Greenhouse Effect

EARTH'S ATMOSPHERE

Our earth is surrounded by a blanket of gases called the atmosphere. Without this blanket, our earth would be so cold that almost nothing could live. It would be a frozen planet. Our atmosphere keeps us alive and warm.

The atmosphere is made up of many different gases. Most of the atmosphere (99 percent) is oxygen and nitrogen. The other one percent is a mixture of **greenhouse gases**. These greenhouse gases are mostly water vapor, mixed with carbon dioxide, methane, CFCs, ozone, and nitrous oxide.

Carbon dioxide is the gas we produce when we breathe and when we burn wood and fossil fuels. Methane is the main gas in natural gas. It is also produced when plants and animals decay. The other greenhouse gases are produced by burning fuels and in other ways.

SUNLIGHT AND THE ATMOSPHERE

Rays of sunlight (radiant energy) shine down on the earth every day. Some of these rays bounce off clouds and are reflected back into space. Some rays are absorbed by molecules in the atmosphere. About half of the sunlight passes through the atmosphere and reaches the earth.

When the sunlight hits the earth, most of it turns into heat (thermal energy). The earth absorbs some of this heat. The rest flows back out toward the atmosphere. This keeps the earth from getting too warm.

When this heat reaches the atmosphere, it stops. Heat can't pass through the atmosphere like sunlight. Most of the heat energy becomes trapped and flows back to the earth. We usually think it's sunlight that warms the earth, but actually it's this heat energy that gives us most of our warmth.

THE GREENHOUSE EFFECT

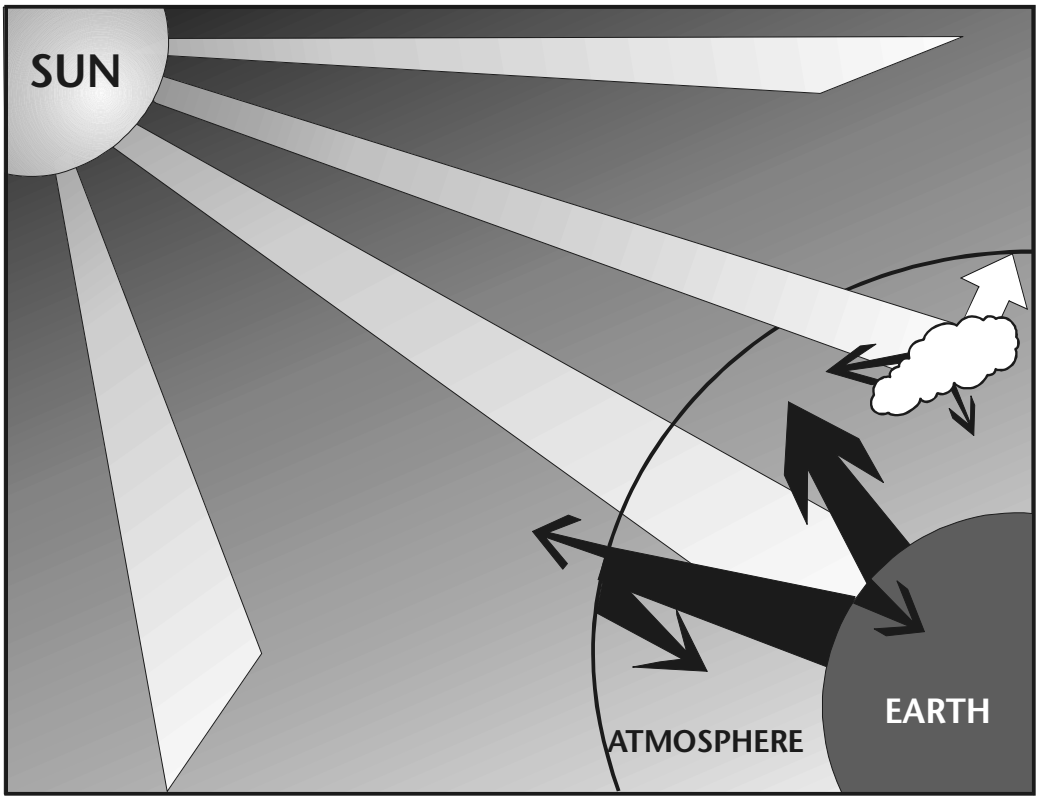
Solar energy (white) shines on the earth all day, every day. Some solar energy reaches the atmosphere and is reflected back into space. Some solar energy is absorbed by the atmosphere and turns into heat energy (black). Half of the solar energy passes through the atmosphere and reaches the earth, where it turns into heat.

Some of the heat energy is absorbed by the earth.

Most of the heat energy flows back into the air. The atmosphere traps the heat energy.

Very little heat energy escapes back into space.

The trapped heat energy flows back to the earth.



THE GREENHOUSE EFFECT

We call this trapping of heat the greenhouse effect. A greenhouse is a building made of clear glass or plastic. In cold weather, we can grow plants in a greenhouse. The glass lets the sunlight in. The sunlight turns into heat when it hits objects inside. The heat becomes trapped. The light energy can pass through the glass; the heat energy cannot.

GREENHOUSE GASES

What is in the atmosphere that lets light through, but traps heat? It's the greenhouse gases, mostly carbon dioxide and methane. These gases are very good at absorbing heat energy and sending it back to earth.

In the last 50 years, the amount of some greenhouse gases in the atmosphere has increased dramatically. We produce carbon dioxide when we breathe and when we burn wood and fossil fuels: coal, oil, natural gas, and propane.

Some methane escapes from coal mines and oil wells. Some is produced when plants and garbage decay. Some animals also produce methane gas. One cow can give off enough methane in a year to fill a hot air balloon!

GLOBAL CLIMATE CHANGE

Many scientists think these greenhouse gases are trapping more heat in the atmosphere as their levels increase. They think the average temperature of the earth is beginning to rise. They call this **global warming**.

These scientists think if the temperature of the earth rises just a few degrees Fahrenheit, it will cause major changes in the world's climate. They think there may be more floods in some places and droughts in others. They believe the level of the oceans might rise as the ice at the North and South Poles melts. They think there might be stronger storms and hurricanes.

They believe that countries all over the world need to act now to lower the amount of carbon dioxide we put into the atmosphere. They believe we should lower the amount of fossil fuels that we burn.

Other scientists disagree. They don't believe the world's temperature is rising. They think it is too soon to tell if there will be long-term changes in the global climate because of increased carbon dioxide in the atmosphere. They are not sure that a little global warming would cause bad things to happen. They think some good things might happen, like longer growing seasons for crops, warmer nights, and milder winters.

They think we should study the problem more before we make major changes in the way we use fossil fuels.

Greenhouse gases make up less than one percent of the atmosphere.

Greenhouse gases are more than 97 percent water vapor.