 Working With Numbers	1.6.1Learn the concept of significant figures; including how to read a measurement from an instrument and how to interpret a reported measurement in terms of sig. figures. 1.6.2Be able to calculate with measurements using sig. figures {including rounding off). 1.6.3Know how to calculate Density, Volume, and Mass using the Density formula: D=M/V 1.6.4Learn that water has a density of 1.0 gms/ml and that 1 ml = 1 cm^3. 1.6.5Be able to write numbers using Scientific Notation and vice versa. 1.6.7Be able to calculate percent error. 1.6.8 Be able to estimate the "expected possible maximum % error" in a measurement.	Use a beaker, graduated cylinder to discuss precision and accuracy and sig figs Find the density of an unknown object.		Significant Figure Density Mass Volume gm/ml cc^3 Scientific Notationi Exponent % error
Goal 1.7 Problem Solving	1.7.1Be able to construct a data table and a graph from data you have generated or which has been supplied to you. 1.7.2Be able to explain dimensional analysis. 1.7.3Be able to convert between the English and metric systems for length, mass and volume using		Use Excel to make graphs	Independent variable Dependent variable Axis Cell Dimensional analysis

	dimensional analysis.			

Unit 2: Energy and Matter

Goal – The student will:	*Objectives (to be reached by completion of Chemistry—11th or 12th grade)*	*Samples of Applications*	*Curriculum Materials (including technological resources)*	*Key Vocabulary*
Goal 2.1: Energy	2.1.1 Name the three basic forms of energy and how they are used. 2.1.2 Be able to explain the law of conservation of energy and give examples. 2.1.3 Explain how we get energy from petroleum and name alternate sources for this energy.		Use Vernier probes to take measure, change, and graph the temperature of water. WISE Phases of Matter online Lab	Kinetic Energy Potential Energy Radiant Energy
Goal 2.2 Temperature	2.2.1 Know the common unit of energy is the Calorie (cal) and the definition of calorie. 2.2.2Know that the SI unit of energy is the joule and that 1 cal=4.184 J. 2.2.3 Compare the Fahrenheit, Celsius, and Kelvin temperature scales and be able to convert from one scale to the other. 2.2.4 Explain what is meant by absolute zero.		Use computers to graph. Use computers to find conversion factors.	Calorie Energy Activation Energy Fahrenheit Celsius Kelvin Scale Absolute Zero
Goal 2.3. Matter	2.3.1 Describe the four states of matter including an example of each state. 2.3.2 Define physical properties and chemical properties of matter. 2.3.3 Describe the differences between physical changes and chemical changes of matter. 2.3.4 State the law of conservation of matter and give examples.	Use Vials of 8 types of matter to discuss mixtures, homogenous, solutions, etc.	Classification of Matter Lab	Gas Solid Liquid Plasma Physical Change Chemical Change Matter Mass Law of conservation of Matter Chemical Property Physical Property
Goal 2.4. Elements and Compounds	2.4.1 Explain the differences between an element and compound and give examples. 2.4.2 Be able to classify matter using the following concepts: homogeneous, heterogeneous, substance, mixture, solution, element, compound, atom and			Element Compound Atom Homogeneous Heterogeneous Mixture Solution Element Compound Molecule

	molecule. Recognize that this system is based on different types of combinations.			
Goal 2.5. Mixtures	2.5.1 Describe several techniques to separate mixtures. 2.5.2 Be able to explain the concept of conservation of matter and energy as it applies to chemical processes. 2.5.3 Explain why compounds are considered pure substances. 2.5.4 Explain how the process of distillation illustrates the relationship between matter and energy.	Lab: Separate a heterogeneous mixture.		Distillation Filtration Separation Pure substance

Unit 3: Atomic Structure

Goal – The student will:	***Objectives (to be reached by completion of Chemistry— 11th or 12th grade)***	***Samples of Applications***	***Curriculum Materials (including technological resources)***	***Key Vocabulary***
Goal 3.1: Early Models of the Atom	3.1.1Define the term atom. 3.1.2 Discuss how Democritus first proposed the atom. 3.1.3 Explain the Law of Constant Composition by Joseph Louis Proust 3.1.4 List the 4 postulates of John Dalton's Atomic Theory of Matter. 3.1.5 Explain how we use symbols to represent the 100 plus symbols on the periodic table. 3.1.6 Explain how the scanning tunneling microscope invented in 1981 helps us in chemistry. 3.1.7 Give examples of submicroscopic and microscopic world of chemistry.		Video: Discovery of the atom PPT: Atom	Macroscopic Microscopic Democritus Law of Constant Composition Dalton's Atomic Theory of Matter
Goal 3.2 Discovering Atomic Structure	3.2.1 Discuss how atomic structure is related to electricity. 3.2.2 Describe electric current in terms of moving electrons. 3.2.3 Describe how a cathode ray tube (CRT) is	Make a timeline of the discoveries that lead to the atom and beyond	Timeline Project using Inspiration software	Atomic Structure Electric Current Electron Cathode Ray Tube Cathode Anode Radioactivity Millikan Oil drop

	made and works and the location of cathode and anode. 3.2.4 Explain what studies of cathode rays and radioactivity revealed (concluded) about atoms (include JJ. Thompson, and Robert Millikan's experiments and what they found out and named). 3.2.5 What is the charge of an electron 1.60 x 10^{-19} C (Coulomb) and the mass of an electron (9.11 x 10^{-28} gram). 3.2.6 Describe how Henri Becquerel discovered radioactivity. 3.2.7 Describe what alpha, beta and particles are and their respective charges. 3.2.8 Describe what gamma particles are. 3.2.9 Discuss Rutherford's alpha-scattering experiment and how it showed the existence of the nucleus and its contents.			Experiment Thompson experiments Coulomb Gram Alpha particles Beta Particles Rutherford's Alpha Scattering Experiment
Goal 3.3 Modern Atomic Theory	3.3.1 Name and describe the properties of the three subatomic particles and their locations in an atom. 3.3.2 Describe the relative masses of electrons, protons and neutrons. 3.3.3 Learn the evidence and be able to describe the "planetary" model of the atom (nucleus and electron cloud). 3.3.4 Be able to determine the number of protons, neutrons, and electrons in an atom or ion. 3.3.5 Define isotopes and atomic mass unit (amu). 3.3.6 Describe the diameter range of a typical atom and the relative size of the nucleus of an atom. 3.3.7 Describe what Henry Mosely found out about the unique positive charge in an atom's nucleus and its	Have students design models of the nucleus of the atom and cloud diagrams.	PPT: Electron Hotel	Electron Nucleus Proton Neutron Atomic Symbol Atomic Mass G.A.W. Isotope AMU Positive Ion Negative Ion Electrically Neutral Carbon-12 Mole

	atomic number. 3.3.8 Describe why an atom is electrically neutral. 3.3.9 Define what an ION is and how they are described as negative or positive and write an example of a positive and negative ion. 3.3.10 Show why Dalton's second postulate (all atoms of a give element are identical) is not entirely true when describing an isotope. 3.3.11 Explain how the isotopes of the same element differ. 3.3.12 Be able to show the chemical symbols for ions and isotopes and give examples to show the difference. 3.3.12 Describe what an AMU is roughly equal to; and what is the AMU the sum of 3.3.13 Describe what the AMU is defined as using the Carbon-12 atom. 3.3.14 Define atomic mass in terms of how it is calculated. 3.3.15 Be able to use the periodic table to find the following information about and element: number of protons, neutrons and electrons; atomic number, atomic mass number; atomic mass and mass per mole (g.a.w.) 3.3.16 Explain how an ion differs from an atom and an isotope.		Vernier Lab: Ions	
Goal 3.4 Changes in the Nucleus	3.4.1 Describe the changes that may occur in the nucleus of a radioactive element. 3.4.2 Name and describe the force that keeps the positive charged particles in an atoms nucleus from repelling each other and flying apart and how	Identify on the periodic table the elements most likely to be radioactive and why.	Ppt: radioactivity.	Nuclear Equation Radiation Carbon-14

	neutrons are involved in this 3.4.3 Describe why all nuclei with the atomic numbers greater than 83 are radioactive. 3.4.4 Write a nuclear equation to represent radioactive decay. 3.4.5 Compare and contrast alpha, beta and gamma radiation. 3.4.6 Define radioactivity 3.4.7 Describe how carbon-14 can be used to date objects.			

Unit 4: Electron Configuration

Goal – The student will:	***Objectives (to be reached by completion of Chemistry—11^{th} or 12^{th} grade)***	***Samples of Applications***	***Curriculum Materials (including technological resources)***	***Key Vocabulary***
Goal 4.1: Radiant Energy	4.1.1 Explain and draw a wave in terms of its frequency, wavelength. speed and amplitude 4.1.2 Know the speed, regardless of its wavelength, that all light travels. 4.1.3 What is this equation used for: $\lambda = c/\nu$ and be able to solve for each variable. 4.1.4 Show the labels that are generally used for the equation in previous objective. 4.1.5 Know that Roy G. Biv corresponds to the first letter in order of the visible spectrum. 4.1.6 Know which color has the shortest wavelength and highest frequency and which has the longest wavelength and lowest frequency	Lab: Gas tubes and atomic spectra	Power source and Gas tubes. .	Wave Frequency Wavelength Speed Amplitude Speed of Light ROY G. BIV
Goal 4.2 Quantum Theory	4.21 Give an example that shows the spectrum of radiation emitted by an object changes with its temperature. 4.2.2 Define the word			Spectrum Quantum Theory Planks Constant Photo-Electric Effect Quanta

	quantum 4.2.3 W hat is Plank's constant and its value Explain what is meant by energy quantization 4.2.4 Explain why quanta jumps are not seen in the every day world but it does affect atoms 4.2.5 Explain what the photoelectric effect causes 4.2.6 Explain why violet light releases electrons from metal but red light does not 4.2.7 Know what the energy quanta of light called 4.2.8 Explain why x-rays can damage humans and radio waves do not 4.2.9 Explain how energy of a quantum of radiant energy is related to frequency 4.2.10 Explain why x-rays technicians wear film badges to monitor radiation exposure			Quantizationi X-Rays Radio Waves
Goal 4.3. Another Look at the Atom	4.3.1 What are the "areas" called that atoms can gain or loose energy 4.3.2 Describe the difference between a line spectrum and a continuous spectrum 4.3.3 Explain how passing electricity thru an element in gasses states produces a line spectrum 4.3.4 Explain what a Bohr quantum number is a how they are numbered in an atom 4.3.5 Explain the difference between ground state and excited state of the energy of an atom and how its change produces a line spectra 4.3.6 Describe lights dual nature. 4.3.7 State the Heisenberg Uncertainty Principle and how it relates to electrons in an atom	Discuss how we know where electrons might or might not be.		Continuous Spectrum Line Spectrum Bohr Quantum Number Ground State Excited State Heisenberg Uncertainty Principal

Goal 4.4. A New Approach to the Atom	4.4.1 Explain why electrons do not have orbits but can be found in orbitals (based upon probabilities) as stated in the quantum mechanical model of an atom. 4.4.1 Define orbital. 4.4.2 Describe the shapes of "s", "p", "d", "f" orbitals 4.4.3Compare "s", "p", "d", "f" orbitals in terms of size and energy 4.4.5 Explain what is meant by "electron density 4.4.6 Describe how you can tell how many sublevels there are for each principal quantum number n = 1 thru n = 4 and name the sublevels for each fig 4-28. 4.4.7 State how many orbitals are in each of the s, p, d, f sublevels 4.4.8 Describe how electrons spin and how they are drawn to show this 4.4.9 Write the maximum number of electrons in each s,p,d,f sublevels and the resulting orbitals.	Show students how to use the periodic table to determine orbital filling.		Orbit Orbital Probability Electron Density
Goal 4.5. Electron Configuration	4.5.1 Describe which electrons of an element's electron configuration would come in contact with another element and may 'stick" it to the element to make a molecule. 4.5.2 Explain and give examples of how to determine the electron configuration of an element 4.5.3 Explain Aufbau Principle 4.5.4 State the Pauli Exclusion Principle 4.5.5 State Hund's Rule 4.5.6 Be able to fill in electrons as arrows to show electron configuration Fig 4-31 4.5.7 Be able to write out the electron configuration of any element on the		Use Internet sites to see and do electron arrow diagrams and filling.	Ball and stick Model Aufbau Principle Pauli Exclusion Principle Hunds Rule Electron Configuration

	periodic table. ($1s^2 2s^2 2p^2$) 4..5.8 From the electron configuration, be able to identify the element.			

Unit 5: The Periodic Table

Goal – The student will:	*Objectives (to be reached by completion of Chemistry— 11th or 12th grade)*	*Samples of Applications*	*Curriculum Materials (including technological resources)*	*Key Vocabulary*
Goal 5.1: Development of the Periodic Table	5.1.1 Describe how and why we needed to organize elements when we found over 62 of them. 5.1.2 Discuss how Mendeleev is ultimately credited with the general arrangement of the periodic table as we know it and what he based the arrangement on (2 things) 5.1.3 Using the periodic table, describe how scientists predicted that some elements had their atomic mass incorrect and that there were still undiscovered elements. 5.1.4 State what Moseley discovered and how this altered the way Mendeleev arranged the elements. 5.1.5 State Periodic Law.	Give students electron config cards and have them "make a periodic" table.	Video: Mendeleev .	Mendeleev Periodic Table Periodic Law
Goal 5.2 Reading the Periodic Table	5.2.1 Know all the information that can be found in each "square" on the Periodic Table. 5.2.2 Describe which areas of the Periodic Table are called Groups/families and why. 5.2.3 Be able to name the vertical groups' family names as: halogens, noble gasses, alkali metals, alkaline earth metals, Carbon group. 5.2.4 Describe what is unusual about the square for Hydrogen and why; include its alternate location. 5.2.5 Describe what a period is on the Periodic Table and how many there	Look at examples of metals		Periodic Family Periodic Period Periodic Group Halogen Noble Gas Alkali Metal Alkaline Earth Metal Carbon Group Hydrogen Metals Nonmetals Dot Diagram Oxidation Number Inner Transition Metals Transition Metals

	are. 5.2.6 Be able to locate the metals, nonmetals and the transition metals, semimetals on the periodic table. 5.2.7 Be able to state the physical properties of nonmetals and the transition metals, semimetals. 5.2.8 Be able to find valence electrons using the periodic table. 5.2.9 Be able to identify the s, p ,d ,f blocks on the periodic table 5.2.10 Be able to use the periodic table to identify the electron configuration of ANY element. 5.2.11 Be able to draw electron dot diagrams for molecules using the periodic table. 5.2.12 Identify the location of the Inner transition metals and the transition metals	Draw e dot diagrams for the first element in the S and P areas.		
Goal 5.3. Periodic Trends	5.3.1 Define the term periodic trend 5.3.2 Be able to define atomic radius and how it is determined. 5.3.3 Be able to explain the periodic trend for Atomic Radius and give the structural basis for the trend 5.3.4 Be able to explain Ionic Size and what happens to it with gain and loss of electrons and why. 5.3.5 Be able to explain the periodic trend for Ionic Size and give the structural basis for the trend. 5.3.6 Be able to define Ionization Energy and how it is determined and the units it is measured in. 5.3.7 Be able to explain the 2 periodic trends of Ionization Energy 5.3.8 Describe what successive ionization energies are.		Ppt: Periodic Trends Have students graph 3 types of trends to see trends for families on the periodic table.	Periodic Trend Atomic Radius Ionic Size Ionization Energy Electron Affinity Octet Rule Electronegativity

	5.3.9 Be able to define Electron Affinity and discuss how it is related to number of electrons it needs to fill its outer energy level. 5.3.10 Be able to discuss Electron Affinity in terms of being negative and positive. 5.3.11 Be able to state general rules for Electron Affinity because they change irregularly across a period or down a group. 5.3.12 Know the principle of the OCTET RULE and how it is related to ionization energies and electron affinities. 5.3.13 Define Electronegativity 5.1.13 Be able to explain the periodic trend for Electronegativity. UPGRADE YOUR PERIODIC TABLE WITH ALL THE NEW CHANGES	Draw the Dot diagrams on the periodic tables above the appropriate families		

Unit 6: Groups of Elements (not covered specifically—integrated in other units)

Goal – The student will:	***Objectives (to be reached by completion of Chemistry—11th or 12th grade)***	***Samples of Applications***	***Curriculum Materials (including technological resources)***	***Key Vocabulary***
Goal 6.1: Student Project on Chemistry of Groups of Elements	6.1.1 Students will follow the following guidelines for their project: a) Typed, neat and organized b) Due the 3rd teaching day of this week Hydrogen (include an explanation as to why it is in two places.) 6.1.2 Groups assigned ar as follows: Alkali metals -- Alkaline Earth Metals Transition Metals		Computer research and paper generation .	Malleable Ductile Reactivness Boiling Point Melting Point

	Chromium Iron Copper Silver Gold Lanthanides (every other one) Actinides (every other one) Boron group Carbon group Nitrogen group Oxygen group Halogen group Noble gasses 6.1.3 Students will meet the following criteria in their projects: You want to answer "what makes them a group?" For each element in the group determine: 1) use shortcut method to show its elemental address (configuration) and dot diagram 2) boiling point degrees C 3) melting point degrees C 4) describe its reactivness with other elements or molecules 5) physical properties (shiny, ductile, good conductor etc) 6) Source of the element (where do you find it) 7) other properties of the element 8) describe other elements this one is combined with to make an alloy. 9) Use(s)of the element 10) A paragraph as to why this is called a family.			

Unit 7: Chemical Formulas and Bonding

Goal – The student will:	***Objectives (to be reached by completion of Chemistry— 11th or 12th grade)***	***Samples of Applications***	***Curriculum Materials (including technological resources)***	***Key Vocabulary***
Goal 7.1: **Ionic Bonding**	7.1.1 Describe the ions (and molecules) that metals and nonmetals tend to form and	Students should delineate metals and non metals and transition metals on	.	Cation Anion

	give examples. 7.1.2 Describe ionic compounds in detail using the terms: cations and anions, electrically neutral and use chemical symbols to show them. 7.1.3 Describe the physical properties of ionic compounds including their interaction with water. 7.1.4 Describe why sodium chloride is more stable than elemental sodium and chlorine; show this using the octet rule. 7.1.5 Learn what ions are and how to predict ion charges from the periodic table (do not include transition and inner transition metals). 7.1.6 Learn what is meant by oxidation state and which have one and multiple oxidation states. 7.1.7 Describe which electrons in an electron configuration are essential in bonding. 7.1.8 Be able to draw Lewis Dot diagrams for elements and molecules 7.1.9 Distinguish and give examples of monatomic and polyatomic ions. 7.1.10 Learn ways to name elements that are multivalent. 7.1.11 Know how to name and write formulas for acids and their related salts using the chart provided by your teacher. 7.1.12 Know how to name and write formulas for compounds which contain no metals. 7.1.13 Describe how you can identify an Ionic and a molecular compound by the location of its elements on the periodic table. 7.1.14 Learn how to use the reference acids to determine	their periodic tables. Add dot diagrams to top of student period table families. Learn how to name polyatomic ions using chart.	Ppt dot diagrams	Octet Rule Monoatomic Polyatomic Lewis Dot Diagram Multivalent Chemical Formula Salt Metal Crossover method Charges Oxidation State number Reference Acid Binary Ionic Compounds

	charges found in ions. 7.1.15 Give examples of empirical formulas for Binary Ionic Compounds and how the criss-cross (crossover) method works to make them electronically neutral.			
Goal 7.2 Covalent Bonding	7.2.1 Describe the physical differences between compounds with ionic and covalent bonds and give examples of those compounds. 7.2.2 Explain the difference between single, double and triple covalent bonds using dots and lines. 7.2.3 Compare and contrast polar, nonpolar, and covalent bonds and use the EN table to mark them (-. +, δ)	Polarity Lab	Ppt bonding	Ionic bond Covalent Bond Polar Covalent Bond Single Bond Double Bond Triple Bond Line Diagram Dot Diagram Non polar Polar
Goal 7.3. Naming Chemical Compounds	7.3.1 Define the term hydrate and anhydrous substances, and explain how a hydrate is named such as $CuSO_4 \bullet H_20$ as copper II sulfate pentahydrate. 7.3.2 Define acid as a molecular substance that dissolves in water to produce hydrogen H^+ ions (cation) and a (reference) anion.			Anhydrous Hydrate
Goal 7.4 Balancing Chemical Equations and Identifying / Writing Types of Reactions	7.4.1 Be able to balance chemical equations. 7.4.2 Be able to write chemical reactions using the 5 types of chemical reactions on your card.		Solubility Lab	Direct Combination Reaction Additon Reaction Decomposition Reaction Single replacement reaction Double replacement Reaction Compustion reaction

Unit 8: Molecular Geometry/Solubility/Reaction Rates

Goal – The student will:	*Objectives (to be reached by completion of Chemistry—11th or 12th grade)*	*Samples of Applications*	*Curriculum Materials (including technological resources)*	*Key Vocabulary*
Goal 8.1: Solubility	8.1.1 Be able to determine solubility from chemical reactions using a solubility chart. 8.1.2 Be able to construct a lab to determine unknowns based on solubility. 8.1.3 Explain Collision Theory	Lab: Breathing	Breathing lab using Vernier and Internet	Solubility Reaction Rate Gas collection tray Collision Theory
Goal 8.2 Bonding	8.2.1 Be able to explain the concept of metal bonds. 8.2.2 Be able to discuss the properties of metals. 8.2.3 Review the strength of chemical bonds and the relation to chemical properties. Consider both intramolecular (chemical) and intermolecular (physical) bonds. 8.2.4 Be able to distinguish between bond types present in a molecule, on the basis of electronegativity.	Lab: Zn + HCl—Change the rate of reaction by measuring H2 given off.	Vernier	Metal Bonds
Goal 8.3 Molecular and Electron Geometry	8.3.1 Be able to create an electron dot diagram for any molecule. Include in the diagram designations of the charge distribution. 8.3.2 Be able to distinguish between the occurrence of atomic orbitals and hybrid orbitals. 8.3.3 Be able to explain how to name hybrid orbitals. 8.3.4 Be able to identify the number and types of groups attached to a hybridized atom in a molecule. 8.3.5 Distinguish between the terminology used to describe molecular geometry and Electron-pair geometry. 8.3.6 Be able to identify which hybrid orbitals occur in any given molecule by using its electron-dot diagram.	Lab: Marshmallow +Dots –molecular geometry PPT hybridization Molecular models	Chemsketch Software: ACD Labs—chemical drawing on computers.	Hybridization Hybrid orbital Sigma Bond Pi bond Molecular Geometry Resonance Electron-pair geometry

	8.3.7 Be able to list the bond angles found in different molecules with hybrid orbitals. sp^3, sp^2, and sp hybrids. 8.3.8 Be able to distinguish between bond strength of single and multiple bonds. 8.3.9 Be able to recognize which molecules show resonance. Be able to explain the effect of resonance on the chemistry of the molecule.			
Goal 8.4 Reaction Rates	8.4.1 Be able to graph and determine reaction rates with both slope and trend lines. 8.4.2 Be able to change rate of reactions by change the things that influence reaction rate.		Graphing in Excel	Trend Line

Unit 9: Metals

Goal – The student will:	***Objectives (to be reached by completion of Chemistry—11^{th} or 12^{th} grade)***	***Samples of Applications***	***Curriculum Materials (including technological resources)***	***Key Vocabulary***
Goal 9.1: Metallic Bonding	9.1.1 Students will understand metallic bonding	Reading guide and worksheet	.	
Goal 9.2 Student Project on Metals	9.2.1 Students will meet the following criteria in the project. 1) When was your element discovered? 2)Who discovered it? 3) How did it get its name? 4) Define and describe the physical properties of your element? 5) State of matter at room temperature, boiling point, melting point, **etc**. 6) Define and describe the chemical properties of your element? 7) Electronegativity, group, period, e- configuration, common ions, **etc.** 8) What does your element look like? – include at least 1 picture in this section 9) Where and how is it naturally found on earth?		Internet Research/ Library Research Word Processing	

	(How is it mined?) 10) What are its elemental forms and what are common compounds it makes, does it make a (an) alloy (s)? 11) What bonding patterns/shapes does it form? 12) What is the history of your element? 13) How was it used or known in the past? 14) What are common and rare uses of your element? 15) Is it used differently today than in the past – how? 16) Has it had a "good" or "bad" history so far? 17) What is the cost of your element (now and/or in the past)? Include a Graph. 18) Why or how is your element related to modern medicine or the environment? 19) Give a minimum of 3 examples. 20) How is your element related to technology? 21) Give a minimum of 3 examples. 21)Conclusion Paragraph(s) Summarize what you have learned and why the reader should care about it. 22) BIBLIOGRAPHY – must be in correct format. See library website for details.			
Goal: 9.3 **Ions of Metals and Their Properties**	9.1.3 Students will discuss in class the environmental impact of ions of Chromiom +3 and +4	Movie	Video	

Unit 10 Organic Chemistry

Goal – The student will:	*Objectives (to be reached by completion of Chemistry—11th or 12th grade)*	*Samples of Applications*	*Curriculum Materials (including technological resources)*	*Key Vocabulary*
Goal 10.1 Naming	10.1.1 Learn how to assemble and use the four parts of an organic molecule's name. 10.1.2 Learn how to identify the longest chain of carbon atom and how to number it for locating substituents. 10.1.3 Learn the prefixes to designate up to 10 carbon atoms in a chain. 10.1.4 Learn the prefixes to indicate the number of substituents. 10.1.5 Learn how to use the prefixes "iso" and "neo". 10.1.6 Learn how to designate a carbon group as a substituent. 10.1.7 Learn how to use the term "cyclo" 10.1.8 Learn the difference between "cis" and "trans" (geometric isomers). 10.1.9 Learn what is meant by the expression "structural isomer". Be able to generate structural isomers from a condensed formula.	Molecular models	.	Organic Substituent Prefix: iso Prefix: neo Cycle Cis Trans Geometric isomer Structural isomer Condensed formula Expanded formula
Goal 10.2 Functional Group and their Prep and Reactions	10.2.1 Learn the general formulae and how to identify the different organic families. 10.2.2 Learn the shapes of the molecules at the functional group. 10.2.3 Be able to explain the significance of molecular shape. 10.2.4 Learn the preparations of alkanes. 10.2.5 Learn the preparations of alkenes. 10.2.6 Learn the preparations of alkynes. 10.2.7 Learn the reactions of alkanes. 10.2.8Learn the reactions	Functional Group Project Lab: Esters	Organic Unknown Lab Ester Synthesis Lab	Organic Family Alkane ALkene Alkyne Markonwnikoff'sRule Multi Step Synthesis

	of alkenes. 10.2.9 Learn Markownikoff's Rule. 10.2.10 Learn the reactions of alkynes. 10.2.11 Learn how to do multi-step syntheses. 10.2.12 Learn the combustion reaction for each of the families.			

Unit 11 Chemistry Forensics

Goal – The student will:	***Objectives (to be reached by completion of Chemistry—11th or 12th grade)***	***Samples of Applications***	***Curriculum Materials (including technological resources)***	***Key Vocabulary***
Goal 11.1		Lab: Flinn Forensics Kits	Electrophoresis Chambers, Power supplies, etc.	