Course Title:	**Chemistry A**	
Michigan High School Content Expectations for Chemistry		
Unit 1 Big Idea:	**The Science of Chemistry**	
Essential Questions	**1. What makes a good scientist?**	
Standards	**Assignment**	**Description**
C1.2E, C1.2k	Lesson 1.1: Introduction to Chemistry	Students will be able to Identify and describe the five areas of chemistry study, to evaluate the future career and occupational prospects of science fields.
C1.2h, C1.2i, C1.1D, C1.1A, C1.1B, C1.1G	Lesson 1.2: Scientific Method	Students will develop an understanding of scientific method: The scientific method is a logical approach to investigation, designed to formulate an explanation for an observation, and then conduct experiments to see if the explanation holds true.
C1.2C C1.2D	Lesson 1.3: Introduction to The Chemistry Lab	Students will evaluate lab safety procedures and apply their understanding to handle chemicals that they may encounter at home or in a lab safely. Students will name each piece of basic lab equipment, and describe how it is used.
C1.1C C1.2C	Lesson 1.4: Scientific Measurement	Students will conduct scientific measurements, indicate the precision of these measurements, and perform calculations with them, in a way that can be understood by all other scientists. In order to deal with very large and very small quantities in science, students will also learn how to use scientific notation to easily express those numbers and use them in calculations.
C1.1C	Lesson 1.5: The Metric System and Unit Conversions	Students will conduct unit conversions by applying the metric system units and their prefixes as used in SI and how to convert them in both directions (larger to smaller units and smaller to larger units).

Unit 2 Big Idea	**Matter and Its Changes**	
Essential Questions	**1. What makes one substance different from another?**	
Standards	**Assignment**	**Description**
P4.p1B, C4.3A, C4.3B, C4.4a, C4.3c, C4.3d, P4.p1A, P4.p1C, P5.p1A, C1.1A, C2.2B, P2.p1A	Lesson 2.1: States of Matter	Students will be able to explain how matter can change phases and learn what happens to particles of matter when a phase change occurs.
P4.p2A	Lesson 2.2: Chemical Composition of Matter	Students will take a closer look at the elements and compounds and learn how to represent them with chemical symbols and with drawings.
C1.1E, P4.p2B, P4.p2A	Lesson 2.3: Classification of Matter	Students will analyze the components of a substance and classify the substance as a pure substance, a compound, or a mixture.
C1.1C, P4.p2C, C1.1f, C1.1g, C1.1h, C1.2A	Lesson 2.4: Physical Properties of Matter	Students will develop an understanding of physical properties of matter by distinguishing them from chemical properties and the relationship between the separation methods and the physical properties of matter. Students will separate a heterogeneous mixture based on differences in physical properties of the individual components.
C1.1A, C1.1g, P4.p2D, C5.2B, C5.2C	Lesson 2.5: Chemical Properties and Changes in Matter	Students will investigate chemical properties and chemical changes that result in matter undergoing a change in identity. Students will identify chemical changes and describe what happens at an atomic level.
Unit 3 Big Idea	**Atoms and Electrons**	
Essential Questions	**1. Why are protons important to an atom?**	

Standards	Assignment	Description
C1.1D, C1.2i, C4.8B, C4.8C	Lesson 3.1: Atomic Models	Students will examine several theories that describe what atoms are made of and what they look like. Students will summarizes the characteristics of subatomic particles and their locations in the three different atomic models.
C1.1f, C4.10A, C4.10B, C4.10e	Lesson 3.2: Atomic Structure and Isotopes	Students will find out what isotopes are by examining the components of an atom. Students will list the number of protons, neutrons, and electrons for given isotopes. Students will also write the symbol for an isotope.
C4.10c, C4.10d	Lesson 3.3: Atomic Mass and Isotope Abundance	Students will investigate the relationship between the atomic number and the atomic mass of an element to develop an understanding of the concept of isotope abundance. Students will calculate to predict which one of the isotopes of any given atom is more abundant than others.
C1.1f, C2.4a, C2.4b, C2.4c, C2.4d	Lesson 3.4: Electrons and Lights	Students will discover the relationship between frequency, wavelength, energy, energy levels, colors of visible lights by focusing on the electrons within atoms and their energy. Students will predict and explain why a certain color is emitted by an electron of a certain atom.
Unit 4 Big Idea	**Electrons and The Periodic Table**	
Essential Questions	**1. Why are electron arrangements in atoms important?**	
Standards	**Assignment**	**Description**
C4.9A, C4.9b, C1.1D, C1.2i	Lesson 4.1: Classification of Elements	Students will develop an understanding of how elements are arranged in the periodic table and will apply the understanding to locate information about specific elements in the periodic table.

C1.1D, C4.8e, C4.8h, C4.8i	Lesson 4.2: Electron Arrangement in Atoms	Students will investigate more about the energy levels of atoms: Energy levels are where electrons reside and electrons are arranged within the energy levels which can be represented by using the Bohr model. Students will write the electron configurations of the basic elements by following the Ababa Principle.
C1.1D, C4.8f	Lesson 4.3: Valence Electrons and The Periodic Table	Students will determine the number of valence electrons in various elements by understanding the relationship between the blocks and groups in the periodic table. Students will write kernel structures for main group elements.
C1.1D, C4.9c	Lesson 4.4: Periodic Trends	Students will be able to explain why atomic size decreases as it moves across a period.
Unit 5 Big Idea	**Compounds and Their Bonds**	
Essential Questions	**1. Why are electron arrangements in atoms important?**	
Standards	**Assignment**	**Description**
P4.p2D, C5.5B, C5.5c, C4.8G	Lesson 5.1: Bonding Basics	Students will explore how compounds are formed at the atomic level and learn what happens at the atomic level when two or more atoms bind together. Students will be able to classify the bond of given binary compounds, and to draw Lewis structures of single elements.
P4.p2d, C4.8D, C5.5B, C5.2B, C5.5c, C4.8G	Lesson 5.2: Ions and Ionic Bonding 1	Students will develop a basic understanding of ions: Ions are atoms that have lost or gained electrons and are no longer neutral, and ions with opposite charges attract each other and form ionic bonds. Students will apply their basic understanding of ions to draw electron dot diagrams of ions.

C4.8D, C5.5B, C5.5c	Lesson 5.3: Ions and Ionic Bonding 2	Students will recall how to draw electron dot diagrams for neutral atoms and ions in the previous lessons (5.1 and 5.2) and apply the skill to draw diagrams of simple ionic compounds. Students will be able to select the correct formula unit for given binary compounds.
C5.5c: Draw Lewis structures for simple compounds.	Lesson 5.4: Covalent Bonding	Students will discover how atoms achieve an octet of electrons in their valence shells by sharing electrons; what classes of elements are involved in a covalent bond; how they can draw an electron dot structure for covalent bonding.
C4.4b, C5.5A, C5.5B	Lesson 5.5: Predicting The Bonding Types	Students will apply their understanding of the electronegativity of atoms to predict what type of bond will be formed between atoms of different elements. Students will use electron dot diagrams to predict formulas for ionic compounds and structures for covalent compounds.
C1.1E, C4.3e, C4.3f, C4.3g C4.3h, C4.3i, C5.5d, C5.5e	Lesson 5.6: Properties of Compounds	Students will examine and compare the properties of different types of compounds. Students will apply the understanding of the properties of compounds to determine which substance, either salt or sugar, is the ionic compound and how these substances differ in their properties.
Unit 6 Big Idea	**Chemical Names and Formulas**	
Essential Questions	**1. How do scientists communicate universally?**	
Standards	**Assignment**	**Description**
C4.2a, C4.2c	Lesson 6.1: Naming Ionic Compounds	Students will learn the basic rules for naming ionic compounds and apply them to identify or figure out the names from given chemical formulas.

C4.2B, C4.2d	Lesson 6.2: Writing Formulas for Ionic Compounds	Students will write the chemical formula based on the name of a binary ionic compound.
C4.2A, C4.2c	Lesson 6.3: Naming Molecular Compounds	Students will learn to name molecular (binary covalent) compounds by using Greek numerical prefixes. Given a formula, students will be able to determine whether the compound is ionic or covalent and to name it.
C4.2B, C4.2d	Lesson 6.4: Writing Formulas for Molecular Compounds	Given a name of a simple binary compound, students will determine either it is a ionic or molecular compound and write a formula for the compound.
Unit 7 Big Idea	**Chemical Quantities**	
Essential Questions	**1. How do we measure the amount of a substance?**	
Standards	**Assignment**	**Description**
C4.6a, C4.6b, C5.2g, C1.1C	Lesson 7.2: Mass, Volume, and The Mole	Students will examine how the mole is related to mass and volume by practicing simple mole-related calculations. Calculations include the conversions between Number of Particles and Moles, Mass and Moles, Mass and Number of Particles, and Moles and Gas Volume. Students will conduct an investigation to find out how many atoms are in a signature written in chalk (calcium carbonate) by using the data given in the table.
C4.1a	Lesson 7.3: Percent Composition	Students will determine percent by mass of each element in a compound, based on the compound's chemical formula.
C4.1b, C4.1c	Lesson 7.4: Determining Formulas	Students will determine a chemical's empirical formula and, more importantly, how to determine a chemical's molecular formula.

Unit 8 Big Idea	**Chemical Reaction**	
Essential Questions	**1. What is a chemical reaction?**	
Standards	**Assignment**	**Description**
C5.2A	Lesson 8.1: Balancing Chemical Equations	Balance simple chemical equations applying the conservation of matter.
C1.2C, C1.1E, C5.2A, C5.2B	Lesson 8.2: Classifying Chemical Reactions	Given a chemical equation, students will identify which type of reaction it represents by following classification strategies. Students will investigate what substance is produced when vinegar and baking soda is mixed by balancing the chemical equation and interpreting the data given.
C5.2A, C5.2B, C5.6b	Lesson 8.3: Predicting Single Replacement Reaction	Students will use the activity series to predict whether or not single replacement reactions will occur.
C5.2A, C5.2B	Lesson 8.4: Predicting Precipitates	Students will learn how to predict whether a precipitate will form. Students will write balanced chemical equations for given reactions and determine whether any of the products are precipitates, and label them with an (s). Label each reactant and product with (l), (s), (g), or (aq). Students will predict the products in given reactions, write balanced chemical equations, determine whether any of the products are precipitates, and label them with an (s). Label each reactant and product with (l), (s), (g), or (aq).