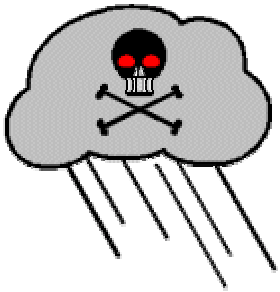
Acid Rain



Rain is very important for life. All living things need water to live, even people.
Rain brings us the water we need. But in many places in the world even where you live, rain has become a menace.
Because of pollution in the air, acid gases from factories, cars and homes, the rain is becoming dangerous for the life of every living creature.

This rain is known as **'acid rain'**.

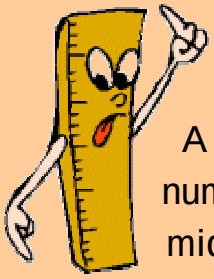
WHAT IS ACID RAIN?

Acid gases are produced when fossil fuels like coal and oil are burned in power stations, factories and in our own homes. Most of these acid gases are blown into the sky, and when they mix with the clouds it can cause rain – or snow, sleet, fog, mist or hail – to become more acidic.
The opposites of acid are alkalis; for example, toothpaste and baking powder are both alkalis. Strong alkalis can also be dangerous, such as ammonia and bleach.

Lemon juice, vinegar and cola are all acidic. Rain is naturally acidic, but acid gases make it even more acidic, sometimes as acid as lemon!

Nature can also produce acid gases, such as volcanoes. When they erupt, the smoke that comes out of the crater is also full of acid gases.

HOW DO WE MEASURE ACIDITY?



There is a special scale called the pH scale that measures the strength of acids and alkalis.

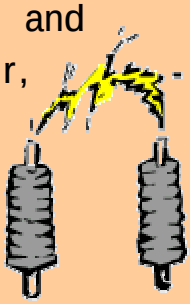
A low pH number means something is acid. A high number means something is alkali. And something in the middle is called neutral.

Acidity can be tested using litmus paper.

Usually rain is a little acidic, and has pH of about 5.5, if the pH of rainfall is less than 5.5, then the rain is probably polluted by acid gases.

Acids turn litmus paper red, and alkalis turn it blue. With a special paper called universal indicator, you can test levels of acidity.

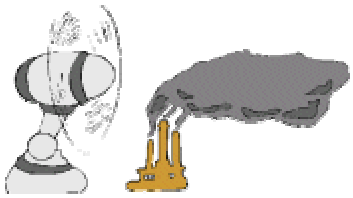
WHAT ARE THE MAIN GASES THAT CAUSE ACID RAIN?



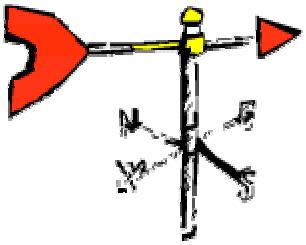
When we burn fuels, chemicals called 'sulphur' and 'nitrogen' are released into the air. Once in the air, they mix with water in the air – rain, snow, etc – and are transformed into different chemicals called 'sulphur dioxide' and 'nitrogen oxides', which can be very dangerous for plants, animals and people.
Most of the 'sulphur' comes from power stations, which make electricity, and also from volcanoes. Most of the 'nitrogen oxides' come from car and truck exhausts.

We call 'air pollution' the bad gases that we produce and release in the air. 'Sulphur dioxide' and 'nitrogen oxides' are the most important causes of acid rain.

A PROBLEM ALL OVER THE WORLD



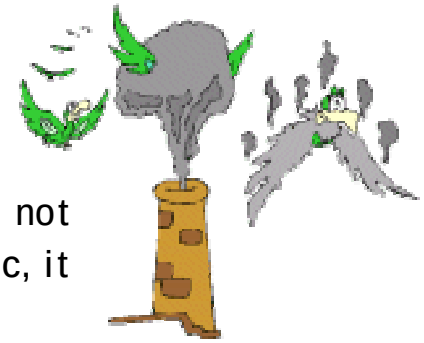
Air pollution can be carried over long distances. When acid gases are released, they go high up in the sky, and then they are pushed by strong winds towards other countries.



The acid rain in Sweden is caused by air pollution in Britain and other countries of Europe. The pollution produced in Britain ends up mostly in Scandinavia – countries in northern Europe including Sweden, Norway and Denmark.

In the USA, the winds blow the air pollution to certain areas in Canada.

HOW BAD IS ACID RAIN?



When rain is acidic, it affects what it falls on: trees, lakes, buildings and farmland.
Sometimes rain is not very acidic and does not cause a lot of problems, but when it is acidic, it can be very harmful to the environment.

TREES AND PLANTS

Acid rain can have terrible effects on a forest. The acid takes away important minerals from the leaves and the soil.
Minerals are like vitamins for trees and plants. Without them, trees and plants cannot grow properly. They lose their leaves and become very weak. They are no longer strong enough to fight against illnesses and frost. They become very ill and can even die.

Some soils are alkaline, when acid rain falls on them the acid becomes neutral.
Plants and trees living on these soils are not in any big danger.

LAKES AND WATER LIFE

Acid rain has a terrible effect on water life. Even if the acid rain does not fall straight into the lake, for example, it may enter from rivers and streams. Some of the life in the lake such as fish and plants may end up dying, because they cannot survive in acidic lakes.

Thousands of lakes in Scandinavia have no more life in them. They have received so much acid rain for so many years, because of the winds pushing the acid gases, that nothing can survive.

You can recognise a lake dead from acid rain by its clean and crystal clear water. But they look clean because there is very little living in them anymore. Tiny plants and animals are mostly unable to survive.

OUR HEALTH

Particulates – very small particles of debris found in some of the air pollution - are one of the main causes of health problems. In towns and cities, these are released mainly by diesel engines from cars and trucks.

When we breathe in air pollution, these very fine particulates can easily enter our body, where they can cause breathing problems, and over time even cause cancer.

Water we drink from taps can be contaminated by acid rain, which can damage the brain.

BUILDINGS

Acid rain can also ruin buildings because the acid eats into metal and stone. It also damages stained glass and plastics. Some types of building materials are softer than others, and it is the softer ones which are most affected by acid rain. Sandstone and limestone are examples of stone which are fairly soft and are damaged easily. Granite is an example of a harder stone that can resist the effects of acid rain.

In many places in the world, ancient and famous buildings and monuments are affected by acid rain. For example, the Statue of Liberty in New York, USA, has had to be restored because of acid rain damage.

Buildings are naturally eroded by rain, wind frost and the sun, but when acidic gases are present, it speeds up the erosion.