



Conceptual Chemistry - Unit 2 - Chemical Reactions

Unit Focus

Chemical reactions are the focus of this unit in Conceptual Chemistry. Students will understand how substances change and they will explore the Law of Conservation of Matter as they perform and analyze chemical reactions. Students will balance equations and apply their understanding of the periodic table and periodic trends to the types of reactions and the reactivity of different elements. Students will engage in a variety of laboratory experiments that will emphasize scientific inquiry skills such as collecting, analyzing, and communicating data with tables and graphs as well as making claims that are supported with data and evidence. Students will experience activities that will require them to follow safety protocols and appropriately use laboratory equipment. Students will work with mathematical conversions, commensurate with the level of challenge and rigor found in Algebra 1.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Next Generation Science Standards Performance Expectations: High School Physical Sciences - Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. (HS-PS1-2) - Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. (HS-PS1-7) Next Generation Science Standards (DCI) Science: 9 - The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (PS1.9.B3) Madison Public Schools Profile of a Graduate - Analyzing: Examining information/data/evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)	<i>Students will be able to independently use their learning to...</i> T1 Make observations and ask questions to define a problem based on prior knowledge and curiosity that stimulates further exploration, analysis, and discovery. T2 Communicate effectively based on purpose, task, and audience to promote collective understanding and/or recommend actions.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 Atoms in a chemical reaction cannot be created or destroyed, they can only be rearranged. U2 When a change in matter occurs, the total mass remains the same (conservation). U3 In a chemical reaction, the particles that make up the original substances can be regrouped into different substances. These new substances may have different properties than the original substances.	<i>Students will keep considering...</i> Q1 How can the atomic structure impact the type of reaction that occurs? Q2 How can you demonstrate that atoms are conserved during a chemical reaction? Q3 What happens to atoms and energy in a chemical reaction?
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<i>Students will know...</i> K1 A chemical reaction (chemical change) is a transformation that alters the composition of one or more substances such that one or more new substances with new properties are produced. K2 A combination reaction is a reaction in which two or more reactants combine to form a single product.	<i>Students will be skilled at...</i> S1 Balance chemical equations. S2 Classify types of chemical reactions. S3 Solve simple stoichiometry problems using mole ratios and molar mass.

Stage 1: Desired Results - Key Understandings

K3 A decomposition reaction is a chemical change in which a single substance is broken down into two or more simpler substances.

K4 A single displacement reaction is a chemical change in which an element is displaced from a compound by a more reactive element.

K5 A double displacement reaction is a chemical change in which both reactants break apart and then recombine to form two new products.

K6 Combustion reactions involve the reaction between a hydrocarbons and oxygen to produce carbon dioxide and water.