Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Homeroom:\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_ **4.5**

**Does that Break the Law of Conservation of Mass?! (SPI.9.11)**

|  |  |
| --- | --- |
| ***Key Point*** | ***Notes*** |
| **Where did the mass go?** | * Sometimes in a chemical reaction, it seems like mass has been destroyed. It HAS NOT!
* This is often because \_\_\_\_\_\_\_ have been \_\_\_\_\_\_\_\_\_\_\_\_\_ into the air
* The mass of the reactants have ***not*** disappeared
* The mass of the products will still be ***exactly equal*** to the mass of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

***Combustion reaction:**** A combustion reaction occurs when \_\_\_\_\_\_\_\_\_ from the air combines with another substance
* During combustion reactions:
	1. \_\_\_\_\_\_\_ are released into air
	2. \_\_\_\_\_\_ and/or \_\_\_\_\_\_\_ is given off

combustion 3.png***Decomposition/Rotting:**** Decomposition occurs when compounds \_\_\_\_\_\_\_ \_\_\_\_\_\_ (or decompose) into simpler compounds.
* Tiny living things called micro-organisms feed on the food and turn it into other substances, including nitrogen compounds and carbon dioxide gas.
* Still, no mass is destroyed even though it appears that it has. The mass is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
 |
| **Where did that new mass come from?** | * Sometimes in chemical reaction, it seems like mass has been created. It **HAS NOT!**
* This is often because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has been combined to form a new substance
* The mass of the reactants has ***not*** increased
* The mass of the products will still be ***exactly equal*** to the mass of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

***Oxidation*** is defined as the interaction between oxygen molecules and all the different substances they may contact, from metal to living tissueExamples: **Rust:*** Rust results when the \_\_\_\_\_\_\_\_\_ in air reacts with \_\_\_\_\_)
* Water can speed up this reaction (this means it acts a catalyst)
* As rust forms when iron (Fe) comes in contact with oxygen (O), it increases the \_\_\_\_\_ of the substance on which it forms because mass from the oxygen has now \_\_\_\_\_\_\_\_\_\_\_ with the iron on the substance
 |
| **So What?!** |  |

 **“I Own This” (Independent Practice)**

1. What is the chemical reaction for *rust*?
2. Why does the formation of rust result in an increase in mass?
3. What type of chemical reaction is occurring when fireworks are formed? How do you know?



1. Where does the mass of the fireworks (reactants) go?
2. When fluorine gas is put into contact with calcium metal at high temperatures, calcium fluoride powder is created. Why does calcium fluoride have a greater mass than the calcium metal did before the chemical reaction?
3. What type of change occurred when the Statue of Liberty turned green? How do you know?
4. When the Statue of Liberty was received from France, it has a mass of 204 116.4 kilograms. The Statue of Liberty now has a mass of 204,116.567 kg. Was this matter created?
5. Where did this additional mass come from?
6. A friend tells you that a campfire can destroy mass. Explain to them why they are wrong.

Ms. Riordan adds of a copper metal with a mass of 2 grams to a solution of nitric acid with a mass of 5 grams. When a strip of copper metal is placed into nitric acid a new substance is formed, gaseous nitrogen dioxide. The remaining mass of the metal and acid have a total mass of 6 grams.

1. What is the total mass of the reactants?
2. Ms. Riordan claims that mass has been destroyed. Is she right or wrong?
3. Why?
4. What will the total mass of the products be?