**LESSON PLAN TEMPLATE – Adolescence Education: Science 7-12**

**Title of Unit: Chemical Reactions Date: 3/17/19**

**Title of Lesson: Balancing Chemical Reactions**

**Class/Grade: Chemistry**

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| **Essential Questions** | 1. How do you balance a chemical reaction equation?
2. How does balancing a chemical reaction equation obey the law of conservation of mass?
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| **Academic Language** | * Conservation of mass
* Chemical equation
* Reactants
* Products
* Yields
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| **Language Function** | Discuss  |
| **Language Demand** | Students will **discuss** how they will design their game. |
| **Discourse** | Students will **discuss** the directions for their games to each other. |
| **Syntax** | Students will interpret each-others chemical equations and games. |
| **Language supports** | * Simple definitions of all content vocabulary will be given.
* When I explain the directions for the game design, I will speak clearly and will put things in simpler terms if needed.
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| **Learning Objectives keyed to NYS Standards and NYSSLS (NGSS)** | 1. Students will be able to balance chemical equations in order to obey the law of conservation of mass (HS-PS1-7 Matter and its interactions).
2. Students will be able to create their own videogames around the concept of balancing chemical equations (HS-PS1-2 Matter and its interactions).
3. Students will be able to navigate each-others games by balancing chemical reactions (HS-PS1-2/7 Matter and its interactions).
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| **Vocabulary** **Level 1** |  |
|  **Level 2** | * Products
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|  **Level 3** | * Conservation of mass
* Reactants
* Chemical equation
* Yields
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**Teaching Materials:**

* Smartboard
* Computers
* Gamestar Mechanic
* Balancing chemical equations notes/ worksheet

**Safety:**

Students will not be working with chemicals or glassware today.

**Time-budgeted Procedure: (This is just a sample.)**

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| **Time (minutes)** | **Activities (description of what you and your students are doing)** |
| 10 | Introduce idea of balancing chemical equations/ work through a few practice questions as a class. |
| 10 | Have students practice balancing chemical equations in pairs. |
| 20 | Have students login to Gamestar Mechanic and explain directions for Game activity. (Students will have previously set up an account and used Gamestar Mechanic). |
| 40 | Have students create chemical reactions to balance and maze game. Students will finish game for homework. |
|  |  |
| Next Day 40  | Students will balance each-others equations and play each-others maze games. |

**Daily Assessment:**

* ***Formative assessment(s)***

***-***Balancing Chemical equations worksheet

-Balancing Chemical equations game

**Details of Differentiation/Modifications:**

I will be sure to walk around the room and help students who have questions on the worksheet and activity.

**Description of Activity:**

Students will write out chemical equations that need specific coefficients to balance. Students will then use Gamestar Mechanic to create a maze game that the avatar will have to navigate through to reach the end goal. Each coefficient from the balanced equations will correspond to the number of spaces that the avatar has to move in a specific direction to reach the end goal. In order to complete the maze, students will first have to balance each equation. Students will be required to write out at least two equations for a total of at least 6 coefficients. If students balance the equations properly, then they should be able to complete the corresponding maze in one shot without any wrong turns.

**Level 1 Maze:**

\_\_\_\_\_N2 + \_\_\_\_\_H2 → \_\_\_\_\_NH3

Right Up Right

\_\_1\_\_N2 + \_\_3\_\_H2 → \_\_2\_\_NH3

Right Up Right

\_\_\_\_\_S8 + \_\_\_\_\_O2 → \_\_\_\_\_SO3

Down Right Down

\_\_1\_\_S8 + \_\_12\_\_O2 → \_\_8\_\_SO3

Down Right Down

**Level 2 Maze:**

\_\_\_\_\_AlBr3 + \_\_\_\_\_K2SO4 → \_\_\_\_\_KBr + \_\_\_\_\_Al2(SO4)3

Down Left Down Right

\_\_2\_\_AlBr3 + \_\_3\_\_K2SO4 → \_\_6\_\_KBr + \_\_1\_\_Al2(SO4)3

Down Left Down Right

\_\_\_\_\_CO2 + \_\_\_\_\_H2O → \_\_\_\_\_C6H12O6 + \_\_\_\_\_O2

Right Down Right Down

\_\_6\_\_CO2 + \_\_6\_\_H2O → \_\_1\_\_C6H12O6 + \_\_6\_\_O2

Right Down Right Down

\_\_\_\_\_P + \_\_\_\_\_O2 → \_\_\_\_\_P4O10

Right Down Right

\_\_4\_\_P + \_\_5\_\_O2 → \_\_1\_\_P4O10

Right Down Right