**Learning Menu**

**Directions: Write your name, Date and Period on your own paper.**

|  |  |  |
| --- | --- | --- |
| $ amount | Menu  | Answer your questions in complete sentences or by copying down the COMPLETE answer. SHOW YOUR WORK! |
| **4$** | **Appetizer** | Compounds are two or more different elements that are chemically combined.  |

**Appetizer ( 4$ Each)**

Objective: SWBAT define the Law of conservation of mass in their own words

Use your own words to Define the following words:

**Chemical equations:**

**Reactant :**

**Product:**

**Yield:**

**Coefficient:**

**Subscript:**

1. What is mass?
2. What scientific tool is used to measure mass?
3. What is the *Law of Conservation of Mass*?
4. The word *conserve* means “to keep up, to maintain, to preserve.” Based on this definition, why do you think that this law is referred to as the Law of *Conservation* of Mass?
5. Can any reaction break the Law of Conservation of Mass? Are you positive?
6. A student is investigating the law of conservation of mass. Her experiment with paper is shown. The law of conservation of mass and the student’s experiment suggest that the small pieces of paper

A.) have the same amount of matter as the full sheet.
B.) have new chemical properties.
C.) have melting and boiling points that are lower than the full sheet.
D.) can serve as catalysts in most chemical reactions.

**Side Salads (3$ each)**

Objective: SWBAT identify the reactants and products of a chemical equation.

**Identify the reactants and the products. You do NOT need to write the phase.**

1. BaO2+ H2SO4 → BaSO4 + H2O2
2. 2H2O2(aq) → 2H2O(l) + O2(g)
3. methane + water → carbon monoxide + hydrogen
4. copper(II) oxide + hydrogen → copper + water
5. 4Al +3O2 →2Al2O3
6. P4+ O2 → P4O10
7. CH4 + 2O2 → CO2 + 2H2O

**Side Dishes (5$)**

Objective: Students will be able to find the missing mass of a product or reactant in an experiment

***Use the chemical equation to answer questions 4-6.***

** *Fill in the table below with the appropriate missing information****.*

|  |  |  |
| --- | --- | --- |
| **Substance** | **Reactant /Product?** | **Element / Compound?** |
| Fe |  |  |
| O2 |  |  |
| Fe2O3 |  |  |

1. What was formed between iron (Fe) and oxygen (O) to create a new substance (Fe2O3)?

2. If 43.7 g of iron is completely used in the reaction above, how many grams of oxygen are involved in the reaction?

3. *When you heat liquid metal mercury in air it combines with oxygen and turns into an orange solid called mercury (II) oxide.*

1. What type of change is occurring in the description above?
2. What evidence is there to support your claim?
3. If you heat 2.53 grams of mercury and produce 2.73 grams of mercury (II) oxide, how much oxygen reacted with the mercury?

4. 15 grams of Hydrogen and 7.5 grams of Oxygen were placed in a beaker. An explosion happened inside the beaker that produced water. The beaker was never opened. How many grams of water were produced?

5. What is the difference between the mass of an ice cube and the mass of the water it melts into?

**Soups**  (5$)

Objective: SWBAT apply the Law of Conservation of mass to find the missing mass of a reactant or product.

1. 20 g of reactants 🡪 \_\_\_\_\_ g product
2. \_\_\_\_\_\_\_ g of reactant 🡪 14.1 g of product
3. 30.5 g Na + 41.84 g Cl 🡪 \_\_\_\_\_\_\_\_\_\_\_\_ g NaCl
4. \_\_\_\_\_\_\_\_\_\_\_\_ g 2Ca + 38.2 g O2 🡪 156.4 g 2CaO
5. 17.0 g 2Na + 129.2 g MgF2 🡪 47.4 g 2NaF + \_\_\_\_\_\_\_\_\_\_ g Mg
6. \_\_\_\_\_\_\_\_\_\_\_ g 2Na + 12.2 g MgF2 🡪 21.4 g 2NaF + 87.1 g Mg
7. 51.8 g N2 + 16.1 g 3H2 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ g 2NH3

**Full Salads**  (6$)

Objective: SWBAT apply the Law of Conservation of mass to find the missing mass of a reactant or product.

1. A scientist combines 32.0 grams of oxygen with 4.0 grams of hydrogen. How much water will be formed?
2. Methane (CH4) is a natural gas that burns in the presence of oxygen, creating carbon dioxide (CO2) and water (H2O). A scientist measured the amount of methane and oxygen in a  closed contained before igniting the mixture as a total mass of 160 grams. After the reaction, the scientist measured exactly 72 grams of water in the container. CH4 + 2 O2 → CO2 + 2 H2O What is the mass of CO2?
3. You react chemical A with chemical B to make product C and product D. It takes 100 g of A to react completely with 20 g B. In this reaction 60g of product C is produced. How many grams of product D is going to be produced?
4. Daytrone makes a sandwich using 20 grams of peanut butter, 10 grams of jelly and 5 grams of bread. What is the mass of the products?
5. When 10 grams of hydrogen gas is burned with oxygen gas, it produces 18 grams of water. How much hydrogen gas was used?
6. In a closed system, 10.00g of sulfur reacts with 20.00g of nitrogen. How many grams of sulfur nitrate are produced?
7. Ms. Ryan reacts 5 grams of vinegar and 10 grams of baking soda to produce a sodium acetate, 2 grams of water and 3 grams of carbon dioxide.. How much Sodium Acetate was formed?

**Sandwiches**  (5$)

Objective: SWBAT Count the number of atoms in a molecule.

**Counting Atoms Level 1**

***Determine how many atoms of each element are present:***

|  |  |
| --- | --- |
| 1) CaF2 2) Be(OH)2 3) NO2 4) Al2(SO4)3 5) NH4NO3 | 6) S2F2 7) Na2CO3 8) CH4 9) MgCl2 10) NaOH |
|  |  |
|  |  |

**Burgers**  (5$)

Objective: SWBAT Count the number of atoms in a molecule.

**Counting Atoms Sheet Level 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Compound  | Element 1: # | Element 2: #  | Element3: # |  Element 4: #  |
| 4 HNO3  |  |  |  |  |
| 4 Mg(OH)2 |  |  |  |  |
| 4 Li2O  |  |  |  |  |
| 2 NaOH |  |  |  |  |
| Li2SO4 |  |  |  |  |
| 3 H2O  |  |  |  |  |
| 4 Al2(SO3)3 |  |  |  |  |
| NaC2H3O2  |  |  |  |  |
| 3 Al2O3 |  |  |  |  |
| 2 (NH4)3PO4 |  |  |  |  |
| NH4Cl  |  |  |  |  |
| 5 ZnSO4 |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 3H2OH:O: | 2. 4HFlH:F: | 3. 6H2 H: | 4. SnFl2Sn: Fl: |

**Steaks and Pastas (6$)**

Objective: SWBAT identify whether or not the example follows the Law of Conservation of Mass

***For each chemical equation below, calculate the number of atoms of each element on each side to see if the equation is balanced or not.***

P4 + 3O2 🡪 2P2O3

|  |  |  |  |
| --- | --- | --- | --- |
| Elements | # of Atoms on REACTANTS | # of atoms on PRODUCTS | Balanced on Both side?Yes or No?  |
|  |  |  |  |
|  |  |  |

 4Al + 3O2🡪 2Al2O3

|  |  |  |  |
| --- | --- | --- | --- |
| Elements | # of Atoms on REACTANTS | # of atoms on PRODUCTS | Balanced on Both side?Yes or No?  |
|  |  |  |  |
|  |  |  |

2HgO 🡪 2Hg + O2

|  |  |  |  |
| --- | --- | --- | --- |
| Elements | # of Atoms on REACTANTS | # of atoms on PRODUCTS | Law of Conservation of Mass? Yes or No. |
|  |  |  |  |
|  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Elements | # of Atoms on REACTANTS | # of atoms on PRODUCTS | Balanced on Both side?Yes or No?  |
|  |  |  |  |
|  |  |  |

Zn + HCl 🡪 ZnCl2 + H2

**Determine if each chemical reaction illustrates the law of conservation of mass. Circle YES or NO and show your work.**

1. 3 grams reactant A + 3 grams reactant B 🡪 3 grams product C YES / NO
2. 12 grams reactant K + 49 grams reactant L 🡪 61 grams product M YES / NO
3. 63 grams reactant E + 59 grams reactant F 🡪 4 grams product G YES / NO
4. 436.1 grams reactant U + 21.8 grams reactant V 🡪 457.9 g product W YES / NO

5. Which of the following chemical reactions best demonstrates the law of conservation of mass?

* 1. 2 grams of A → 3 grams of B + 2 grams of C
	2. 2 grams of X + 5 grams of Y → 3 grams of Z
	3. 6 grams of D + 15 grams of E → 21 grams of F + 2 grams of G
	4. 8 grams of H + 8 grams of I → 9 grams of J + 7 grams of