

6 2 chemical reactions oak park high school

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Chemical Reactions and Their Types**

Types of Chemical Reactions

Chemical reactions occur when one or more substances are transformed into new substances. There are numerous types of chemical reactions, including (but not limited to):

- **Combination** (synthesis): Two or more substances combine to form a single product.
- **Decomposition**: A single compound breaks down into two or more smaller substances.
- **Single replacement**: One element replaces another in a compound.
- **Double replacement**: Two compounds exchange ions to form two new compounds.
- **Combustion**: A substance reacts with oxygen, releasing heat and light.
- **Acid-base**: An acid reacts with a base to form a salt and water.
- **Redox**: A reaction involving the transfer of electrons.

Predicting and Determining Products

Predicting reaction products requires understanding the types of reactions and the chemical properties of the reactants. To find the products:

- Identify the type of reaction.
- Apply the appropriate rules for that reaction type.

- Balance the chemical equation to ensure that the number of atoms of each element remains the same on both sides.

Solving Chemical Equations

To solve chemical equations:

- Balance the chemical equation.
- Determine the mole ratios of the reactants and products.
- Use stoichiometry to calculate the masses or volumes of the reactants and products.

5 Common Chemical Reaction Equations

- **Combustion of methane:** $\text{CH}_4 + 2 \text{O}_2 \rightarrow \text{CO}_2 + 2 \text{H}_2\text{O}$
- **Neutralization of hydrochloric acid and sodium hydroxide:** $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- **Decomposition of water:** $2 \text{H}_2\text{O} \rightarrow 2 \text{H}_2 + \text{O}_2$
- **Single replacement of copper and silver nitrate:** $\text{Cu} + 2 \text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2 \text{Ag}$
- **Double replacement of sodium chloride and silver nitrate:** $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{NaNO}_3 + \text{AgCl}$

Reaction Symbols

- The arrow in a reaction equation represents the transformation of reactants into products (yields or produces).
- The reactants are written on the left side of the equation, while the products are on the right side.

Evidence of Chemical Reactions

Chemical reactions may be evident through changes such as:

- Temperature change
- Color change

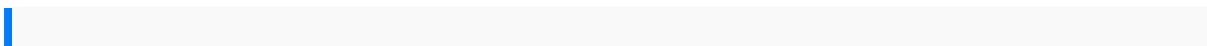
- Gas evolution
- Formation of a precipitate
- Light emission

20 Examples of Chemical Reactions

- Rusting of iron
- Burning of wood
- Mixing vinegar and baking soda
- Digestion of food
- Photosynthesis

Rules for Balancing Chemical Equations

- Make sure that the number of atoms of each element on both sides of the equation is the same.
- Use coefficients to adjust the number of molecules or atoms of each reactant and product.
- Do not change the subscripts of the chemical formulas.



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