Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: 10/15/13 Period: \_\_\_\_\_\_ NOTES

**Chemical Reactions Notes: The Law of Conservation of Mass**

|  |  |
| --- | --- |
| **What happens in a Chemical Reaction?** | * Chemical \_\_\_\_\_\_\_\_\_\_\_ in the reactants are \_\_\_\_\_\_\_\_\_\_\_\_\_, then atoms are \_\_\_\_\_\_\_\_\_\_\_\_ to form new substances (\_\_\_\_\_\_\_\_\_\_\_\_\_\_). * The amount of \_\_\_\_\_\_\_\_\_\_\_\_ does not \_\_\_\_\_\_\_\_\_\_\_\_ during a chemical reaction, the \_\_\_\_\_\_\_\_\_\_ are only rearranged to form \_\_\_\_\_\_\_ substances. * This is evidenced (\_\_\_\_\_\_\_\_\_\_\_\_) in a balanced chemical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **What is a Chemical Equation?** | * A chemical equation is a way that scientists \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a chemical \_\_\_\_\_\_\_\_\_\_\_\_ that has occurred. It shows the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of atoms in a chemical reaction.   + It contains the chemical \_\_\_\_\_\_\_\_\_\_\_\_ of the substances involved in the reaction.   + An \_\_\_\_\_\_\_\_\_\_\_ is used to distinguish between the reactants and \_\_\_\_\_\_\_\_\_\_\_\_, and can be understood as meaning “\_\_\_\_\_\_\_\_\_\_” or “\_\_\_\_\_\_\_\_\_\_\_”.   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are the substances broken apart or combined in a chemical reaction (what you \_\_\_\_\_\_\_\_\_\_\_ with!) and they are located on the \_\_\_\_\_\_\_ side of the arrow in a chemical \_\_\_\_\_\_\_\_\_\_\_\_\_\_.   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are new substances formed in a chemical reaction (what you \_\_\_\_\_\_\_\_\_ with!) and they are located on the \_\_\_\_\_\_\_\_\_\_\_ side of the arrow in a chemical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   + Ex: C + O2  🡪 CO2     - This equation says “carbon \_\_\_\_\_\_\_\_\_\_ with oxygen to \_\_\_\_\_\_\_\_\_\_\_\_\_ (make) carbon dioxide.”     - The arrow shows the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the reaction: ­­­­­­       * \_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **What is the Law of Conservation of Mass?** | * When substances \_\_\_\_\_\_\_\_\_\_\_ with each other, many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can take place, but in every case the total amount of \_\_\_\_\_\_\_\_\_\_ afterward is the \_\_\_\_\_\_\_\_\_ as before. * Discovered by Lavoisier—\_\_\_\_\_\_\_\_\_\_\_\_\_ chemist * Law of Conservation of \_\_\_\_\_\_\_\_\_: in a chemical rxn, \_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_) is neither \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   + *Mass of = mass of products*   + All \_\_\_\_\_\_\_\_\_\_\_\_ present in the reactants are also present in the \_\_\_\_\_\_\_\_\_\_\_\_\_. There must be the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of atoms in the products and reactants. |
| **Mass Stays the SAME** | * The \_\_\_\_\_\_\_\_\_\_ of the products must be the \_\_\_\_\_\_\_\_\_\_ as the mass of the \_\_\_\_\_\_\_\_\_\_\_   + You do not magically gain or lose mass!!! * Example: If you have \_\_\_\_ grams of Na react with \_\_\_\_ gram of Cl to make NaCl, you know you must have \_\_\_\_ grams of NaCl in the products!   + Na + Cl 🡪 NaCl   \_\_ g + \_\_g 🡪 \_\_\_g |
| **Number of Atoms Stays the SAME** | * You must have the \_\_\_\_\_\_\_\_\_ number of atoms of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on both sides of the equation. * If you have \_\_\_\_ atoms of oxygen in the reactants, you must have \_\_\_\_ atoms of oxygen in the products. (You do not magically gain or lose atoms!!!) * This is NOT something someone made up; it’s how chemical reactions happen in \_\_\_\_\_\_\_\_\_\_\_\_! |
| **How can I tell how many atoms of each element there are?** | * Coefficient: the “\_\_\_\_\_\_\_\_\_” number written in \_\_\_\_\_\_\_\_\_\_\_ of a chemical \_\_\_\_\_\_\_\_\_\_\_ that tells you how many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of that substance there are.   + Ex: 5 H2O = \_\_\_\_ molecules of water   + Draw: * The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tells you how many \_\_\_\_\_\_\_\_\_\_\_ of each element there are. * The coefficient \_\_\_\_\_\_\_\_\_\_ the subscript tells you how many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of that element are present.   + 5 H2O = \_\_\_\_ atoms of Hydrogen, \_\_\_\_ atoms of Oxygen * If there is \_\_\_\_\_ coefficient, then there is only \_\_\_\_\_\_\_ molecule of that substance! |
| **What does it mean to Balance a Chemical Equation?** | * Sometimes we have to “\_\_\_\_\_\_\_\_\_\_\_\_\_\_” a chemical equation to make sure that we have the \_\_\_\_\_\_\_\_\_\_\_ number of \_\_\_\_\_\_\_\_\_\_\_ of each element on \_\_\_\_\_\_\_\_\_\_\_ sides of the equation. To do this, we change the number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by changing the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (NEVER THE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!!!) until we have the same number of atoms of each \_\_\_\_\_\_\_\_\_\_\_\_\_\_ on both sides. When we do this, we are saying how many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of each substance must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_ before the reaction will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (remember: this is not something scientists made up; this is how the reactions happen in \_\_\_\_\_\_\_\_\_\_\_\_!). |
| **How do I know if a Chemical Equation is Balanced?** | * Check the number of \_\_\_\_\_\_\_\_\_\_\_\_\_ of each element on both sides of the equation (reactants and products). * If the number of atoms of each element is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on both sides, then the equation is balanced. * Example:   H2 + O2 🡪 H2O : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  2H2 + O2 🡪 2H2O : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |