

Grade & Course: 9 -12 Chemistry	Topic: Reactions	Duration: 3 weeks
<p><b>Georgia Standards and Content:</b>  <b>SC3. Obtain, evaluate, and communicate information about how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.</b></p> <ol style="list-style-type: none"> <li>Use mathematics and computational thinking to balance chemical reactions (i.e. synthesis, decomposition, single replacement, double replacement, and combustion) and construct 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.</li> <li>Plan and carry out an investigation to determine that a new chemical has been formed by identifying indicators of a chemical reaction (e.g. precipitate formation, gas evolution, color change, water production, and changes in energy to the system).</li> </ol>		
<p><b>Narrative / Background Information</b></p>		
<p><b>Prior Student Knowledge: (REFLECTION – PRIOR TO TEACHING THE UNIT)</b>  <b>S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter.</b></p> <ol style="list-style-type: none"> <li>Construct an argument based on observational evidence to support the claim that when a change in substance occurs, it can be classified as either chemical or physical. (Clarification statement: Evidence could include ability to separate mixtures, development of a gas, formation of a precipitate, change in energy, color, and/or form.)</li> <li>Construct an explanation based on evidence to describe conservation of matter in a chemical reaction including the resulting differences between products and reactants. (Clarification statement: Evidence could include models such as balanced chemical equations.)</li> </ol>		
<p><b>Year-Long Anchoring Phenomena: (LEARNING PROCESS)</b>  Changes to the measurement of chemicals added to Flint Michigan’s water supply created dangerous levels of lead contamination in the drinking water.</p>		
<p><b>Unit Phenomena (LEARNING PROCESS)</b>  A candle transforms into gases, water vapor, and soot during combustion, yet the total mass of the reactants remains the same as the total mass of the products formed.</p>		
<p><b>MYP Inquiry Statement:</b>  Mass is preserved in chemical reactions and provides a tool to predict and understand the quantity of reactants and products in a given reaction.</p>		
<p><b>MYP Global Context:</b>  Scientific and Technical Innovation</p>		
<p><b>Approaches to Learning Skills:</b></p> <ul style="list-style-type: none"> <li>Communication skills</li> <li>Social skills</li> <li>Self Management skills</li> <li>Research skills</li> <li>Thinking skills</li> </ul>	<p><b>Disciplinary Core Ideas:</b></p> <ul style="list-style-type: none"> <li>Chemical Reactions</li> <li>Indicators of a Reaction</li> <li>Chemical Equations</li> <li>Law of Conservation</li> <li>Balancing Equations</li> <li>Synthesis</li> <li>Decomposition</li> <li>Single Replacement</li> <li>Double Replacement</li> <li>Combustion</li> </ul>	<p><b>Crosscutting Concepts:</b></p> <ul style="list-style-type: none"> <li>Systems and System Models</li> <li>Stability and Change</li> <li>Scale, Proportion, and Quantity</li> </ul> <p><b>MYP Key and Related Concepts:</b></p> <p><b>Key Concept(s)</b></p> <ul style="list-style-type: none"> <li>Systems</li> <li>Change</li> </ul> <p><b>Related Concept(s)</b></p> <ul style="list-style-type: none"> <li>Models</li> <li>Balance</li> <li>Interaction</li> <li>Transfer</li> </ul>

**Possible Preconceptions/Misconceptions: (REFLECTION – PRIOR TO TEACHING THE UNIT)**

Add.

**Key Vocabulary: (KNOWLEDGE & SKILLS)**

reaction  
 reactant  
 product  
 coefficient  
 subscript  
 Law of Conservation  
 balanced chemical equation  
 indicator  
 precipitate  
 synthesis  
 decomposition  
 single replacement  
 double replacement  
 combustion

**Inquiry Questions:**

Factual - What does the Law of Conservation of Matter state? How does it dictate the behavior of atoms in a chemical reaction?

Conceptual - What implications does the Law of Conservation of Matter have for the predictability of chemical reactions?

Debatable - What are the limitations of the Law of Conservation of Matter? Are there scenarios where exceptions or modifications to this law should be considered to better explain certain chemical phenomena?

MYP Objectives	Summative assessment		
Sciences	<p>Criterion A: Knowing and Understanding</p> <ul style="list-style-type: none"><li>Common Summative Assessment</li></ul> <p>Criterion B: Inquiring and Designing</p> <p>Criterion C: Processing and Evaluating</p> <ul style="list-style-type: none"><li>Common Laboratory Experience</li></ul>	Relationship between summative assessment task(s) and statement of inquiry: Students will perform tasks and respond to assessment items that will gauge their mastery of reactions as required by the Georgia Standards of Excellence. Mastery of these concepts is necessary to move forward in our student of chemical behavior.	
Unit Objectives:			
Learning Activities and Experiences	Inquiry & Obtain: (LEARNING PROCESS)	Evaluate: (LEARNING PROCESS)	Communicate: (LEARNING PROCESS)

<b>Week 1</b> <b>Week 2</b> <b>Week 3</b>	<b>Engage:</b> <ul style="list-style-type: none"> <li>● Core Interactive Text: Preparing For Chemical Reactions and Equations</li> <li>● Video: Fireworks</li> <li>● Video: Combining Atoms</li> </ul>	<b>Evaluate:</b> <ul style="list-style-type: none"> <li>● Common Formative Assessment</li> <li>● Common Summative Assessment</li> </ul>	<b>Explain:</b> <ul style="list-style-type: none"> <li>● Core Interactive Text: Explaining Chemical Reactions and Equations</li> </ul>
	<b>Explore:</b> <ul style="list-style-type: none"> <li>● Core Interactive Text: What Are Five Types of Chemical Reactions?</li> <li>● Core Interactive Text: How Can You Predict the Products of Each of the Five Types of Chemical Reactions?</li> <li>● Exploration: Exploring Chemical Reactions and Equations</li> <li>● Core Interactive Text: How Can You Represent Chemical Reactions Using Chemical Equations?</li> <li>● Hands-On Activity: Balancing Chemical Equations</li> </ul>		<b>Elaborate:</b> <ul style="list-style-type: none"> <li>● Core Interactive Text: Applying Chemical Reactions and Equations</li> <li>● Project Starter: How Can You Scrub a Smokestack?</li> <li>● Project Starter: Have a Positive Reaction</li> <li>● Chemical Reactions Investigation</li> </ul>

**Resources (hyperlink to model lessons and/or resources):**

Discovery Education Science Techbook

**Reflection: Considering the planning, process and impact of the inquiry**

Prior to teaching the unit	During teaching	After teaching the unit
(click here)	(click here)	(click here)