

## The Greenhouse Effect

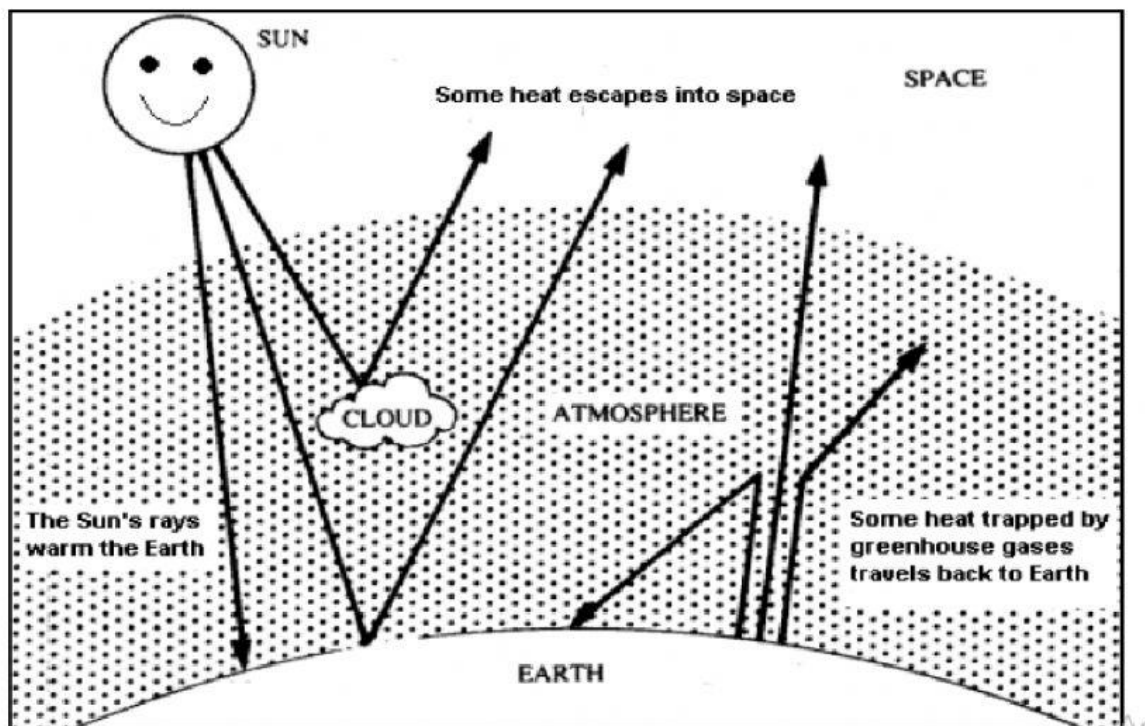
The Earth is surrounded by a layer of gases called the atmosphere. The Sun is much hotter than the Earth and it gives off rays (radiation) that travel through the atmosphere and reach the Earth. The rays of the Sun warm the Earth and heat from the Earth then travels back into the atmosphere. This is the same as on bonfire night when the warmth of the bonfire warms your face. Your face will give off heat to the cold air. There are some gases in the atmosphere which trap the heat escaping from the Earth and stop it from travelling back into space. These gases are called greenhouse gases.

The glass in a greenhouse has a similar effect on the Sun's rays and so it is called the **Greenhouse Effect**.

The greenhouse effect is a natural process and it warms the Earth. Without the greenhouse effect the Earth would be very cold, too cold for living things, such as plants and animals.

The diagram below shows how the Sun's rays are trapped by the greenhouse gases in the atmosphere.

*The Greenhouse Effect*



## The Greenhouse Gases

The atmosphere which surrounds the Earth contains the greenhouse gases, sometimes in very small amounts. The list of gases below shows the greenhouse gases which are produced naturally on Earth.

- *Carbon dioxide*
- *Water vapour*
- *Methane*
- *Ozone*

These gases are very important in keeping the Earth's temperature at the correct level so that we can live. To do this, the amount of greenhouse gases in the atmosphere must be kept at the right balance.

### a. Natural sources

Carbon dioxide is produced naturally when people and animals breathe. Plants and trees take in and use carbon dioxide to live. Volcanoes also produce carbon dioxide.

Methane comes from cattle as they digest their food. The gas also comes from fields where rice is grown: paddy fields. Ozone occurs naturally in the atmosphere.



### b. Man-made sources



Some of the activities of man also produce greenhouse gases.

Carbon dioxide comes from the burning of fuel such as coal, oil and gas. These are called fossil fuels. We burn fossil fuels to make energy, which gives us heat and light in buildings. The cutting down and burning of trees also releases carbon dioxide.

Methane can be released from buried waste. For example, the rubbish that is collected from our homes by the dustmen is buried in large rubbish dumps. This buried waste will produce methane. Coal mining and stored gas also produces methane.

Another group of greenhouse gases includes the chlorofluorocarbons.

The name for these gases is rather long so they are called CFCs for short. CFCs have been used in aerosols, such as hairspray cans, fridges and in making foam plastics. They become dangerous when released into the atmosphere, depleting the ozone layer. For this reason, their use has been banned around the world.



## **Global Warming**

Since the Industrial Revolution 200 years ago, these activities have increased, releasing more greenhouse gases into the atmosphere and upsetting the balance. More gases mean that more of the heat trying to escape from the Earth back into space is trapped. When more heat is trapped by the greenhouse gases the Earth becomes warmer, this is known as global warming.

Many scientists now agree that our activities are making the natural greenhouse effect stronger. If we carry on polluting the atmosphere with greenhouse gases scientists believe that it will have a dangerous effect on the Earth.



## **The Effects**

A warmer Earth might lead to a change in the weather, including hotter summers. This may seem like a good idea, but a rise of a few degrees in temperature could change the conditions on Earth which are at present just right for life.

At the moment it is difficult for scientists to say how great the changes on Earth will be and where the changes will happen.

### **a) The Weather**

Scientists agree that in Britain our winter and summer temperatures will increase and the weather will be warmer.

In winter it may also rain more but in summer it may become drier. In other parts of the world the effect will be different; some countries will become much hotter whilst others become cooler. There may be more storms, floods and drought, but we do not know which areas of the world will be affected.

### **b) Sea Levels**

Higher temperatures will make the water of the seas and oceans expand. Some of the ice from ice caps and mountain glaciers will melt, and this melted ice will also cause the seas to rise.

Higher sea levels will threaten the low-lying coastal areas of the world, such as the Netherlands and Bangladesh. Throughout the world millions of people and areas of land will be at danger from flooding. Many people will have to leave their homes and large areas of farmland will be ruined because of floodwater. In Britain, East Anglia and the Thames estuary will be at risk from the rising sea.

### **c) Farming**

The changes in the weather will affect the type of crops grown. Some crops, such as wheat and rice grow better when it is warmer, but other plants, such as

maize and sugarcane do not. Changes in the amount of rainfall will also affect plant growth.

The effect of a change in the weather on plant growth may lead to food shortages in some countries of the world. Brazil, parts of Africa, southeast Asia and China will be affected most and many people could suffer from hunger.

#### **d) Water**

Throughout the world there is a great demand for water, and in many regions, such as the Sahel in Africa, there is not enough water for the people. Changes in the weather will bring more rainfall in some countries, but others will have less rainfall. In Britain the southeast will be at risk from drought.

### **At Risk!**

#### **a) Plants and Animals**

It has taken millions of years for life to adapt to the conditions on Earth. A climate that changes too quickly will alter these conditions and affect the homes of plants and animals throughout the world. For example, the polar bears and seals will have to find new feeding grounds as the ice melts. Many animals and plants may not be able to cope with these changes and could die. This could lead to local, or world-wide extinction of certain species.

#### **b) People**

Climate change will affect everyone but some populations will be at greater risk. For example, countries whose coastal regions have a large population, such as Egypt and China, may see whole populations move inland to avoid flood. The effect on people will depend on well we can adapt to the changes and how much we can do to reduce global climate change.

### **What can we do to slow down global warming?**

Governments throughout the world have already taken action to start reducing global warming. In their plan they hope to reduce the amount of man-made emissions of greenhouse gases. Everyone can help in some way to slow down global warming.

About half of the enhanced greenhouse effect is caused by our use of energy, especially from fossil fuels. Other sources of energy could be used which do not emit carbon dioxide, for example wind power, solar (power from the Sun's rays) and wave power. In the home and at school we must learn to use energy efficiently and not waste it. We can make buildings more efficient, for example by putting in loft insulation and double-glazing.

Much of the rubbish we throw away can be recycled, such as glass bottles and jars, steel and aluminium cans, plastic bottles and waste paper. Recycling used materials uses less energy than making new ones. Composting fruit and vegetable waste reduce the amount of rubbish buried at rubbish dumps.

We should try and reduce our use of the car by travelling on public transport, cycling and walking.

If more forests were planted they could take in more of the carbon dioxide from the atmosphere.

Industries that produce and use CFCs have already agreed to stop by 1996.

- I. **GLOSSARY:** Read the following definitions and then, translate the words into Spanish.

**Atmosphere:** a layer of gases which surrounds the Earth.

**Fossil fuels:** fuels formed over a long time from material containing carbon. The main fossil fuels are coal, oil and natural gas.

**Greenhouse effect:** the Sun's radiation is trapped in the atmosphere and leads to a warming of the Earth.

**Greenhouse gas:** a gas in the atmosphere which can trap the heat escaping from Earth.

**Global warming:** a continued warming of the atmosphere as a result of mankind's activities.

**Industrial Revolution:** the rapid growth of industry which started in the late 18<sup>th</sup> century, made possible by the harnessing of energy from fuels such as coal.

**Radiation:** energy that passes from a warmer object to a cooler one.

## II. WORD MATCH

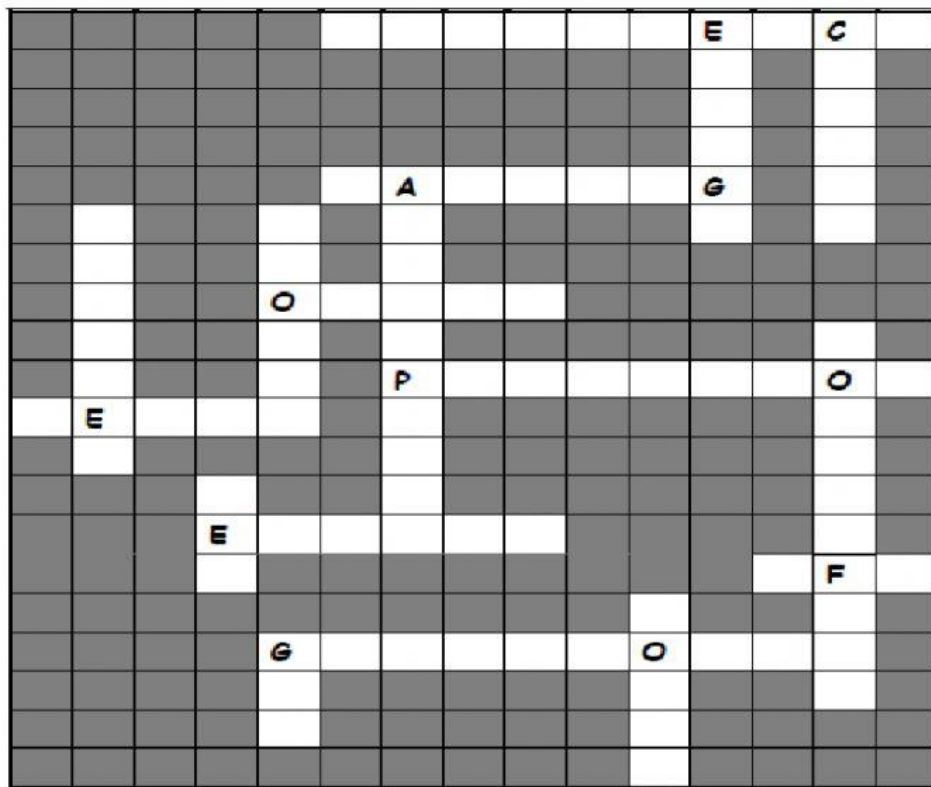
The fourteen words that are below can be matched up to make seven new phrases. Match a word from the left column with a word from the right-hand column, (choose a word from the left-hand column first) and see if you can do it!

1 Carbon	Level
2 Greenhouse	Efficiency
3 Global	Vapour
4 Ozone	Effect
5 Water	Dioxide
6 Energy	Hole
7 Sea	Warming

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

### III. WORD PUZZLE

See if you can fit the words on the next page into the correct spaces in the puzzle below.



\*SEA \*CFC \*LEVEL ENERGY \*CARBON \*GREENHOUSE  
 \*GLOBAL \*ATMOSPHERE \*SOLAR \*WARMING \*FOSSIL FUEL  
 \*EFFECT \*OZONE \*GAS \*WEATHER \*POLLUTION



#### IV. WORDSEARCH

The words printed at the bottom of the page are hidden in the wordsearch box.  
How many can you find?

Q	G	R	E	E	N	H	O	U	S	E	Z
S	A	L	D	R	H	J	F	N	B	Y	U
R	C	D	O	F	G	A	W	O	C	F	M
E	T	L	H	B	O	P	A	S	A	E	E
T	H	X	R	T	A	N	R	U	R	W	N
V	I	Z	E	K	V	L	M	A	B	N	E
M	E	T	H	A	N	E	I	L	O	S	R
D	A	N	L	H	T	I	N	P	N	A	G
U	P	J	Q	V	B	S	G	E	D	H	Y
G	B	C	K	U	R	S	M	A	I	A	C
J	X	I	F	Q	G	I	O	Z	O	N	E
L	L	P	N	C	A	O	F	G	X	R	M
S	G	A	D	T	S	N	H	Y	I	L	V
W	O	R	W	P	E	S	C	L	D	D	Y
R	Q	W	Z	G	C	C	I	P	E	N	I

**Words to Look For:** greenhouse, gas, global, Warming, ozone, carbon dioxide, Cfcs, methane, energy.



## V. AN ENERGY INEFFICIENT KITCHEN

The picture below shows how a kitchen can be inefficient. Can you make a list of how it is wasting energy and suggest ways in which the kitchen could be made more efficient?



- 1.
- 2.
- 3.