

## COMBUSTION AND FLAME

- A chemical process in which a substance reacts with oxygen to give off heat is called **combustion**. The substance that undergoes combustion is said to be combustible. It is also called a fuel. The fuel may be solid, liquid or gas. Sometimes, light is also given off during combustion, either as a flame or as a glow.
- A good fuel is one which is readily available. It is cheap. It burns easily in air at a moderate rate. It produces a large amount of heat. It does not leave behind any undesirable substances. There is probably no fuel that could be considered as an ideal fuel.

The amount of heat energy produced on complete combustion of 1 kg of a fuel is called its calorific value.

The calorific value of a fuel is expressed in a unit called kilojoule per kg (kJ/kg).

- The lowest temperature at which a substance catches fire is called its **ignition temperature**.
- The substances which have very low ignition temperature and can easily catch fire with a flame are called inflammable substances. Examples of inflammable substances are petrol, alcohol, Liquefied Petroleum Gas (LPG) etc.

- The most common fire extinguisher is water. But water works only when things like wood and paper are on fire. If electrical equipment is on fire, water may conduct electricity and harm those trying to douse the fire. Water is also not suitable for fires involving oil and petrol.
- For fires involving electrical equipment and inflammable materials like petrol, carbon dioxide (CO<sub>2</sub>) is the best extinguisher. CO<sub>2</sub>, being heavier than oxygen, covers the fire like a blanket. Since the contact between the fuel and oxygen is cut off, the fire is controlled. The added advantage of CO<sub>2</sub> is that in most cases it does not harm the electrical equipment

- Unburnt carbon particles in air are dangerous pollutants causing respiratory problems.
- Incomplete combustion of a fuel gives poisonous carbon monoxide gas. It is a very poisonous gas. It is dangerous to burn coal in a closed room. The carbon monoxide gas produced can kill persons sleeping in that room.
- Combustion of most fuels releases carbon dioxide in the environment. Increased concentration of carbon dioxide in the air is believed to cause global warming.

- Global warming is the rise in temperature of the atmosphere of the earth. This results, among other things, in the melting of polar glaciers, which leads to a rise in the sea level, causing floods in the coastal areas. Low lying coastal areas may even be permanently submerged under water.

- Burning of coal and diesel releases sulphur dioxide gas. It is an extremely suffocating and corrosive gas. Moreover, petrol engines give off gaseous oxides of nitrogen. Oxides of sulphur and nitrogen dissolve in rain water and form acids. Such rain is called acid rain. It is very harmful for crops, buildings and soil.