Chestnut Grove Academy

Chemistry

9. The Atmosphere

Name:

Topics

1. Composition and evolution of the earths atmosphere
2. Greenhouse gases
3. Atmospheric pollutants

1. Composition and evolution of the earths' atmosphere

Complete the table about the composition of the atmosphere today:

Gas	**Percentage (%)**
	80
	20
	Trace amounts

Add numbers in the left hand column to order the statements about the evolution of the earths' atmosphere.

	Intense volcanic activity released gases into the earths early atmosphere
	Carbon dioxide dissolved into the oceans, reducing the amount of CO_2 in the atmosphere
	Plants evolved and the percentage of oxygen in the atmosphere gradually increased, allowing animals to increase
	Water vapour cooled to for the oceans
	The atmosphere consists of mainly carbon dioxide, with little or no oxygen gas
	Algae began to produce oxygen and take in carbon dioxide
	Volcanoes also produced nitrogen which gradually built up in the atmosphere

Describe three ways the amount of carbon dioxide in the early atmosphere decreased as the earths atmosphere evolved:

1. _____

   _____

2. _____

   _____

3. _____

   _____

Algae and plants increased the concentration of oxygen in the atmosphere through p_____

2. Greenhouse gases

Why are greenhouse gases important?

_____

_____

State the three greenhouse gases:

1._____

2._____

3._____

Describe how human activities can increase the concentrations of greenhouse gases:

_____

_____

_____

_____

Why is it important that scientific evidence is subject to the peer-review process before it is published?

_____

_____

_____

Identify four potential consequences of climate change:

1._____

2._____

3._____

4. _____

Define the term “carbon footprint”

_____

_____

How can we reduce our carbon footprint? What might be some barriers to this?

_____

_____

3. Atmospheric Pollutants

Combustion of fuels

Releases useful heat energy.

Complete combustion:

Hydrocarbon + oxygen → carbon dioxide + water

Needs plenty of ……

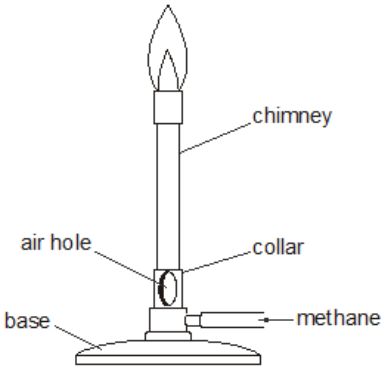
Incomplete combustion:

Hydrocarbon + oxygen → carbon monoxide + carbon (soot) + water

Happens when there is ……

Why you want complete combustion, not incomplete:

- Less soot is produced
- More heat energy is released
- No carbon monoxide is made



The Bunsen burner

Air hole open = …….. combustion happens.

Air hole closed = …… combustion

Higher Tier

Complete combustion symbol equations with methane (CH_4):

$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$$

Incomplete combustion with methane:

$$2CH_4 + 3O_2 \rightarrow 2CO + 4H_2O$$

Or

$$CH_4 + O_2 \rightarrow C + 2H_2O$$

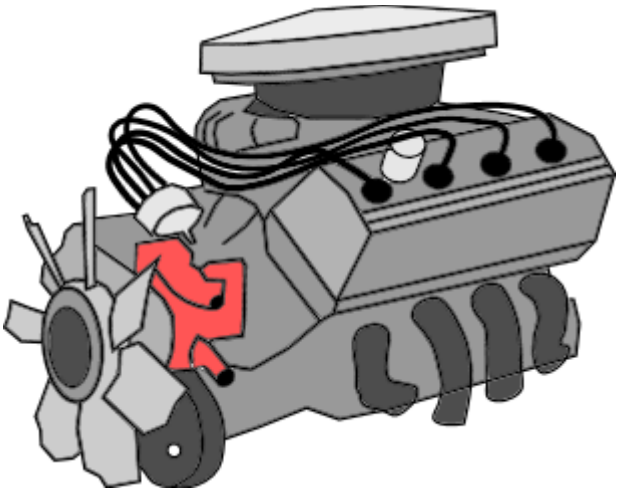
Common pollutants:

1. …….. – poisonous/toxic gas.
2. …….. – causes photochemical smog and acid rain.
3. …….. – causes acid rain.

Environmental impacts of acid rain:

- ……
- ……
- ……

The internal combustion engine:



Carbon monoxide:

Made by incomplete combustion of fuel.

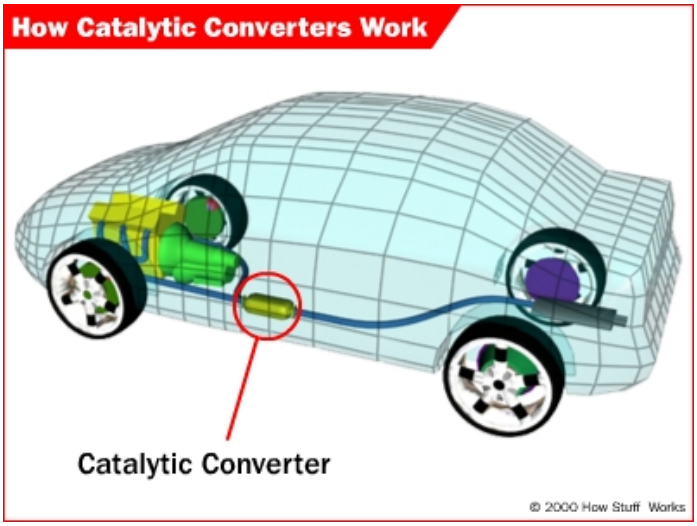
Oxides of nitrogen:

Nitrogen in air reacts with oxygen because of **high temperature in engine.**

Sulfur dioxide:

Made when sulphur impurities in fuel burn.

Catalytic Converter: Reduces pollution from car engines



Removes carbon monoxide from exhaust fumes:

$2CO + 2NO \rightarrow N_2 + 2CO_2$

Why control atmospheric pollution?

1. ……

2. ……