Curriculum Sample Template – 8 Pages Max. (12 pages for integrated ELA sample

Grade Level	10	**Content Area**	Science
Course Title (grades 9-12 Only)	Biology		
Expected Prior Knowledge *List the knowledge/skills mastered earlier in the year that are foundational to the mastery of the Required Standard(s).*	Students are expected to give differences between physical and chemical change. Students are expected to explain the difference between products and reactants. Students will define/express chemical reaction and give some examples.		
Alignment to Program of Instruction *Describe how the methods of instruction found in this sequence of lessons align to the Program of Instruction described in the application package.*	The lesson is delivered by scaffolding through sequence of slides, with videos and activities embedded. Students will also have access to these slides by logging into their blackboard account supported by Fuel Education. The Instruction is direct (Tier 1) and also online (Tier2). The content is aligned to STEM, students will use scientific and engineering process like asking questions, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, evaluating and communicating information.		
Standard Number* and Description *The standard number and description of the Required Standard(s) being instructed and assessed to mastery in the curriculum sample.*	HS 5 - Physical Science 4 – Chemical Reactions (Investigate relationships between reactants and products in chemical reactions.) HS.5.4.9: Predict the products of a chemical reaction using types of reactions (example, synthesis, decomposition, replacement, combustion). HS.5.4.10: Explain the energy transfers within a chemical reaction using the law of conservation of energy.		
Materials/Resources Needed *List all items the teacher and students will need for the entire sequence of instruction (excluding common consumables)*	Smart Boards, graphing paper, vinegar, baking soda, calcium chloride, water, beakers, thermometers, hot packs, cold packs, glow sticks, salt substitute like potassium chloride, hydrogen peroxide, dry yeast Computers with internet access.		

* ***Standard Number****: For English Language Arts (Reading and Writing), use Grade, Strand, Standard (e.g., 3.RI.2). For K-8 Math, use Grade, Domain, Cluster, Standard (e.g., 6.EE.B.7). For HS Math, use Conceptual Category-Domain, Cluster, Standard (e.g., A-REI.C.6).*

Lesson (add as needed)	**Instructional Strategies -** *List and describe teacher actions, lesson by lesson, which will provide students with opportunities to engage the grade-level rigor defined by the Required Standard(s). Indicate alignment of instructional strategies to specific component(s) or content/skill(s) of the Required Standard/component.*	**Student Activities -** *Describe the activities, lesson by lesson, in which students will engage to allow them to master the grade-level rigor defined by the Required Standard(s). Indicate alignment of student activities to specific component(s) or content/skill(s) of the Required Standard/component.*
1	**Objective:** Students will predict the products of a chemical reaction using synthesis and decomposition reactions. **Key points:** Synthesis Decomposition **Activation of prior knowledge:** Teacher will review the key points. TW use online learning tools to provide visuals to identify materials to be used in the introduction of new material. **Introduction to new material:** Teacher will explain and reflect on the process for the different types of reactions with a focus on synthesis and decomposition. Teacher will show a few examples related to synthesis and decomposition reactions and model the writing process used to document the process. Students will be challenged with more chemical reactions and students are expected to predict the products and balance the equations. TW model each reaction and writing process. **Guided Practice and Exploration:** Teacher will guide the students to elicit responses for synthesis and decomposition reaction. Teacher will give simple examples and ask students to identify if it is a synthesis or decomposition. TW have students work in groups to predict the products of the given chemical reactions, using their knowledge of synthesis and decomposition. If 80% of the students give the answers correctly then teacher will give questions for Independent practice. **Flipped classroom/Blended Learning:** Students will use their black board account to login to FuelEd to watch examples of chemical reactions. Interactive component allows students to predict chemical reactions and products though equations and mixtures of different materials. Teacher will monitor student progress and facilitate student learning. Teacher will work with students one on one or in small group with students who need help	Students will (**SW)** write the objective in the note book Students will understand the key points and write definitions and draw symbolic figures and examples of synthesis and decomposition reaction. **SW** listen, watch, and take notes of key points. **SW** follow teacher directions and identify the reactants and products in the given chemical reactions. Students will take notes and write reactions to understand the different types of reactions. SW document the writing process used. **SW** think, analyze and identify the types of reactions. Students will think, analyze and predict the products of the chemical reaction. Students will work in groups and predict the products of the given chemical reactions, using the knowledge of synthesis and decomposition. **SW** work on online program to complete assigned work. Students needed help will work with teacher to understand the concepts and then work on the questions and challenges provided by the teacher.

	and provide them with more examples and models to understand the concept **Independent practice:** Teacher will give different examples and equations for students to predict the products and identify the types of reactions. **Assessment**: TW collect independent practice and provide feedback to the student and address needed re-teaching for the entire class.	**SW** work individually on independent practice. SW write a reflection on their process in identifying the types of reactions. **SW** submit independent practice.
	Objective: Students will predict the products of a chemical reaction using replacement and combustion reactions. **Key points:** Chemical Reaction Replacement Combustion **Flipped classroom/Blended Learning:** Students will use their black board account to login to fuel education. **Activation of prior knowledge:** TW use online learning program to review previously presented material. Teacher will direct students to identify the reactants and products in the chemical reaction. **Introduction to new material:** Teacher will model and explain the different types of chemical reactions, with a focus on replacement and combustion. Teacher will guide the students to elicit responses for replacement and combustion products and model equations. Teacher will give examples and ask students to identify if it is a reactant or product and model writing process. **Guided Practice and Exploration:** Teacher will show a few examples related to replacement and combustion reactions and model writing process for reflection. Students will be challenged with adding previously presented chemical reactions and students are expected to predict the products and balance the equations and follow the writing process. If 80% of the students give the answers correctly then teacher will give questions for Independent practice. Teacher will work with students one on one or in small group with students who need help and provide them with more examples and models to understand the concept.	Students will write the objective in the note book Students will understand the key points and write definitions and draw symbolic figures and examples of replacement and combustion reaction. Students will use Fuel education material with their accounts. SW use the online learning program to review needed re-teaching of previously presented material. Students will follow teacher directions and identify the reactants and products in the given chemical reactions. Students will take notes and write reactions to understand the different types of reactions. Students will think, analyze and identify the types of reactions. Students will think, analyze and predict the products of the chemical reaction. Students will work in groups and predict the products of the given chemical reactions, using the knowledge of synthesis, decomposition, replacement and combustion. Students needing help will work with teacher to understand the concepts and then work on the questions and challenges provided by the teacher.

	Independent practice: Teacher will give examples and equations for students to predict the products and identify the types of reactions. **Assessment:** TW assess independent practice and provide student feedback and class re-teaching or accelerate learning.	SW work independently to complete independent practice. SW submit independent practice.
3	**Objective:** Students will explain the energy transfers within chemical reactions using the law of conservation of energy. **Key points:** Law of conservation of energy Bond energy Bond Disassociation energy Activation energy Enthalpy **Flipped classroom/Blended Learning:** Students will use their black board account to login to FuelEd to review the different types of chemical reactions. **Activation of prior knowledge:** Teacher will review the different types of chemical reactions, and engages the students in asking questions and make students think and write about why, and how chemical reactions occur? **Introduction to new material:** TW answer the following questions. What are the energy transformations in a chemical reaction? What is TW ask students to answer the questions. Teacher will summarize the student responses and use the student responses in building the concepts of energy transfers with in a chemical reaction.TW review the key points and specifically address the objective. Teacher will guide the students to see how the energy transfers occur in a chemical reaction using diagrams, videos, and graphs. **Guided Practice and Exploration:** TW have students work in groups to detail specific energy transfers in chemical reaction. TW instruct students to use their own diagrams, create a video or graph. If 80% of the students give the answers correctly then teacher will give questions for Independent practice. Teacher will work with students	Students will write the objective in the note book Students will understand the key points and write definitions and draw symbolic figures and examples. Students will use FuelED to review previously presented information on chemical reactions. Students will actively engage in the class discussions, asking and answering questions. Students will come up with their views of how reactions occur, and the energy transfers during the reactions. Students will take notes and follow teacher's slides in the better understanding of the concepts. Students will use graph paper and draw graphs showing the energy of products, activation energy, energy of the reactants and enthalpy. Students will work in groups and explain the energy transfers in the given reactions or graphs. Students needing help will work with teacher to understand the concepts and then work on the questions and challenges provided by the teacher.

	one on one or in small group with students who need help and provide them with more examples and models to understand the concept **Independent practice:** Teacher will give different graphs showing the energy of products and energy of reactants to check students understanding. **Assessment:** TW assess independent practice and provide students with feedback and monitor class progress on objective	**SW** write about the graph showing the energy of products and energy of reactants. SW write about why and how the chemical reaction occurred. **SW** submit independent practice.
4	**Objective:** Students will explain and show energy transfers within chemical reactions using the law of conservation of energy. **Key points:** Exothermic and Endothermic reactions. Bond Energy Bond Disassociation energy Activation energy Enthalpy **Flipped classroom/Blended Learning:** Students will use their black board account to login to FuelEd to review previously learned material. **Activation of prior knowledge:** Teacher will review the different types of chemical reactions, and engages the students in asking questions and make students think about how chemical reactions occur? What are the energy transformations in a chemical reaction? What is law of conservation of energy? TW answer any questions about previously learned material. **Introduction to new material:** Teacher will summarize the student responses. TW use previously learned chemical reactions to investigate the energy transfers in a chemical reaction. Teacher will guide and demonstrate how to conduct the experiment, using hands-on lab explorations. Teacher will explain the safety rules in doing the labs. TW model two hands-on experiments for students as they write down the procedure and lab writing process. TW instruct students to record the temperature of the products and reactants and classify the reactions into exothermic and endothermic reactions. TW model the writing process for students. Teacher will work with student's one on one or in small group with students who need help in doing the investigations.	Students will write the objective in the note book Students will understand the key points and write definitions and draw symbolic figures. Students will use FuelEd to review previously learned material. Students will actively engage in the class discussions, asking and answering questions. Students will come up with their views of how reactions occur, and the energy transfers during the reactions. Students will take notes and come up with a design and plan to investigate the one of the energy changes during chemical reactions modeled by the teacher. Students will follow the safety rules and watch teacher's demonstration in doing the investigations. Students needed help will work with teacher to understand the concepts and then work on the investigations.

	Guided Practice and Exploration: TW instruct the students to complete the two experiments. TW instruct students to review the safety rules before beginning with the experiment. **Independent practice:** TW have each student pick one of the two experiments to recreate. TW instruct students to fill out the Lab Sheet to complete. Assessment: TW monitor and assess the independent practice and the completed Lab Sheet.	Students will work in groups and begin the experiment by reviewing the safety rules. SW then begin their first experiment and investigate the different chemical reactions, students will record the temperature of the products and reactants and classify the reactions into exothermic and endothermic reactions. **SW** select an experiment and complete a Lab Sheet to meet the objective. **SW** submit the completed Lab Sheet.
S.A.	*Provide an opportunity for the student to complete the summative assessment items which is clearly separate from instruction and guided or independent practice, and in which the student is assessed independently. In the Student Activities column, provide a brief description of the summative assessment (S.A.) items that will allow students to demonstrate mastery of the rigor of the Required Standard(s)/components, and the context in which the items will be administered.*	Students will explain and show energy transfers within chemical reactions using the law of conservation of energy. Students will predict the products of a chemical reaction using synthesis and decomposition reactions. Students will work individually on material they have learned during the week.

Summative Assessment Items and Scoring: *Below, provide at least three Summative Assessment Items that together accurately measure student mastery of the application of the content and/or skills as defined by the grade-level rigor in the Required Standard(s). For each assessment item, provide an answer key or scoring rubric which clearly describes how assessment items are to be scored and how points will be awarded, such that mastery of the application of the content and/or skills as defined by the grade-level rigor in the Required Standard is clearly demonstrated by an acceptable score.*

Summative Assessment Item 1 (clearly identify answer key/scoring rubric, and acceptable score):
Write the chemical equation to show the reaction between Magnesium (Mg) and Hydrochloric acid (HCl). The SW predict and describe any temperature changes during this reaction, if any. Explain the type of energy change, if any.

Summative Assessment Item 2 (clearly identify answer key/scoring rubric, and acceptable score):
Give two examples of exothermic and endothermic reactions, and write the balanced chemical equation, showing the enthalpy.

Summative Assessment Item 3 (clearly identify answer key/scoring rubric, and acceptable score): (add as needed):
Identify the products for the following chemical reactions. Identify the type of reaction and balance the chemical equation.

$KClO_3$ →_____

Answer Key

1. $Mg_{(s)} + 2\ HCl_{(aq)} \rightarrow MgCl_{2\ (s)} + H_{2\ (g)}$

   The rise in temperature during the reaction indicates that this is an exothermic reaction, as energy is released to the surroundings.

2. Examples can vary, students are expected to write the balanced equation and show the energy changes.

3. $2KClO3_{\ (s)} \rightarrow 2\ KCl_{(s)} + 3O2_{\ (g)}$: This is an example of Decomposition reaction and the products are Potassium chloride and oxygen.

Scoring Rubric: scoring is done based on the following criteria

1. *If all the questions are answered correctly,*
2. *Equation are written correctly and*
3. *The equations are balanced with proper subscripts*

3- points: If all the three are present in the response

2- points: If only two are present in the response

1- Point: If only one of the above is correct

0- Point : If none of the three are correct

9 points possible 80%=Mastery

0-5=Re-teach/Re-test 6= 70% Proficient 8-9=Mastery