

Unit 6 Chemical Equations Guided Notes

- *Process by which atoms of one or more substances are rearranged to form different substances*
- AKA *chemical change*
- *Reactants* react to form *products, which have different compositions from reactants*
- REVIEW Evidence that chemical reaction has occurred:
 1. Formation of a *GAS*
 2. Formation of a *PRECIPITATE*
 3. Change in *COLOR*
 4. Change in or production of *ODOR*
 5. Change in *MAGNETISM*
 6. Change in *temperature* or *ENERGY*
 - Exothermic: *releases energy (temperature increases)*
 - Endothermic: *absorbs energy (temperature decreases)*
- Formulas show chemistry *at a standstill*. Equations show chemistry *in action*.
- Equations show:
 1. *The reactants that enter into a reaction*
 2. *The products that are formed by the reaction*
 3. *The relative amounts of each substance used and produced*
- Two Important Principles
 1. Every chemical compound has *one correct formula, which cannot be altered*

 2. A chemical reaction must obey *the Law of Conservation of Matter*, which states *In a chemical reaction, atoms are neither created nor destroyed.*

- General formula for equations:



- Symbols used in equations

Symbol	Meaning	Symbol	Meaning
+	<i>Separates two or more reactants or products</i>	→	<i>Separates reactants from products; “yields or “forms”</i>
(s)	<i>Identifies solid state</i>	(l)	<i>Identifies liquid state</i>
(g)	<i>Identifies gaseous state</i>	(aq)	<i>Identifies aqueous (water) solution</i>

- Word Equations
Indicate the reactants and products in a reaction using words.
- Skeleton Equations
Use chemical formulas rather than words to indicate reactants and products
- Balanced Chemical Equations
 1. Reflect the *Law of Conservation of Matter*.
 2. *The number of atoms of one element on one side of the equation must equal the number of atoms of that element on the other side of equation.*

Reaction: Carbonic acid decomposes to produce water and carbon dioxide gas.

Word Equation: *carbonic acid (aq) → water (l) + carbon dioxide (g)*

Skeleton Equation: *H₂CO₃ (aq) → H₂O (l) + CO₂ (g)*

Balanced Equation: *H₂CO₃ (aq) → H₂O (l) + CO₂ (g)*

Reaction: Magnesium ribbon reacts with oxygen in the air to produce solid magnesium oxide.

Word Equation *magnesium (s) + oxygen (g) → magnesium oxide (s)*

Skeleton Equation: *Mg (s) + O₂ (g) → MgO (s)*

Balanced Equation: *2Mg (s) + O₂ (g) → 2MgO (s)*

Reaction: Hydrogen and oxygen gases combine to form water.

Word Equation *hydrogen (g) + oxygen (g) → water (l)*

Skeleton Equation: *H₂ (g) + O₂ (g) → H₂O (l)*

Balanced Equation: *2H₂ (g) + O₂ (g) → 2H₂O (l)*

Subscripts

- *Whole numbers written to lower right of element symbols in chemical formulas*
- *Indicate number of atoms/ions present in one particle of a compound*
- *A subscript of 1 is not written*
- *Once correct formula is written, subscripts changed cannot be changed*

Coefficients

- *Whole numbers written in front of chemical formulas in a chemical equation*
- *Describe the lowest whole number ratio of all reactants and products in a reaction*
- *A coefficient of 1 is not written.*
- *Coefficients—not subscripts—are to balance equations.*