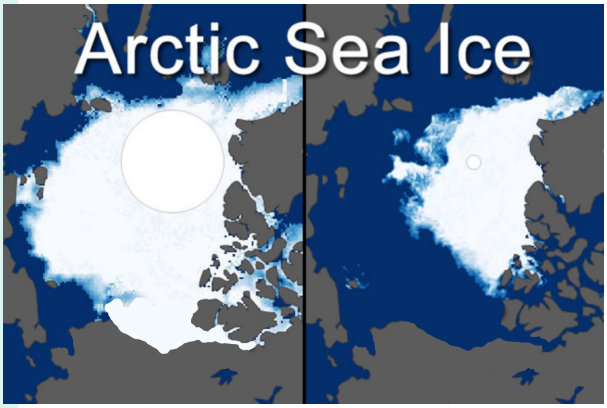
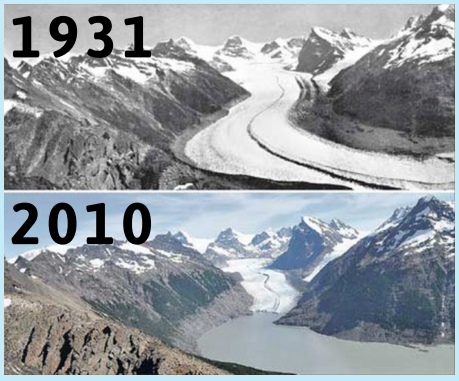
CLIMATE CHANGE FACT FILE

The **climate** is the usual **weather** in a place. One way to think about the difference between weather and climate: the weather tells you what clothes you need to put on today; the climate tells you what kind of clothes you need in your wardrobe. For example, Scotland has a wet climate, so you need some good waterproof gear, but the weather on any day can still be sunny, cold or rainy so you might wear the wet weather gear or you might wear a hat and shorts.

The climate of the world is changing and the Earth is getting warmer. We call this **global warming** or **climate change.** So how do we know the climate is changing?

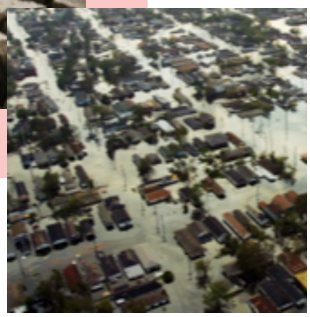
In the winter, the surface of the Arctic Ocean freezes making **sea-ice** that floats. In the summer a lot of it melts but some stays as ice. This picture shows the summertime **sea-ice** at the North Pole in 1984 and 2012. In less than thirty years a lot of summer **sea-ice** has melted making it difficult for large mammals to survive.
As the ice turns into water, the ocean is getting warmer, which makes **sea level rise**. This rise is also because **ice sheets** (ice on land) and **glaciers** are melting. This means that some low islands are starting to disappear under the sea. In the future, no plants or land animals, including humans, will be able to live on them.



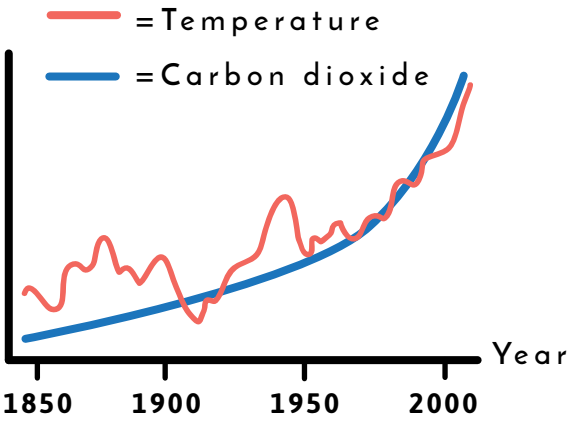


Glaciers (rivers of ice) in high mountains are also melting. These photos show the same glacier over 79 years. Most of the ice has melted. Until recently, glaciers melted slowly through the summer, and rivers flowed all year. But as the glaciers disappear, some rivers will dry up in the summer.

As the Earth gets warmer, there are more storms with heavy rain. So, in some places there are huge **floods**. But at the same time, other places are becoming **drier**, with less rain than before. Areas with too little water could become **deserts**. People who live in these places may have to leave their homes and live somewhere else.



WHAT CAUSES CLIMATE CHANGE?



It is normal for the Earth's climate to get hotter and then cooler - we know it has done this throughout history. But in the last hundred years, temperatures have risen faster than normal. The red line in this graph shows the temperature of the world. It goes up and down, but goes up steeply after 1950. The blue line in the graph shows the levels in the air of a gas called **carbon dioxide**. The more carbon dioxide there is, the hotter the world becomes.

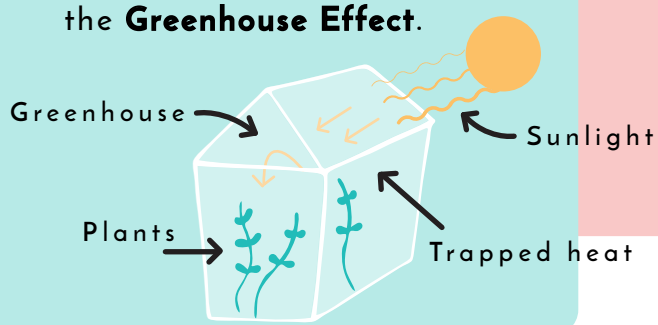
Oil, coal and **natural gas** are fossil fuels that contain lots of energy, which people can use if they burn them. Carbon dioxide is a gas created from burning these fuels. Until the 1800's, people burned wood and a little bit of **coal** but mainly used **sustainable energy**. For example, they travelled on horseback. When an old horse died, a young horse took its place. They also used water and wind to make power with watermills and windmills - other examples of **sustainable** and **renewable power** that we still use today today.

But in the 1800s, people used coal to make energy for new inventions like steam trains. In the 1900s, they used **oil** and **gas** to make energy for new inventions like street lights and central heating. Once coal is burnt, it can't be burnt agian, so it is not sustainable. By the beginning of this century, fossil fuels powered machines all over the world.

Nowadays, oil powers planes, lorries and cars. Oil and gas heat houses. Oil, gas and coal generate electricity. But burning fossil fuels produces '**greenhouse gases**' like carbon dioxide.

THE GREENHOUSE EFFECT

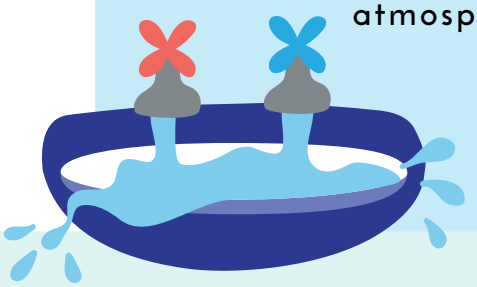
Greenhouse gases act like the glass roof of a greenhouse. In a greenhouse, the sun shines through the glass and heat is trapped inside. Just like the glass roof, greenhouse gases trap the heat of the sun round the Earth, and it gets hotter. This is called the **Greenhouse Effect**.



Methane is another greenhouse gas. Animals like cows and sheep produce methane in their farts and burps. Nowadays, there are more cows, pigs and sheep than ever before because more people eat meat, and these animals are producing a lot of methane! Rotting rubbish produces methane too.

THE CARBON WASH BASIN METAPHOR

The **atmosphere** is a layer of gases around the Earth, where the methane, carbon dioxide and other greenhouse gases collect and cause the Greenhouse effect and climate change. Some people compare our Earth and its atmosphere to the water in a big wash basin. This is the **carbon wash basin metaphor**.



Have you ever filled a wash basin so that it has got too full and overflown onto the bathroom floor? How naughty! This usually happens with the plug in the plug hole, but you can also do it without the plug in, if you run the tap fast enough.

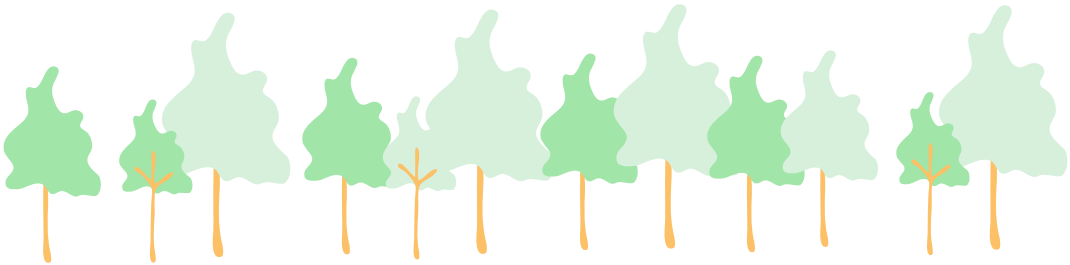
Now imagine that the basin is our Earth and its atmosphere. The 'water' coming out of the tap is like the carbon dioxide we make by doing things like burning fossil fuels and cutting down **trees**. The 'water' is coming out of the tap too fast!

The 'plughole' is like the trees and **oceans**. They naturally take in carbon dioxide. The trouble is that they can't cope with all the greenhouse gases that we are putting into the atmosphere. The 'water' is going out too slowly. So the 'basin' is overflowing.

HOW CAN WE SLOW CLIMATE CHANGE?

There are **two** things we need to do to slow climate change:

1. We need to reduce the greenhouse gases that we are putting into the atmosphere (like turning down the tap).
2. We also need to plant more trees and stop chopping them down, as they take in and store carbon dioxide (like making the plughole bigger).



The good news is that we know what we need to do. Lots of adults are working hard to do these two things: they're trying to reduce the amount of greenhouse gases in the atmosphere by:

- Driving and flying less
- Eating less meat
- Burning less gas and oil in homes, factories and transport
- Producing electricity without fossil fuels – using solar panels, wind farms and water power
- Helping nature take in carbon dioxide by planting more trees and by protecting the oceans

There are things everyone can try and do to look after our wonderful world. You'll find some ideas in our climate challenge leaflet.

Climate change can feel overwhelming. If you are feeling sad or worried about climate change, or experiencing any other feelings you'd like some help with, find an adult to talk to – one that will really listen.