

The Greenhouse effect

Our planet has a nice climate compared to our neighbours. On Earth the highest temperature recorded is 58 C and the lowest is -89 C. However for most of the planet most of the time the temperatures are much nicer. The average temperature is just around 14 C. The reason for this is our atmosphere. The planet is surrounded by a mixture of gases, and air. We need air to breathe, but also certain gases in the air act like a blanket around the Earth, keeping heat from the Sun from escaping out into space.

Certain gases are very good at trapping the Sun's heat. The most important of these is carbon dioxide. Scientists write carbon dioxide as CO₂ for short.

The carbon cycle

Carbon is everywhere and in all living things – including you! But carbon does not just stay in one place – it is constantly moving from one part of the planet to another and changing form. For example, carbon exists in the air mainly as a gas (carbon dioxide, or CO₂) which is absorbed by plants, including trees, and the oceans. Animals, including us, take in carbon when they eat plants and breathe it out as CO₂ during respiration. When plants and animals die, their remains decay and decompose, some of the carbon is absorbed into the Earth and some are released into the air as carbon dioxide.

Facts



What's causing climate change?

The carbon cycle has kept the level of CO₂ in the atmosphere more or less stable for thousands of years. However, this fine balance is being upset by human activities. The rate we burn fossil fuels releases CO₂ faster than it can be removed naturally. Deforestation of woodland and tropical rainforests means there is less carbon removed naturally from the atmosphere. This means that the amount of CO₂ in the atmosphere has been increasing. The planet is warming and this is changing climates around the planet.

Other human activities like draining and cutting bogs, agriculture, farming livestock, and the production of chemicals also contribute to climate change.

Weather vs. climate

Weather and climate are different but related things. Weather describes the day-to-day conditions in a particular place – for example, it can be cloudy and wet one day and sunny the next. 'Climate' describes the average weather conditions in a place over relatively long periods of time (e.g. 30 years). Deserts, for example, have a hot and dry climate, while the Arctic and Antarctic regions are cold and dry.

European Commission, Directorate-General for Climate Action, Our planet, our future: fighting climate change together, Publications Office, 2018

Happy Planet

A SUSTAINABLE MATHS GAME

The effects of climate change - Food for thought

The effects of climate change are being felt on all continents across the world and are predicted to become more frequent and more intense in the coming decades. Different countries and regions face different problems. These changes have the power to transform our world, affecting food and water supplies and our health. The bigger the problems, the more difficult and expensive it will be to solve them – which is why taking early action to deal with climate change is the best option.

Searing heat and a lack of water are a disastrous mix for crops and for world food supplies. The result is less food, which is a big problem because the world's population is set to increase from around 7.5 billion today to 9 billion by 2050 – so we will need more food, not less. Our food supplies are also threatened by the negative effects of climate change on bees and other pollinators. All of this means that we need to prevent climate change as much as we can while adapting our agriculture to deal with a changing climate.

Facts



Getting warmer

In 2016, the Earth was around 1.1 °C hotter than it was in the late 19th century – and the average global temperature is set to rise even more over the next century. 1.1 °C may not sound like much, but consider this:

- Most of the warming so far happened in the past few decades, so the temperature rise is speeding up.
- Don't forget, this is an average increase: some places have become much warmer and others colder. Many places will get more droughts and many will get more flooding. For example, the Arctic has become substantially warmer over the last 60 years and could be ice-free in summer by 2040. Europe is warming faster than other areas of the world.

European Commission, Directorate-General for Climate Action, Our planet, our future: fighting climate change together, Publications Office, 2018

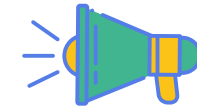
SUSTAINABLE SHOPPING

The next time you put something in the bin, think about it. On average, each of the 500 million people living in the EU throws away around half a tonne of household rubbish each year! Even though the amount of waste being recycled is rising, a lot still ends up in landfill sites. As waste rots, it releases huge amounts of methane – a powerful greenhouse gas – into the air, contributing to climate change. Today, better waste management means more energy is being recovered, and EU legislation on landfilling is making a big difference. Preventing waste is becoming more important as the global population increases and we are eating away at our finite supply of natural resources.

Imagine returning from the supermarket and throwing a third of your shopping straight into the bin. That is roughly the proportion of food produced globally that is lost or wasted every year. The European Commission is working to help spread the word about shopping wisely, the meaning of dates on food labels, and using leftovers.

EU guidelines were adopted in October 2017 to make it easier – where safe to do so – for surplus food to be donated to food banks or used for animal feed. Let's all work together to reduce the estimated 90 million tonnes of food currently wasted each year in the EU!

Acts



Waste electrical and electronic equipment (WEEE)

This is the fastest-growing category of waste in the EU. WEEE is full of plastics and metals, including harmful ones like mercury and valuable ones like gold used in circuit boards. The EU has set targets for recycling electronics to save resources and restrict the hazardous materials manufacturers can put into electronics, protecting recyclers and the environment.

RENEWABLE ENERGY

One way to cut greenhouse gas emissions is by using more renewable energy, such as wind and solar power. These provide endless supplies of energy, unlike fossil fuels which will run out one day. And unlike burning fossil fuels in power stations, generating electricity from renewables produces little to no greenhouse gases.

The EU is a world leader in renewable energy technologies, and many EU countries are already generating a lot of their electricity from renewables. Getting more of our energy from renewable sources not only cuts emissions but also means spending less on coal, oil, and gas imports from outside the EU. In 2015, nearly 17 % of the EU's energy came from renewables. The plan is to raise this to at least 27 % by 2030.

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A SUSTAINABLE MATHS GAME

MAKE A SMART CHOICE

What about you? Do you feel concerned about the threats from climate change? Don't worry, we can do something about it.

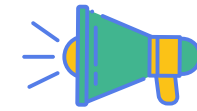
Are you passionate about the need to reduce carbon emissions? A good place to start is by making changes in everyday actions that reduce your carbon footprint.

No action you take is too small.

One way you can make a difference is by making smart sustainable choices.

- Cleaner transport: Walk, cycle or use public transport whenever possible. Try to avoid flying if you can.
- Smarter energy use: Don't heat rooms more than necessary. Use energy-efficient light bulbs.
- A green diet: Eating plenty of fruit and vegetables and less meat is climate-friendly and healthy too. Try not to waste food.
- Be picky about packaging: plastic packaging creates a lot of waste and is often difficult to recycle. Try to avoid packaged products and take a reusable bag to carry your shopping home.

Acts



TOP TIPS!

- Reduce the number of car journeys.
- Walk or cycle where it is safe to do so and where possible take public transport.
- Turn off lights and appliances when you are not using them. Leaving a TV or computer on standby mode still uses up some energy. So does plugging in your mobile phone overnight – and even when your charger isn't connected to your phone, it is draining electricity! Switching off and unplugging devices can reduce your house's annual energy costs by as much as 10 %.
- Turning down the thermostat by 1 °C could reduce your family's energy bill by 10 % – and setting a lower temperature at night and when you are out of the house will lower the bill even more.
- Turn off the tap while brushing your teeth – this will save many liters of water. Also, did you know that taking a short shower instead of a bath uses up to four times less energy as well as much less water?

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