European Commission

Our planet, our future

Fighting climate change together

Climate Action

Climate change is one of the greatest threats facing mankind today. It is not a problem we can put off and deal with when we have more time, or more money. We all have a duty to act to stop the climate getting worse. The actions we take now will determine what the world we live in will look like in 10, 20 or 50 years' time. And it's going to need huge efforts from all of us individuals, governments, businesses, schools and other organisations, working together for a better climate and a better future."

Miguel Arias Cañete, EU Commissioner for Climate Action and Energy

More information on the European Union.

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Contents

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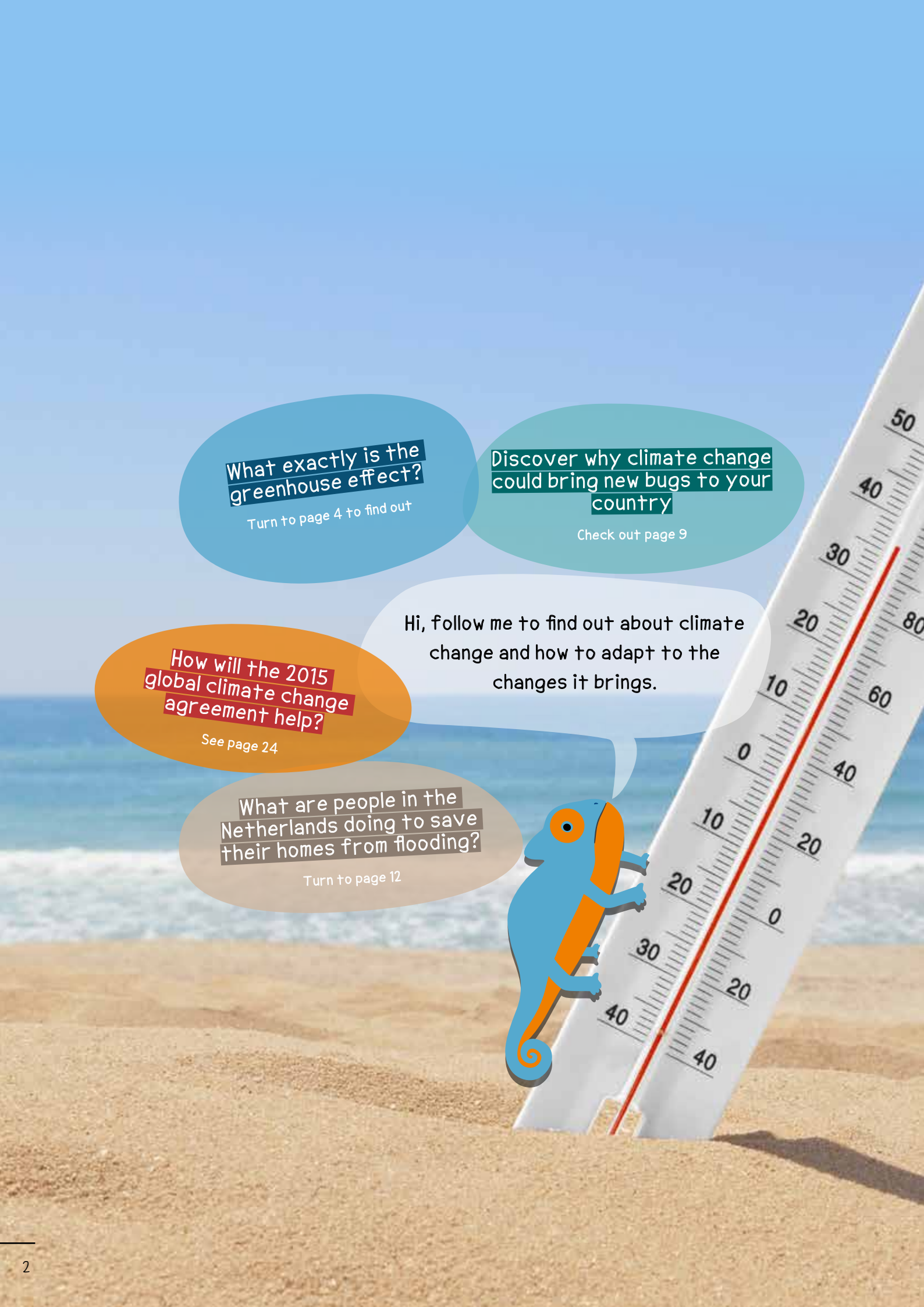

What exactly is the greenhouse effect?
Turn to page 4 to find out
Discover why climate change could bring new bugs to your country
Check out page 9
Hi, follow me to find out about climate change and how to adapt to the changes it brings.
How will the 2015 global climate change agreement help?
See page 24
What are people in the Netherlands doing to save their homes from flooding?
Turn to page 12

Hot topic

Why is everyone talking about climate change? Well, probably because it is one of the most serious challenges facing our world today. Our planet is experiencing significant and accelerated climate change that began over a century ago.

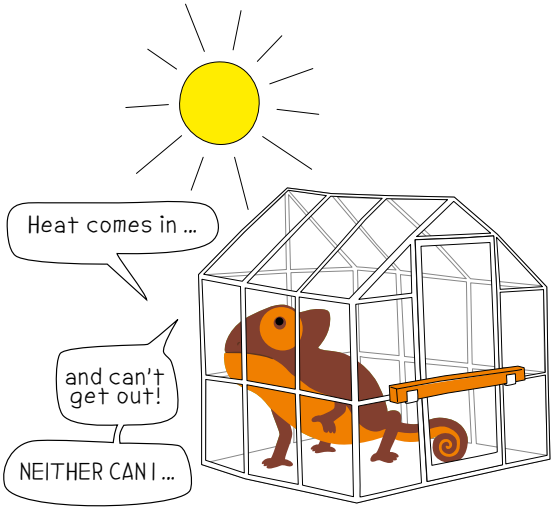
Most scientists agree that the planet is warming up faster than ever because of the vast amount of greenhouse gases that are being pumped into the atmosphere as the result of human actions. This includes activities such as burning fossil fuels (coal, oil and gas), driving cars and cutting down forests.

Many of us have seen – and even experienced – the effects of climate change. But it is not just about extreme weather like floods, droughts and hurricanes. The changes in our climate have the potential to completely alter the way we live.

The good news is that in the EU and around the world, governments, companies and individuals are working to tackle its causes and adapt to the changes it brings. We all have a part to play because climate change is a global problem which can affect each one of us.

We all share one planet and the changes we make in one place can affect others far away. You could say our behaviour makes a lasting impression, like a footprint. So, through our actions and choices, each one of us can take steps to leave smaller footprints and help tackle climate change.

The science bit



Earth's climate has changed throughout history, gradually getting hotter or colder for long periods of time. In the last million years there have been about ten ice ages, with much warmer periods in between. These changes were the result of natural causes, such as changes in the tilt of the planet, the sun's activity and ocean currents. But the changes we are seeing today are different – and we are responsible! By releasing more of the gases that trap heat into the atmosphere, we are causing the temperature on Earth to rise at an extraordinary rate.

The greenhouse effect

When sunlight hits the Earth's surface, some of it is absorbed and warms the ground and some bounces back into space. The absorbed heat is eventually released back into the air.
As it travels upwards towards space, some gases in the atmosphere, notably water vapour, carbon dioxide, methane and nitrous oxide, trap the heat and act like the glass in a greenhouse – keeping the inside warm. This 'greenhouse effect' is what normally keeps our planet at a comfortable temperature.
But human activities are creating vast amounts of greenhouse gases, which are building up in the atmosphere and making the greenhouse effect stronger.

What's causing climate change?

Energy is essential to our daily lives. We need it to heat and light our homes and schools, power our businesses, factories and power plants, and to run the transport we use – cars, buses, trains, etc. But burning fossil fuels to produce this energy, as well as other human activities, such as cutting down rainforests and farming livestock, adds enormous amounts of greenhouses gases to those naturally occurring in the atmosphere. This is increasing the greenhouse effect and global warming.

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 is the average weather conditions in a place over relatively long periods of time. Deserts, for example, have a hot and dry climate, while the Arctic and Antarctic regions are cold and dry.

Did you know?

Levels of carbon dioxide (CO_2) in the atmosphere are higher today than at any time during the last 800 000 years.

Getting warmer

The average surface temperature of the Earth has increased by 0.85°C since the late 19th century and is expected to rise even higher over the next century. It may not sound much, but consider this:

- Most of this warming happened in recent decades so the temperature rise is speeding up;
- 14 of the 15 warmest years on record have occurred this century;
- Don't forget, this is an average increase: some places have become much warmer and others colder; for example, the Arctic has become substantially warmer over the last 60 years and could be ice-free in summer by 2040.

The carbon cycle: always on the move

Carbon is everywhere and in all living things – including you! But carbon does not 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) which is absorbed by plants, including trees, and the oceans.

On land, animals, including us, take in carbon when they eat plants and breathe it out during respiration. When plants and animals die, their remains decay and decompose creating carbon which is absorbed back into the earth. The carbon cycle has kept the proportion of the gas in the atmosphere more or less stable.

However, this fine balance is being upset by human activities that either release CO_2 faster than it can be removed naturally or reduce natural stores of carbon, such as through deforestation of tropical rainforests.

Is the hole in the ozone layer responsible for climate change?

No! Ozone is a very useful gas high up in the Earth's atmosphere that absorbs harmful ultraviolet radiation from the sun. When scientists realised that man-made gases used in fridges and aerosols were making a hole in the ozone layer, the international community set about phasing them out. An agreement called the Montreal Protocol was drawn up to gradually reduce the use of these dangerous substances called chlorofluorocarbons (CFCs).

Efforts have been so successful that the ozone layer is on track to recover by the middle of the 21st century. Unfortunately, the CFCs – and their successor substances – were eventually replaced by fluorinated gases, known as F-gases. These have no effect on the ozone layer but are powerful greenhouse gases. The EU is now leading the world in restricting their use and finding alternatives to them. By 2030, EU emissions of F-gases will be cut by two-thirds compared to current levels.

Did you know?

Without the greenhouse effect, the average temperature on Earth would be a chilly -18°C instead of the comfortable 15°C it is today – far too cold for plants and animals, including us, to survive!

Fossil fuels – like coal – are the remains of ancient plants and animals buried deep in the ground for millions of years that have turned into substances that can be used as fuels.

Did you know?

Carbon comes in many forms, like graphite in your pencil and diamonds, which are pure carbon. And about 20% of our body is carbon.

How does CO_2 compare with other greenhouse gases released into the atmosphere?

	Contribution to global warming	Lifetime	Heat-storing power
Carbon dioxide (CO_2)	55%	50-500 years	/
Methane	32%	12 years	28 x CO_2
Nitrous oxide (N_2O)	6%	120 years	265 x CO_2
Halocarbons and fluorinated gases	7%	from days up to thousands of years	1-10 000 x CO_2

Our **carbon footprint** measures the impact we have on the planet in terms of the amount of greenhouse gases we produce in our daily lives, for example, how much fuel and power we use or is needed to make the things we use. Check out some tips for making your carbon footprint smaller on page 26.

Measuring change

Samples of ice taken from deep below Antarctica contain bubbles of air from 650 000 years ago. They tell us about greenhouse gas levels in the past, and reveal that concentrations of CO_2 and methane in the atmosphere were much lower than they are today.

Tree rings are a record of a year's growth. Scientists study rings in very old trees to find out how the climate has changed over time. For example, rings are thinner when the weather is cold or dry.

The Mauna Loa Observatory in Hawaii, USA, has been measuring CO_2 levels in the atmosphere since 1958. Measurements taken from this remote location, where the air is undisturbed, are a good indicator of global CO_2 levels.

Satellite images show us the difference between Artic sea ice cover over a period of time.

The below 2°C objective

Governments have agreed that to prevent the most severe impacts of climate change, the increase in the global temperature must be limited to below 2°C compared to the level in pre-industrial times (before the Industrial Revolution). This is because scientists believe that beyond this point the risk of irreversible large-scale changes increases dramatically. The below 2°C objective was agreed under the United Nations Framework Convention on Climate Change (UNFCCC) – the international agreement to address the climate challenge.

Sorting the science

Every six or seven years, an important scientific body called the Intergovernmental Panel on Climate Change (IPCC) releases a report on scientific evidence on climate change. The world's most influential and respected climate scientists contribute to this. They assess tens of thousands of scientific papers to update the world on the state of the climate plus options to tackle global warming and the changes it brings.

The IPCC's latest Assessment Report (AR5), published in 2013 and 2014, involved thousands of authors and editors from more than 80 countries. It shows there is at least 95% certainty that human activities are the main cause of climate change. The report says it is not too late to prevent dangerous climate change but the world must act fast to cut greenhouse gas emissions.

TOP TIP

Get your parents to check the labels when they buy a new fridge or air-conditioning unit to make sure they are energy efficient and are not harmful to the ozone layer.

Did you know?

The Intergovernmental Panel on Climate Change and former US Vice-President Al Gore were jointly awarded the Nobel Peace Prize in 2007 for their work on climate change.

Dr Jolene Cook climate scientist

How serious is climate change?

Our planet is warming fast. Human activities are causing this change, and we are beginning to see the consequences all over the world. The more we disturb the climate, the greater the risks of dangerous changes and the harder and more expensive it will be to limit future changes and adapt to the unavoidable impacts. The average temperature of the Earth's surface could rise by 4°C or more before the end of this century if we don't take urgent action to reduce greenhouse gas emissions.

How does science help in the fight against climate change?

Science is where it all starts. It helps us understand the changes we're experiencing now and those that could happen in the future depending on our actions today and over the coming decades. Science provides the solid evidence that guides policy-makers and enables them to make informed decisions on the best course of action.

What can we do about climate change?

Unfortunately, there will be some impacts of climate change that we won't be able to avoid and we will have to adapt to those, but it's still important that we limit the scale of future impacts. The good news is that there is a lot we can do. It's not just up to politicians to take action. We can all do our part by making smart choices like eating less meat and more locally grown fruit and vegetables, saving energy, and cycling or walking instead of travelling by car (especially on short journeys). The great thing is that many of these actions are also good for our health and our wallets.

WHAT'S THE DIFFERENCE?

Global warming describes the current rise in the Earth's temperature. It is just one feature of climate change.

Climate change refers to the many different effects of global warming on the Earth's climate system. These include rising sea levels, melting glaciers, changing rainfall patterns, increased frequency of extreme weather (such as flash floods and heatwaves), changing lengths of seasons, and changing crop yields.

A changing world

Around 50 000 people died (almost 15 000 in France alone) during a heatwave in Europe in August 2003, when many countries experienced their highest temperatures on record.

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.

Feeling the heat

The world is experiencing more hot days and fewer cold days, with heatwaves predicted to become more frequent and last longer. Long periods of unusually hot weather can be dangerous, causing health problems such as heatstroke, and even death. A warmer planet can also lead to water shortages and droughts. We are already experiencing this in Europe, particularly in southern parts. And a lack of rain means trees and other plants become very dry and catch fire easily, resulting in destructive wildfires.

Food for thought

Searing heat and a lack of water are a disastrous mix for crops and for world food supplies. Plants need water to survive, and without plants to eat, livestock such as cattle starve too. When the top layer of soil in a farmer's field dries out it becomes dusty and blows away, taking with it vital nutrients the plants need. The result is less food, which is a big problem because the world's population is set to increase from 7 billion today to 9 billion by 2050, so we will need more food, not less.

Our food supplies are also threatened by the effect of climate change on bees and other pollinators. Some scientists think warmer springs encourage bees to leave their winter nests too early, before the plants they feed on and pollinate are in flower.

Did you know?

The United Nations Food and Agriculture Organization estimates that of the 100 or so types of crops that provide 90% of food worldwide, 71 are pollinated by bees!

Examples of extreme weather events in 2013

Wild storms

Global warming is being linked to wilder, more damaging storms. Hurricanes, typhoons and cyclones are different names for the violent storms that form over warm bodies of water, like the Pacific Ocean or Caribbean Sea, when there is a lot of warm, wet air in the atmosphere. On land, the fast, spiralling winds can uproot trees, destroy buildings and overturn vehicles. In 2013, Typhoon Haiyan, which reached wind speeds of more than 300 km per hour, killed over 5700 people in the Philippines.

The map above shows some examples of extreme weather events in 2013. In the future, we can expect these kinds of events to become more frequent as a result of climate change.

Did you know?

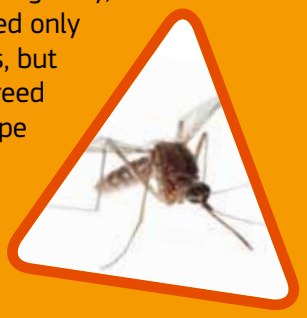
In June 2013, floods in central Europe caused damage estimated at around €12 billion.

Flood alert!

Heavy rain causes floods when it runs off land and swells rivers and reservoirs so they burst their banks. The impact can be extreme in cities, where water cannot soak into concrete and tarmac. After the flood waters have subsided, the clean-up is time consuming and expensive.

Wildlife on the move

Many land and sea species have already moved to new locations. Some will be at greater risk of extinction without action to limit climate change. Changes in the climate also mean that some insects that previously lived in one region are now invading new places. Some mosquitoes transmit diseases such as yellow fever, dengue fever, chikungunya and malaria when they bite. Originally, these insects lived only in tropical places, but some live and breed in southern Europe today because the climate is warmer.



Did you know?

Scientists believe that oceans are acidifying faster today than at any time in the last 300 million years.

Warmer oceans

Climate change is also having a big impact on the world's oceans. Oceans have absorbed more than 90% of the additional heat from atmospheric changes caused by our activities over the past 40 years. While this means that the atmosphere is not warming as much as it could, it is warming the oceans. Warmer water reduces fish and shellfish numbers and causes species to migrate. For example, tiny shrimp-like krill, eaten by fish and whales, breed best in cold water. Warmer water means fewer krill and fewer fish. Coral reefs, which are home to over 25% of all marine life and where many fish breed, also struggle to survive when the water gets too warm.

The oceans absorb around a quarter of the carbon dioxide we release every year, and rising levels of CO_2 mean greater amounts of the gas being stored in the seas. This helps to regulate the climate but is changing the chemical balance in the oceans. The waters are becoming more acidic, which is harmful to marine life, in particular to shell-building sea creatures like lobsters, oysters and corals.

Did you know?

Oceans absorb about 4kg of CO_2 per person per day.

Can you imagine what it is like to know that one day your home may be submerged by water? The Marshall Islands in the northern Pacific Ocean is one the most vulnerable island countries in the world, with much of the land lying only around three metres above sea level. Scientists say a local rise in sea level of just 80cm could submerge two-thirds of the land.

Rising sea levels

Between 1901 and 2010, the average sea level across the world rose by 19cm. There are two main reasons for this: the first is that as water gets warmer it expands and takes up more space. The second is that global warming is causing glaciers and the giant ice sheets in Greenland and Antarctica to melt faster, adding more water to the oceans. The resulting rise in sea levels causes floods on low-lying coastlines and is threatening to submerge some islands completely. Higher sea levels can also harm important coastal ecosystems like mangrove forests, which are safe havens for young fish and other wildlife, protecting them from storms that erode coasts. And when salt water soaks into land, it ruins drinking water supplies and spoils soils, making it impossible to grow crops.

Did you know?

Venice sank by more than 20cm in the 20th century.

Sinking city

The wooden piles on which Venice is built are disappearing into the mud in the shallow lagoon in the Adriatic Sea. With the lagoon waters rising by about 2mm each year, the combined effect is a 4mm-a-year rise in the sea level. Frequent floods damage the historic buildings, cover paths and affect tourism. However, a plan is under way to install 78 huge steel gates to hold back floods.

Polar food threat

The largest polar predators, like leopard seals and polar bears, need tiny algae that grow on the underside of ice to survive. These algae are the start of almost all polar food chains. Plankton eat the algae, small fish and krill and other creatures eat the plankton, and so on up the food chain to fish, penguins and seals. With less Antarctic and Arctic sea ice, these food chains are breaking down.

Did you know?

Only 2.5% of water on the Earth is fresh water. Of this, over two-thirds is frozen in glaciers and polar ice caps. So, use water wisely!

Changing with the climate

Whether we like it or not, climate change is a part of our lives. Even if we could eliminate all our emissions tomorrow, the planet would still have to recover from the greenhouse gases that are already in the atmosphere. This means we need to adapt to the changes happening now and plan for the future to prevent or limit the damage that climate change can cause.

Adapting to rising waters

Floating houses: in Maasbommel, in the low-lying Netherlands, some residents are preparing for more frequent floods by living in amphibious homes that are anchored to the land but designed to rise when the water rises.

Building barriers: constructing man-made sea walls and dykes helps keep the water out, as do sand dunes. These can be planted with tough grasses whose roots help stop the dunes being washed away.

Green sponges: flood plains (natural areas that drain into rivers) can act as sponges, absorbing excess rainwater. Countries along the River Danube and the River Elbe are restoring former plains by giving rivers more room.

Water wise

Water conservation: some people are finding novel ways to save water, for example by installing 'grey-water' systems in homes and businesses (such as hotels) that reuse water from washing for flushing toilets. And innovative farmers are using trickle irrigation at night so that plants get water straight to their roots without it evaporating in the heat of the day.

Tackling the heat

Smart planting: some farmers are planting more crops among trees for shade to cope with the hotter, drier climate. In cities, landscapers are introducing drought-tolerant flowers and shrubs in parks and along roadsides that can cope with warm, dry conditions.

Green walls and roofs: a number of cities are growing plants on walls and roofs to absorb heat and help control the temperature inside buildings when it is hot. They also absorb water and reduce run-off during storms.

Plans to tackle climate change

Many EU countries have already prepared national plans to address the problems climate change causes. As different regions will face different problems, these plans have to be adapted to regional and local situations. In agricultural areas, for example, this might include investing in storage facilities to water crops in a drought, while in cities it may mean creating more parks to keep people cool during heatwaves.

Taking action to prevent floods can save lives and money: each euro spent on flood protection could save six euros in repair costs!

Preparing for extreme weather in Copenhagen

In July 2011, it rained in Copenhagen ... but this was no ordinary shower. Around 15cm of rain fell in just two hours. The city's drains could not cope with the volume of water and buildings and roads were soon flooded. Two of Copenhagen's major hospitals were threatened with closure because of flooding and power cuts. The event made the city's leaders think about drawing up a plan to protect the city from future extreme weather events. As a result, a Cloudburst Management Plan has been developed which will not only help manage rainwater better in the future but will also improve the quality of city life. The scheme even includes proposals to develop new bicycle routes that also serve as storm-water channels.

Making a difference

The most important challenge we face today is to stop climate change getting worse. There is a lot we can – and must – do to make our world less energy-consuming and more climate-friendly. This means finding solutions that help us cut greenhouse gas emissions. Besides being good for the climate, it is also good for our health (less pollution), the security of our energy supplies and creates more jobs, helping the economy to grow.

Renewable energy

One way to cut greenhouse gas emissions is by using more renewable energy, such as wind and sunlight. 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. Today, around 15% of the EU's energy comes from renewables. The plan is to raise this to 20% by 2020 and to at least 27% by 2030.

New ideas on the horizon

Finding sustainable solutions to tackle climate change requires new scientific research and discoveries. Horizon 2020, the EU's largest-ever research and innovation programme, has nearly €80 billion of funding available between 2014 and 2020 to help researchers and innovators develop ideas that can be applied in the real world. The EU also supports the development of innovative low-carbon power plants (see pages 20-21).

Hot spot

Geothermal energy is hot stuff! Some countries can use energy stored below the Earth's surface to warm pipes that heat homes and water, or to drive a generator to produce electricity. Many spas in Hungary use geothermal energy to heat water for leisure activities, and the EU is supporting innovative geothermal power projects there, too.

Did you know?

At least 4.2 million people in the European Union work in the EU's green sector.

Did you know?

The EU imports more than half its energy – at a cost of more than €1 billion a day!

EU countries are already working hard to cut greenhouse gas emissions and meet reduction targets: -20% by 2020 and at least -40% by 2030, keeping us on track towards a long-term goal of at least -80% by 2050.

A school powered by the sun

Gedved School in Horsens, Denmark, gets 75% of its energy from the sun, saving the school €30 000 each year. This money can now be used for education. Switching to solar power has not only cut CO_2 emissions by 90 tonnes a year, but is also helping educate pupils about climate change.

Did you know?

Between 2014 and 2020, 20% of the EU budget – as much as €180 billion – will be spent on climate-related actions.

Solar cycle path

Famous cycling nation, the Netherlands has laid a 70-metre stretch of cycle path in Krommenie, north of Amsterdam, with built-in solar cells that convert sunlight into electricity. The cycle path is being used to test out the pioneering technology and will be extended to 100 metres in 2016. The pilot project is expected to generate enough electricity to power three homes.

Did you know?

Renewable energy now provides more than one-fifth of the world's electricity.

The green sector: jobs connected to protecting and preserving the environment, for example in water and waste management, recycling and renewable energy.

Did you know?

Greenhouse gas emissions in the EU were reduced by 19% between 1990 and 2013.

Driving change

What kinds of transport do you use? Cars, trains, buses, boats and planes that burn oil-based fuels are responsible for around 25% of EU greenhouse gas emissions. Fortunately, new technologies are helping to make transport more climate-friendly. By reducing traffic and pollution, they are making our cities cleaner, too.

Emissions from the global shipping industry amount to around 1 billion tonnes a year, accounting for 3% of the world's total greenhouse gas emissions. The EU has adopted laws for monitoring emissions from large ships using EU ports.

Did you know?

Global CO_2 emissions from aviation and shipping are higher than those of the entire continent of Africa!

On the road to cleaner transport

More than two-thirds of transport emissions come from road transport, but thanks to EU CO_2 emission standards, vehicles are becoming less polluting. For example, a new car produced in the EU emits 20% less CO_2 today than in 2007. The EU has some of the toughest standards in the world and is continuously working to strengthen them. Many countries, such as Japan, the US, Canada and China have also introduced CO_2 standards.

Hybrid cars have a fuel engine for long, speedy trips and a battery-powered electric one that kicks in on short, stop-start journeys.

Electric trams indirectly emit CO_2 from the electricity they use, unless they are powered by renewables in which case they do not emit any, but emissions per passenger/kilometre are less than half those of a small car.

Did you know?

Cooking oil, fruit peelings and vegetable scraps can be converted into car fuel.

Aviation is one of the fastest-growing sources of greenhouse gas emissions. The EU has laws in place to reduce aviation emissions from all flights within Europe and is working with the international community to develop measures that cover the whole world.

Did you know?

The EU aims to cut carbon emissions from transport by 60% by 2050.

TOP TIP

New cars sold in EU countries have a label showing their fuel efficiency and CO_2 emissions, so help your family choose a car with low fuel consumption.

Climate change and the city

Cities are big contributors to climate change – not so surprising, since that is where 75% of Europeans live today. As hubs of activity, they are a big source of carbon emissions. Urban areas account for 60-80% of global energy use and around the same share of CO_2 emissions, so they have a large carbon footprint. But as well as being part of the problem, cities can also be part of the solution. Cities across the EU are changing for the better, thanks to the innovation and vision of local leaders who are helping reduce emissions through smart planning and clever schemes.

Accessible cities

Car-free days are a great way of getting people to explore alternative ways of getting around town. This is one of the events that take place in many cities during European Mobility Week, a campaign supported by the European Commission which is organised every September. In 2014, more than 2000 cities from 44 countries took part. And despite the title, cities outside the EU also participated – including some in Japan, Brazil and Ecuador. Mobility Week gives people the chance to try out alternative forms of transport and encourages cities to introduce practical measures. More than 8000 permanent measures, such as carpooling and bicycle-sharing schemes, have been introduced thanks to the campaign.

Did you know?

Cities cover around 2% of the earth's surface but are home to more than half the world's population.

Mayors with a mission

More than 6000 cities across the EU have made a voluntary commitment to take measures to reduce greenhouse gas emissions. They have joined the Covenant of Mayors, a European Commission scheme to encourage cities to cut emissions by increasing energy efficiency and the use of renewable energy sources. It has been so successful that a second scheme, called Mayors Adapt, has been set up focusing on action to anticipate the adverse effects of climate change in cities and taking action to prevent or minimise the damage. Is your city a member?

Did you know?

90% of Europeans think climate change is a serious problem.

Save energy, save money

More efficient buildings and appliances can save huge amounts of energy, emissions and money. A large amount of energy used by households in the EU goes on heating homes. Triple-glazed windows to keep the heat in, good insulation and roofs covered with plants that store rainwater and help to keep buildings cool are just some of the ways to reduce the carbon footprint of our homes, schools and offices. By 2020, more efficient appliances, like refrigerators and washing machines, are expected to save European households around €465 a year on their energy bills.

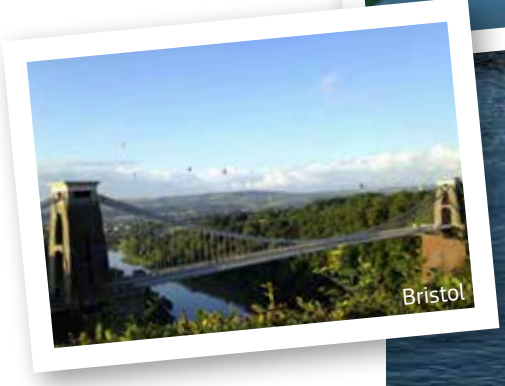
The EU has pledged to improve energy efficiency by 20% by 2020 and by at least 27% by 2030.

Did you know?

By the end of 2020, all new buildings in the EU will have to be nearly zero-energy buildings.

European Green Capitals

The European Green Capital award is given to cities that are committed to becoming more sustainable. Bristol, in south-west England, took the honours for 2015. Ljubljana in Slovenia will take over the title in 2016. The aim is for cities to inspire each other and share ideas and experiences.



Sustainable: able to ensure we have and continue to have the basic resources needed to survive, such as water, food and energy. Being sustainable means taking care of the planet and living within the limits of what it can provide.

Copenhagen (European Green Capital 2014)

Be wise about waste

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.

What a waste!

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 with its partners to help spread the word about shopping wisely, the meaning of dates on food labels and using leftovers. It is also trying 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 100 million tonnes of food currently wasted annually in the EU!

Did you know?

Today new buildings use half the energy they did in the 1980s.

Think twice before upgrading gadgets

Waste electrical and electronic equipment (WEEE) 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.

Cleaner industries

Factories that make the products we use every day and power stations that produce electricity we need to run our homes, schools and offices, release large amounts of CO_2 and other greenhouse gases (GHGs). To help reduce these emissions, the EU has designed the world's first and largest system which limits the amount of GHGs that can be emitted and also makes companies pay for the emissions they release into the atmosphere.

The EU Emissions Trading System (EU ETS) sets a limit on the annual amount of GHGs that companies can emit. This overall amount goes down every year, and because companies report their emissions, we can be sure our industries are becoming less polluting. The more companies emit, the more they have to pay, so it is in their interest to emit as little as possible, for example by investing in cleaner technologies which produce less CO_2.

The EU ETS was launched in 2005 and is a key part of the EU's climate policy. It currently covers over 11 000 power stations and industrial plants in all EU countries and also includes emissions from flights within the EU.

Today, there are similar systems across the world, for example in China, California and South Korea. More countries are following the EU in putting a price on emissions so that over time companies in most countries should have to pay if they want to pollute.

For sectors that are not included in the EU ETS, like cars, buildings, agriculture and waste, responsibility to reduce emissions is shared out among the EU countries through targets set at national level.

Supporting new technology

The EU is helping to finance ground-breaking low-carbon technologies around Europe through a special fund raised through the EU ETS. So far, some €2.1 billion of EU funding has been used to support 38 renewable energy projects, such as offshore wind turbines, geothermal energy and biofuels as well as new technology that captures carbon and stores it underground. The EU will continue to support the research and development of climate-friendly solutions in the future. European countries are also spending billions of euros raised from the EU ETS to tackle climate change.

Concrete action on CO_2 emissions

Concrete is an essential building material – used to make buildings roads and bridges – but producing its basic ingredient, cement, also generates large amounts of CO_2. Making one tonne of cement releases one tonne of CO_2 because most cement is made by heating limestone to high temperatures. The cement industry is now starting to make more sustainable concrete by investing in modern technology and using material that emits less CO_2.

Jobs in the pipeline

Fancy an exciting career working with the latest cutting-edge technologies? Today, there are many jobs in areas like renewables that did not exist ten years ago. Some EU countries have even set up special training centres for the operation and maintenance of offshore wind turbines. Imagine climbing up an 85-metre tall wind turbine tower to fix an electrical fault or service the oil filter – a long way from shore and working in stormy seas and gusting winds!

Body warmers

You know how we all heat up when rushing around? Clever engineers have installed ventilation systems to capture body heat from the 250 000 commuters passing through Stockholm Central Station each day. The heat warms water in underground tanks, which is pumped to a nearby 13-storey office block where it is used to keep workers warm.

Storing carbon underground

The first large-scale project in Europe demonstrating carbon capture and storage technology will take place in the UK with funding from the EU ETS. The White Rose project will involve pumping CO_2 from a new coal-fired power station into rocks under the North Sea. The project, which will be located in Yorkshire, is expected to capture 90% of the new plant's emissions, instead of releasing them into the atmosphere. This will reduce greenhouse gases by an amount equivalent to taking more than a million cars off the road. Carbon capture and storage is a technology with significant potential to contribute to the fight against climate change, both in Europe and globally.

Destroying more than trees

People are cutting down the world's forests at an alarming rate: up to 80% of tropical deforestation is to clear land for farms, but trees are also cut down to make products such as timber and paper, or to build roads and mines. Deforestation has a major impact on CO_2 levels. When there are fewer trees, less CO_2 is absorbed, and when trees are cut down or burned they release their store of CO_2 into the atmosphere. Deforestation has other devastating impacts too, such as destroying the habitat for forest animals – a tragedy in tropical forests, which are home to around half of all known land-based species – as well as changing rainfall patterns, causing droughts.

So what's the solution? Countries can protect existing areas of forest and stop people selling trees that are illegally harvested. The EU Timber Regulation traces timber from forests to timber yard to ensure that only legally harvested wood is imported into the EU. The law affects both imported and domestically produced timber and timber products ranging from paper and pulp to solid wood and flooring.

Did you know?

An area of tropical forest about the same size as Greece is cut down every year.

Protecting global forests

A scheme called REDD+ (Reducing Emissions from Deforestation and Forest Degradation plus conservation) helps tropical countries adopt more sustainable approaches. It pays people in developing countries to preserve their forests by calculating the value of carbon prevented from entering the atmosphere by not cutting down forests, and converting this into funds for climate-smart use of forest land. REDD+ money has been used in more than 40 countries, focusing for example, on forest monitoring (measuring trees), improving fire-service response to forest fires, and developing the agro-forestry industry (a mix of farming and forestry). It requires a careful balancing act between conservation and protecting the interests of those who live in the forest and rely on it for food, water and other resources. The European Commission commits around €25 million a year to REDD+ activities in Asia, Africa and Latin America.

Did you know?

Soils are home to over a quarter of all living species on earth.

Soil's super carbon store

Most of us consider the soil beneath our feet as just dirt, but soil plays an essential role in regulating the world's climate. Soil stores carbon mainly in the form of organic matter, and is the second largest carbon pool on Earth, after the oceans. The ability of soil to keep hold of the huge amounts of carbon it stores has been weakened in recent decades, largely due to unsustainable land-management practices and changes in land use. However, with almost half of Europe's land under farming and around 40% covered by forests, sustainable agriculture, good forestry practices and good land management can help maintain or even increase the amount of carbon held in the ground.

Fighting climate change around the world

The global effort to fight climate change began in 1992, when countries around the world joined an international treaty aimed at preventing dangerous climate change. The agreement is called the United Nations Framework Convention on Climate Change (UNFCCC).

"As an actor I pretend for a living. I play fictitious characters often solving fictitious problems. I believe humankind has looked at climate change in that same way: as if it were a fiction, happening to someone else's planet, as if pretending that climate change wasn't real would somehow make it go away. But I think we know better than that. Every week, we're seeing new and undeniable climate events, evidence that accelerated climate change is here now."

Leonardo DiCaprio, UN Messenger for Peace, 2014, speaking to world leaders at the UN Climate Summit in New York

Some countries, including the EU, have agreed to legally binding targets to limit their emissions in the years up to 2020 under an agreement called the Kyoto Protocol.

Altogether more than 90 countries from all around the world have also pledged to take voluntary action by 2020. But these pledges will not be enough to avoid dangerous climate change.

Towards a new global deal

Thanks to pressure from the EU and other countries, UN negotiations are under way to reach a new legally binding climate agreement that would require action by all countries to cut greenhouse gas emissions. Citizens and businesses have a role to play too.

World leaders will meet in Paris in December 2015 to finalise the deal, which should be implemented in 2020.

Did you know?

Almost all countries in the world are members of the United Nations Framework Convention on Climate Change – that's 195, including all EU Member States individually, plus the EU as an organisation.

Funding change

Poor and vulnerable nations will need help to cut their emissions and adapt to the impacts of climate change. The EU provides the largest amount of public money to developing countries to fund climate projects. In 2013, for example, the EU and its member countries collectively provided €9.5 billion to help them tackle climate change. EU Member States also contributed almost half of the $10 billion pledged to the UN's new Green Climate Fund, which will also support developing countries.

Did you know?

The EU is responsible for 9% of global emissions, while China accounts for 25% and the US 11%.

The People's Climate March

In September 2014, the largest-ever meeting of world leaders to discuss climate change took place in New York. Ahead of this UN Climate Summit, some 400 000 people took to the streets in support of climate action. This was the biggest single climate march in history. But New York was not the only place where people were campaigning for the climate – more than 2500 marches took place in over 150 countries. At the Summit, governments, cities, companies and individuals committed to reducing their use of fossil fuels and moving towards cleaner alternatives. Global leaders representing almost half the world's population supported putting a price on greenhouse gas emissions.

Milestones

1988 The Intergovernmental Panel on Climate Change (IPCC) is established, bringing together thousands of scientists to assess scientific evidence on climate change and its impacts

1992 Countries join the United Nations Framework Convention on Climate Change (UNFCCC), the main international treaty for fighting climate change

1997 The UNFCCC adopts the Kyoto Protocol, the world's first greenhouse gas emissions treaty

2005 The EU launches its Emissions Trading System (EU ETS) (see page 20)

2007 The EU agrees the 2020 climate and energy package to reduce EU greenhouse gas emissions by 20% compared to 1990 levels, raise the share of renewables to 20% of EU energy use, and improve energy efficiency by 20%

2009 The UN Climate Change Conference in Copenhagen ends without an overall agreement on binding cuts

2014 100 world leaders meet for the UN Climate Summit in New York; IPCC 5th Assessment Report on climate change declares the below 2°C objective is still within reach; EU agrees its 2030 climate and energy package, including a target to reduce EU greenhouse gas emissions by at least 40%

2015 Paris, France: new global climate agreement due to be adopted

over to you!

What about you? Do you feel concerned about the threats from climate change? 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.

Make smart choices

One way you can make a difference is by making smart choices when you are shopping.

Buy less: buy better, spend less – for example, buy one good pair of shoes rather than three cheap pairs.

Buy locally: choosing local fruit and vegetables in season rather than those grown a long way away saves energy used in transport. (But remember, local is not always better carbon-wise, for example if grown in heated greenhouses or with fertilisers made from fossil fuels.)

Be picky about packaging: plastic packaging adds to the waste burden and is not easily recycled. Buy products in recyclable or compostable packaging and take a reusable bag to carry shopping home.

Did you know?

The average carbon footprint for a European is 7 tonnes of CO_2 per year.

TOP TIPS

- Gadgets like TVs and computers left on standby drain power from wall sockets so switch them all off properly – this can save as much as 10% of annual energy costs which your family can spend on other things.
- Turn down the thermostat by 1°C – that can trim 300kg off your home's carbon footprint and 10% off household energy bills.
- Turn off the tap while brushing your teeth. This can save several litres of water.

Carbon offsetting

Carbon offsetting is when you calculate the amount of carbon an activity, for example, a plane ride, releases and then pay an organisation to reduce emissions elsewhere, or in some cases plant trees. It sounds good but some people say it is better to try harder to create less carbon in the first place. What do you think?

Reusing, repairing and recycling waste saves scarce natural resources, energy and CO_2 emissions.

Young Europeans take the lead

When Felix Finkbeiner from Munich, Germany, was nine he gave a presentation at school on the climate crisis. Inspired by the story of a Kenyan woman, Wangari Maathai, who started a tree-planting campaign, Felix set himself and young students everywhere a challenge – to plant a million trees in each country of the world. The first tree was planted in his school. Felix is now 17, and today his Plant-for-the-Planet movement involves around 100 000 children who have planted billions of trees across the globe. The plan is to plant a trillion trees by 2020.

Speak up!

Why not get involved yourself? You might come up with an idea that could change the future!

Get your arguments ready and join the debate on climate change at school and at home. And if you feel passionate enough, why not start campaigning for climate action:

- Talk about the issues with friends and family and get them involved. You will be able to explain the topics to them in a way that really makes an impact – and showing them how much you care may make them care more, too.
- Encourage your family to make changes at home and in their daily lives.
- Find out what climate actions your school is taking.
- Write to mayors, politicians and business leaders to encourage them to take action.

Tell us what you think about climate change and what you are doing to fight it at:
ec.europa.eu/clima/citizens/youth/

For more climate-friendly tips, visit:
ec.europa.eu/clima/citizens/tips/

Check out our latest films at:
youtube.com/EUClimateAction

And remember three things:

1. It is not too late to fix the climate
2. You can make a difference
3. No action you take is too small

Johannes, 13, Finland

Are you concerned about climate change?

Yes. I worry about it for the future. If the ice caps continue to melt away, sea levels will rise and wildlife will be destroyed. I think carbon dioxide emissions and other gases like nitrous oxide should be minimised to reduce the greenhouse effect.

What do you do to help the climate?

I walk to school because I live very close, so I guess that's one way to decrease greenhouse gas emissions. And if possible we try not to travel by car.

Gabriela, 15, Spain

What do you think needs to be done to tackle climate change?

We definitely have to focus on renewable energy and I think we are doing a quite a good job of that in Europe. I know Spain has invested a lot of money in solar and wind energy and the Netherlands are building a lot of offshore wind turbines.

Have you changed your lifestyle because of climate change?

I try not to travel on holiday away from the continent I'm in because I know that planes give off a lot of CO_2 emissions. I try not to eat too much meat because cattle produce methane and also take up a lot of space so farmers tend to clear forests for space for cows and that's not good either.

Kazuki, 16, Japan

What impacts of climate change worry you most?

I am concerned about rising sea levels and the change in weather patterns as well as seasonal changes which have large impacts on wildlife and biodiversity. I believe that biodiversity must be conserved so that future generations can appreciate the world the way it is right now.

What are you doing to help reduce emissions?

I try to reduce the use of plastic products because most plastic is made from oil and causes carbon emissions.

Luigi, 16, Italy

How is climate change affecting your country?

Some regions in Italy that used to be very fertile for agriculture are now becoming warmer, leading to an arid climate and less variety of wildlife and plants.

How are you helping the planet?

We used to have two cars but when we moved we decided to see what would happen if we only had one and we realised that our lives became quite different. I started taking the tram and the bus and we still haven't bought a second car.

George, 15, United Kingdom

What are you doing to tackle climate change?

My family recycles glass, cans, paper and card, and plastic bottles. We also turn lights off when they aren't needed and we don't waste water because we are on a water meter. We are carbon footprint conscious and pay the airline fee to help reduce our footprint when we book flights.

Vincent, 12, the Netherlands

What can your generation do to help fight climate change?

We definitely need to recycle more and we really need to look at renewable forms of energy, at electric cars and climate-friendly alternatives to fossil fuels, so that we can reduce CO_2 emissions. And maybe reduce the amount of cattle, because methane is a big problem.

Vincent's top tips:

Turn off the lights, recycle, try to use public transport or walk or cycle – the small stuff is what really counts.

Driti, 12, India

What impacts of climate change have you seen?

Cases of heat stroke have really increased because of the rising temperatures, so it is not just affecting wildlife, it's affecting everyone.

How are you helping to fight climate change?

At school, we are supporting a charity that helps people who have been affected by floods with money raised during charity week. We are also trying to raise awareness about climate change, so we have made a pledge chart. People can make pledges, like to switch off the lights when they don't need them.

Answers to the quiz:
1 A 2 B 3 A 4 B 5 C
6 C 7 B 8 C 9 B 10 B

Are you a climate change expert?

ML-06-14-050-EN-N

1 By how much has the EU committed to cut its greenhouse gas emissions by 2020?

- ☐ **A** 20% below the 1990 level
- ☐ **B** 12% below the 1990 level
- ☐ **C** 17% below the 2005 level

2 Which of these gases contribute to global warming?

- ☐ **A** Oxygen
- ☐ **B** Methane
- ☐ **C** Argon

3 Which of the following are causing sea levels to rise?

- ☐ **A** Warming oceans
- ☐ **B** Heavy ships
- ☐ **C** Erosion of beaches

4 If you are going to visit family at the other end of the country, which is the 'greenest' way to travel there?

- ☐ **A** By car
- ☐ **B** By train
- ☐ **C** By plane

5 Which of these is not a renewable energy?

- ☐ **A** Geothermal power
- ☐ **B** Solar power
- ☐ **C** Coal power

6 Through what instrument does the EU limit greenhouse gas emissions from power stations and heavy industrial sites?

- ☐ **A** The Montreal Protocol
- ☐ **B** The European Timber Regulation
- ☐ **C** The EU Emissions Trading System

7 To prevent dangerous climate change, the international community has agreed to keep the increase in global temperature below a certain level. What is this level?

- ☐ **A** 4°C above the temperature before the Industrial Revolution
- ☐ **B** 2°C above the temperature before the Industrial Revolution
- ☐ **C** 2°C below the temperature when Leonardo da Vinci was born

8 Which of the following does not release carbon dioxide into the atmosphere?

- ☐ **A** Forest fires
- ☐ **B** Deforestation
- ☐ **C** Carbon capture and storage

9 What proportion of food produced globally is wasted every year?

- ☐ **A** 1/4
- ☐ **B** 1/3
- ☐ **C** 1/5

10 Which of the following is true?

- ☐ **A** It is too late to fix the climate
- ☐ **B** Everyone can do their bit to fight climate change
- ☐ **C** Climate change has entirely natural causes

(Answers on page 29)

Publications Office