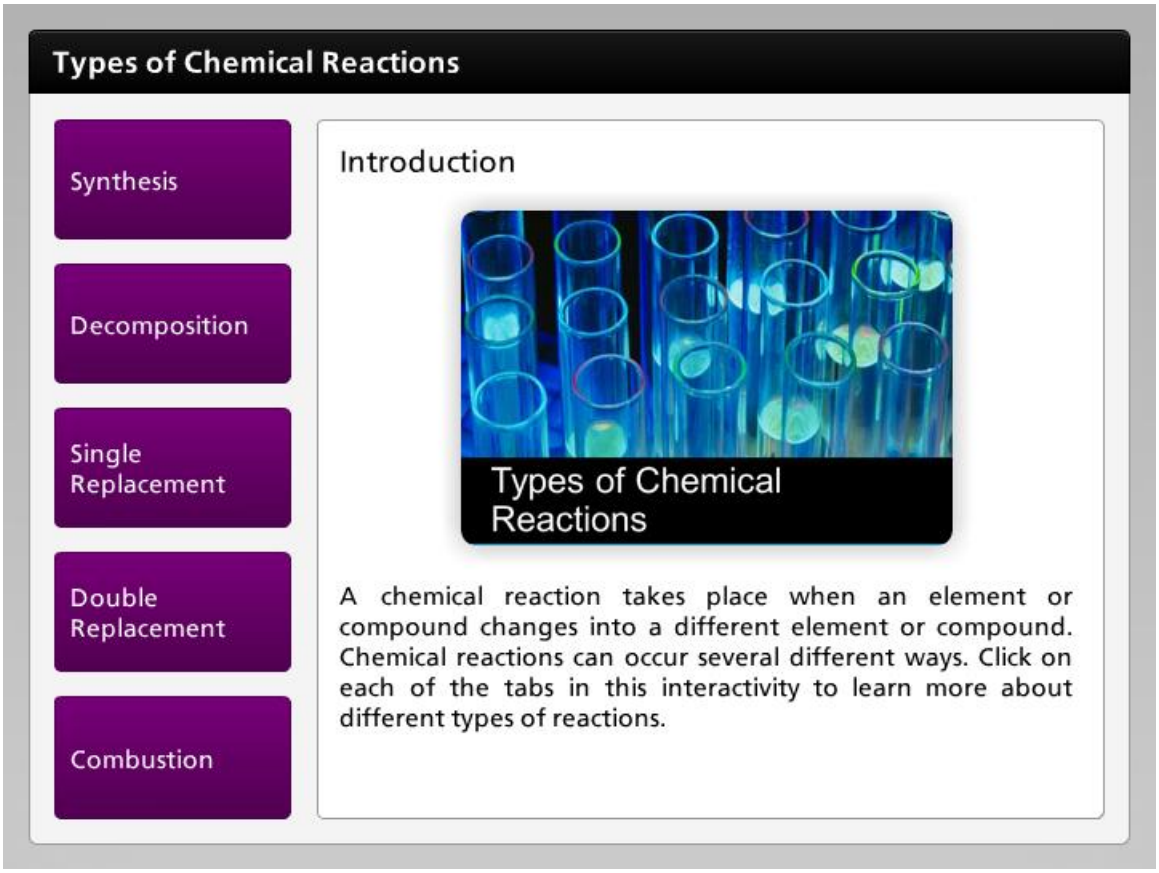
Module 6: Chemical Reactions
Topic 2 Content: Types of Chemical Reactions Notes

Introduction



A chemical reaction takes place when an element or compound changes into a different element or compound. Chemical reactions can occur several different ways. Click on each of the tabs in this interactivity to learn more about different types of reactions.

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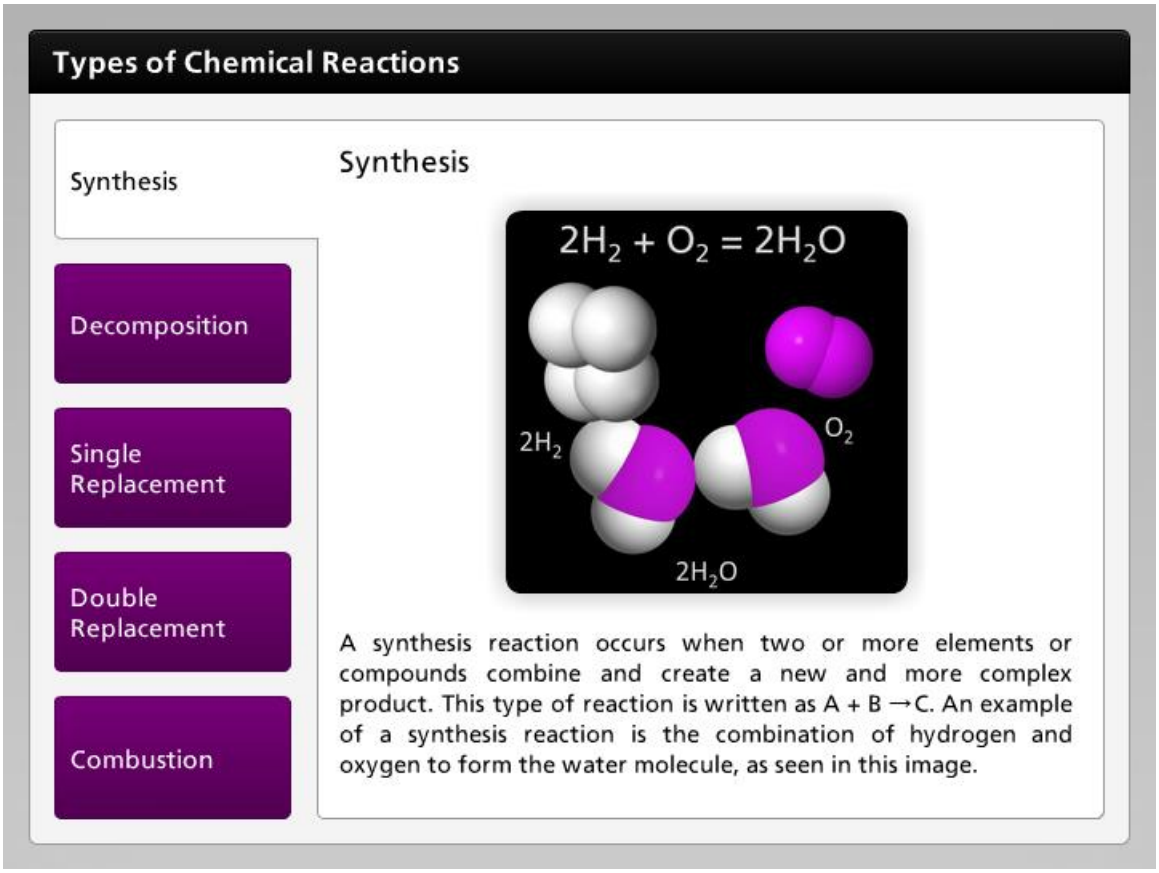
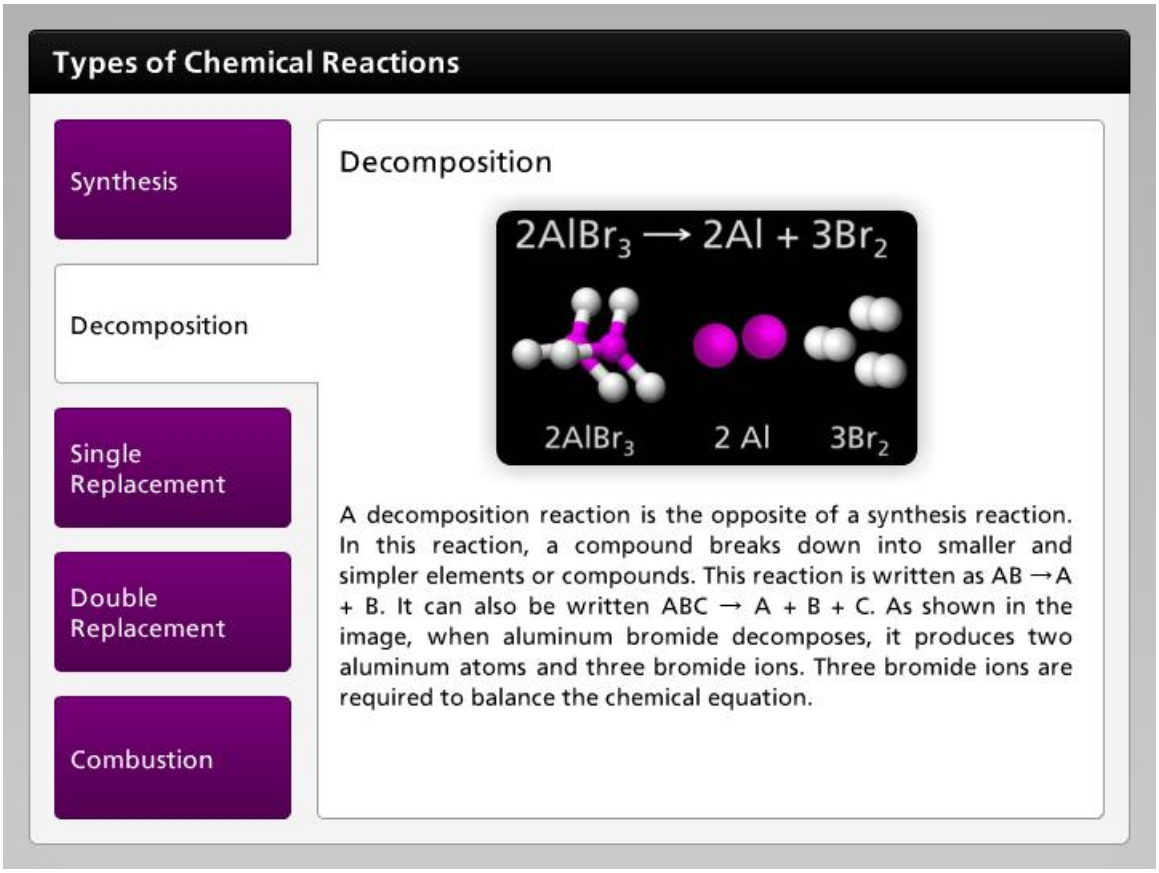
Synthesis



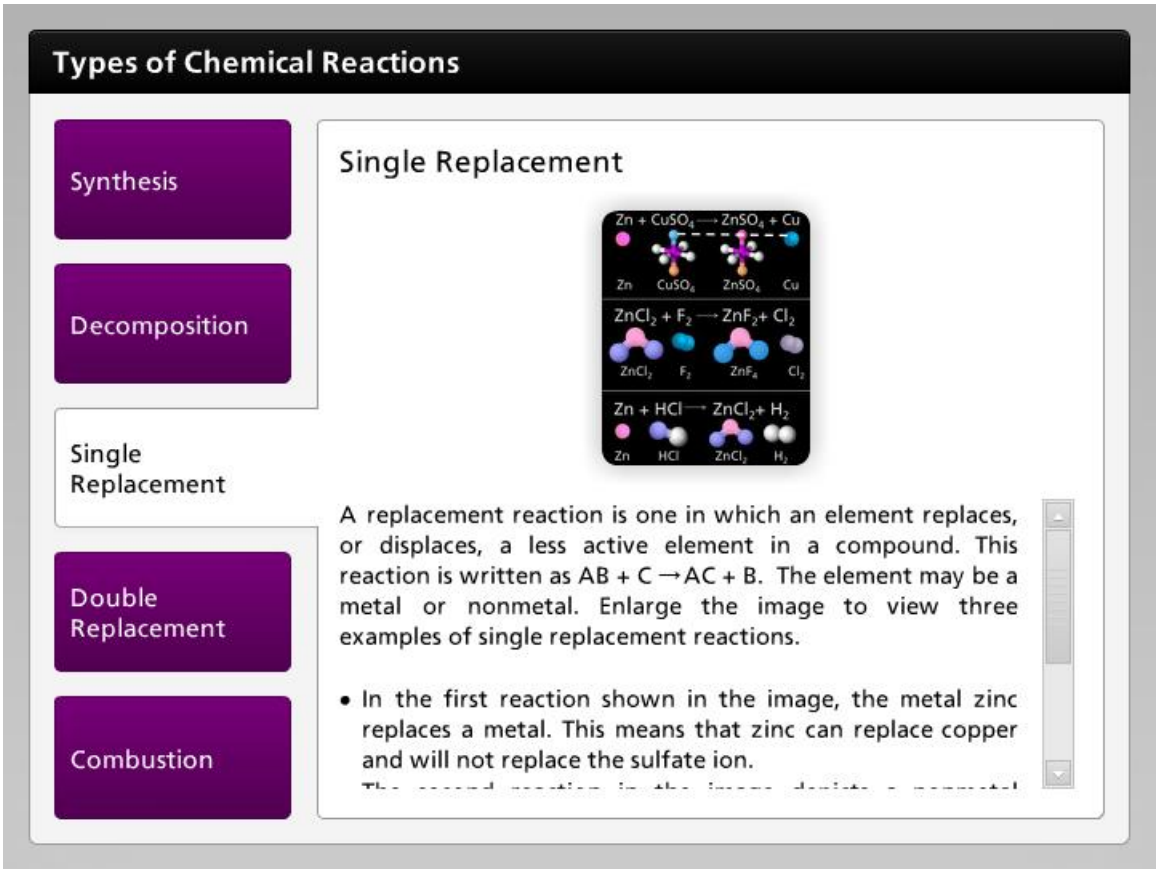
A synthesis reaction occurs when two or more elements or compounds combine and create a new and more complex product. This type of reaction is written as A + B → C. An example of a synthesis reaction is the combination of hydrogen and oxygen to form the water molecule, as seen in this image.

Decomposition



A decomposition reaction is the opposite of a synthesis reaction. In this reaction, a compound breaks down into smaller and simpler elements or compounds. This reaction is written as AB → A + B. It can also be written ABC → A + B + C. As shown in the image, when aluminum bromide decomposes, it produces two aluminum atoms and three bromide ions. Three bromide ions are required to balance the chemical equation.

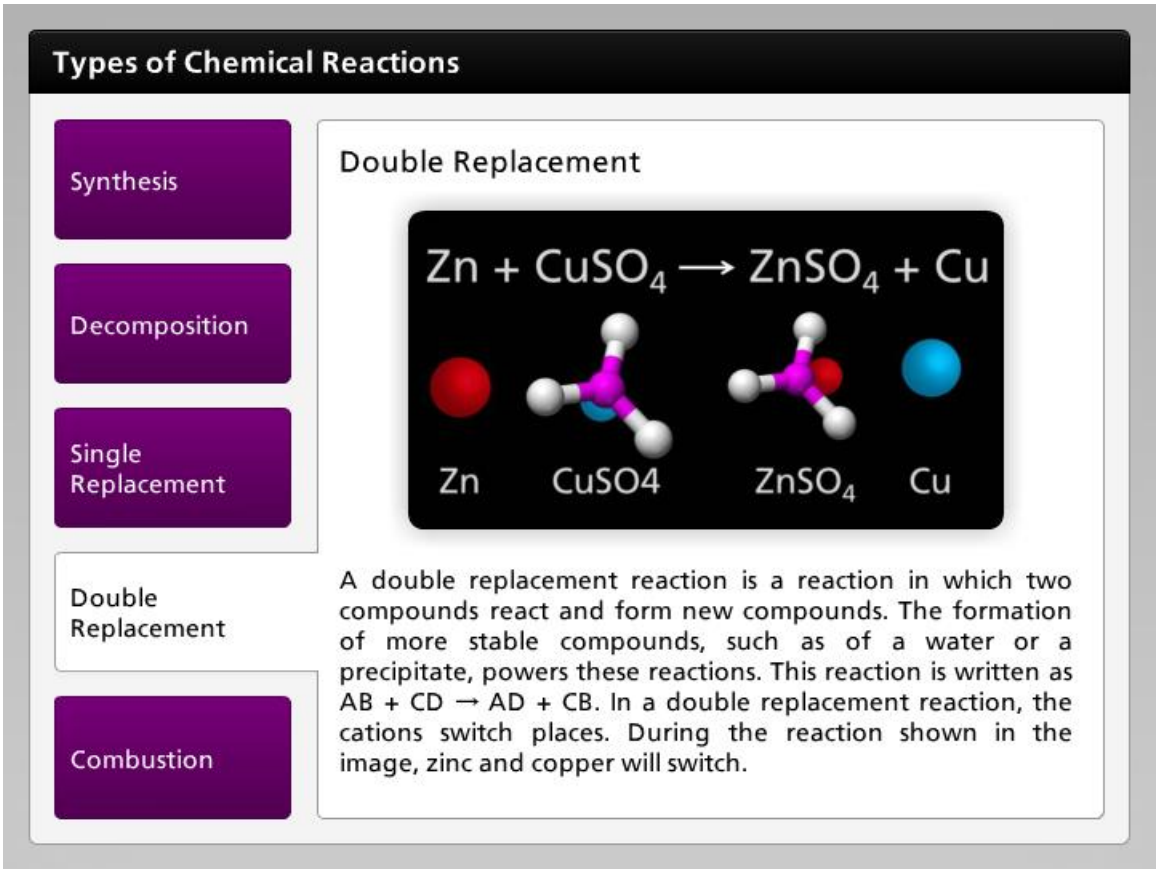
Single Replacement



A replacement reaction is one in which an element replaces, or displaces, a less active element in a compound. This reaction is written as AB + C → AC + B. The element may be a metal or nonmetal. Enlarge the image to view three examples of single replacement reactions.

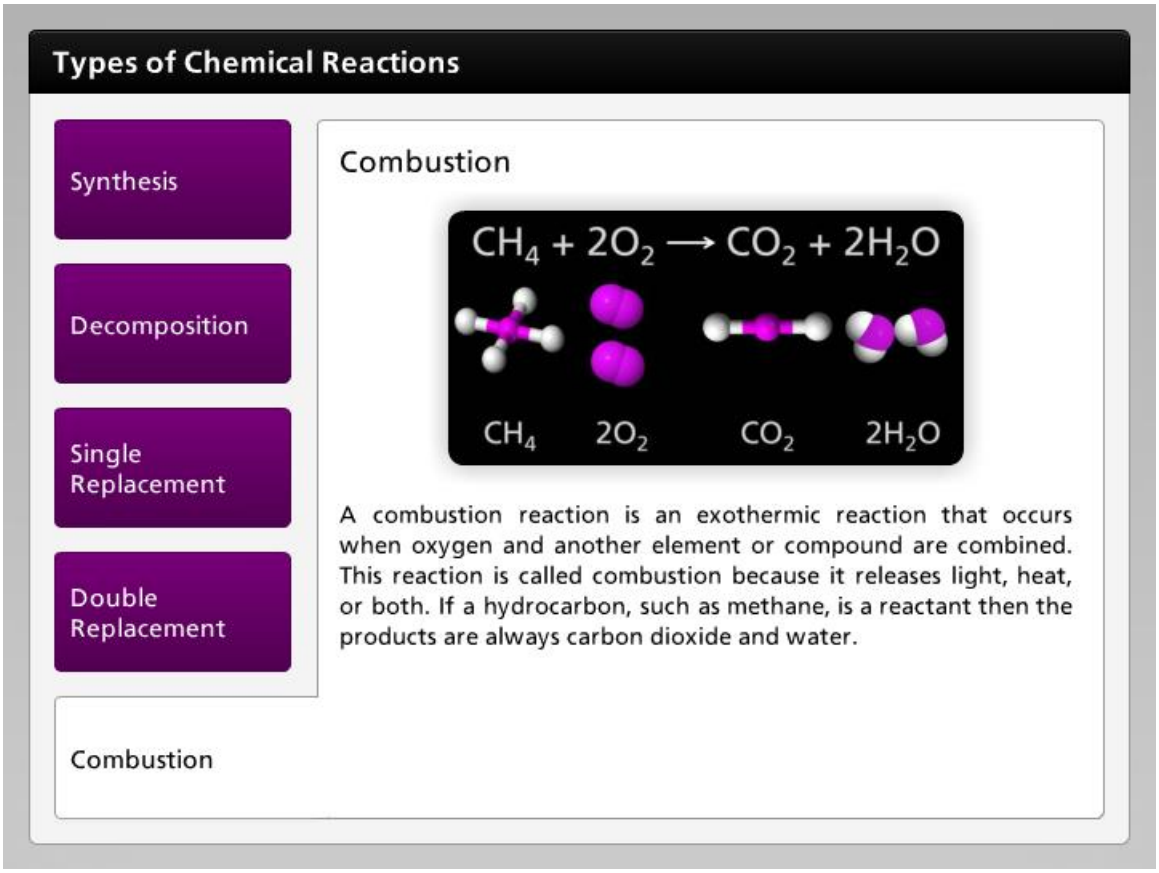
- In the first reaction shown in the image, the metal zinc replaces a metal. This means that zinc can replace copper and will not replace the sulfate ion.
- The second reaction in the image depicts a nonmetal example in which fluorine replaces the chlorine atom. This produces zinc fluoride and chlorine.
- The third reaction in the image shows a metal added to an acid. Zinc is added to hydrochloric acid. The zinc atoms bond with the chlorine atom, creating zinc chloride and hydrogen.

Double Replacement



A double replacement reaction is a reaction in which two compounds react and form new compounds. The formation of more stable compounds, such as of a water or a precipitate, powers these reactions. This reaction is written as AB + CD → AD + CB. In a double replacement reaction, the cations switch places. During the reaction shown in the image, zinc and copper will switch.

Combustion



A combustion reaction is an exothermic reaction that occurs when oxygen and another element or compound are combined. This reaction is called combustion because it releases light, heat, or both. If a hydrocarbon, such as methane, is a reactant then the products are always carbon dioxide and water.