



Keyword	Definition
combustion	A chemical reaction in which a compound reacts with oxygen.
incomplete combustion	When a substance reacts only partially with oxygen, such as when carbon burns in air producing carbon monoxide and soot (unburnt carbon).
oxidation	A reaction in which oxygen is added to a substance; loss of electrons by an atom or negative ion
toxic	Poisonous.
acid rain	Rainwater that is more acidic than usual due to air pollution, usually caused by sulfur dioxide and nitrogen oxides.
oxide of nitrogen	Any one of a variety of gaseous compounds consisting of only nitrogen and oxygen atoms. Together they are often represented as NO _x .
pollutant	A substance that harms living organisms when released into the environment.
weathering	When rocks are broken up by physical, chemical or biological processes.
greenhouse gas	A gas that helps to trap 'heat' in the atmosphere. Carbon dioxide, methane and water vapour are greenhouse gases.
atmosphere	The layer of gases that surrounds the Earth.
climate change	Changes that happen to the global weather patterns as a result of global warming.

Fuel + oxygen → carbon dioxide + water

Combustion is an oxidation reaction. Energy is also released (Exothermic) . Complete combustion occurs when there is plenty of oxygen for the reaction. **Incomplete combustion** happens when there is not enough oxygen to allow a fuel to burn completely:
Fuel + oxygen → carbon dioxide + carbon monoxide + carbon + water

Product	Problem
Carbon dioxide	Greenhouse gas
Carbon monoxide	Toxic – binds irreversibly to haemoglobin so it can't carry oxygen, reduces oxygen in blood: tiredness, coma and death.
Carbon (soot)	can block flues, makes buildings dirty, respiratory problems and reduced air quality
Water	Damages decorations

When burning fossil fuels there are also impurities
 Sulphur + oxygen → sulphur dioxide (causes acid rain)
 Nitrogen + oxygen → oxides of Nitrogen (acid rain and photochemical smog – a type of air pollution that causes breathing difficulties)

Acid rain

Causes: acidic gases which dissolve in rain water
Examples: sulfur dioxide, oxides of nitrogen
Problems: makes lakes and rivers acidic, which harms fish and other life. It also damages trees, buildings made of limestone or marble, and makes metal corrode.
Solutions: 1) removing sulfur from car fuels; 2) by removing sulfur dioxide from power station waste gases.

Climate change

Causes: greenhouse gases trap heat (Infrared radiation) that is radiated **from the earth**, keeping earth warm
Activities that release greenhouse gases: burning fuel, cows (digestive processes) and rice fields
 Increased human population means an increased demand for energy, greater deforestation (demand for space, fewer trees taking CO₂ from atmosphere)
Examples: carbon dioxide, methane and water vapour
Effects: Global warming
Solutions: Reduce use of fossil fuels and be more energy efficient

The Evidence

The evidence for climate change shows a correlation between human activities such as burning fossil fuels and an increase of temperature. However there are some uncertainties caused by the location where these measurements were taken and historical accuracy.
 We can estimate by looking at: fossils, tree rings, gas bubbles in ice. (Less precise)