

MVS Course Alignment Document

Chemistry MMC

STANDARD C1: INQUIRY, REFLECTION, AND SOCIAL IMPLICATIONS

C1.1	Scientific Inquiry	Unit	Lesson	Resources Used
C1.1A	Generate new questions that can be investigated in the laboratory or field.	All Units		All Labs
C1.1B	Evaluate the uncertainties or validity of scientific conclusions using an understanding of sources of measurement error, the challenges of controlling variables, accuracy of data analysis, logic of argument, logic of experimental design, and/or the dependence on underlying assumptions.	All Units		All Labs
C1.1C	Conduct scientific investigations using appropriate tools and techniques (e.g., selecting an instrument that measures the desired quantity—length, volume, weight, time interval, temperature—with the appropriate level of precision).	All Units		All Labs
C1.1D	Identify patterns in data and relate them to theoretical models.	All Units		All Labs
C1.1E	Describe a reason for a given conclusion using evidence from an investigation.	All Units		All Labs
C1.1f	Predict what would happen if the variables, methods, or timing of an investigation were changed.	All Units		All Labs
C1.1g	Based on empirical evidence, explain and critique the reasoning used to draw a scientific conclusion or explanation.	All Units		All Labs
C1.1h	Design and conduct a systematic scientific investigation that tests a hypothesis. Draw conclusions from data presented in charts or tables.	All Units		All Labs
C1.1i	Distinguish between scientific explanations that are regarded as current scientific consensus and the emerging questions that active researchers investigate.	All Units		All Labs
C1.2	Scientific Reflection and Social Implications	Unit	Lesson	Resources Used
C1.2A	Critique whether or not specific questions can be answered through scientific investigations.	All Units		All Labs, DB Assignment, Scientific Method
C1.2B	Identify and critique arguments about personal or societal issues based on scientific evidence.	All Units		All Labs, DB Assignment, Scientific Method
C1.2C	Develop an understanding of a scientific concept by accessing information from multiple sources. Evaluate the scientific accuracy and significance of the information.	All Units		All Labs, DB Assignment, Scientific Method
C1.2D	Evaluate scientific explanations in a peer review process or discussion format.	All Units		All Labs, DB Assignment, Scientific Method
C1.2E	Evaluate the future career and occupational prospects of science fields.	All Units		All Labs, DB Assignment, Scientific Method
C1.2f	Critique solutions to problems, given criteria and scientific constraints.	All Units		All Labs, DB Assignment, Scientific Method
C1.2g	Identify scientific tradeoffs in design decisions and choose among alternative solutions.	All Units		All Labs, DB Assignment, Scientific Method
C1.2h	Describe the distinctions between scientific theories, laws, hypotheses, and observations.	All Units		All Labs, DB Assignment, Scientific Method
C1.2i	Explain the progression of ideas and explanations that lead to science theories that are part of the current scientific consensus or core knowledge.	All Units		All Labs, DB Assignment, Scientific Method
C1.2j	Apply science principles or scientific data to anticipate effects of technological design decisions.	All Units		All Labs, DB Assignment, Scientific Method
C1.2k	Analyze how science and society interact from a historical, political, economic, or social perspective.	All Units		All Labs, DB Assignment, Scientific Method

Standard C2: FORMS OF ENERGY

P2.p1	Potential Energy (prerequisite)	Unit	Lesson	Resources Used
P2.p1A	Describe energy changes associated with changes of state in terms of the arrangement and order of the atoms (molecules) in each state. (<i>prerequisite</i>)	Chem1A Unit 5	Lesson 2	Extt, V5, 9, G10, 11, w14, 15 Pr1 , A10, 17, 18, 25,

	P2.p1B Use the positions and arrangements of atoms and molecules in solid, liquid, and gas state to explain the need for an input of energy for melting and boiling and a release of energy in condensation and freezing. (<i>prerequisite</i>)	Chem1A Unit 5	Lesson 2	Etxt, V5, 9, G10, 11, w14, 15 Pr1, A10, 17, 18, 25,
C2.1x	Chemical Potential Energy	Unit	Lesson	Resources Used
	C2.1a Explain the changes in potential energy (due to electrostatic interactions) as a chemical bond forms and use this to explain why bond breaking always requires energy.	Chem1B Unit 2	Lesson 1	Etxt, G41 & 43, A50
	C2.1b Describe energy changes associated with chemical reactions in terms of bonds broken and formed (including intermolecular forces).	Chem 1BUnit 2	Lesson 1	Etxt, G41 & 43, A50
	C2.1c Compare qualitatively the energy changes associated with melting various types of solids in terms of the types of forces between the particles in the solid.	Chem 1BUnit 2	Lesson 1	Etxt, G41 & 43, A50
C2.2	Molecules in Motion	Unit	Lesson	Resources Used
	C2.2A Describe conduction in terms of molecules bumping into each other to transfer energy. Explain why there is better conduction in solids and liquids than gases.	Chem1A Unit 2	Lesson 1	Etxt Chapter 2 S1, V6, A16, Pr2
	C2.2B Describe the various states of matter in terms of the motion and arrangement of the molecules (atoms) making up the substance.	Chem1A Unit 2	Lesson 1	Etxt Chapter 2 S1, V6, A16, Pr2
C2.2x	Molecular Entropy	Unit	Lesson	Resources Used
	C2.2c Explain changes in pressure, volume, and temperature for gases using the kinetic molecular model.	Chem 1BUnit 1	Lesson 3	Etxt Chapter 10 S4, V41, DB47, Prj41, A49
	C2.2d Explain convection and the difference in transfer of thermal energy for solids, liquids, and gases using evidence that molecules are in constant motion.	Chem 1BUnit 1	Lesson 3	Etxt Chapter 10 S4, V41, DB47, Prj41, A49
	C2.2e Compare the entropy of solids, liquids, and gases.	Chem 1BUnit 1	Lesson 3	Etxt Chapter 10 S4, V41, DB47, Prj41, A49
	C2.2f Compare the average kinetic energy of the molecules in a metal object and a wood object at room temperature.	Chem 1BUnit 1	Lesson 3	Etxt Chapter 10 S4, V41, DB47, Prj41, A49
C2.3x	Breaking Chemical Bonds	Unit	Lesson	Resources Used
	C2.3a Explain how the rate of a given chemical reaction is dependent on the temperature and the activation energy.	Chem1A Unit 4	Lesson 2	Etxt Chapter 6 S1, G9, DB9, W7,8,9,10. A3, A24
	C2.3b Draw and analyze a diagram to show the activation energy for an exothermic reaction that is very slow at room temperature.	Chem1A Unit 4	Lesson 2	Etxt Chapter 6 S1, G9, DB9, W7,8,9,10. A3, A24
C2.4x	Electron Movement	Unit	Lesson	Resources Used
	C2.4a Describe energy changes in flame tests of common elements in terms of the (characteristic) electron transitions.	Chem1AUnit 2	Lesson 2	Etxt Chapter3 S3, V7, G6, G7, GW1, W2, A7
	C2.4b Contrast the mechanism of energy changes and the appearance of absorption and emission spectra.	Chem1AUnit 2	Lesson 2	Etxt Chapter3 S3, V7, G6, G7, GW1, W2, A7
	C2.4c Explain why an atom can absorb only certain wavelengths of light.	Chem1AUnit 2	Lesson 2	Etxt Chapter3 S3, V7, G6, G7, GW1, W2, A7
	C2.4d Compare various wavelengths of light (visible and nonvisible) in terms of frequency and relative energy.	Chem1AUnit 2	Lesson 2	Etxt Chapter3 S3, V7, G6, G7, GW1, W2, A7
C2.5x	Nuclear Stability	Unit	Lesson	Resources Used
	C2.5a Determine the age of materials using the ratio of stable and unstable isotopes of a particular type.	Chem1A Unit 5	Lesson 2	Etxt Chapter 18 S1, V10 & 14, G 15&16, A 15, 10, 24 30,, 22&23, Prj6
	C2.r5b Illustrate how elements can change in nuclear reactions using balanced equations. (<i>recommended</i>)	Chem1A Unit 5	Lesson 2	Etxt Chapter 18 S1, V10 & 14, G 15&16, A 15, 10, 24 30,, 22&23, Prj6
	C2.r5c Describe the potential energy changes as two protons approach each other. (<i>recommended</i>)	Chem1A Unit 5	Lesson 2	Etxt Chapter 18 S1, V10 & 14, G 15&16, A 15, 10, 24 30,, 22&23, Prj6
	C2.r5d Describe how and where all the elements on earth were formed. (<i>recommended</i>)	Chem1A Unit 5	Lesson 2	Etxt Chapter 18 S1, V10 & 14, G 15&16, A 15, 10, 24 30,, 22&23, Prj6

Standard P3 ENERGY TRANSFER AND CONSERVATION

P3.p1	Conservation of Energy (prerequisite)	Unit	Lesson	Resources Used
	P3.p1A Explain that the amount of energy necessary to heat a substance will be the same as the amount of energy released when the substance is cooled to the original temperature. (<i>prerequisite</i>)	Chem 1BUnit 1	Lesson 3	Etxt Before Chapter 10, V41, DB47, Prj41, A49
C3.1x	Hess's Law	Unit	Lesson	Resources Used
	C3.1a Calculate the ΔH for a given reaction using Hess's Law.	Chem 1BUnit 1	Lesson 3	Etxt Chapter 10 S3, V41, DB47, Prj41, A49
	C3.1b Draw enthalpy diagrams for exothermic and endothermic reactions.	Chem 1BUnit 1	Lesson 3	Etxt Chapter 10 S3, V41, DB47, Prj41, A49

	C3.1c Calculate the ΔH for a chemical reaction using simple coffee cup calorimetry.	Chem 1B Unit 1	Lesson 3	Ettx Chapter 10 S3, V41, DB47, Prj41, A49
	C3.1d Calculate the amount of heat produced for a given mass of reactant from a balanced chemical equation.	Chem 1B Unit 1	Lesson 3	Ettx Chapter 10 S3, V41, DB47, Prj41, A49
P3.P2	Energy Transfer (prerequisite)	Unit	Lesson	Resources Used
	P3.P2a Trace (or diagram) energy transfers involving various types of energy including nuclear, chemical, electrical, sound, and light. (<i>prerequisite</i>)	Chem1B Unit 5	Lesson 2	Ettx Chapter 20 S4, V46, Lab62, G43&44, Prj8, DB48
C3.2x	Enthalpy	Unit	Lesson	Resources Used
	C3.2a Describe the energy changes in photosynthesis and in the combustion of sugar in terms of bond breaking and bond making.	Chem 1B Unit 1	Lesson 2	Ettx Chapter 10 S1, V47, G45, A 46, 47 & 48
	C3.2b Describe the relative strength of single, double, and triple covalent bonds between nitrogen atoms.	Chem 1B Unit 1	Lesson 2	Ettx Chapter 10 S1, V47, G45, A 46, 47 & 48
C3.3	Heating Impacts	Unit	Lesson	Resources Used
	C3.3A Describe how heat is conducted in a solid.	Chem 1B Unit 1	Lesson 2	Ettx Chapter 10 S2, V47, G45, A 46, 47 & 48
	C3.3B Describe melting on a molecular level.	Chem 1A Unit 4	Lesson 2	Ettx Chapter 10 S2, G9, DB9, W7,8,9,10, A3, A24
C3.3x	Bond Energy	Unit	Lesson	Resources Used
	C3.3c Explain why it is necessary for a molecule to absorb energy in order to break a chemical bond.	Chem1A Unit 4	Lesson 2	Ettx Chapter 6 S1, G9, DB9, W7,8,9,10, A3, A24
C3.4	Endothermic and Exothermic Reactions	Unit	Lesson	Resources Used
	C3.4A Use the terms endothermic and exothermic correctly to describe chemical reactions in the laboratory.	Chem1A Unit 2	Lesson 1	Ettx Chapter 2 S1, V6, A16, Pr2
	C3.4B Explain why chemical reactions will either release or absorb energy.	Chem1A Unit 2	Lesson 1	Ettx Chapter 2 S1, V6, A16, Pr2
C3.4x	Enthalpy and Entropy	Unit	Lesson	Resources Used
	C3.4c Write chemical equations including the heat term as a part of equation or using ΔH notation.	Chem 1B Unit 1	Lesson 3	Ettx Chapter 10 S4, V41, DB47, Prj41, A49
	C3.4d Draw enthalpy diagrams for reactants and products in endothermic and exothermic reactions.	Chem 1B Unit 1	Lesson 3	Ettx Chapter 10 S4, V41, DB47, Prj41, A49
	C3.4e Predict if a chemical reaction is spontaneous given the enthalpy (ΔH) and entropy (ΔS) changes for the reaction using Gibb's Free Energy, $\Delta G = \Delta H - T\Delta S$ (Note: mathematical computation of ΔG is not required.)	Chem 1B Unit 1	Lesson 3	Ettx Chapter 10 S4, V41, DB47, Prj41, A49
	C3.4f Explain why some endothermic reactions are spontaneous at room temperature.	Chem 1B Unit 1	Lesson 3	Ettx Chapter 10 S4, V41, DB47, Prj41, A49
	C3.4g Explain why gases are less soluble in warm water than cold water.	Chem 1B Unit 1	Lesson 3	Ettx Chapter 10 S4, V41, DB47, Prj41, A49
P3.5x	Mass Defect	Unit	Lesson	Resources Used
	C3.5a Explain why matter is not conserved in nuclear reactions.	Chem1A Unit 5	Lesson 2	Ettx Chapter 18 S1, V46, Lab62, G43&44, Prj8, DB48

Standard C4 PROPERTIES OF MATTER

P4.p1	Kinetic Molecular Theory (prerequisite)	Unit	Lesson	Resources Used
	P4.p1A For a substance that can exist in all three phases, describe the relative motion of the particles in each of the phases. (<i>prerequisite</i>)	Chem1A Unit 2	Lesson 1	Ettx Chapter 2 S1, V6, A16, Pr2
	P4.p1B For a substance that can exist in all three phases, make a drawing that shows the arrangement and relative spacing of the particles in each of the phases. (<i>prerequisite</i>)	Chem1A Unit 2	Lesson 1	Ettx Chapter 2 S1, V6, A16, Pr2
	P4.p1C For a simple compound, present a drawing that shows the number of particles in the system does not change as a result of a phase change. (<i>prerequisite</i>)	Chem1A Unit 2	Lesson 1	Ettx Chapter 2 S1, V6, A16, Pr2
P4.p2	Elements, Compounds, and Mixtures (prerequisite)	Unit	Lesson	Resources Used
	P4.p2A Distinguish between an element, compound, or mixture based on drawings or formulae. (<i>prerequisite</i>)	Chem1A Unit 1	Lesson 2	Ettx Chapter 1 S3 - V2, A6
	P4.p2B Identify a pure substance (element or compound) based on unique chemical and physical properties. (<i>prerequisite</i>)	Chem1A Unit 1	Lesson 2	Ettx Chapter 1 S3 - V2, A6
	P4.p2C Separate mixtures based on the differences in physical properties of the individual components. (<i>prerequisite</i>)	Chem1A Unit 1	Lesson 2	Ettx Chapter 1 S3 - V2, A6

	P4.p2D Recognize that the properties of a compound differ from those of its individual elements. (<i>prerequisite</i>)	Chem1A Unit 1	Lesson 2	Etxt Chapter 1 S3 - V2, A6
C4.1x	Molecular and Empirical Formulae	Unit	Lesson	Resources Used
	C4.1a Calculate the percent by weight of each element in a compound based on the compound formula.	Chem1A Unit 5	Lesson 2	Etxt Chapter 7 S3, V10 &14, G 15&16, A 15, 10, 24 30,, 22&23, Prj6
	C4.1b Calculate the empirical formula of a compound based on the percent by weight of each element in the compound.	Chem1A Unit 5	Lesson 1	Etxt Chapter 7 S3, DB10
	C4.1c Use the empirical formula and molecular weight of a compound to determine the molecular formula.	Chem1A Unit 5	Lesson 1	Etxt Chapter 7 S3, DB10
C4.2	Nomenclature	Unit	Lesson	Resources Used
	C4.2A Name simple binary compounds using their formulae.	Chem1A Unit 4	Lesson 1	Etxt, V13, G13, A13, 24 & 20, DB12
	C4.2B Given the name, write the formula of simple binary compounds.	Chem1A Unit 4		
C4.2x	Nomenclature	Unit	Lesson	Resources Used
	C4.2c Given a formula, name the compound.	Chem1A Unit 4	Lesson 1	Etxt Chapter 5 S3, V13, G13, A13, 24 & 20, DB12
	C4.2d Given the name, write the formula of ionic and molecular compounds.	Chem1A Unit 4	Lesson 1	Etxt Chapter 5 S3, V13, G13, A13, 24 & 20, DB12
	C4.2e Given the formula for a simple hydrocarbon, draw and name the isomers.	Chem1A Unit 4	Lesson 1	Etxt Chapter 5 S3, V13, G13, A13, 24 & 20, DB12
C4.3	Properties of Substances	Unit	Lesson	Resources Used
	C4.3A Recognize that substances that are solid at room temperature have stronger attractive forces than liquids at room temperature, which have stronger attractive forces than gases at room temperature.	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1, G41 & 43, A50
	C4.3B Recognize that solids have a more ordered, regular arrangement of their particles than liquids and that liquids are more ordered than gases.	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1, G41 & 43, A50
C4.3x	Solids	Unit	Lesson	Resources Used
	C4.3c Compare the relative strengths of forces between molecules based on the melting point and boiling point of the substances.	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1 and 2, G41 & 43, A50
	C4.3d Compare the strength of the forces of attraction between molecules of different elements. (For example, at room temperature, chlorine is a gas and iodine is a solid.)	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1 and 2, G41 & 43, A50
	C4.3e Predict whether the forces of attraction in a solid are primarily metallic, covalent, network covalent, or ionic based upon the elements' location on the periodic table.	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1 and 2, G41 & 43, A50
	C4.3f Identify the elements necessary for hydrogen bonding (N, O, F).	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1 and 2, G41 & 43, A50
	C4.3g Given the structural formula of a compound, indicate all the intermolecular forces present (dispersion, dipolar, hydrogen bonding).	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1 and 2, G41 & 43, A50
	C4.3h Explain properties of various solids such as malleability, conductivity, and melting point in terms of the solid's structure and bonding.	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1 and 2, G41 & 43, A50
	C4.3i Explain why ionic solids have higher melting points than covalent solids. (For example, NaF has a melting point of 995°C while water has a melting point of 0° C.)	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1 and 2, G41 & 43, A50
C4.4x	Molecular Polarity	Unit	Lesson	Resources Used
	C4.4a Explain why at room temperature different compounds can exist in different phases.	Chem1A Unit 4	Lesson 2	Etxt Chapter 6 S1, G9, DB9, W7,8,9,10. A3, A24
	C4.4b Identify if a molecule is polar or nonpolar given a structural formula for the compound.	Chem1A Unit 4	Lesson 2	Etxt Chapter 6 S1, G9, DB9, W7,8,9,10. A3, A24
C4.5x	Ideal Gas Law	Unit	Lesson	Resources Used
	C4.5a Provide macroscopic examples, atomic and molecular explanations, and mathematical representations (graphs and equations) for the pressure-volume relationship in gases.	Chem1B Unit 2	Lesson 2	Etxt Chapter 12 , G46, DB44, Prj42
	C4.5b Provide macroscopic examples, atomic and molecular explanations, and mathematical representations (graphs and equations) for the pressure-temperature relationship in gases.	Chem1B Unit 2	Lesson 2	Etxt Chapter 12 , G46, DB44, Prj42
	C4.5c Provide macroscopic examples, atomic and molecular explanations, and mathematical representations (graphs and equations) for the temperature-volume relationship in gases.	Chem1B Unit 2	Lesson 2	Etxt Chapter 12 , G46, DB44, Prj42
C4.6x	Moles	Unit	Lesson	Resources Used
	C4.6a Calculate the number of moles of any compound or element given the mass of the substance.	Chem1A Unit 5	Lesson 1	Etxt Chapter 7 S1, DB10

	C4.6b Calculate the number of particles of any compound or element given the mass of the substance.	Chem1A Unit 5	Lesson 1	Ettx Chapter 7 S1, DB10
C4.7x	Solutions	Unit	Lesson	Resources Used
	C4.7a Investigate the difference in the boiling point or freezing point of pure water and a salt solution.	Chem1B Unit 3	Lesson 1	Ettx Chapter 13, A53, G47
	C4.7b Compare the density of pure water to that of a sugar solution.	Chem1B Unit 3	Lesson 1	Ettx Chapter 13, A53, G47
C4.8	Atomic Structure	Unit	Lesson	Resources Used
	C4.8A Identify the location, relative mass, and charge for electrons, protons, and neutrons.	Chem1A Unit 2	Lesson 2	Ettx Chapter 1 S1 and 2, V7, G6, G7, GW1, W2, A7
	C4.8B Describe the atom as mostly empty space with an extremely small, dense nucleus consisting of the protons and neutrons and an electron cloud surrounding the nucleus.	Chem1A Unit 2	Lesson 2	Ettx Chapter 1 S1 and 2, V7, G6, G7, GW1, W2, A7
	C4.8C Recognize that protons repel each other and that a strong force needs to be present to keep the nucleus intact.	Chem1A Unit 4	Lesson 1	Ettx Chapter 1 S1 and 2, V13, G13, A13, 24 & 20, DB12
	C4.8D Give the number of electrons and protons present if the fluoride ion has a -1 charge.	Chem1A Unit 4	Lesson 1	Ettx Chapter 1 S1 and 2, V13, G13, A13, 24 & 20, DB12
C4.8x	Electron Configuration	Unit	Lesson	Resources Used
	C4.8e Write the complete electron configuration of elements in the first four rows of the periodic table.	Chem1A Unit 3	Lesson 1	Ettx Chapter 3 SS3, V1, V8, A2, A22
	C4.8f Write kernel structures for main group elements.	Chem1A Unit 3	Lesson 1	Ettx Chapter 3 SS3, V1, V8, A2, A22
	C4.8g Predict oxidation states and bonding capacity for main group elements using their electron structure.	Chem1A Unit 3	Lesson 1	Ettx Chapter 3 SS3, V1, V8, A2, A22
	C4.8h Describe the shape and orientation of <i>s</i> and <i>p</i> orbitals.	Chem1A Unit 3	Lesson 1	Ettx Chapter 3 SS3, V1, V8, A2, A22
	C4.8i Describe the fact that the electron location cannot be exactly determined at any given time.	Chem1A Unit 3	Lesson 1	Ettx Chapter 3 SS3, V1, V8, A2, A22
C4.9	Periodic Table	Unit	Lesson	Resources Used
	C4.9A Identify elements with similar chemical and physical properties using the periodic table.	Chem1A Unit 3	Lesson 1	Ettx Chapter 4, V1, V8, A2, A22
C4.9x	Electron Energy Levels	Unit	Lesson	Resources Used
	C4.9b Identify metals, non-metals, and metalloids using the periodic table.	Chem1A Unit 3	Lesson 1	Ettx Chapter 4 Section 1, V1, V8, A2, A22
	C4.9c Predict general trends in atomic radius, first ionization energy, and electronegativity of the elements using the periodic table.	Chem1A Unit 3	Lesson 1	Ettx Chapter 4 Section 1, V1, V8, A2, A22
C4.10	Neutral Atoms, Ions, and Isotopes	Unit	Lesson	Resources Used
	C4.10A List the number of protons, neutrons, and electrons for any given ion or isotope.	Chem1A Unit 4	Lesson 1	Ettx Chapter 5 S1, V13, G13, A13, 24 & 20, DB12
	C4.10B Recognize that an element always contains the same number of protons.	Chem1A Unit 4	Lesson 1	Ettx Chapter 5 S1, V13, G13, A13, 24 & 20, DB12
C4.10x	Average Atomic Mass	Unit	Lesson	Resources Used
	C4.10c Calculate the average atomic mass of an element given the percent abundance and mass of the individual isotopes.	Chem1A Unit 2	Lesson 2	Ettx Chapter 3 S4, V4, G3, G4, G5, W1, W2, A7, A21
	C4.10d Predict which isotope will have the greatest abundance given the possible isotopes for an element and the average atomic mass in the periodic table.	Chem1A Unit 2	Lesson 2	Ettx Chapter 3 S4, V4, G3, G4, G5, W1, W2, A7, A21
	C4.10e Write the symbol for an isotope, $X^Z A$, where <i>Z</i> is the atomic number, <i>A</i> is the mass number, and <i>X</i> is the symbol for the element.	Chem1A Unit 2	Lesson 2	Ettx Chapter 3 S4, V4, G3, G4, G5, W1, W2, A7, A21

Standard C5 CHANGES IN MATTER

P5.p1	Conservation of Matter (prerequisite)	Unit	Lesson	Resources Used
	P5.p1A Draw a picture of the particles of an element or compound as a solid, liquid, and gas. (<i>prerequisite</i>)	Chem1A Unit 1	Lesson 2	G3, Chg - eText Chapter 1 S1 Visual Concept
C5.r1x	Rates of Reactions (recommended)	Unit	Lesson	Resources Used
	C5.r1a Predict how the rate of a chemical reaction will be influenced by changes in concentration, temperature, and pressure. (<i>recommended</i>)	Chem1A Unit 5	Lesson 2	Ettx Before Chapter 8, V5, 9, G10, 11, w14, 15 Pr1, A10, 17, 18, 25
	C5.r1b Explain how the rate of a reaction will depend on concentration, temperature, pressure, and nature of reactant. (<i>recommended</i>)	Chem1A Unit 5	Lesson 2	Ettx Before Chapter 8, V5, 9, G10, 11, w14, 15 Pr1, A10, 17, 18, 25
C5.2	Chemical Changes	Unit	Lesson	Resources Used
	C5.2A Balance simple chemical equations applying the conservation of matter.	Chem1A Unit 5	Lesson 2	Ettx Chapter 8 S1, V5, 9, G10, 11, w14, 15 Pr1, A10, 17, 18, 25

	C5.2B Distinguish between chemical and physical changes in terms of the properties of the reactants and products.	Chem1A Unit 5	Lesson 2	Etxt Chapter 8 S1, V5, 9, G10, 11, w14, 15 Pr1, A10, 17, 18, 25
	C5.2C Draw pictures to distinguish the relationships between atoms in physical and chemical changes.	Chem1A Unit 5	Lesson 2	Etxt Chapter 8 S1, V5, 9, G10, 11, w14, 15 Pr1, A10, 17, 18, 25
C5.2x	Balancing Equations	Unit	Lesson	Resources Used
	C5.2d Calculate the mass of a particular compound formed from the masses of starting materials.	Chem1A Unit 5	Lesson 2	Etxt Chapter 8 S2, V5, 9, G10, 11, w14, 15 Pr1, A10, 17, 18, 25
	C5.2e Identify the limiting reagent when given the masses of more than one reactant.	Chem1A Unit 5	Lesson 2	Etxt Chapter 8 S2, V5, 9, G10, 11, w14, 15 Pr1, A10, 17, 18, 25
	C5.2f Predict volumes of product gases using initial volumes of gases at the same temperature and pressure.	Chem1A Unit 5	Lesson 2	Etxt Chapter 8 S2, V5, 9, G10, 11, w14, 15 Pr1, A10, 17, 18, 25
	C5.2g Calculate the number of atoms present in a given mass of element.	Chem1A Unit 5	Lesson 2	Etxt Chapter 8 S2, V5, 9, G10, 11, w14, 15 Pr1, A10, 17, 18, 25
C5.3x	Equilibrium	Unit	Lesson	Resources Used
	C5.3a Describe equilibrium shifts in a chemical system caused by changing conditions (Le Chatelier's Principle).	Chem1B Unit 3	Lesson 2	Etxt Chapter 14 S1, 2, 3, V42&48, A55, 56, Prj43
	C5.3b Predict shifts in a chemical system caused by changing conditions (Le Chatelier's Principle).	Chem1B Unit 3	Lesson 2	Etxt Chapter 14 S1, 2, 3, V42&48, A55, 56, Prj43
	C5.3c Predict the extent reactants are converted to products using the value of the equilibrium constant.	Chem1B Unit 3	Lesson 2	Etxt Chapter 14 S1, 2, 3, V42&48, A55, 56, Prj43
C5.4	Phase Change Diagrams	Unit	Lesson	Resources Used
	C5.4A Compare the energy required to raise the temperature of one gram of aluminum and one gram of water the same number of degrees.	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S4, G41 & 43, A50
	C5.4B Measure, plot, and interpret the graph of the temperature versus time of an ice-water mixture, under slow heating, through melting and boiling.	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S4, G41 & 43, A50
C5.4x	Solids	Unit	Lesson	Resources Used
	C5.4c Explain why both the melting point and boiling points for water are significantly higher than other small molecules of comparable mass (e.g., ammonia and methane).	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1 and 2, G41 & 43, A50
	C5.4d Explain why freezing is an exothermic change of state.	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1 and 2, G41 & 43, A50
	C5.4e Compare the melting point of covalent compounds based on the strength of IMFs (intermolecular forces).	Chem1B Unit 2	Lesson 1	Etxt Chapter 11 S1 and 2, G41 & 43, A50
C5.5	Molecular Polarity Chapter 6 S1	Unit	Lesson	Resources Used
	C5.5A Predict if the bonding between two atoms of different elements will be primarily ionic or covalent.	Chem1A Unit 4	Lesson 2	Etxt, G9, DB9, W7,8,9,10. A3, A24
	C5.5B Predict the formula for binary compounds of main group elements.	Chem1A Unit 4	Lesson 2	Etxt, G9, DB9, W7,8,9,10. A3, A24
C5.5x	Chemical Bonds	Unit	Lesson	Resources Used
	C5.5c Draw Lewis structures for simple compounds.	Chem1A Unit 4	Lesson 2	Etxt Chapter 6 S2, G9, DB9, W7,8,9,10. A3, A24
	C5.5d Compare the relative melting point, electrical and thermal conductivity, and hardness for ionic, metallic, and covalent compounds.	Chem1A Unit 4	Lesson 1	Etxt Chapter 6 S2, V3, G8, DB7, W5, W6, W18, A8, A15, A9
	C5.5e Relate the melting point, hardness, and electrical and thermal conductivity of a substance to its structure.	Chem1A Unit 4	Lesson 1	Etxt Chapter 6 S2, V3, G8, DB7, W5, W6, W18, A8, A15, A9
C5.6x	Reduction/Oxidation Reactions	Unit	Lesson	Resources Used
	C5.6a Balance half-reactions and describe them as oxidations or reductions.	Chem1B Unit 5	Lesson 1	Etxt Chapter 17 1-4, V45&49, A60761, Prj45
	C5.6b Predict single replacement reactions.	Chem1B Unit 5	Lesson 1	Etxt Chapter 17 1-4, V45&49, A60761, Prj45
	C5.6c Explain oxidation occurring when two different metals are in contact.	Chem1B Unit 5	Lesson 1	Etxt Chapter 17 1-4, V45&49, A60761, Prj45
	C5.6d Calculate the voltage for spontaneous redox reactions from the standard reduction potentials.	Chem1B Unit 5	Lesson 1	Etxt Chapter 17 1-4, V45&49, A60761, Prj45
	C5.6e Identify the reactions occurring at the anode and cathode in an electrochemical cell.	Chem1B Unit 5	Lesson 1	Etxt Chapter 17 1-4, V45&49, A60761, Prj45
C5.7	Acids and Bases	Unit	Lesson	Resources Used
	C5.7A Recognize formulas for common inorganic acids, carboxylic acids, and bases formed from families I and II.	Chem1B Unit 4	Lesson 1	Etxt Chapter 15 S1 - S3, V43, G48&49, A57 & 58, Prj44
	C5.7B Predict products of an acid-based neutralization.	Chem1B Unit 4	Lesson 1	Etxt Chapter 15 S1 - S3, V43, G48&49, A57 & 58, Prj44
	C5.7C Describe tests that can be used to distinguish an acid from a base.	Chem1B Unit 4	Lesson 1	Etxt Chapter 15 S1 - S3, V43, G48&49, A57 & 58, Prj44
	C5.7D Classify various solutions as acidic or basic, given their pH.	Chem1B Unit 4	Lesson 1	Etxt Chapter 15 S1 - S3, V43, G48&49, A57 & 58, Prj44

	C5.7E Explain why lakes with limestone or calcium carbonate experience less adverse effects from acid rain than lakes with granite beds.	Chem1B Unit 4	Lesson 1	Etxt Chapter 15 S1 - S3, V43, G48&49, A57 & 58, Prj44
C5.7x	Brønsted-Lowry	Unit	Lesson	Resources Used
	C5.7f Write balanced chemical equations for reactions between acids and bases and perform calculations with balanced equations.	Chem1B Unit 4	Lesson 1	Etxt Chapter 15 S1 S2, V43, G48&49, A57 & 58, Prj44
	C5.7g Calculate the pH from the hydronium ion or hydroxide ion concentration.	Chem1B Unit 4	Lesson 1	Etxt Chapter 15 S1 S2, V43, G48&49, A57 & 58, Prj44
	C5.7h Explain why sulfur oxides and nitrogen oxides contribute to acid rain.	Chem1B Unit 4	Lesson 1	Etxt Chapter 15 S1 S2, V43, G48&49, A57 & 58, Prj44
	C5.r7i Identify the Brønsted-Lowry conjugate acid-base pairs in an equation. <i>(recommended)</i>	Chem1B Unit 4	Lesson 1	Etxt Chapter 15 S1 S2, V43, G48&49, A57 & 58, Prj44
C5.8	Carbon Chemistry	Unit	Lesson	Resources Used
	C5.8A Draw structural formulas for up to ten carbon chains of simple hydrocarbons.	Chem1B Unit 6	Lesson 1	Etxt Chapter 19, V45&50
	C5.8B Draw isomers for simple hydrocarbons.	Chem1B Unit 6	Lesson 1	Etxt Chapter 19, V45&50
	C5.8C Recognize that proteins, starches, and other large biological molecules are polymers.	Chem1B Unit 6	Lesson 1	Etxt Chapter 19, V45&50