





THE GREENHOUSE EFFECT

The sun's rays pass through the atmosphere to the earth. When they reach the earth's surface they are reflected and go through the atmosphere to space. However! When the sun's rays are reflected from the earth, GREENHOUSE GASES can trap the heat in the atmosphere.

Without these gases the earth would be very cold – about minus 18 degrees Celsius.

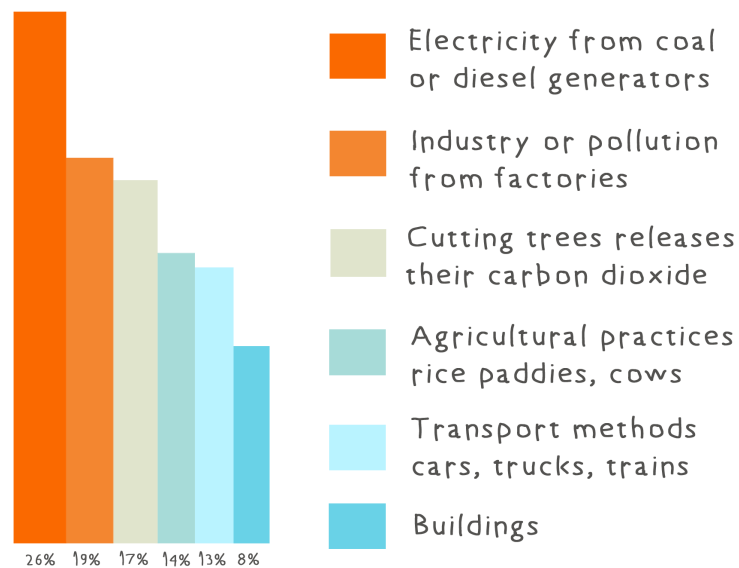
We call this process THE GREENHOUSE EFFECT because it is similar to what happens in a greenhouse. In the atmosphere these greenhouse gases act like a big blanket around the earth, trapping more and more heat from the sun.



CAUSES

HUMAN ACTIVITIES contribute to having more greenhouse gases in the atmosphere.

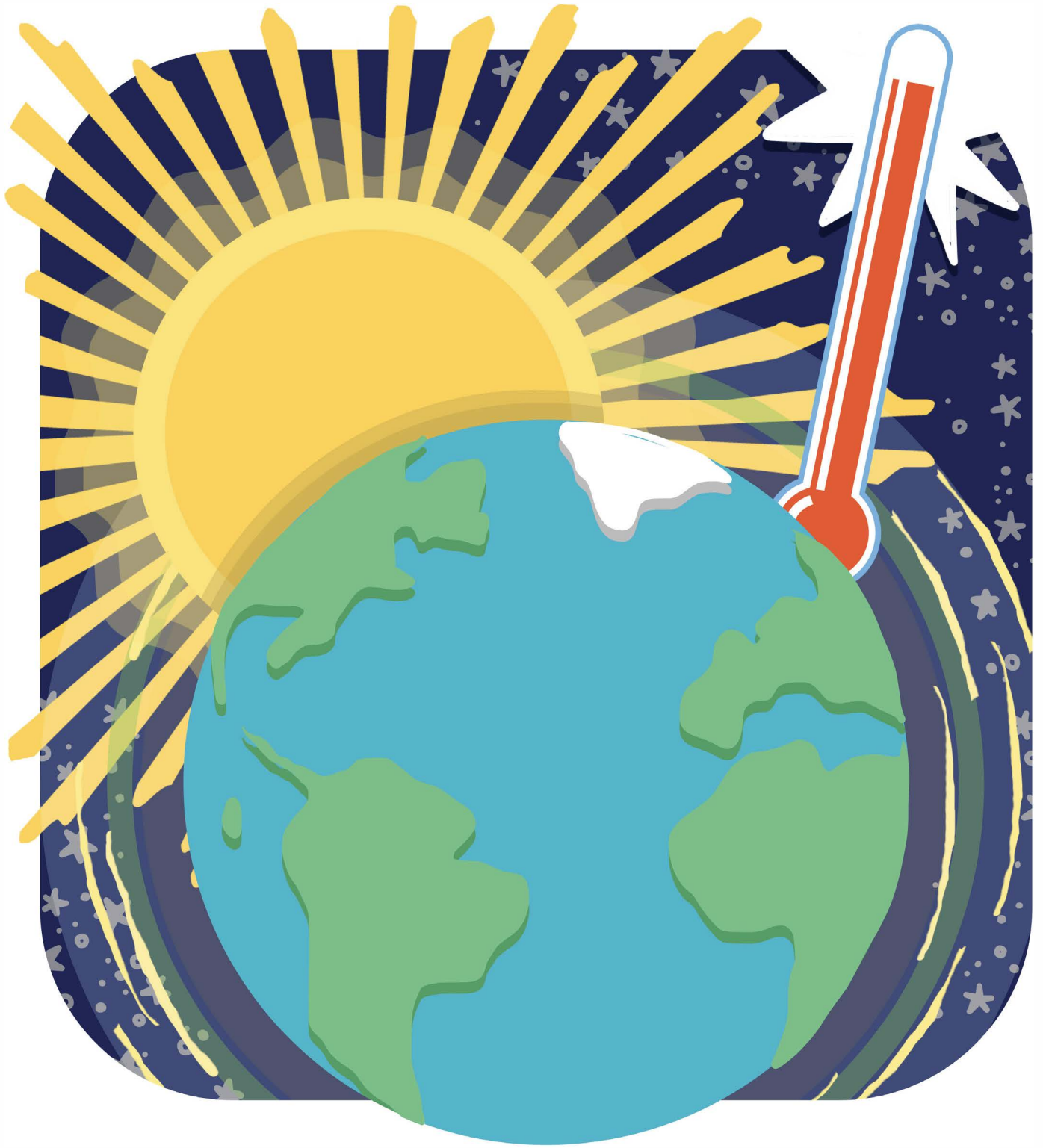
What do you think the biggest causes are?



The major greenhouse gases are:

1. - Carbon dioxide
2. - Methane
3. - Nitrous oxide
4. - Fluorinated gases
5. - Water vapour








GLOBAL WARMING

We know greenhouse gases are building up in the atmosphere. More heat in the atmosphere causes the planet to warm up. We call this GLOBAL WARMING.

Since 1880, global temperature has increased by almost one degree Celsius in total. How much this continues to rise depends on how many greenhouse gases there will be in the atmosphere.

Temperatures could rise by almost 5 degrees Celsius by the year 2100 (IPCC, AR5). However, countries around the world agreed to try to keep this below 2 degrees.

That may not sound like a lot, but what happens when your body temperature is two degree warmer than its usual temperature? You would immediately fall sick and get a fever.





THE WATER CYCLE

The earth has a limited amount of water. It keeps going around in what we call the "Water Cycle":

1. The sun heats water in rivers, lakes or the ocean. Water **EVAPORATES** becoming water vapour.
2. The vapour rises into the air. When it reaches the colder atmosphere it **CONDENSES** to form clouds.
3. As more water vapour collects in the clouds, the clouds become heavier. When they can't hold the water vapour, water falls back from the clouds back to Earth as **PRECIPITATION** - such as rain, hail or snow.
4. The precipitation **COLLECTS** in the oceans, lakes or rivers, or may end up on land.

We know that changes in the water cycle are increasing the risks of floods and droughts (climaterealityproject).

1. Higher temperatures due to global warming are increasing evaporation.
2. Warmer air can hold more water vapour. This can result in more intense rainstorms.
3. Intense rainstorms are more likely to lead to **FLOODING**.
4. Also, increased temperatures increase the likelihood of **DROUGHT**.

Global warming is effecting weather patterns around the world. This is what we call **CLIMATE CHANGE**. Climate Change is exacerbating a wide range of weather related hazards and impacts.



CHANGING SEASONS

Today, climate change is leading to shifts in what seasons used to look like. Spring might come earlier in some parts of the world. Rainy seasons are delayed in other parts. Seasons are getting more extreme too. This is predicted to worsen in the future.

Changing seasons affect farmers. For example if the rainy season is delayed, crops already planted might fail. Farmers might need to change crops to those that grow better to keep up with the new climate conditions.

Changing seasons also affect fresh water availability. In the Northern Hemisphere, an earlier spring causes earlier peaks in snow melt and river flows. This means less water is available in the summer and autumn when demand is often highest (Earth observatory (2017)).







DROUGHT

Droughts have been drier and lasting longer in recent years thanks in part to climate change. Higher temperatures increasing evaporation combined with less rain causes can cause more drought.

Droughts can be devastating to the environment. But droughts also have serious consequences for people's livelihoods. They really affect farmers, but also the water supply and people's health.

Over the longer term some crops and animals will not be able to survive the drier conditions. Farm workers and their families may have to migrate.






EXTREME WINDS AND STORMS

Higher temperatures lead to warmer and wetter environments.

In the future, climate change will likely lead to stronger tropical storms, cyclones and hurricanes. However, it may lead to a decrease in the number of storms (NOAA, 2017).

In general, rainfall will become more intense, which will lead to increased impact from storms.







FLOODS

Higher temperatures are leading to more intense rainstorms. This is because of increased evaporation of water from the sea, lakes and rivers and because warmer air can hold more water vapour. More intense rainfall increases the likelihood of flooding.

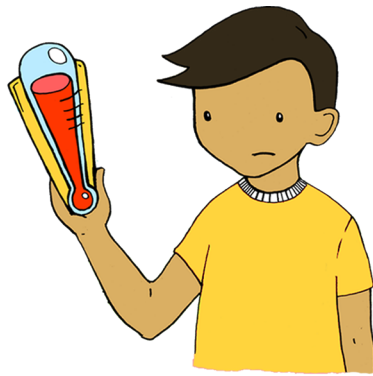
The immediate risk is that sudden intense rainfall can cause flash floods where drainage systems are unable to cope with so much water.

In the medium term, wet season flooding may happen more often and the water levels may be higher. Vector-borne diseases (malaria and dengue fever) and water-borne diseases (especially diarrhoea) are linked to flooding.

In the long term, extreme events such as river floods may cause population displacement.







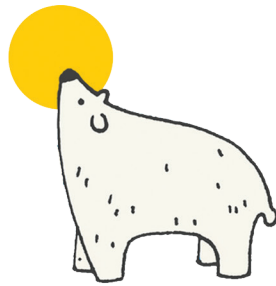
GLOBAL WARMING AND HEAT WAVES

the 10 hottest years ever recorded have all occurred since 1998. The hottest year on record is 2016. It broke the record set in 2015, which itself broke the record setting 2014 (climatecentral, 2017).

A long period of unusually hot weather can cause illness that is especially dangerous to the elderly, small children and sick people. Exposure to the sun could result in fainting, heat exhaustion and heat stroke. One of the worst heat wave was recorded in the year 2003 when more than 70,000 Europeans died .

Another risk related to warming is that mosquitoes like heat! They can fly faster, bite more, breed faster and move into new areas that used to be too cold for them. Mosquitoes can carry diseases.





MELTING GLACIERS AND POLAR ICE

Water can soak up a lot of heat. When the oceans get warmer, sea ice begins to melt in the Arctic and around Greenland. NASA's satellites show us that every summer some Arctic ice melts and shrinks, getting smallest by September. Then, when winter comes, the ice grows again.

But, since 1979, the September ice has been getting smaller and smaller and thinner and thinner in the Arctic this now decreases 13% every 10 years! (NASA, 2017).

Glaciers are another form of melting, shrinking ice. Glaciers are frozen rivers. They flow like rivers, only much slower. Lately, they have been speeding up (NASA kids, 2017).

As more sea ice and glaciers melt, the global sea level rises.





SEA LEVEL RISE (COASTAL EROSION)

As the ocean gets warmer, the water actually expands! Sea level has risen 17 centimetres in the last 100 years. In the last 10 years, it has risen twice as fast as in the previous 90 years (NASA kids, 2017).

One immediate risk of sea level rise is that with every storm there is a higher risk of coastal flooding.

Another risk is that a rise in sea level causes salt water intrusion in coastal areas. This can cause problems for drinking water and can lead to more cases of diarrhoea.

Sea levels are projected to continue rising. The rate is expected to be even faster, with some predictions up to 8-16 mm per year.

