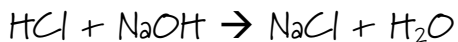


## Chemical Reaction Types - Examples for AS 92021

### Neutralisation

- acid + base → salt + water

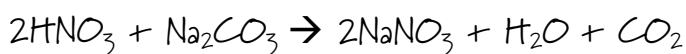
hydrochloric acid + sodium hydroxide → sodium chloride + water



- acid + carbonate\* → salt + water + carbon dioxide

\*or hydrogen carbonate

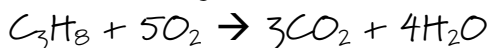
nitric acid + sodium carbonate → sodium nitrate + water + carbon dioxide



### Combustion

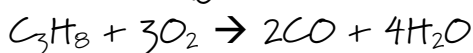
- complete combustion: carbon compound + excess oxygen

Propane + oxygen → carbon dioxide + water



- incomplete combustion; carbon compound + limited oxygen. Many possible equations.

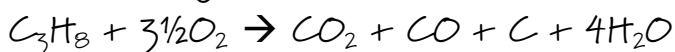
Propane + oxygen → carbon monoxide + water



Propane + oxygen → carbon dioxide + carbon monoxide + water



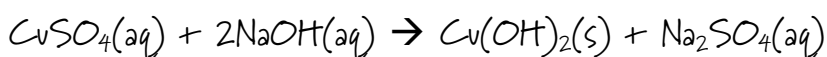
Propane + oxygen → carbon dioxide + carbon monoxide + carbon + water



### Precipitation

- ionic compound(aq) + ionic compound(aq) → ionic compound(s) + ionic compound(aq)

copper sulfate(aq) + sodium hydroxide(aq) → copper hydroxide(s) + sodium sulfate(aq)



### Combination

- metal + nonmetal → ionic compound  
sodium + chlorine → sodium chloride  
 $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$
- nonmetal + nonmetal → covalent compound  
sulfur + oxygen → sulfur dioxide  
 $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$

### Decomposition

- metal carbonate (heated) → metal oxide + carbon dioxide  
zinc carbonate → zinc oxide + carbon dioxide  
 $\text{ZnCO}_3 \rightarrow \text{ZnO} + \text{CO}_2$
- metal hydroxide (heated) → metal oxide + water  
copper hydroxide → copper oxide + water  
 $\text{Cu}(\text{OH})_2 \rightarrow \text{CuO} + \text{H}_2\text{O}$
- metal hydrogen carbonate (heated) → metal carbonate + carbon dioxide + water  
sodium hydrogen carbonate → sodium carbonate + carbon dioxide + water  
 $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$