Unit Title: Chemical Reactions	**Content Area:** Chemistry	**Grade Level:** 9-12

Unit Summary: So far this year students have studied elements and compounds alone, but they have never had the opportunity to explore what happens when elements and compounds interact with each other. This unit will explore the basics of chemical reactions: the different types and how they are written. With the basics taught in this unit students will be able to progress onto such topics as predicting products and calculating required amounts of reactants. Topics covered in this unit include classification of reactions, identification of products/reactants, activity series, net ionic equations, balancing equations, and translating between word equations and chemical equations.

Cross cutting concepts:
1. Patterns: Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.
2. Cause and effect: Mechanism and explanation. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.
5. Energy and matter: Flows, cycles, and conservation. Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

Science and Engineering Practices:
6. Constructing explanations (for science) and designing solutions (for engineering)
8. Obtaining, evaluating, and communicating information

Unit Essential Questions:	**Unit Enduring Understandings:**
• What types of chemical changes drive all the actions around us? • Is it possible to create or destroy matter? How is it changed into something new?	• Chemical reactions can be one of five types: synthesis, decomposition, single replacement, double replacement or combustion. • Matter is neither created nor destroyed, only converted from one form to another by chemical reactions.

Possible Student Misconceptions: When balancing equations students often attempt to change subscripts instead of just adding coefficients.

NJCCCS: 5.2.12.B.3 The conservation of atoms in chemical reactions leads to the ability to calculate the mass of products and reactants using the mole concept.

NGSS Performance Expectations: *Students who demonstrate understanding can…*
- HS-PS1-7.Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

Primary CCSS ELA/Literacy Connections: None listed.	**Primary CCSS Mathematics Connections:** MP.2 Reason abstractly and quantitatively. HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. HSN-Q.A.2Define appropriate quantities for the purpose of descriptive modeling. (HS-PS1-4),(HS-PS1-7)

Lesson Pace & Sequence

Lesson Title/Number: Lesson 1 Balancing Chemical Equations	**Learning Objective(s):** SWBAT balance a chemical equation	**Lesson Duration:** 80 minutes

Learning Cycle ***What lesson elements will support students' progress towards mastery of the learning objectives(s)?*** ****Elements do not have to be in conducted in sequence.***	***Learning Activities*** ***What specific learning experiences will support ALL students' progress towards mastery of the learning objective(s)?***	***Resources/Materials*** ***What curricular resources/materials are available to facilitate the implementation of the learning activities?***	***Science and Engineering Practices*** ***What specific practices do students need to use in order to progress towards mastery of the learning objective(s)?***	***Disciplinary Core Ideas*** ***What core ideas do students need to understand in order to progress towards mastery of the learning objective(s)?***	***Crosscutting Concepts*** ***What crosscutting concepts will enrich students' application of practices and their understanding of core ideas?***
Elicit: How will you access	Ask students to hypothesis what				Energy and Matter The total

students' prior knowledge?	they think it means to say "an equation must be balanced"				amount of energy and matter in closed systems is conserved. (HS-PS1-7) Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)
Engage: How will you capture students' interest and get students' minds focused on the concept/topic?	DIRECT INSTRUCTION: Teacher must introduce chemical reactions, reactants and products and how to balance equations. DEMONSTRATION Electrolysis of water	• Holt Chemistry TE Pg. 268			
Explore: What hands-on/minds-on common experience(s) will you provide for students?	Students can practice balancing reactions by building models of molecules. Suggested methods are pipe cleaners and beads, toothpicks and jelly beans, spaghetti and marshmallows, etc. The items should be colored so each element gets a different color. In this activity students should learn that you cannot change a subscript - only replicate a whole 'stick' (representing a molecule). They will learn that an equation is only balanced when each side has the same amount of each color (representing the same atoms of each element).	• Description of balancing activity: http://www.exo.net/~donr/activities/Sweetly_Balanced_Equations.pdf	Developing and Using Models Use a model to predict the relationships between systems or between components of a system. (HS-PS1-1)	PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	Energy and Matter The total amount of energy and matter in closed systems is conserved. (HS-PS1-7) Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)
Explain: How will you help students connect their exploration to the concept/topic under investigation?	After students make a 3D model with materials, they will learn how to draw molecules in a 2D format on paper. This method of balancing equations is called circle or bubble method.	• Interactive tutorial on balancing equations: http://phet.colorado.edu/en/simulation/balancing-chemical-equations • Balancing equation online game: http://education.jlab.org/elementbalancing/	Developing and Using Models Use a model to predict the relationships between systems or between components of a system. (HS-PS1-1)	PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	Energy and Matter The total amount of energy and matter in closed systems is conserved. (HS-PS1-7) Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)
Elaborate: How will students apply their learning and develop a more sophisticated understanding of the	DIRECT INSTRUCTION: After students understand the concept of balancing, the teacher must introduce multiple ways to	• Balancing polyatomic ions as a group Pg. 273 Holt Chemistry TE	Using Mathematics and Computational Thinking Use mathematical representations of phenomena	PS1.B Chemical Reactions The fact that atoms are conserved, together with knowledge of the chemical properties of the	Energy and Matter The total amount of energy and matter in closed systems is conserved. (HS-PS1-7) Science assumes

concept/topic?	balance. Students should lastly be taught how to balance equations without drawing them out. This method is often called inventory method and involves using a table. Some lower level students will not be able to master inventory method and will continue to draw circles or bubbles. As long as students have a method of balancing that works they should be permitted to choose how to balance. It helps to remind students to save elements that appear in multiple compounds for last. These elements are often oxygen and hydrogen. Advanced students can also be taught to balance polyatomic ions as a group instead of as individual elements.		to support claims. (HS-PS1-7)	elements involved, can be used to describe and predict chemical reactions. (HS-PS1-2),(HS-PS1-7)	the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)
Evaluate: How will students demonstrate their mastery of the learning objective(s)?	Administer an exit ticket, quiz or other assessment.	• Pg. 274 Holt Chemistry Section 4 Review • Many Practice problems for this unit: https://njctl.org/courses/science/chemistry/chemical-reactions/reactions-practice-problems/# • This packet as multiple choice practice problems: https://njctl.org/courses/science/chemistry/chemical-reactions/reactions-multiple-choice-2/#			
Lesson Title/Number: Lesson 2 Classify Reactions		**Learning Objective(s):** SWBAT identify and define the major symbols used when writing chemical reactions SWBAT classify reactions as one of five types presented in this lesson			**Lesson Duration:** 40 minutes
Learning Cycle ***What lesson elements will support students' progress towards mastery of the learning objectives(s)?***	***Learning Activities*** ***What specific learning experiences will support ALL students' progress towards mastery of the learning***	***Resources/Materials*** ***What curricular resources/materials are available to facilitate the implementation of the learning***	***Science and Engineering Practices*** ***What specific practices do students need to use in order to progress towards mastery***	***Disciplinary Core Ideas*** ***What core ideas do students need to understand in order to progress towards mastery of the learning objective(s)?***	***Crosscutting Concepts*** ***What crosscutting concepts will enrich students' application of practices and their understanding of core***

*Elements do not have to be in conducted in sequence.	objective(s)?	activities?	of the learning objective(s)?		ideas?
Elicit: How will you access students' prior knowledge?	Have students define the words synthesis, decomposition and displacement in their own words.				
Engage: How will you capture students' interest and get students' minds focused on the concept/topic?	DIRECT INSTRUCTION: This lesson can be done with demonstrations of each type of reaction. After students complete a graphic organizer of each type of reaction they can see the demonstration performed. TEACHING TIP: You can also relate each type of reaction to dating or dancing. Dancing is described in the text book, dating would be The Hook Up, The Break up, The home-wrecker and the wife swap. You can even have students act out these reactions to help them remember what to look for. Downside of using analogies is that some students will use the analogy term forever and not use the actual term for the reaction.	• Using Analogies explanation: Pg. 284 Holt Chemistry TE	Obtaining, Evaluating, and Communicating Information Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6)	PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	
Explore: What hands-on/minds-on common experience(s) will you provide for students?	Students should complete a gallery walk of the five types of reactions or teacher demonstrations of each.			PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	Patterns Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-1),(HS-PS1-3)
Explain: How will you help students connect their exploration to the concept/topic under investigation?	Students should practice identifying the types of reactions. Students can play a version of the game 'four corners' where the four corners of the room are labeled with one of the five reaction types. The fifth can go in the middle. As the teacher	• For teachers mostly, but this tutorial helps investigate the types of chemical reactions and how to classify them: http://learningcenter.nsta.org/product_detail.aspx?id=10.2505/7/SCB-CRX.2.1		PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	Patterns Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-1),(HS-PS1-3)

	holds up signs of a chemical reaction, students must move to the correct corner. Incorrect students are eliminated until only one student remains. Students who are eliminated can be required to write at least five reaction examples from the game on their graphic organizer to make sure they are still engaged. Anyone who writes down enough examples can earn the same prize as the winner (candy, bonus, etc.)				
Elaborate: How will students apply their learning and develop a more sophisticated understanding of the concept/topic?	ADDITIONAL DIRECT INSTRUCTION: Throughout this lesson insert vocabulary terms such as precipitate, catalyst, the symbol for heat, exothermic and endothermic. These terms can help students discuss the reactions on a more intellectual level. These terms can also be included in a graphic organizer.			PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	
Evaluate: How will students demonstrate their mastery of the learning objective(s)?	Administer an exit ticket, quiz or other assessment.	• Pg. 285 Holt Chemistry Section 3 Review • Many Practice problems for this unit: https://njctl.org/courses/science/chemistry/chemical-reactions/reactions-practice-problems/# • This packet as multiple choice practice problems: https://njctl.org/courses/science/chemistry/chemical-reactions/reactions-multiple-choice-2/#			
Lesson Title/Number: Lesson 3 Word equations		**Learning Objective(s):** SWBAT translate between word equation and chemical equations			**Lesson Duration:** 40 minutes

Learning Cycle ***What lesson elements will support students' progress towards mastery of the learning objectives(s)?*** ****Elements do not have to be in conducted in sequence.***	***Learning Activities*** ***What specific learning experiences will support ALL students' progress towards mastery of the learning objective(s)?***	***Resources/Materials*** ***What curricular resources/materials are available to facilitate the implementation of the learning activities?***	***Science and Engineering Practices*** ***What specific practices do students need to use in order to progress towards mastery of the learning objective(s)?***	***Disciplinary Core Ideas*** ***What core ideas do students need to understand in order to progress towards mastery of the learning objective(s)?***	***Crosscutting Concepts*** ***What crosscutting concepts will enrich students' application of practices and their understanding of core ideas?***
Elicit: How will you access students' prior knowledge?	Ask students to name multiple ionic and covalent compounds. As they share their answers with the class, review naming rules for ionic and covalent compounds as well as polyatomic ions. Stress that if students cannot properly write formulas from their names then they will constantly make mistakes writing chemical reactions from word equations. If students struggle with this perhaps provide some additional review work on naming for homework.		Obtaining, Evaluating, and Communicating Information Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6)		Patterns Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-1),(HS-PS1-3)
Engage: How will you capture students' interest and get students' minds focused on the concept/topic?	Teacher-lead discussion: Engage students in a discussion of the dangers of miscommunications between languages. Ask them how this could affect them as they travel or shop in different countries. Then urge them how it might affect them as a scientist - the implications on medicine or ordering chemicals for cleaning supplies or industry. This lesson they will learn the language of chemical reactions. Mistakes can be dangerous or even deadly.		Obtaining, Evaluating, and Communicating Information Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6)		

Explain: How will you help students connect their exploration to the concept/topic under investigation?	DIRECT INSTRUCTION: The teacher must explain how to translate from word equations to chemical equations with a step by step or systematic approach. Have students underline 'chemicals'. Then have them locate signifier words that can be changed into symbols such as: and, reacts with, to form, decomposes, synthesizes, produces etc. Students can take a sentence and translate it into compound names connected by symbols. The last step is to change compound name into formulas. This may involve using ionic or covalent naming rules, or simply just looking at an element on the periodic table. Remind students that some elements are diatomic and require a subscript. Challenge students to be as detailed as possible. Can they include states of matter or special instructions such as add heat or a catalyst?	• Here is a tutorial with practice problems that can be given to students as an extra practice or as classwork: http://www.marin.edu/homepages/ErikDunmire/CHEM131/D3_Equations_Reactions_Worksheet.pdf	Obtaining, Evaluating, and Communicating Information Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6)	PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	Patterns Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-1), (HS-PS1-3) Energy and Matter The total amount of energy and matter in closed systems is conserved. (HS-PS1-7) Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)
Elaborate: How will students apply their learning and develop a more sophisticated understanding of the concept/topic?	Give students word equations that are already written as chemical reactions. Have them search these for mistakes and when mistakes are present have them explain why they are incorrect.			PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	

Evaluate: How will students demonstrate their mastery of the learning objective(s)?	Administer an exit ticket, quiz or other assessment.	• Pg. 266 Holt Chemistry Section 1 Review • Many Practice problems for this unit: https://njctl.org/courses/science/chemistry/chemical-reactions/reactions-practice-problems/# • This packet as multiple choice practice problems: https://njctl.org/courses/science/chemistry/chemical-reactions/reactions-multiple-choice-2/#			
Lesson Title/Number: Lesson 4 Activity Series, Solubilities and Net Ionic Equations		**Learning Objective(s):** SWBAT write a net ionic equation from a balanced chemical reaction SWBAT use a solubility chart to predict precipitates SWBAT use an activity series to predict if a single replacement reaction will proceed			**Lesson Duration:** 80 minutes
Learning Cycle ***What lesson elements will support students' progress towards mastery of the learning objectives(s)?*** ****Elements do not have to be in conducted in sequence.***	***Learning Activities*** ***What specific learning experiences will support ALL students' progress towards mastery of the learning objective(s)?***	***Resources/Materials*** ***What curricular resources/materials are available to facilitate the implementation of the learning activities?***	***Science and Engineering Practices*** ***What specific practices do students need to use in order to progress towards mastery of the learning objective(s)?***	***Disciplinary Core Ideas*** ***What core ideas do students need to understand in order to progress towards mastery of the learning objective(s)?***	***Crosscutting Concepts*** ***What crosscutting concepts will enrich students' application of practices and their understanding of core ideas?***
Elicit: How will you access students' prior knowledge?	Ask Students to define the words 'net' and 'spectator'. Both of these words will be used when writing net ionic equations.		Obtaining, Evaluating, and Communicating Information Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6)		

Engage: How will you capture students' interest and get students' minds focused on the concept/topic?	DIRECT INSTRUCTION: The teacher must conduct a lesson on using the activity series to determine if a single replacement reaction will proceed and also on using a solubility chart to determine if a precipitate is present. DEMONSTRATION:	• DEMONSTRATION: plating Ag with Cu Pg. 280 of Holt Chemistry TE • Relative Activity of two metals Pg. 281 Holt Chemistry TE		PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	Patterns Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-1),(HS-PS1-3)
Explore: What hands-on/minds-on common experience(s) will you provide for students?	Game to determine precipitates - described in resource to the right.	• Precipitate Card Game: Pg. 287 Holt Chemistry TE		PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	Patterns Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-1),(HS-PS1-3)
Explain: How will you help students connect their exploration to the concept/topic under investigation?	DIRECT INSTRUCTION CON'T: Students must fully understand precipitates before tackling net ionic equations. These problems must be broken down into steps. Step by step instructions can be found in the textbook. Additionally, providing rhythm of writing coefficient, symbol, charge and state every time will give some students patterns to help. See explanation of this also cited to the right.	• Net Ionic Steps AND Writing in Rhythm Pg. 288 Holt Chemistry TE	Using Mathematics and Computational Thinking Use mathematical representations of phenomena to support claims. (HS-PS1-7)	PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	Patterns Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-1),(HS-PS1-3)
Elaborate: How will students apply their learning and develop a more sophisticated understanding of the concept/topic?	Students should complete additional practice problems and explore real world connections. Provide students with real world examples of how to apply the activity series or solubility rules. See example problem sited to the right. Also, have them write net ionic equations for partners and then check their partners work. For advanced students they can intentionally add 1/2	• Real life word problem: Pg. 282 Holt Chemistry TE	Using Mathematics and Computational Thinking Use mathematical representations of phenomena to support claims. (HS-PS1-7)	PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	

	mistakes for their partner to locate and correct.				
Evaluate: How will students demonstrate their mastery of the learning objective(s)?	Administer an exit ticket, quiz or other assessment.	• Pg. 289 Holt Chemistry Section 4 Review • Many Practice problems for this unit including net ionic equations: https://njctl.org/courses/science/chemistry/chemical-reactions/reactions-practice-problems/# • This packet as multiple choice practice problems including those on precipitates and activity series: https://njctl.org/courses/science/chemistry/chemical-reactions/reactions-multiple-choice-2/#			
Extend: How will students deepen their conceptual understanding through use in new context?	Real World Connection of metal plating	• Real World Connection: Pg. 280 of Holt Chemistry TE			
Lesson Title/Number: Lesson 5 Conservation of Mass Experiment		**Learning Objective(s):** SWBAT complete an experiment demonstrating the law of conservation of mass and then complete a lab report			**Lesson Duration:** 40-80 min depending on the experiment
Learning Cycle ***What lesson elements will support students' progress towards mastery of the learning objectives(s)?*** ****Elements do not have to be in conducted in sequence.***	***Learning Activities*** ***What specific learning experiences will support ALL students' progress towards mastery of the learning objective(s)?***	***Resources/Materials*** ***What curricular resources/materials are available to facilitate the implementation of the learning activities?***	***Science and Engineering Practices*** ***What specific practices do students need to use in order to progress towards mastery of the learning objective(s)?***	***Disciplinary Core Ideas*** ***What core ideas do students need to understand in order to progress towards mastery of the learning objective(s)?***	***Crosscutting Concepts*** ***What crosscutting concepts will enrich students' application of practices and their understanding of core ideas?***

Elicit: How will you access students' prior knowledge?	Have students write down the law of conservation of mass, define reactants and products and list signs that a chemical reaction has taken place.			PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	The total amount of energy and matter in closed systems is conserved. (HS-PS1-7) Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)
Explore: What hands-on/minds-on common experience(s) will you provide for students?	Students will combine baking soda and vinegar in a sealed zip lock bag. They will mass the bag before and after the substances are mixed to observe the law of conservation of mass.	• Pg. 259 Holt Chemistry TE	Obtaining, Evaluating, and Communicating Information Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6)		
Explain: How will you help students connect their exploration to the concept/topic under investigation?	Students should complete an analysis of this activity. Analysis would include writing a brief explanation of why this demonstrates the law of conservation of matter, writing a balance chemical equation for the reaction after being given the formulas for reactants and classifying this reaction as one of the six reaction types.		Using Mathematics and Computational Thinking Use mathematical representations of phenomena to support claims. (HS-PS1-7)	PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	The total amount of energy and matter in closed systems is conserved. (HS-PS1-7) Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)
Elaborate: How will students apply their learning and develop a more sophisticated understanding of the concept/topic?	Error Analysis: If students did not get the same ending and starting mass have them discuss possible errors that may have caused this loss/gain of mass.		Using Mathematics and Computational Thinking Use mathematical representations of phenomena to support claims. (HS-PS1-7)	PS1.B Chemical Reactions 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. (HS-PS1-2),(HS-PS1-7)	The total amount of energy and matter in closed systems is conserved. (HS-PS1-7) Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)

Evaluate: How will students demonstrate their mastery of the learning objective(s)?	Students should write a lab report on this topic. See earlier unit plans with ideas on how to differentiate or grade these lab reports.				
Extend: How will students deepen their conceptual understanding through use in new context?	Students can suggest ideas of other chemical reactions they would like to perform or see performed in the classroom. Oftentimes students will find experiments on YouTube that can easily be done as a demonstration later on in the year. This increases student engagement in the course as well as gets them thinking about experimental design for the future.				
Lesson Title/Number: Lesson 6 TEST		**Learning Objective(s):**		**Lesson Duration: 40 min**	