

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

<b>What happens in a Chemical Reaction?</b>	<ul style="list-style-type: none"> <li>Chemical _____ in the reactants are _____, then atoms are _____ to form new substances (_____).</li> <li>The amount of _____ does not _____ during a chemical reaction, the _____ are only rearranged to form _____ substances.</li> <li>This is evidenced (_____) in a balanced chemical _____</li> </ul>
<b>What is a Chemical Equation?</b>	<ul style="list-style-type: none"> <li>A chemical equation is a way that scientists _____ a chemical _____ that has occurred. It shows the _____ of atoms in a chemical reaction. <ul style="list-style-type: none"> <li>It contains the chemical _____ of the substances involved in the reaction.</li> <li>An _____ is used to distinguish between the reactants and _____, and can be understood as meaning "_____ " or "_____".</li> <li>_____ 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 _____.</li> <li>_____ are new substances formed in a chemical reaction (what you _____ with!) and they are located on the _____ side of the arrow in a chemical _____.</li> </ul> </li> <li>Ex: <math>C + O_2 \rightarrow CO_2</math> <ul style="list-style-type: none"> <li>This equation says "carbon _____ with oxygen to _____ (make) carbon dioxide."</li> <li>The arrow shows the _____ of the reaction: <ul style="list-style-type: none"> <li>_____ <math>\rightarrow</math> _____</li> </ul> </li> </ul> </li> </ul>
<b>What is the Law of Conservation of Mass?</b>	<ul style="list-style-type: none"> <li>When substances _____ with each other, many _____ can take place, but in every case the total amount of _____ afterward is the _____ as before.</li> <li>Discovered by Lavoisier – _____ chemist</li> <li><u>Law of Conservation of _____</u>: in a chemical rxn, _____ (_____) is neither _____ nor _____ <ul style="list-style-type: none"> <li><u>Mass of _____</u> = <u>mass of products</u></li> <li>All _____ present in the reactants are also present in the _____. There must be the _____ of atoms in the products and reactants.</li> </ul> </li> </ul>
<b>Mass Stays the SAME</b>	<ul style="list-style-type: none"> <li>The _____ of the products must be the _____ as the mass of the _____ <ul style="list-style-type: none"> <li>You do not magically gain or lose mass!!!</li> </ul> </li> <li>Example: If you have _____ grams of Na react with _____ gram of Cl to make <u>NaCl</u>, you know you must have _____ grams of NaCl in the products! <ul style="list-style-type: none"> <li><math>Na + Cl \rightarrow NaCl</math></li> <li><math>\_\_g + \_\_g \rightarrow \_\_g</math></li> </ul> </li> </ul>
<b>Number of Atoms Stays the SAME</b>	<ul style="list-style-type: none"> <li>You must have the _____ number of atoms of _____ on both sides of the equation.</li> <li>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!!!)</li> <li>This is NOT something someone made up; it's how chemical reactions happen in _____!</li> </ul>
<b>How can I tell how many atoms of each element there are?</b>	<ul style="list-style-type: none"> <li>Coefficient: the "_____" number written in _____ of a chemical _____ that tells you how many _____ of that substance there are. <ul style="list-style-type: none"> <li>Ex: <math>5 H_2O</math> = _____ molecules of water</li> <li>Draw:</li> </ul> </li> <li>The _____ tells you how many _____ of each element there are.</li> <li>The coefficient _____ the subscript tells you how many _____ of that element are present. <ul style="list-style-type: none"> <li><math>5 H_2O</math> = _____ atoms of Hydrogen, _____ atoms of Oxygen</li> </ul> </li> <li>If there is _____ coefficient, then there is only _____ molecule of that substance!</li> </ul>

<b>What does it mean to Balance a Chemical Equation?</b>	<ul style="list-style-type: none"> <li>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 _____!).</li> </ul>
<b>How do I know if a Chemical Equation is Balanced?</b>	<ul style="list-style-type: none"> <li>Check the number of _____ of each element on both sides of the equation (reactants and products).</li> <li>If the number of atoms of each element is the _____ on both sides, then the equation is balanced.</li> <li>Example:  <math display="block">\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O} : \underline{\hspace{2cm}}</math> <math display="block">2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O} : \underline{\hspace{2cm}}</math> </li> </ul>