

Combustion

def: A form of oxidation which releases a large amount of energy usually in the form of heat.
oxidation def: A chemical change involving oxygen.

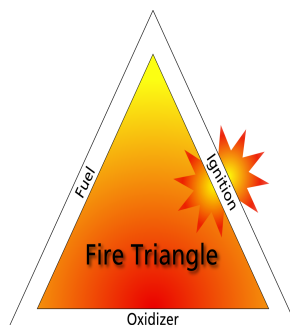
Examples: $2 \text{Cu} + \text{O}_2 \Rightarrow 2 \text{CuO}$, fire, rust, apple rotting

How do you recognize a combustion reaction?

O₂ is one of the reactants

Fire triangle

Gives the three conditions necessary for combustion to occur.



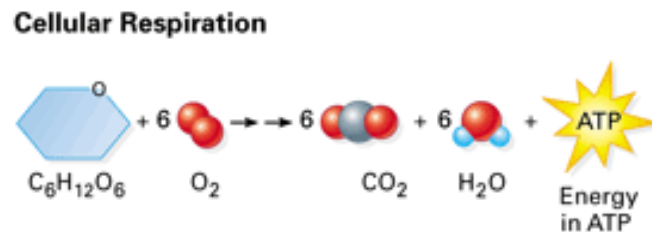
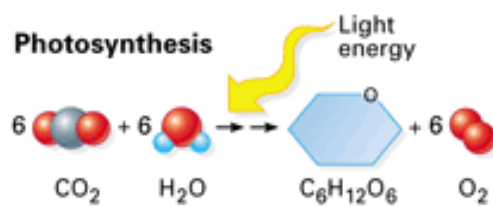
fuel	Substance which will combust (wood, gas).
ignition temperature	A specific temperature the fuel must reach in order for it to combust. (wood 450°F)
oxidizing agent	O ₂ - substance which allows fuel to continue to combust.

Types of combustion

rapid	Occurs quickly and releases a lot of energy. Ex- fire
spontaneous	As above, but ignites on its own. Ex- Forest fire
slow	Occurs slowly and releases little energy. Ex- rust, apple turning brown

Cellular respiration and photosynthesis

	cell respiration	photosynthesis
who	humans	plants
formula	$\overset{\text{Sugar}}{\text{C}_6\text{H}_{12}\text{O}_6} + 6 \text{O}_2 \Rightarrow 6 \text{H}_2\text{O} + 6 \text{CO}_2 + \text{energy}$	$6 \text{H}_2\text{O} + 6 \text{CO}_2 + \text{sun} \Rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2$
energy	released after reaction	needed for the reaction
waste	CO ₂	O ₂



Past Exam Questions

1. A fire is extinguished by removing at least one of the three conditions required for combustion to occur. These conditions are indicated in the fire triangle below.

The following table describes three functions of a CO₂ extinguisher.

Table I -Functions of a CO₂ Extinguisher

1	The main function of the carbon dioxide (CO ₂) is to smother the fire by reducing the amount of oxygen gas (O ₂) that feeds it <i>oxidizer</i>
2	In the very early stages of a fire, the CO ₂ has a cooling effect, since it comes out of the extinguisher at a temperature of -78°C. <i>ign temp</i>
3	The gas comes out of the extinguisher <i>as a</i> powerful spray that puts out small paper fires by scattering the pieces of material involved.

State the part of the fire triangle each description is referring to.

2. It is said that using wood to build houses helps in the fight against climate change because trees store some of the atmospheric carbon. Through what carbon cycle process do trees store atmospheric carbon?

- A) Photosynthesis
- B) Plant decomposition
- C) Cellular respiration
- D) Fossil fuel combustion

3. On a hot and dry afternoon, some hay in a barn caught fire, but there were no external causes involved. Water was used to put out the fire. Spraying the water with fire affected one of the fire triangle components in particular. Which statement indicates both the type of combustion that caused the fire triangle component that the water affected?

- A) Slow combustion and the water affected the fuel.
- B) Slow combustion and the water affected the oxidizer.
- C) Spontaneous combustion and the water affected the ignition temperature.
- D) Spontaneous combustion and the water affected the fuel.