

Teacher(s)	F. Morales, R. Guerra,	Subject group and discipline	Science		
Unit title	Chemical Equations	MYP year	5	Unit duration (hrs)	15

### Inquiry: Establishing the purpose of the unit

Key concept	Related concept(s)	Global context & (exploration)
<b>Change</b>	<b>Interaction, transformation</b>	Global Context: <b>Scientific &amp; Technical Innovation</b> Exploration: <b>Systems</b>
<b>Statement of inquiry Process</b>		
Conceptual Understanding: <b>Change</b> is the outcome of <b>interactions</b> and <b>transformation</b> .		
Statement of Inquiry: <b>Change</b> is the outcome of <b>interactions</b> and <b>transformation</b> within <b>systems</b> .		
<b>Inquiry questions</b>		
<p><b>Factual Question —</b></p> <p>1. What constitutes <b>change</b>?</p> <p><b>Conceptual Question—</b></p> <p>2. Why should changes in a <b>system</b> be observed?</p> <p><b>Debatable Question—</b></p> <p>3. Should <b>interactions</b> be regulated within a <b>system</b>?</p>		
<b>Objectives and their strands</b>	<b>Summative assessment</b>	

<p>Ai) i. explain scientific knowledge</p> <p>Cii) interpret data and explain results using scientific reasoning,</p> <p>Civ) evaluate the validity of the method</p> <p>Cv) explain improvements or extensions to the method</p>	<p>Outline of summative assessment task(s) using the GRASPS model including assessment criteria (not the strands) in the final "S" of GRASPS:</p> <p>G – Your goal...is to demonstrate your understanding of how <b>change</b> is the outcome of <b>interactions</b> and <b>transformations</b> within <b>systems</b></p> <p>R – You are...a cartoonist</p> <p>A – Your audience...is a group of middle school students at a summer science camp who require an easy-to-understand representation of the different types of chemical reactions.</p> <p>S – The situation...you find yourself in is trying to come up with an original cartoon that shows a balanced equation for each of the six types of chemical reactions. The cartoon must be a simple but a complete summary of the basic concepts of reaction types and balancing chemical equations.</p> <p>P – Your product is a cartoon that accurately shows not only the different types of chemical reactions, but that also, by cartoon analogy, represents how the law of conservation of matter is shown by using balanced chemical equations. Make sure your cartoon includes all 6 reaction types.</p> <p>S –The cartoon must include an example and brief explanation of the reaction by showing a balanced equation that describes the reaction. Your work will be assessed using MYP criteria A and C.</p>	<p>Relationship between summative assessment task(s) and statement of inquiry:</p> <p>During this summative assessment, students will show their understanding of how <b>change</b> is the outcome of <b>interactions</b> and <b>transformations</b> in <b>systems</b> using the concept of reaction types and the law of conservation of matter (balancing chemical equations).</p> <p>Students will, by analogy, use cartoons to represent the concepts of reaction types and the law of conservation of matter by including balanced equations for each of the 6 reaction types studied in chemistry I.</p> <p>Students will present, in cartoon format, 6 reaction types, including synthesis, decomposition, single-replacement, double-replacement, neutralization, and combustion reactions. The written interpretation demonstrates their ability to connect their illustration to interactions between particles and the physical world.</p>
<p><b>Approaches to learning (ATL)</b></p>		

In order for students to explain scientific knowledge, students must Give and receive meaningful feedback (ATL Category: Communication, Skill Cluster: Communication Skills)

In order for students to interpret data and explain results using scientific reasoning, students must write for different purposes. (ATL Category: Communication, Skill Cluster: Communication Skills)

In order for students to evaluate the validity of the method, students must identify obstacles and challenges. (ATL Category: Thinking, Skill Cluster: Critical -thinking Skills)

In order for students to explain improvements or extensions to the method, students must propose and evaluate a variety of solutions. (ATL Category: Thinking, Skill Cluster: Critical-thinking Skills)

### Action: Teaching and learning through inquiry

Content (TEKS) Write them out	Learning process		
	Learning experiences and teaching strategies	Formative Assessment	Differentiation (Include how you will differentiate for GT students, as well as for students with an IEP and LEP students)
4A) Differentiate between physical and chemical changes.	<ol style="list-style-type: none"> <li>Students will be introduced to the law of conservation of matter with a short lab that allows them to explore how reactants and products are made of the same atoms, simply rearranged.</li> </ol>	<ol style="list-style-type: none"> <li>Daily warm-ups will be used.</li> <li>Daily exit tickets will be collected</li> <li>Two quizzes will be given. One on balancing and reaction types, and</li> </ol>	<ol style="list-style-type: none"> <li>Tutoring and peer-tutoring will be available.</li> <li>Using open-ended questions and writing prompts.</li> </ol>

<p>8D) Use the law of conservation of mass to write and balance chemical equations.</p>	<ol style="list-style-type: none"> <li>2. Students are introduced to working with reactants and products with skeleton equations (not balanced), and sentence equations (written as sentences). Students will be able to write a skeleton equation given the sentence, and to write a sentence given the skeleton equation.</li> <li>3. Students will be able to demonstrate the law of conservation of matter by balancing chemical equations, given the skeleton equations. We will begin with a Skittles &amp; chips game.</li> <li>4. Students will write balanced equations given only the sentence that describes the reaction.</li> <li>5. Students will learn the 6 reaction types (synthesis, decomposition, single-replacement, double-replacement, neutralization, and combustion reactions), identify, and name the type of chemical reaction, given a balanced equation.</li> <li>6. Students will identify, name, and balance a chemical equation given the unbalanced equation. We will utilize the balancing equation tiles.</li> <li>7. Students will identify, name, write, and balance a chemical equation given the sentence describing the equation. Balancing equation cards will be available for struggling students.</li> <li>8. Students will analyse the single-replacement reaction in "Boat Loads of Copper" lab by reacting copper (II) chloride and aluminium.</li> </ol>	<p>one on the experimental methods used in the unit.</p> <ol style="list-style-type: none"> <li>4. A test on the unit will be given at the end.</li> </ol>	<ol style="list-style-type: none"> <li>3. Lessons for review and reteach will be pre-prepared and ready for implementation.</li> <li>4. GT students may use this project for the GT showcase (must use tri-fold presentation board).</li> </ol>
-----------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	<p>9. Students will differentiate between the reaction types by exploring the six types in a lab experience.</p> <p>10. Students will compete to quickly balance equations using the “Snowman Challenge” game.</p> <p>Possible Questions to Drive Instructions:</p> <ol style="list-style-type: none"> <li>1. What is the evidence that a chemical reaction is taking place?</li> <li>2. What are the products of a combustion reaction that uses (a hydrocarbon) for fuel?</li> <li>3. How do balanced equations show the law of conservation of mass?</li> <li>4. What does the law of conservation of mass demonstrate about changes in systems?</li> <li>5. Should all cars be hydrogen powered?</li> <li>6. Should the government have stricter carbon emission regulations?</li> <li>7. How far should government regulate the chemical industry?</li> </ol>		
<b>Resources</b>			
occ.ibo.org, calculators, manipulatives			

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

Prior to teaching the unit	During teaching	After teaching the unit
<ul style="list-style-type: none"><li>•Teacher needs to gather the games and manipulatives, and to buy the skittles</li><li>•Teacher needs to have the warm-ups and review / reteach items ready</li><li>•Attendance, students must be present or must get make-up work and/or come to tutoring to get the information</li><li>•Prior knowledge: students must have prior knowledge on how to write names and formulas of compounds</li><li>•Time management: students must be reminded about due dates, teacher will have a reminder hand-out for student journal</li></ul>		