

**CBSE Class 8 Science Notes Chapter 4:** Chapter 4 of CBSE Class 8 Science, titled "Combustion and Flames," explains the process of combustion, which is a chemical reaction involving oxygen that produces heat and light. The chapter categorizes substances as combustible and non-combustible and describes the different types of combustion, including rapid, spontaneous, and explosive combustion.

Additionally, the concept of ignition temperature is introduced, along with examples of fuels and their calorific values. The chapter emphasizes the importance of fire safety, providing measures to control fire and prevent accidents.

## **CBSE Class 8 Science Notes Chapter 4 Overview**

Chapter 4 of CBSE Class 8 Science, titled "Combustion and Flames," provides a comprehensive understanding of the process of combustion and the characteristics of flames. Combustion is a chemical reaction in which a substance (fuel) reacts with oxygen to release heat and light. Substances are classified into two categories: combustible (capable of burning) and non-combustible. The chapter explains different types of combustion, such as rapid combustion (like in gas stoves), spontaneous combustion (occurs without external heat), and explosive combustion (as seen in fireworks).

The concept of fuel efficiency is explained with terms like calorific value, which measures the energy produced by burning a fuel. The chapter also emphasizes fire safety measures, explaining how fire extinguishers work and how to prevent fire-related hazards.

## **CBSE Class 8 Science Notes Chapter 4 Combustion and Flames**

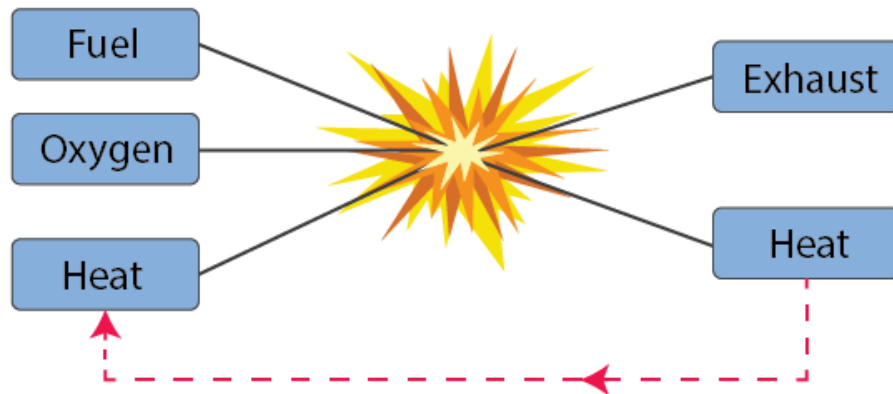
Below we have provided CBSE Class 8 Science Notes Chapter 4 Combustion and Flames -

### **Introduction**

#### **Combustion**

Combustion is the name for the chemical reaction that occurs when a material combines with oxygen to produce heat and light.

One instance of combustion is the burning of wood.



## Combustible and Non-Combustible Substances

Combustible materials, like wood, coal, and paper, are substances that ignite quickly. Sand, water, and glass are examples of non-combustible materials that do not easily catch fire.

## History of Wood and Candle Flame

### Fuel

Fuel is any substance that burns to release a usable amount of energy. For instance, nuclear energy, biogas, and fossil fuels.

Fuels can exist in three different states: solid, liquid, or gas.

Depending on how they occur, they might be classified as artificial or natural.

### Ignition Temp

The lowest temperature at which a combustible substance catches fire when heated in air is called its ignition temperature.

### Inflammable Substances

Inflammable compounds include acetone, fuel, and LPG. These substances have very low ignition temperatures and can readily catch fire.

### Fire

A chemical combustion reaction involving oxygen and a fuel source produces fire. A fire's duration is determined by the amount of fuel and oxygen that are present.

## Candle Flame

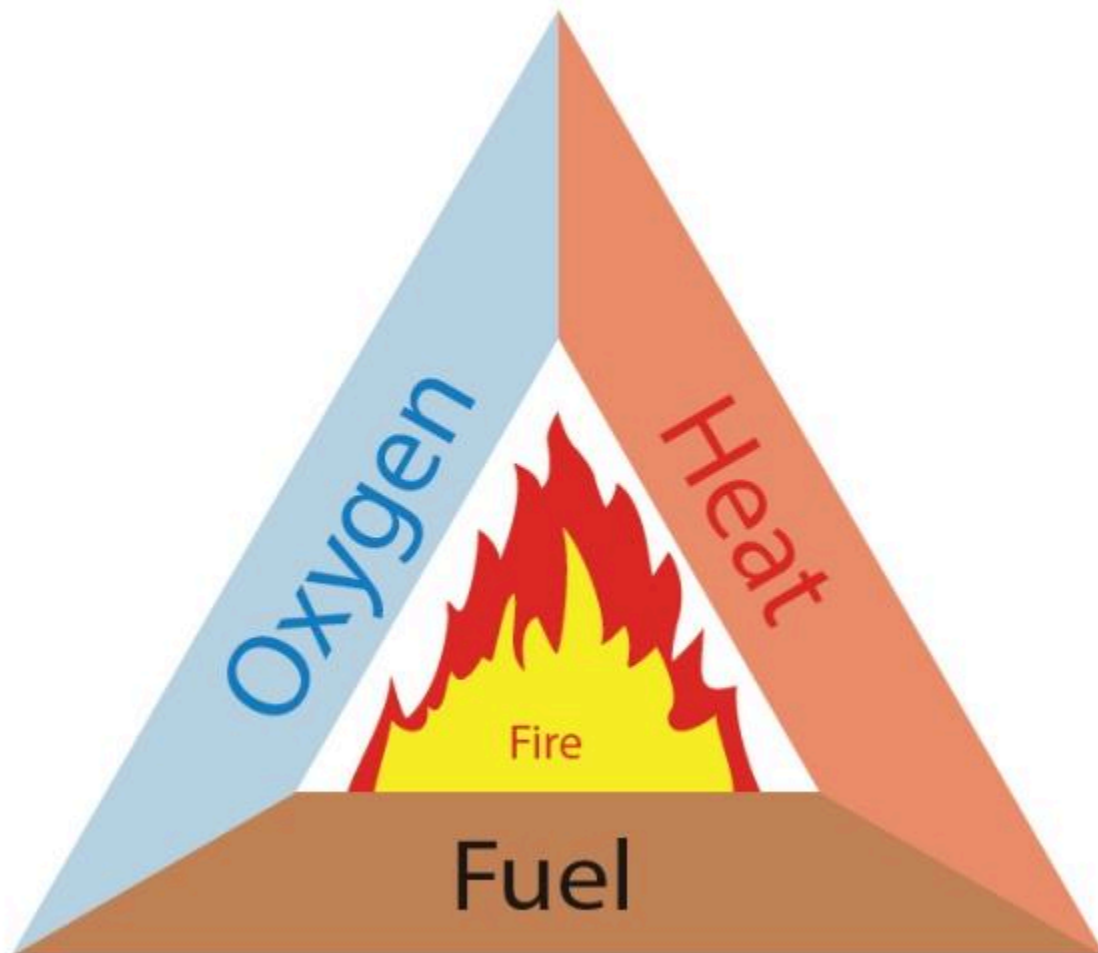
### Fire Triangle

Three conditions must be met at the same time in order for fire to start.

Some kind of fuel or flammable substance.

a heat source to bring the fuel's temperature up to that needed for ignition.

sufficient oxygen to keep burning. Thus, we can control the fire if we take away any one of these resources.

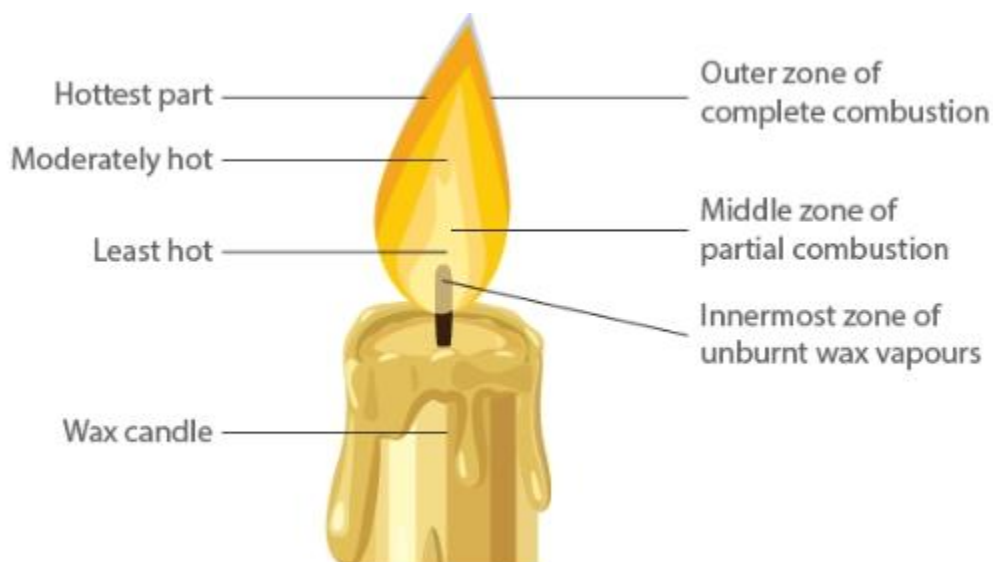


### Flame

Flame is the visible and gaseous part of the fire.

What we see as the flame is the light energy released due to the combustion of fuel.

## Zones of Candle Flame



## Structure of Flame

Because of total combustion, the outermost zone is the hottest of all the zones and is also blue in hue. It is the area of the flame that is not glowing.

Partial fuel combustion occurs in the candle's centre zone, which is yellow in hue and somewhat hot. It is the area of the flame that is brilliant.

The flame's core region is black in colour and the least heated. The reason for this is the vapours from unburned wax.



## Smoke

One example of a solid (unburned particle) scattered in a gas (air) is smoke. The unburned carbon particles in the smoke are what give it its black colour.

## Matchstick

### Types of Combustion

Rapid combustion is the kind of combustion in which heat and light are released very quickly. For instance, the burning of LPG.

Spontaneous combustion is the kind of combustion that occurs when materials ignite on their own without the need for heat, as in the case of forest fires.

### Working of a Matchstick

Red phosphorus, which transforms into white phosphorus when heated, is the primary component of a matchstick's bulb.

The matchstick begins to burn when white phosphorus spontaneously ignites, raising the wooden stem's temperature to the ignition point.

## Fire Extinguisher

### Fire Control

Fire can be controlled by removing any or all of the factors of combustion, i.e. fuel, oxygen (air) and ignition temperature (by lowering the temperature).

## **Fire Extinguisher**

The fire brigade uses extinguishers as one of its tools for fighting fires.

The purpose of fire extinguishers is to either cut off the oxygen supply or lower the fuel's temperature, or both.

## **Calorific Value**

The calorific value of a substance refers to the amount of heat energy produced when a unit mass or volume of the substance is completely burned in the presence of oxygen. It is a measure of the energy content of a fuel, determining how efficiently the fuel can release energy upon combustion.

Calorific value is typically expressed in units like kilojoules per gram (kJ/g) or kilojoules per kilogram (kJ/kg) for solid and liquid fuels, and kilojoules per liter (kJ/L) or cubic meter (kJ/m<sup>3</sup>) for gaseous fuels. Higher the calorific value, the more energy the fuel can provide.

## **Ideal Fuel**

The perfect fuel is inexpensive, widely accessible, and quickly ignited.

Its calorific value is high.

It doesn't release any toxic gases or residues that contaminate the surroundings.

## **Calorific Value and Efficiency of a Fuel**

A fuel's calorific value is the quantity of heat energy released during the full combustion of one kilogramme of fuel. A fuel's calorific value is stated in kilojoules per kilogramme (kJ/kg).

Efficiency is the percentage of energy emitted during the burning of fuel that is transformed into productive work.

Its efficiency is directly correlated with its calorific value. Its efficiency will likewise be great if the value is high. Its efficiency would likewise be low if the value was low.

## **Pollution**

Pollution refers to the introduction of harmful substances or contaminants into the environment, causing adverse effects on living organisms, ecosystems, and the natural surroundings. It can occur in various forms, including air, water, soil, noise, and light pollution, each having specific sources and impacts.

## **Harmful Products from Burning of Fuel**

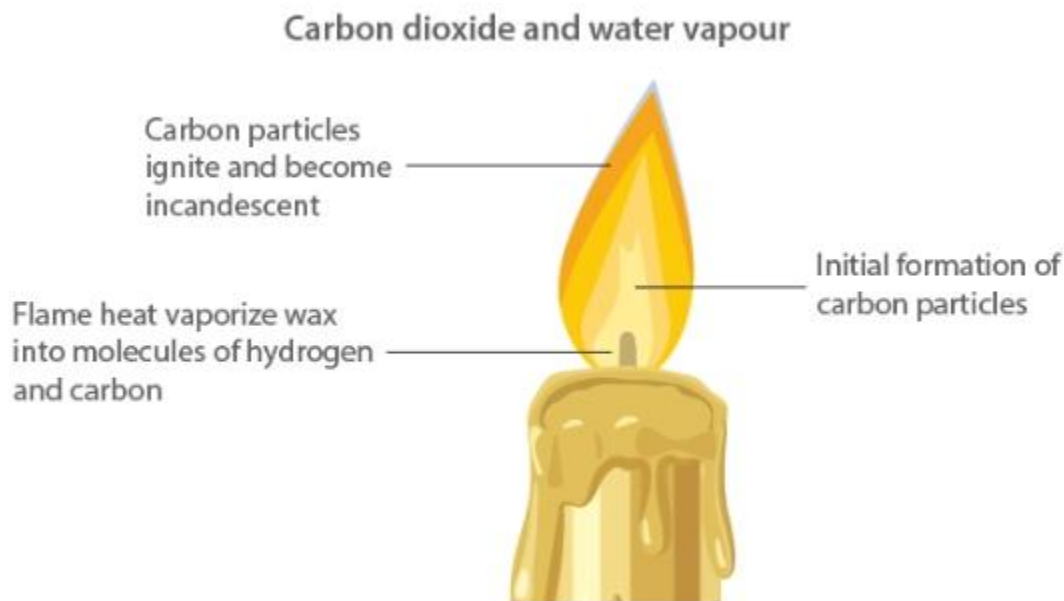
Respiratory issues arise from the airborne particulates of unburned carbon released during the burning of fuels such as coal, wood, and petroleum products.

One of the most toxic gases produced when fuels burn partially is carbon monoxide. Carbon dioxide, which is released into the atmosphere when fuels are burned, is what causes global warming.

## Unburnt Carbon Particles

Wood, coal, candles, and petroleum are examples of carbon fuels that leak unburned carbon particles.

These tiny particles are harmful contaminants that aggravate respiratory conditions like asthma.



## CO Emission

An incomplete burning of fuels releases the deadly chemical carbon monoxide. Burning coal in a closed space is risky because the carbon monoxide it produces can kill anyone who is sleeping there.

## Global Warming

Global warming is the term used to describe the increase in the average temperature of the earth's atmosphere caused by the release of carbon dioxide during the combustion of fuels. The effects of global warming include changes in rainfall patterns and the melting of polar ice caps.

## Acid Rain

Emissions of nitrogen oxide and sulphur dioxide combine with atmospheric water molecules to form acid, which is what causes acid showers.  
It seriously damages infrastructure, aquatic and terrestrial animals, and vegetation.

## **CNG – The Clean Fuel**

Because compressed natural gas (CNG) is a cleaner and less polluting fuel than diesel and petrol, it is gradually replacing these fuels in cars.

## **Benefits of CBSE Class 8 Science Notes Chapter 4**

The CBSE Class 8 Science Notes for Chapter 4, Combustion and Flames, provide several benefits for students:

**Clear Understanding of Concepts:** The notes break down complex concepts like combustion, flames, and ignition temperature into simple, easy-to-understand explanations.

**Structured Learning:** The notes are well-organized, making it easier for students to learn the types of combustion, the zones of a flame, and the essential components of a fire in a step-by-step manner.

**Time-saving:** Summarized notes help students revise the entire chapter quickly, especially during exams, without the need to go through lengthy textbooks.

**Improves Retention:** Key terms like "calorific value," "combustible substances," and "fire safety measures" are highlighted, enhancing memory retention and helping students recall information during assessments.

**Application-based Knowledge:** The notes include practical applications of combustion, such as fire safety precautions, use of fire extinguishers, and understanding fuel efficiency, which are useful in real-life situations.

**Exam-focused:** The notes cover important topics that are frequently asked in exams, helping students focus on what's essential and boosting their confidence in answering questions effectively.