



# Foundational Climate Change Curriculum for Educators

## Authors

Koen Timmers  
Dr. Jennifer Williams  
Matt Larsen-Daw  
Séan Mallon

# Contents

<b>1. Introduction</b>	5
Our goal	5
The purpose of this curriculum	5
Technology and pedagogy	5
<b>2. Understanding Climate Change</b>	9
Clearing up the confusion	9
Global Warming vs Climate Change	9
Weather vs Climate	11
Greenhouse Gases	11
Natural cycles vs human impact	12
Our impact	13
A new epoch	13
Facing the future	13
Crisis point	15
Just a few degrees...	16
Climate Change and biodiversity loss	17
The effects of climate change	19
Temperatures Will Continue to Rise	19
Arctic Likely to Become Ice-Free	19
Changes in Precipitation Patterns	20
Hurricanes Will Become Stronger and More Intense	20
The Solutions	22
Reducing fossil fuel use	22
Electric Transport	23
Improved building and infrastructure	23
Changing Industry	24
Agriculture	24
Reinventing our economy to a circular economy	24
Remove CO <sub>2</sub> from the atmosphere	24
Climate adaptation: dealing with the inevitable consequences	25
The Stop Button	25
Government Action	26
The Paris Agreement (2015)	26
<b>Why 1.5° C?</b>	27
What can you do?	29
The power of schools	30
Climate Change in your country	33
Further reading / Resources:	33
<b>3. Teaching Climate Change</b>	34
Instruction versus other learning systems	34
Pedagogy	34
Collaborative learning	34

1: Social constructivism (Vygotsky)	35
2: Connectivism (Siemens & Downes)	35
Learning by doing and playful learning	36
Technology Enhanced Learning	37
Green screen	37
Stop motion video	38
Virtual Reality	39
Augmented reality	39
Gamification versus game based learning	40
Project-based and Problem-based learning (PBL)	41
Important skills	42
Systems Thinking	42
<b>4. Lesson plans and Activities</b>	<b>43</b>
Lesson plans	43
Activities	43
For your inspiration: Compass Education	44
<b>5. Climate Action Project</b>	<b>46</b>
About the project	46
Past impact: you can do this!	46
Malawi - Tree planting Malawi	47
Canada - 3D printing to restore coral reefs	47
Sweden - Visiting prime minister	47
Ireland - Green dot movement	48
USA - Solar Suitcase	48
Nigeria - Biomass plant	49
Indonesia - Ecobricks	49
Belgium - Inviting parents to classroom	49
USA - Aquaponics	50
50 countries - Minecraft eco-world	50

# 1. Introduction

The Climate Action Project was launched in 2017 aiming to connect students globally and allow them to discuss, create, and share findings and solutions online. As participants in the project, teachers and students exchange experiences and local insights, making learning global and authentic. During previous years, students have conceived solutions and taken actions at a local level, while contributing to a truly global conversation and rallying cry about the importance of action on climate change.

This curriculum aims to give teachers enough background and context so they can guide their students on their journey in the project.

It has become clear to teachers around the world that this is not only a key topic about which students are eager to know more, but also an issue around which they wish to take action. They also want to explore other environmental issues, such as pollution, the loss of biodiversity, and water scarcity, and to understand the links between them.

## Our goal

Our main goal is to nurture global citizens who have a deep and nuanced understanding of the world in which they live, and who are willing to take action for a better world. People who are creative, empathetic, collaborative, and who love solving problems. Future-proofed students... and teachers to match!

## The purpose of this curriculum

This syllabus was **not created to be taught through direct instruction or lecture**, or to be handed out to students. Its purpose is to give sufficient context to teachers so they can point their students in the right direction, respond confidently to their inquiries, and guide their discussions.

We do realize that students' age, the topic you teach, culture and even politics may affect how you will need to teach about climate and the environment, yet we decided to stick to one curriculum. We stress that while students are coming from a background that might be influenced by these listed factors, the information within this curriculum is scientific fact and is designed to be universally trusted.

## Technology and pedagogy

COVID-19 has highlighted the role that technology can play in delivering a quality education. Technology allows us to do more than replacing pen and paper; it allows us to connect students and teachers from every corner of the world. Pedagogy is a crucial part in this process. We believe that there are better ways to teach about climate and the environment

than students consuming lectures. Asking students to memorize definitions and statistics about climate change may not be the best way to build their understanding to the point when they can apply such knowledge in their lives. That is why we decided to dedicate one chapter to this important matter.

Students are taking action and causing a shift to occur in classrooms across the world. Students have planted trees, developed solar driven carts, cleaned up beaches, recycled, invented solar suitcases, developed new bioplastics recipes, met with Prime Ministers, brought national change with green dots, and more!

Questions and remarks? Please reach out: [koen@takeactionglobal.org](mailto:koen@takeactionglobal.org).

This curriculum is part of the Climate Action Project, a six week experience launching 28<sup>th</sup> September 2020 and aiming to involve more than 1,000,000 students across more than 100 countries. Our website [www.climate-action.info](http://www.climate-action.info) showcases all of our students' weekly accomplishments.



This curriculum and the Climate Action Project are created and coordinated by Take Action Global. TAG inc. is a 501(c)3 non-profit registered in Florida, USA.



WWF is the leading global organization in wildlife conservation and endangered species, operating in nearly 100 countries around the world.



Creative Commons Licence [CC BY-NC-ND 2.0](https://creativecommons.org/licenses/by-nd/2.0/)



"Climate Change is real. All around the world where the patterns are changing and affecting people, animals and the environment. To tackle this growing crisis we have to take action. We have to change mindsets."

***Dr. Jane Goodall, DBE, Founder the Jane Goodall Institute & UN Messenger of Peace***



"Education is key to changing students' behavior and societies' mindset. For this we need to understand that students can do so much more than memorizing facts about climate and environment. They have the capacity to solve real-world solutions and take action for a better world."

***Koen Timmers, Founder Climate Action Project***



"As we consider the necessary actions to protect our planet, we can look to students to lead the way. This new generation is moving forward in climate action pursuits and impacting international dialogue on societal issues and policy. Through the use of networks and compelling messages of solidarity and resilience, these young activists are taking causes beyond the classroom to social media, city streets, and the steps of government buildings. As citizens of the world, they are demonstrating that an individual person can make a positive impact on climate and the environment. They are mighty and fearless and serve as voices of hope--and, the whole world is watching them."

***Jennifer Williams, Co-founder Take Action Global***



"Climate change is the greatest environmental challenge that the world has ever faced, but we can take active steps. Whatever happens in the next decade, the future is going to look very different, and it is essential that young people are prepared for that future, and given the opportunity to shape the world that they will inherit. This includes understanding how we must work with nature if we want to achieve a healthy and sustainable world."

***Cecily Yip, Global Education Coordinator, WWF***



"We need to educate learners at all ages on the causes of climate change, the impacts of climate change and what we can do to mitigate the effects of climate change. We need to teach communities affected on how they can cope and adapt to climate change. We need to educate learners in schools about climate change so that they can take action in their schools and communities. We need to educate the youth to understand climate change and how they can adapt and develop innovations on climate smart solutions that can in turn create green jobs for themselves. We need to ensure that the youth become a stronger voice for climate change. They can only do this if they understand climate change, its impacts and what can be done."

**Zipporah Musyoki, Regional ESD Programme Coordinator, WWF Africa Region**



Global warming is the biggest issue we as a species have ever faced. It impacts every element of our lives, and yet many people still don't know about it or don't understand it. Education is rightly regarded as one of the most important ways to help solve the climate crisis. We need to be teaching our young people how they can fix the problems facing them. To give them the tools they need, and the hope that will drive them towards a more sustainable future. Our motto at the WWF is to **Fight for your world**, and we want to ensure future generations have the same opportunities and understanding so they can continue that fight. They will be the generation who fixes the problem.

**Seán Mallon, Climate Change Specialist, WWF-UK**



"The challenges the world faces due to climate change and biodiversity loss are daunting, but it is essential that young people growing up in this time of crisis do not feel helpless, but rather are focused on the mission of shaping a world that lives in balance with nature. As the world transitions from ways of living and working that we know cannot be sustained forever to a new, sustainable, zero carbon future, there will be opportunities for the young people who have the skills, knowledge and resolve to lead the way. If educators equip them properly and inspire them with a sense of their potential, their future can be one in which they can thrive - not just survive."

**Matt Larsen-Daw, Education Manager, WWF-UK**

## 2. Understanding Climate Change

We hear a lot about climate change, but what is it? In this chapter you'll learn the scientific definition of climate change, how we know it is happening, and what it means when we say we are currently facing a climate emergency.

### Clearing up the confusion

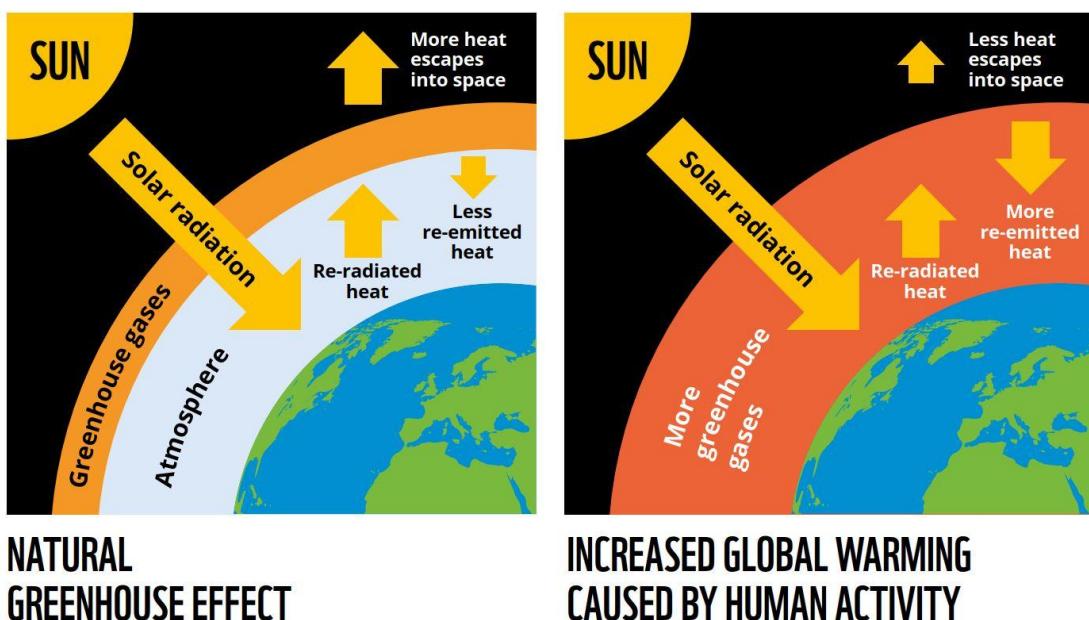
There is still a lot of confusion around climate change. Many terms get mixed up and people don't understand the core principles. This curriculum does not rely on quoting facts, it puts the focus on understanding the 'why' behind something. This critical thinking approach will be easier to communicate to students and will be easier for them to understand.

### Global Warming vs Climate Change

**Global Warming** is the gradual warming of the Earth's atmosphere, oceans and surface. For this, you need to picture the entire planet increasing in temperature, not just one area. It is caused by greenhouse gases entering the atmosphere from various sources, where they trap heat and light from the sun, just like a large greenhouse. That's when things start to heat up.

While we have seen some natural changes over time, they are relatively small. The biggest changes have been in recent times and are the result of human activity.

**Climate Change** is a shift in long-term weather patterns caused (in this instance) by Global Warming. It means a change to the conditions for life, rather than just a change in temperature. The warming globe will have direct results on already hot areas, and in other regions, the heat will have knock-on effects on the weather patterns.



Due to climate change, weather patterns will become more extreme and erratic. We are already experiencing Climate Change; we have more intense summers and harsher winters and the resulting weather events that follow with that.

As Global Warming increases, so do the effects of Climate Change.

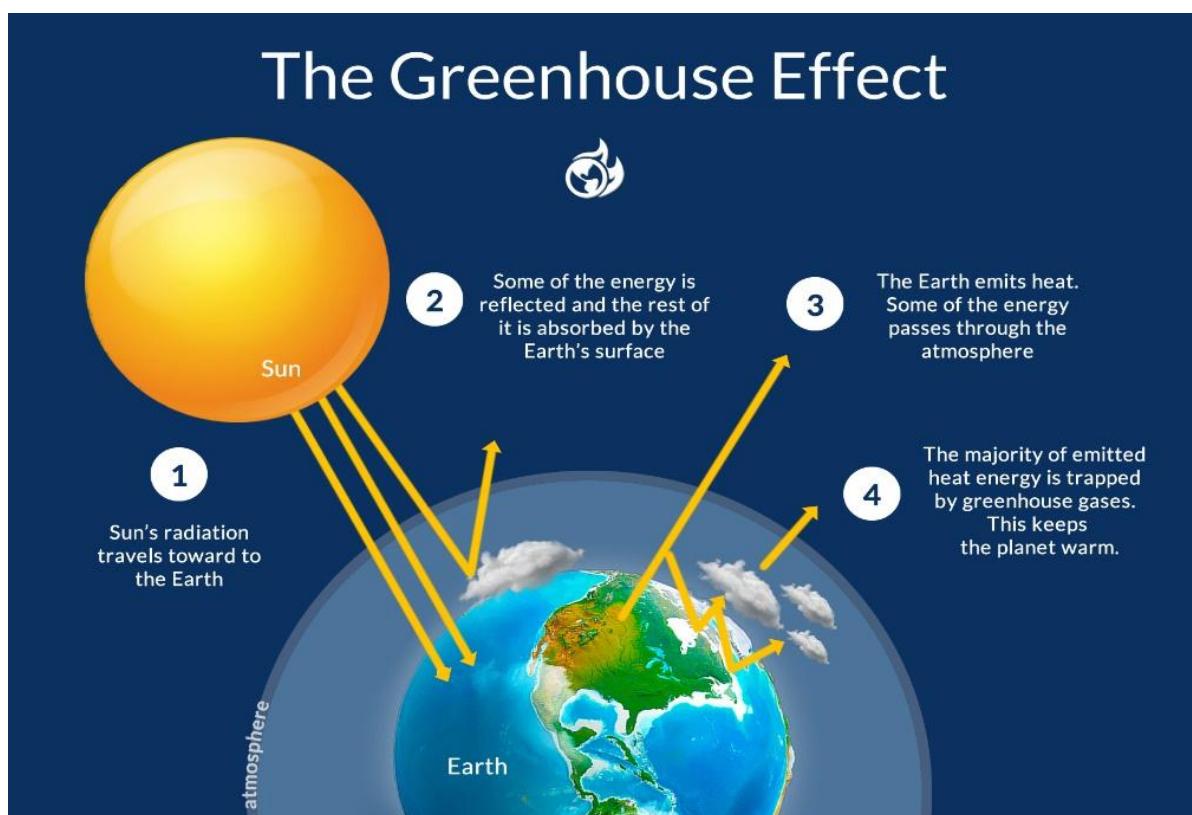
A changing climate is bad news for life on our planet. A stable climate helps living things thrive because they have time to adapt over many years to the conditions in which they live, until their features and behaviours are perfect for those conditions. If the climate changes more quickly than they can adapt to the new conditions it can lead to species being no longer able to survive in the same place or by doing the things they have always done.

An international panel of scientists known as the **Intergovernmental Panel on Climate Change (IPCC)** published a [study](#) detailing what global warming will do to our planet, and they used degrees to show what it meant in real terms. The warmer it gets, the worse the effects are.

We are trying to limit that warming to 1.5 degrees Celsius. It is a target for us to reach in order to protect the environment that sustains us.

A 2-degree change would be devastating for our planet...

**We are currently on a path towards 4 degrees.**



## Weather vs Climate

The concepts of climate and weather are often mixed up with people then thinking a change in weather is evidence against global warming. So here is a quick definition of each to help.

- **Weather** is how we talk about short term changes to the atmosphere. This is how humans feel their surrounding environment. It can refer to rain, snow, cloud cover, humidity and many others states we are familiar with. It can change quickly and be difficult to predict due to its volatile nature.
- **Climate** refers to longer term trends of weather in specific regions. Different regions can have unique climates (coastal areas, deserts). Climate is usually measured in blocks of time that range from decades, or hundreds of thousands of years.

Weather is what we experience day-to-day or week-to-week. Rain, wind, cold snaps and heatwaves are all weather. Weather is affected by lots of atmospheric factors and can be difficult to predict. One year may have very different weather from the next, but this does not show a definite change in climate. Therefore we may have a winter that is colder than the last, while still being in a period of climate change in which the planet is warming up.

Since the 18th century scientists have been monitoring and recording the weather, and these records show us that the climate is changing; our planet is becoming warmer.

## Greenhouse Gases

Gases that trap heat in the atmosphere are called greenhouse gases. When the sun rays are travelling through our atmosphere, these gases can amplify the effect of that heat, just like a green house does for plants. We refer to the individual impact of these gases as their global warming potential or GWP. The two most important Green House Gases to know about are:

- **Carbon dioxide (CO<sub>2</sub>)**: Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees, and other biological materials, and as a result of certain chemical reactions (e.g. manufacturing of cement). Carbon dioxide is removed from the atmosphere (or "**sequestered**") when it is absorbed by plants as part of the biological carbon cycle.
- **Methane (CH<sub>4</sub>)**: Methane emissions have become very important as we learn about our diet. They result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills. When animals chew grass and burp or pass wind, they release methane into the air. And while there are less methane emissions than carbon emissions, the methane emissions have a much bigger GWP. This means a little bit can have a much bigger impact.

Carbon is actually a very common element that can be found in everything from rocks, food and even us! We are carbon-based life. It is not a bad element, but unfortunately due to human activity, it is present in our atmosphere in higher concentrations than we have ever seen.

The rise in carbon in our atmosphere is from the burning of fossil fuels. This all began during the industrial revolution when we discovered combustion created energy, so we started to burn coal and oil to power trains and power our factories. We use fossil fuels to generate electricity and to heat and cool our homes.

Fossil fuels are made from old carbon from plants and animals decaying for hundreds of millions of years. This decaying matter condenses and groups together and forms due to the immense heat within the Earth's mantle.

It is not just from the burning of fossil fuels that causes the release of GHGs into the atmosphere, they can also be released from the destruction of natural resources that might have stores a lot of carbon. It can also happen due to deforestation

Peat bogs getting dug up, forests being destroyed for land and even ancient permafrost melting can all release huge amounts of GHGs into the atmosphere.

These natural resources like trees and bogs are the best way to take carbon out of the atmosphere and trap it in the ground. We need to put it back where it came from – we refer to these kinds of natural resources as Nature-Based Solutions. They take the pollution we have created, and they absorb it so it can't affect us.

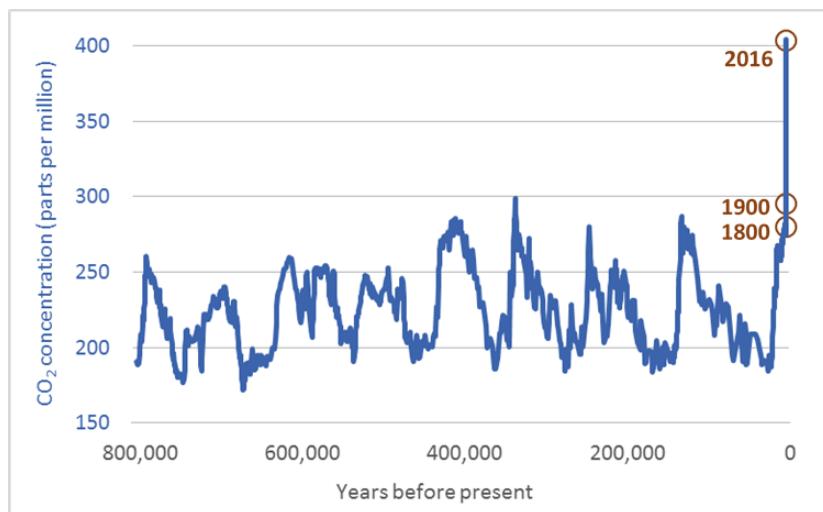
## Natural cycles vs human impact

Our climate is always in a state of change, and is going through natural cycles of change that can happen in the short term (eg seasons) and really long term (eg ice ages).

Our planet Earth has had a relatively stable climate for the past 10,000 years. Changes have been limited to smaller climatic variations. It is this stable period that has allowed humans to flourish – relying on seasonal rainfall and temperature changes to refine productive farming techniques.

These natural cycles are no longer the dominant factor but have been replaced by human influenced cycles. The below graph shows the limits of CO<sub>2</sub> in a historical context. The last segment on the right shows the spike in atmospheric CO<sub>2</sub> since the industrial revolution. This is an unprecedented spike that directly correlates to the industrialisation of the planet through human influence.

We have gone beyond our natural cycles and are creating artificial ones. That is why this current geological time scale is called the **Anthropocene**.



## Our impact

### A new epoch

Today our planet is facing its biggest challenges ever – and that's because of us. Human activity is changing every part of our planet. These changes are so great that scientists are saying that we have entered a new age – the **Anthropocene epoch**, meaning “the age of humans.”

Humans have only been around for 200,000 years, a tiny sliver of time in comparison to the 4.6 billion years of our planet's history. Yet in that time we have had a greater impact on our planet than any other species - and our impact is increasing. We have spread into almost every part of the planet, cutting down forests to create farmland and, over time, settling into huge cities. Technological changes have led to the growth of industries and we now consume more of the earth's resources than ever before.

Our actions have led to climate change, as we continue to burn vast amounts of fossil fuels, pumping carbon dioxide into the Earth's atmosphere.

### Facing the future

In this new epoch, we face stark choices. If we continue to take more from our planet than we put back then we risk its very survival. But this could also be an epoch of opportunity. We understand what is happening and how we can change the way we live to shape a better future for our planet, where human beings can thrive alongside nature. By making the right choices now we can nurture our planet's special qualities and protect the Earth for many generations to come.

Climate change can and does happen naturally, however the current **climate emergency** is caused by humans. Global warming is happening at the scale and speed that it is because of human activity. This is happening much too fast for animals and humans to adapt. Some species are migrating or adapting to the new conditions, but many others are simply declining or heading for extinction.

Nasa video showing acceleration of global temperatures:

[https://www.youtube.com/watch?v=SWPzGo\\_C010](https://www.youtube.com/watch?v=SWPzGo_C010)



## Crisis point

The current emergency is mainly down to three human activities:

1. **Burning fossil fuels**

Since the start of the industrial revolution in the late 18<sup>th</sup> century, human development, has been powered by developed Western nations extracting and burning fossil fuels such as oil, coal and gas – carbon-rich materials formed from plants and animals that died long ago. Burning these has released huge amounts of carbon dioxide (CO<sub>2</sub>) into the atmosphere. As industrialisation has spread across the world more and more power is needed. Even the spread of digitisation is involved as power is needed for computers and the storage of data. We are seeing higher CO<sub>2</sub> levels than there have been in 800,000 years. CO<sub>2</sub> is a greenhouse gas, so this is a huge cause of global warming.

## 2. Deforestation

Forests are important to the planet because they absorb huge amounts of carbon from the atmosphere and release oxygen that we need to breathe. Humans have already destroyed vast expanses of forest to harvest wood and to clear areas for farmland, and deforestation (destruction of forest) continues at a horrifying pace. Destroying forests releases carbon dioxide, while lowering the ability of our planet to capture carbon from the atmosphere. Watch this clip to learn more about why deforestation is such a big problem for our planet:

**The Amazon Is Dying:** <https://www.ourplanet.com/en/video/the-amazon-is-dying>

## 3. Destruction of biodiversity

The climate doesn't just provide the conditions in which life thrives – it works the other way too as the actions of living things help to keep the climate stable. Human activity (hunting, habitat destruction, pollution etc) has caused a 60% decline in wildlife populations in just 50 years, and if this decline continues many ecosystems will become unable to play their part in supporting life – including us.

Just a few degrees...

Today, the Earth is about 1°C warmer than 100-150 years ago. That may not seem like much - after all, we are facing much larger temperature fluctuations every day, but for the planet this average temperature rise is quite significant. Let's examine why.

First, it is about the average temperature rise across the globe. A crucial fact. This means that some parts of the Earth have warmed up to more than 1.1° C and others have experienced less warming. Global warming at the poles is up to 4 times faster compared to global warming around the equator, and twice as fast as the average global warming. There are also differences between the Northern and Southern Hemispheres. For example, the Northern Hemisphere heats up faster than the Southern Hemisphere because there is proportionally more land in the Northern Hemisphere, and land simply heats up faster than water.

Second, past climate changes teach that a few degrees is enough to change the Earth beyond recognition. For example, the average world temperature during an ice age was barely 4 to 6° C lower than today. Yet this was enough to convert so much water into snow and ice that the sea level was no less than 120 meters lower at the time. That drastically redesigned the world map.

In Europe, for example, the British Isles were not islands. They were connected to Europe by a land bridge and were part of the European mainland. This vast landform was ideal for large grazing mammals such as mammoths, woolly rhinoceroses, steppe horses and giant deer. Anyone who would return with a time machine, for example from 22,000 years ago (= the peak of the last ice age), would not recognize anything here. Everything was extremely different. And, all with a lower global average temperature. If were to take our already warmed climate and increase it by a further 4 to 6°C, we would drastically change the face of the planet.

In addition to plants and animals, the oceans are also severely affected by the high velocity with which humans emit greenhouse gases into the atmosphere.

One third of all CO<sub>2</sub> emissions ever have been absorbed by our oceans. Without this action, our planet would be dramatically hotter than it is now, but dissolving CO<sub>2</sub> in the ocean water causes the oceans to acidify. This means the water is becoming harsher for the plants and animals living in it, so coral starts to bleach and animals are forced to move or be impacted. Ocean acidification during the past decades is about 100 times faster than in the past 55 million years.

Oceans are significantly delaying the effects of global warming because they absorb a significant amount of the extra heat. Just as a pot of water doesn't start boiling right away, the oceans take a while to warm up. Our oceans are made up of intricate currents of cold and hot water that mix and create currents that impact weather patterns. This warming water will create new harsher and more intense weather as a result.

So, the warming oceans not only impact the weather, but the fish that live within it – and the fishermen who provide our food.

## Climate Change and biodiversity loss

<https://www.ourplanet.com/en/video/what-is-biodiversity/>

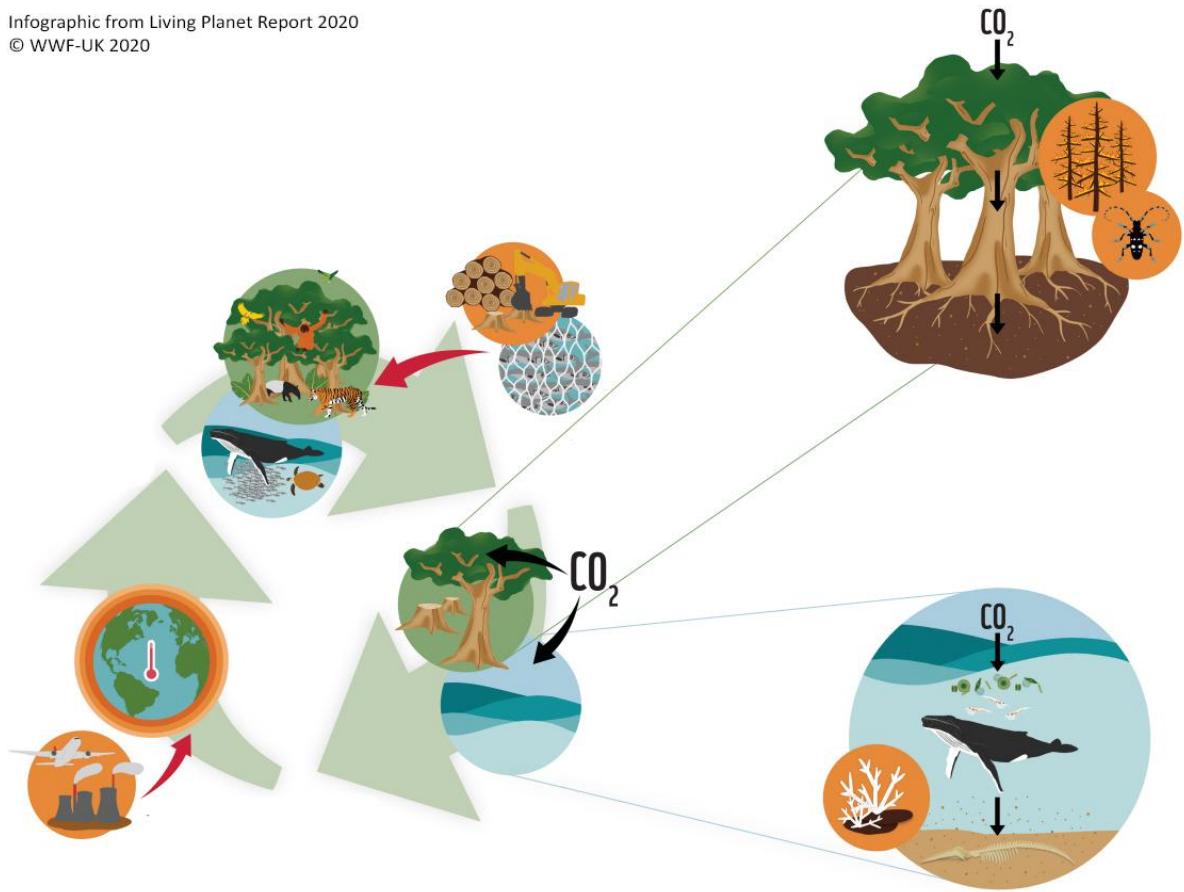
Climate change has not been a big factor in the decline of biodiversity up to this point, but scientists are now seeing the effects of rising temperatures on wildlife and it is clear that many species will face problems in the years ahead as temperatures rise. Species that are used to certain conditions are shifting their ranges, with knock-on effects on other ecosystems, and in some cases where they are unable to do this species are struggling to survive the changes to their habitat.

The important thing to note is that biodiversity is, itself, our most important ally in stabilising the climate. Healthy ecosystems play a key role in absorbing and locking away carbon, and as we destroy habitats and cause wildlife populations to decline we make climate change harder to slow, and nature and people become more vulnerable to its impacts.

WWF's Living Planet Report 2020 reveals that wildlife populations have plummeted by, on average, 68% since 1970. This is largely because of human activities – especially the destruction of habitat to clear land for food production, and the unsustainable fishing of the oceans.

Forests and oceans are especially important in the fight against climate change.

Short classroom video on the link between biodiversity and climate change:  
<https://www.youtube.com/watch?v=osXiN2uqp1M&feature=youtu.be>



## FORESTS

Healthy forests draw carbon from the atmosphere as CO<sub>2</sub> and lock it into trees and soil. Climate change increases the risks from forest fires and invasive pests, which are especially damaging for forests that are fragmented by human activities.

## OCEANS

In a thriving ocean ecosystem carbon is drawn from the atmosphere by phytoplankton, stored in wildlife biomass, then sinks to the ocean floor as poo and debris. Climate change threatens key habitats that are vital for sustaining ocean ecosystems – such as coral reefs.

## WORLD ON FIRE

Every year more wildfires are reported around the world, destroying huge areas of natural habitat including the Amazon rainforest and the Australian bush, and posing threats to humans and wildlife. 10% of the world's greenhouse gas emissions are attributed to wildfires annually, and the number, scale and duration of fires is being increased by climate change. Fires pose a threat to the survival of endangered species and could upset the balance of ecosystems when species that cannot adapt to fires are lost.



## The effects of climate change

Now we know about the process of Global Warming and what it means, it is important to talk about what it will mean for us, and we can do about it.

### Temperatures Will Continue to Rise

Summers will become drier and hotter, which can lead to drinking water shortages and yield losses in the agricultural sector. We get more tropical days (warmer than 30° C) and heat waves are more frequent. We see heat stress due to rising temperatures mainly in the built environment (heat island effect).

### Arctic Likely to Become Ice-Free

The Arctic is expected to become ice free in summer before mid-century. This will reduce the albedo effect (reflection of sunlight back away from Earth) of the ice if provides and act as a tipping point for warming.

## Changes in Precipitation Patterns

Projections of future climate suggest that the recent trend towards increased heavy precipitation events will continue. The warming seas and oceans will evaporate more water into the atmosphere and create bigger storm fronts, which will have bigger downpours than we are used to. The clouds will also drop all this water on the coasts and inland regions will be starved of water due to this.

## Hurricanes Will Become Stronger and More Intense

The intensity, frequency, and duration of hurricanes and typhoons are all projected to increase as the climate continues to warm. Again, linked to the amount of water being evaporated by the heat.

## More Droughts and Heat Waves

Droughts and heat waves are periods of abnormally hot weather lasting days to weeks. They are projected to become more intense and long lasting, and cold fronts to be less intense everywhere. By the end of this century, what have been once-in-20-year extreme heat days (one-day events) are projected to occur every two or three years over most of the northern hemisphere.

## Sea Level Will Rise

Global sea level has risen by about eight inches since reliable record keeping began in 1880. It is projected to rise another one to eight feet by 2100. This is the result of added water from melting ice from on land and from the expansion of seawater as it warms up.

Check how sea level rises could impact on your region:  
<https://choices.climatecentral.org/#12/40.7116/-74.0010?compare=scenarios&carbon-end-yr=2100&scenario-a=unchecked&scenario-b=extreme-cuts>

## Flooding

In the next several decades, storm surges and high tides could combine with sea level rise and land subsidence to further increase flooding in many regions.

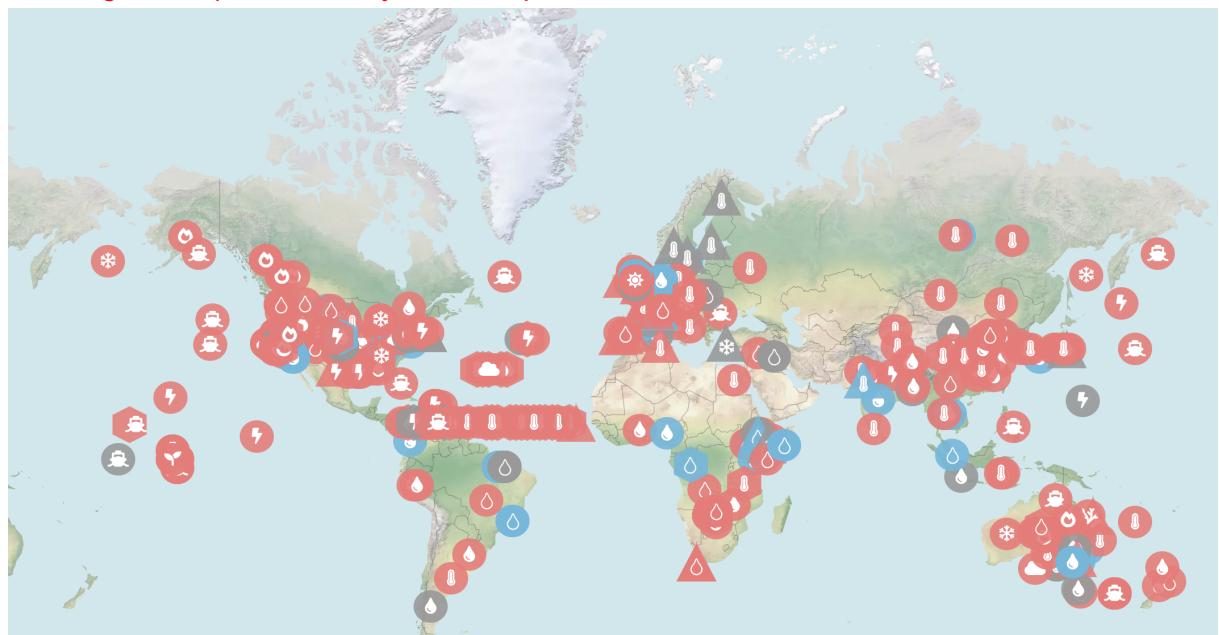
## Climate Refugees

Environmental migrants are people who are forced to leave their home region due to sudden or long-term changes to their local environment. These are changes which compromise their well-being or secure livelihood. Parts of the world will become unliveable to humans due to the intense heat or lack of resources like water and food. The initially most vulnerable regions can be found along the equator, or in already desert-based communities - like the Middle East, Southeast Asia and Africa.

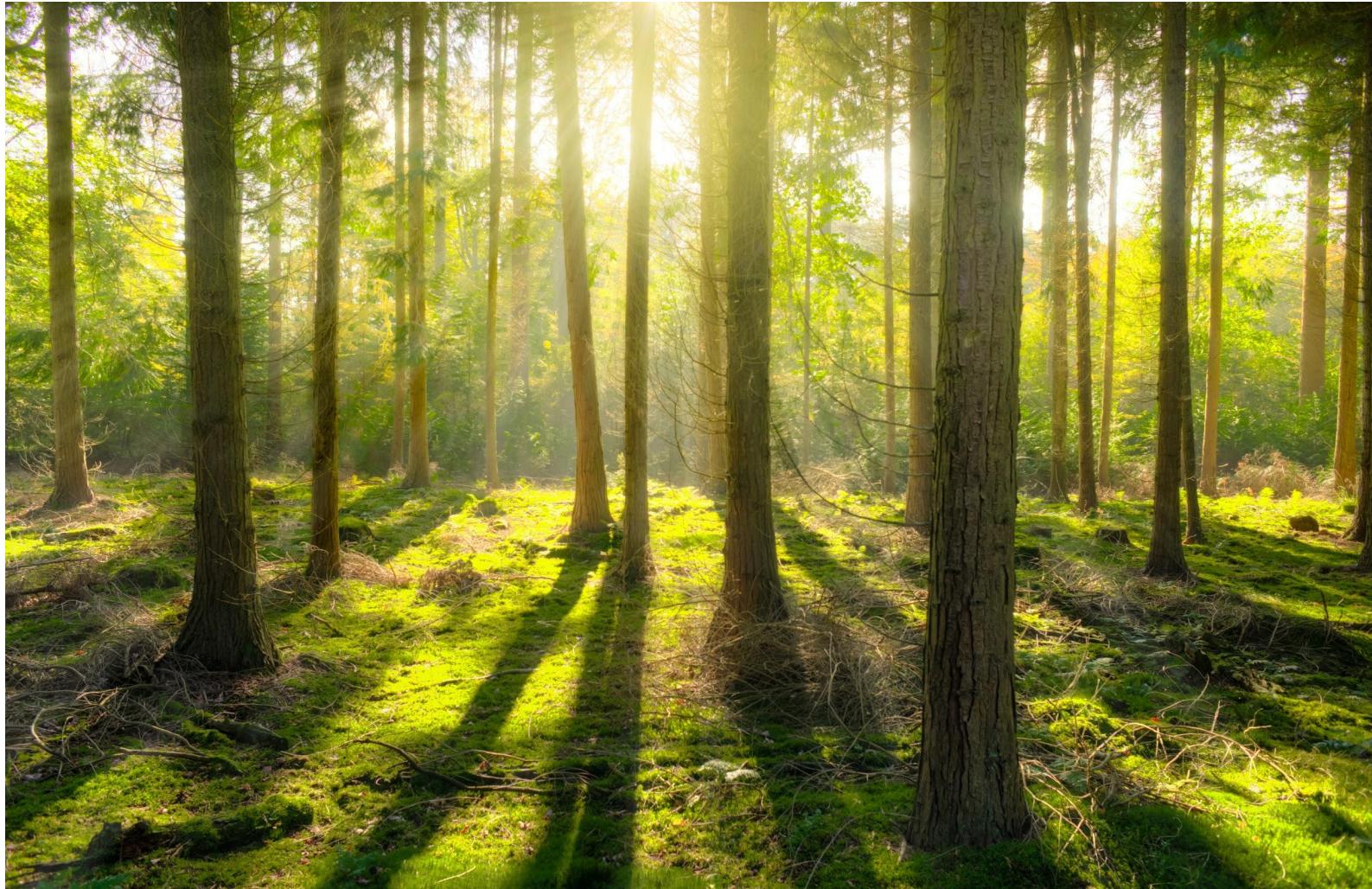
## Our Health

As we are subjected to harsher conditions and more stress will take its toll on our health. Air quality will decrease causing respiratory issues, heatwaves ill impact the sick and elderly who have problems regulating their own temperature. Lack of access to green space is proven to have many impacts on a person's psyche and well-being which can lead to sickness.

Showing consequences on dynamic map:



<https://www.carbonbrief.org/mapped-how-climate-change-affects-extreme-weather-around-the-world>



## The Solutions

Though there are many negative impacts, we have options of taking action provide hope. We have everything we need to fight this problem. We have the solutions to global warming, and we know how to use them. We just need to act.

### Reducing fossil fuel use

This is the important first step. The use of fossil fuels is responsible for 70 to 75% of anthropogenic greenhouse gas emissions worldwide. Within the European Union, that share even approaches 80%. By replacing these fossil fuels with low-carbon alternatives is therefore the quickest way to climate success.

### Renewable energy

We need to transition to a low carbon energy source that is renewable and has a low impact on our planet.

The best alternative to fossil fuels we have is electricity that is generated by wind and solar power. This is energy provided by the heat of the sun, or the strength of the wind. We literally harness those powerful forces that exist and use them to power our homes. This has its own challenges because it is a whole new energy sector, we need to improve the efficiency of electricity delivery AND we must provide a certain amount of storage, because sun and wind are not always present.

Some countries can use geothermal energy. This involves the use of heat from the deep parts of the earth. The most striking example is Iceland. Groundwater of about 300° C can already be found there a few hundred meters deep. It is ideal for heating homes and generating electricity.

## Electric Transport

We need to change how we travel; it is not simply about changing the fuel a train uses. We also need to use those trains more and use alternatives to cars. The demand for transport is constantly increasing, both for people and for goods. Because a lot of our current means of transport use combustion engines, greenhouse gas emissions are a big impact of how we get around.

Electric vehicles are much more efficient than conventional fuel engines. In addition to the absence of greenhouse gas emissions, they are also much better for our health. They emit less fine dust and nitrogen oxides (NOx). From a social point of view, electric driving is therefore a huge opportunity and a must for any government. For the time being, the main challenge remains the cost price and the further development of a charging infrastructure. Fortunately, things are going in the right direction in terms of both cost and charging infrastructure.

Since the switch to low-carbon alternatives in the aviation sector is still in development, it is ideal to keep the amount of air travel to a minimum.

## Improved building and infrastructure

Heating or cooling a building, as well as using hot water, requires a lot of energy. We need to improve the energy efficiency of them so they keep their warmth. You do this in the first place by insulating the roof or attic floor, then installing high-efficiency glass in high-quality joinery, insulating walls and floors, and finally by improving the airtightness of the building to prevent heat loss through cracks and crevices. A building is thought to be ready for the future if it also has floor or wall heating or low temperature radiators.

## Changing Industry

The industrial revolution was when our actions began to really impact the planet on a large scale. So, it stands to reason that we need to rethink and fix this industrial process to be more sustainable. Depending on the sector of industry, significant emission reductions are possible, including through:

- Increase the energy efficiency of the production process.
- switching to (sustainable) electricity for process heat and sustainably produced hydrogen in chemical processes and in steel production
- applying residual heat recovery, for example in the building sector
- capturing CO<sub>2</sub> emissions for storage or to make new materials
- more efficient use of materials and circular economy

## Agriculture

Food production is one of the major contributors to climate change, while also being a major cause of biodiversity loss.

We as consumers have a big part to play here. What we do influences the government and the shops that sell food. We need to rethink our consumption of meat and dairy products. If you compare the impact of the different meat and dairy products, lamb and beef not only turn out to have the biggest climate imprint within the food sector, but they are also the largest contributors in terms of water and land consumption (deforestation). Consuming less meat and dairy products also benefits our health.

WWF have created the [livewell principles](#) to show you how to do this and still enjoy a delicious and varied amount of food.

## Reinventing our economy to a circular economy

In a circularly organized economy, the CO<sub>2</sub> impact of a product or service over its entire life cycle will usually be less in any case than in a linear system. During the design phase of a product, one takes into account its final dismantling, at the end of its life cycle. To this end, materials are used in such a way that they are easy to separate and reuse, and customers are already provided with residual products.

Check out this youth edit of WWF's Our Planet Our Business film:  
<https://vimeo.com/371912372> (password: Greta\_Thunberg)

## Remove CO<sub>2</sub> from the atmosphere

Almost all scenarios that give us a reasonable chance of staying below the dangerous two-degree limit in 2100 now work with so-called negative emissions. In practice, this means removing CO<sub>2</sub> from the atmosphere.

Using the nature-based solutions we referred to earlier is the easiest way to do that. The cheapest and easiest solution also happens to be the most effective - planting trees. Trees capture carbon from the atmosphere and store it safely in the ground. It is estimated that if we were to plant 1 trillion trees across the whole planet, it would be enough to draw down enough carbon from the atmosphere to solve our problem. It sounds like a lot of trees, but if you think about the size of the planet, it is not that hard.

There are other types of carbon capturing technology that are known as geo-engineering. Carbon Capture and Storage, known as CCS or sometimes BECCS is the process of using technology to capture carbon and then transport it through a giant network of pipes and store it underground. This is a hugely expensive technique that is still being created. It has not been proven to work at scale yet. Many other ideas for removing CO<sub>2</sub> from the air also have problems. Some require a tremendous amount of energy, others are not (yet) economically viable, and others still require a lot of research to discover the potential and determine the advantages and disadvantages.

What would you do, would you use natural solutions like trees? Or would you use industrial pipelines to help fix the problem?

### Climate adaptation: dealing with the inevitable consequences

Certain consequences of global warming can already be felt or can no longer be stopped. And we have to prepare for that. **Climate adaptation** is therefore the process by which society adapts to the current or expected climate and its effects, in order to limit the damage that can be caused by global warming and to use the possible opportunities.

Taking adaptation measures in time will almost always be cheaper than repairing the effects of global warming. Scientists and governments are having to think about such adaptations as they also consider the bigger and most vital challenge of slowing and stopping climate change itself.

### The Stop Button

If we were to press an imaginary button that immediately stopped all emissions entering our atmosphere, the Earth would continue to heat up in the coming decades. This is called **Drawdown**. It means that if we stopped all GHG emissions right now, they would still take a long time to filter through the system. We have already released the gases, now they will take effect. We cannot rely on emission reduction alone to fix our problem. We therefore need to take carbon out of the atmosphere with nature-based solutions such as planting trees.

## Government Action

That was a quick introduction to all the things that you need to know about climate change and what it means. But now we need to talk about how we are working to fix it. And while individuals have their place to make a change, we need governments to make laws and help us make emission reduction a key priority. We cannot do this alone!

We need all nations working together at the highest level to stop our shared problem. If we are all feeling the effects of a warming world, then we all need to agree to work together to fix it. And this brings us to a very special agreement that you might have heard about...

### The Paris Agreement (2015)

**The Paris Climate Agreement aims to keep global warming well below 2 degrees Celsius.**

A climate agreement was signed for the first time in Paris on 12 December 2015, in which nearly all countries in the world committed to taking concrete action against global warming.

At the heart of the Paris Agreement are the objectives to keep the global average temperature rise to well below 2° C compared to the pre-industrial period (1850-1900) and to make efforts to limit global warming to 1, 5° C. We want to stop any more heating to our planet because of the negative impacts it will have.

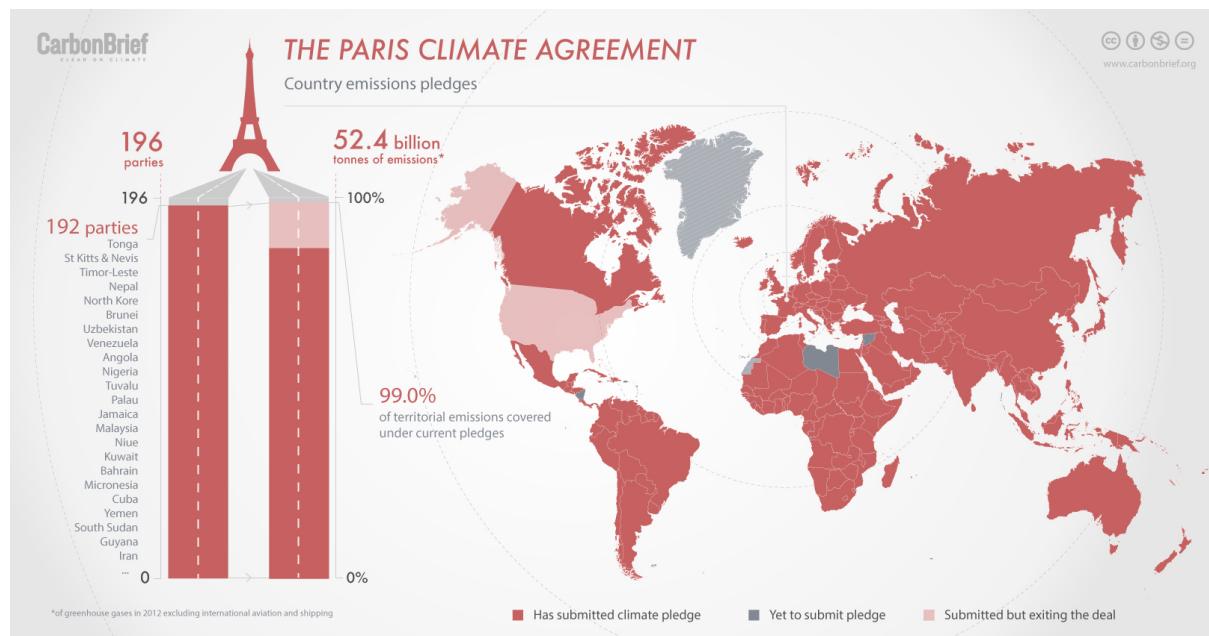
The agreement is in principle binding, but no specific sanctioning mechanisms have been established.

The agreement uses a "bottom-up" approach, in which each country determines, prepares, and communicates its own national contribution and must take measures to make that contribution - we call these NDCs. Each country takes responsibility for a big chunk of emissions and works to reduce them.

If we don't act quick enough, the temperature will go up with passing time and inaction. Then we will start to trigger tipping points (which we will talk about on the next page), and that is when the impacts of climate change become catastrophic.

That is why the participating countries promised to evaluate each other's climate policy every five years and make adjustments if necessary. The first check is in 2023.

The Paris Climate Agreement also included agreements on a climate fund, financed by the richer countries with the historically largest emissions. With the money from that fund, developing countries must be better able to arm themselves against the effects of global warming and to develop further in a climate-friendly manner.



### CarbonBrief Paris Climate pledge tracker (per country):

<https://docs.google.com/spreadsheets/d/1LtaBOv70pvXVPDgLUGtTKnSxojfZy7jx06bTSaMaH4/pubhtml?gid=14385633&single=true>

### Why 1.5° C?

Scientists use detailed forecasting data to predict what will happen as our planet warms. They have created many scenarios to compare and contrast the impacts of warming from 1.5° C to 6° C and even higher.

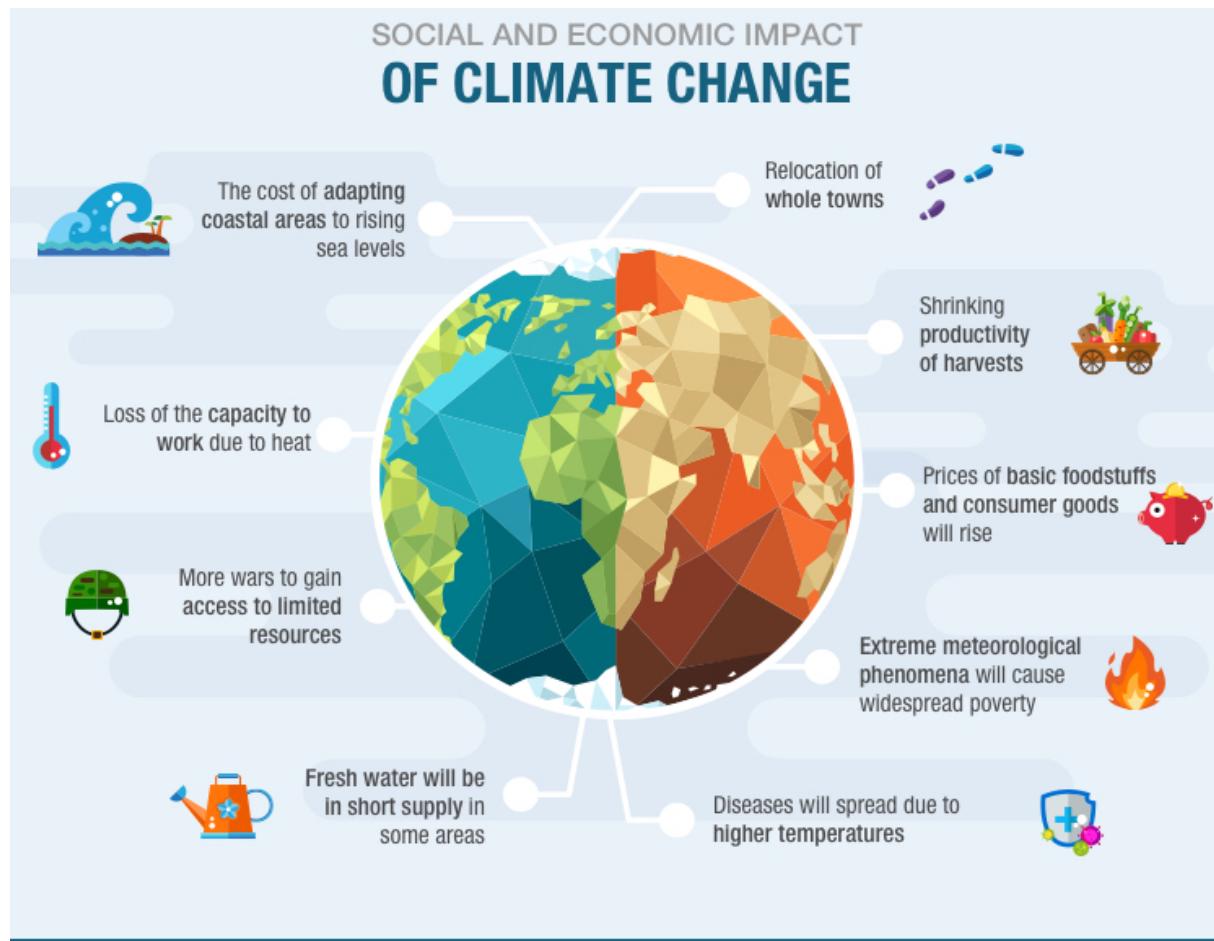
If we are currently at 1° C of warming and we are seeing negative impacts, what temperature do we need to limit warming to as to safeguard our future? At 1.5° C we can live roughly the same lifestyles as we do now. We would still see dramatic impacts on our planet like storms, wildfires, species death and even flooding.

But if we were to turn the temperature up to 2° C, we start to see problems like rising sea levels affecting coastal communities, changing weather patterns causing more intense and prolonged droughts, more frequent and powerful storms – and even impacts on our economy as our food systems and crops are negatively affected. All of that for just 0.5° C change.

The problem of climate change is a problem of social justice, with many of the poorest communities affected worst.

If the temperature increases even more, we increase the impact of all of these issues and we risk triggering tipping points that would have an even bigger impact. A tipping point is when a series of small changes becomes significant enough to cause a larger, more important change. An example in a climate context would be the GHGs in our atmosphere melting the permafrost in Northern Russia and the Arctic. This would then release a vast quantity of extra GHGs into the atmosphere and amplify the problem even more. Accelerating and enhancing the greenhouse effect, which further thaws the permafrost and releases even more greenhouse gases.

Some tipping points lead to rapid, local changes. Others enhance global warming, making it a self-reinforcing process that is increasingly difficult to control.



## Total gigatons of CO2-equivalent emissions that could be reduced by 2050

SOLUTION		PLAUSIBLE SCENARIO		DRAWDOWN SCENARIO		OPTIMUM SCENARIO
Refrigerant Management	1	89.74	2	96.49	3	96.49
Wind Turbines (Onshore)	2	84.60	1	146.50	1	139.31
Reduced Food Waste	3	70.53	4	83.03	4	92.89
Plant-Rich Diet	4	66.11	5	78.65	5	87.86
Tropical Forests	5	61.23	3	89.00	2	105.60
Educating Girls	6	59.60	7	59.60	8	59.60
Family Planning	7	59.60	8	59.60	9	59.60
Solar Farms	8	36.90	6	64.60	7	60.48
Silvopasture	9	31.19	9	47.50	6	63.81
Rooftop Solar	10	24.60	10	43.10	13	40.34

Source: Project Drawdown

## What can you do?

The causes and solutions to climate change can seem too big for us to play any role in addressing, and this can lead to people feeling helpless or apathetic. It is important to note that no individual is helpless in this fight for our future.

Your actions and daily behaviours have big impacts on everything around you. From your diet to your travel habits, and even how you spend your money. Every action you take has an impact on the planet, but it also influences people around you and the businesses that you support (or don't) because of their practices. So, it is important to think about the way we live and the actions we take and to show decision-makers and other people that sustainable values are important to us.

As people are starting to change their daily habits, governments and businesses are taking notice and changing to suit their customers and citizens. Earlier in this program we talked about tipping points. Lots of small actions can build up to big changes. You and your family and your class. If you all changed little things, they would add up to a bigger whole. So how do you do it?

These are steps that any individual can take to start acting more consciously.

**Step 1** – find out what your carbon footprint is – by finding out your carbon footprint, you will see what areas are having the biggest impact and where you need to make some changes. The WWF have a great tool that helps you do this easily. <https://footprint.wwf.org.uk/#/>

**Step 2** – plan out those changes you will make – it is difficult to know where to start and what the impacts will look like. Environmentally Conscious is a website with a list of many actions all listed out for you. They are broken down by the different areas of your life. They start small and get really big. <https://www.environmentallyconscious.org/>

## The power of schools

Adopting a whole school approach to sustainability in your school can lead to a ripple effect that creates change in the wider community.

A school is more than just a place where students gain skills, knowledge and experience. Schools are businesses, employers, landscape managers, event spaces and community hubs. They are connected to other local businesses and local government, visible to local media, and landmarks for the community as a whole.

This means three things.

**1. Achieving direct impact**

Schools can play a positive role in helping to bring about a sustainable future by adopting the principles of sustainability and reflecting the Global Goals in policies and practices. Schools can make positive changes in policies around stationery procurement, catering, site management, energy supplier, green infrastructure, landscape management, cleaning supplies, pension provider and more. In this way schools can lower their energy and water footprints, improve local biodiversity by creating nature-friendly school grounds and support the green economy.

**2. Bringing sustainability to life for students**

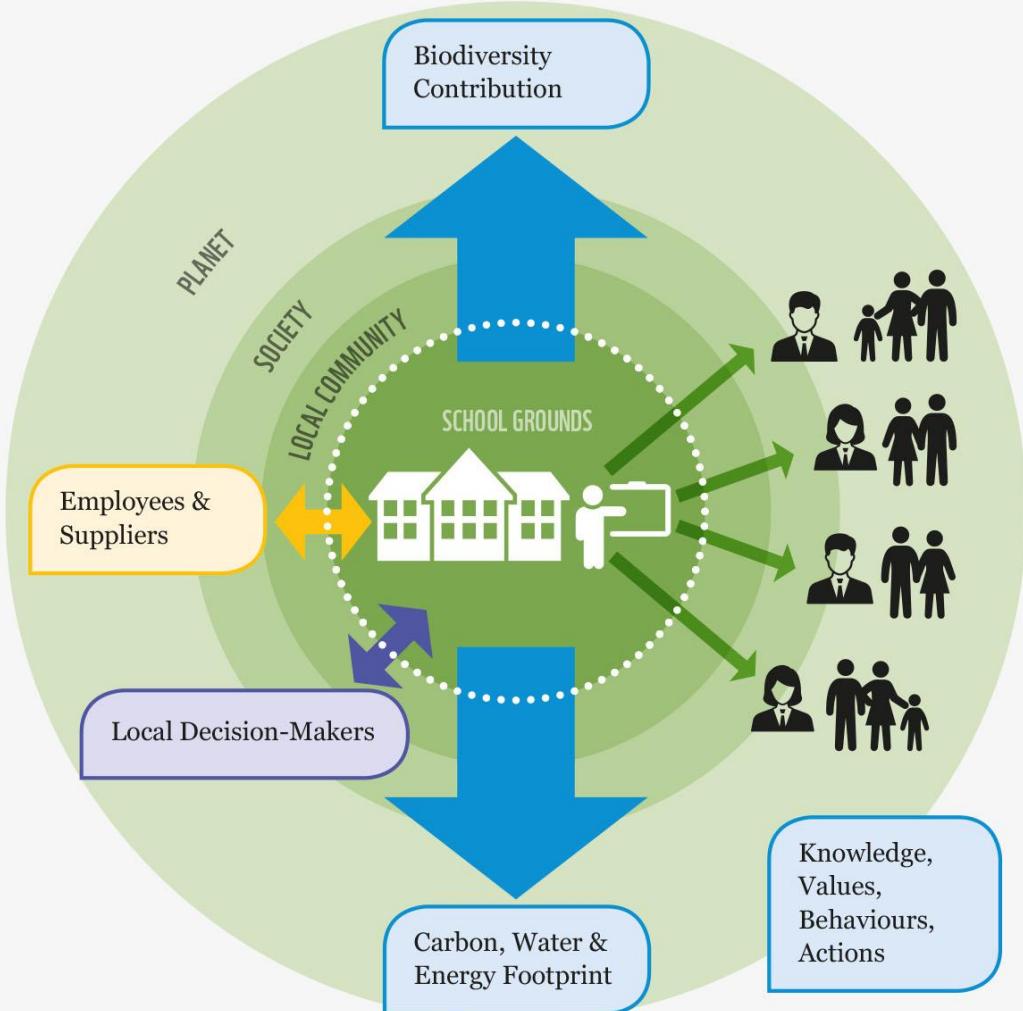
Involving students in defining and implementing sustainable practices in school can help them to understand and apply these principles beyond the classroom. They see and experience first-hand how changes can be made and what impact they have, and have the opportunity to form positive habits and values that they carry outside of school time, and beyond their school life.

**3. Acting as an exemplar of sustainable practice**

Because schools have wide visibility and influence beyond their students and staff, applying sustainable policies can help to promote, encourage and normalize sustainable choices. By communicating decisions around policies and practice to students and their families, staff, suppliers, local media and decision makers, schools can showcase what is possible and the practicalities and benefits of taking positive action for the planet.



# SCHOOL INFLUENCE





Schools can inspire and support individual and community action.

Actions that we can do with others near to us.

Actions that people who sell services and goods can take.

Action that happens on a bigger scale.

Actions we can take ourselves to change our daily habits.



## Climate Change in your country

The effects of climate change vary a great deal depending on where you are in the world, and each country has a different set of considerations when it comes to addressing the drivers of climate change, and different policies and practices in place. It is important that students understand the global picture of climate change, but also that they have an awareness of local issues and priorities. It will also help students to understand the issues and concepts if they can apply them to the places, people and situations that are familiar to them.

You can easily access information about your specific context to enrich your classroom resources and discussions.



**Example:**

[https://en.wikipedia.org/wiki/Environmental\\_issues\\_in\\_Liberia#:~:text=Environmental%20issues%20in%20Liberia%20include,including%20dumping%20of%20household%20waste.](https://en.wikipedia.org/wiki/Environmental_issues_in_Liberia#:~:text=Environmental%20issues%20in%20Liberia%20include,including%20dumping%20of%20household%20waste.)

Find out about your country here: <https://www.climatelinks.org/where-we-work#/countries/list>

## Further reading / Resources:

- <https://climate.nasa.gov>
- <https://www.unenvironment.org/explore-topics/climate-change>
- <https://www.natgeokids.com/uk/discover/geography/general-geography/what-is-climate-change/>
- <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>
- [https://ec.europa.eu/clima/policies/f-gas\\_en](https://ec.europa.eu/clima/policies/f-gas_en)
- <https://www.drawdown.org/solutions>
- <https://www.un.org/en/un75/climate-crisis-race-we-can-win>

### 3. Teaching Climate Change

#### Instruction versus other learning systems

Some teachers believe instruction is the best way to teach. It is the easiest and maybe even the most efficient way to transfer knowledge. Other teachers realize that enquiry-based, collaborative or project-based learning may be a better way since it addresses important skills like collaboration, empathy, problem-solving, critical thinking and creativity.

The odd thing is that both directions have been explored by many researchers and both have the same amount of research stating that “their” beloved approach is the right one. Well... there is no holy grail. Both are essential to deliver a quality education. In fact, the students’ age, topic, school and even culture will require a different approach.

For teaching about climate and environment we prefer that students

- gain a deeper and authentic understanding about global issues
- are able to solve problems
- are taking action.

Because what do we really need? Do we want (a) students memorizing definitions about climate change and passing exams? Or, do we want (b) students changing behaviour and taking action for a more sustainable world?

We prefer the second option. By allowing students to create their own bioplastics or edible water bubbles, they will start understanding that one has to avoid using single-use plastics. By inviting parents at school to explain what they have been learning, they are able to bring change bottom-up. By having a chat with students in a different continent with other climate change effects, they make friends across the world and learn to appreciate their environment.

This is why we decided not to add assessment to our curriculum.

#### Pedagogy

So, what is the best way to teach about climate change and environmental threats? There are different ways. Let’s explore **collaborative learning, learning by doing and playful learning, technology enhanced learning, and project-based learning**. Each is distinct, though there is also overlap. One example is offered for each approach.

#### Collaborative learning

Students can learn from their peers, teachers, experts, or other sources. We are at a point in time in education where teachers now are reimagining their role. As they say “from sage on the stage to guide on the side.” Collaborative learning has several approaches: social constructivism and connectivism. In each approach, the teacher has a different role and students will be using different technology.

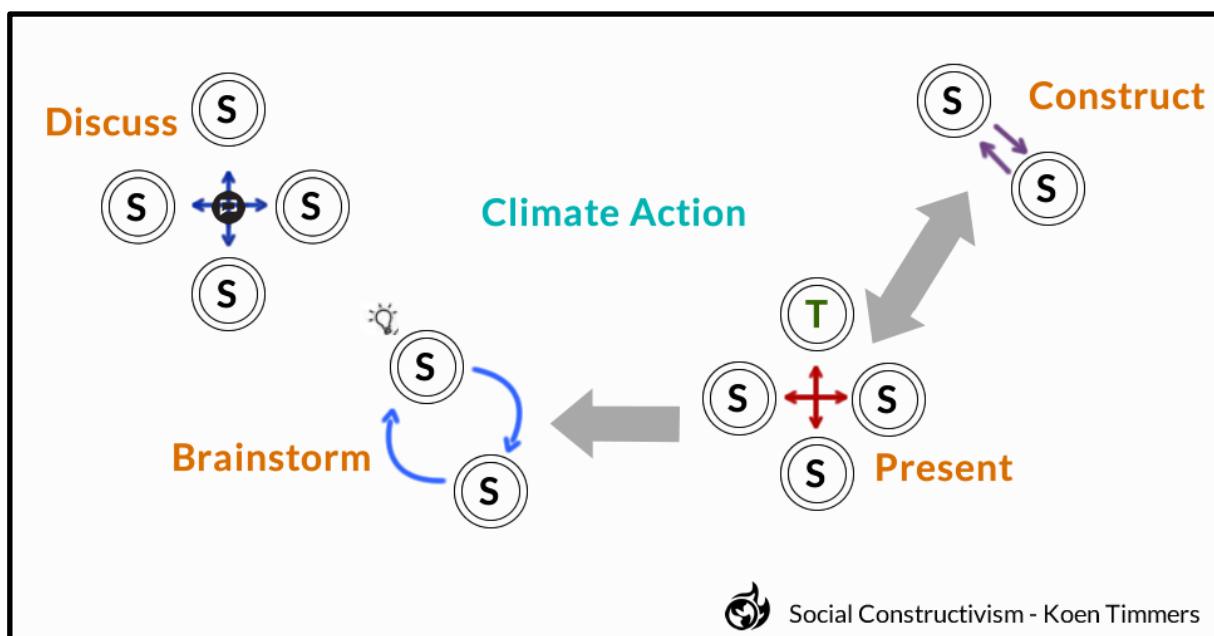
**Important:** It will not work to put your students in groups from the very beginning. A teacher has to instruct and offer context and background to students before shifting to social constructivism or connectivism.

A **community of practice** (Wenger and Lave, 1991) is a group of people who "share a concern or a passion for something they do and learn how to do it better as they interact regularly".

### 1: Social constructivism (Vygotsky)

Students learn from each other in groups, and construct their own knowledge. They brainstorm, discuss and share understandings, knowledge, and experience to come up with new knowledge. The teacher becomes a facilitator and a mentor and encourages students to interact and exchange views.

Technology options: email, discussion forums, chat, video conferencing



#### Example:

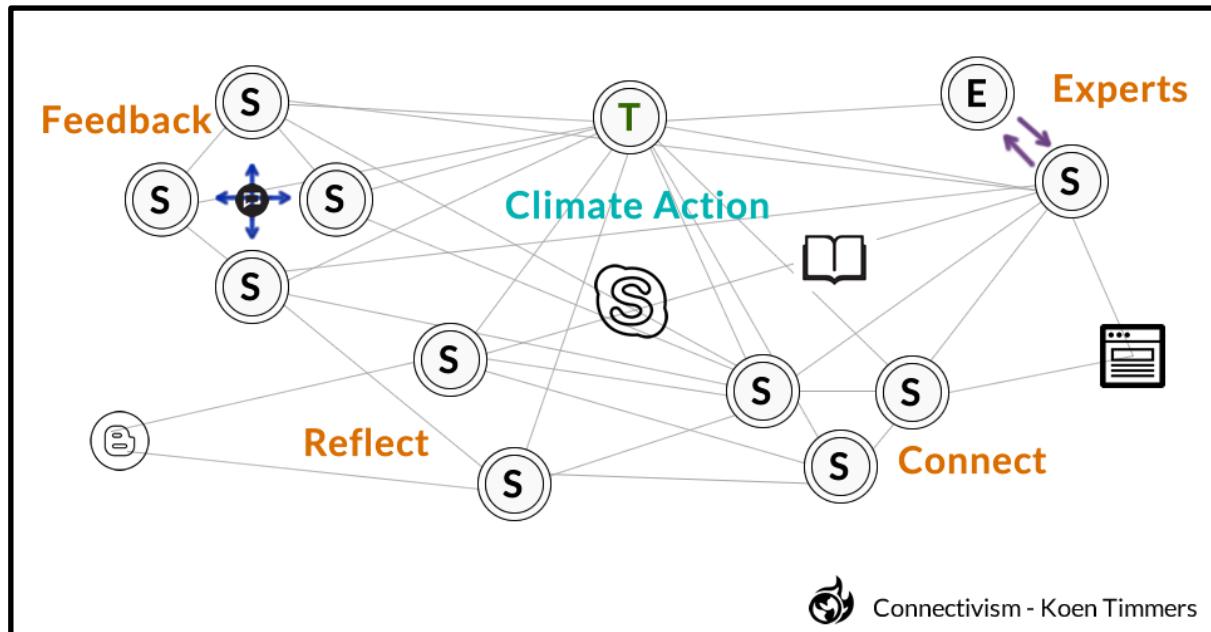
The teacher explains about the Green House Effect for 15 minutes and puts students in groups of five. In one group, students discuss how their behaviour at home may influence causes for climate change. In another group, students brainstorm about potential solutions. Students then present outcomes to the other groups. The teacher guides all groups and ensures the information shared is accurate and that every group member is involved.

### 2: Connectivism (Siemens & Downes)

Students learn by connecting to nodes which can be peers, websites, teachers, books, or experts. Creating a Personal Learning Network (PLN) is key. Students encourage each other

to be involved in networks. Teachers guide the students and help evaluate sources. Students reflect in a blog or in a wiki.

When using technology: social media, wiki, blog, website



### Example:

The teacher explains about the Green House Effect for 15 minutes and asks students to read about climate change causes online. Students connect to experts on Twitter and have videocalls with other experts. The teacher points the students in the right direction by pointing to reliable and relevant resources. Some students are checking facts in books. Students get feedback from teachers or peers. By the end of the lesson, students reflect in their blog.

### Learning by doing and playful learning

Students can learn by **doing** in so-called **maker spaces** or by **playing**. Research has proven that play and interactive learning students may develop their language skills, imagination, emotions, creativity and social skills . Play helps to nurture imagination and give a child a sense of adventure. Through this, they can learn essential skills such as problem solving, working with others, and much more. One sometimes claims "hands-on - minds-on". When you touch things, you'll better understand and remember.



**Example:**

A teacher asks students to think about a carbon dioxide free world in LEGO. Students used bricks and created small houses with solar, wind turbines, and bikes.

In some cases, activities require a LEGO WeDo as in “Prevent Flooding” (<https://education.lego.com/en-us/lessons/wedo-2-science/prevent-flooding#2-explore-phase>), but sometimes it only requires the bricks and students’ imaginations.

It is important to note that LEGOs or expensive resources are not required. [Arvind Gupta](#) created a lot of toys from trash and made a website. Would you like to build your own solar driven cart? Check <http://www.arvindguptatoys.com/toys-from-trash.php>

## Technology Enhanced Learning

Technology allows learners to visualize, brainstorm, discuss, connect, project, collect, inform, assess, and more--even on a global scale. Here are some tools that allow students to learn through technology:

### Green screen

Green screen technology requires a green screen or wall and an app (for example Do Ink) on your phone or tablet. The app allows you to replace the green with any image or video. This way students can create videos in a news studio, in the past, or wherever their imaginations take them.



### Stop motion video

Student can create stop motion videos with small items (e.g. LEGOs and a stop motion studio app). Students create a setting, take a picture using the app, change the setting, make a picture, and repeat up to 100 times. The app will make a video of all pictures and the LEGO figures will start moving.



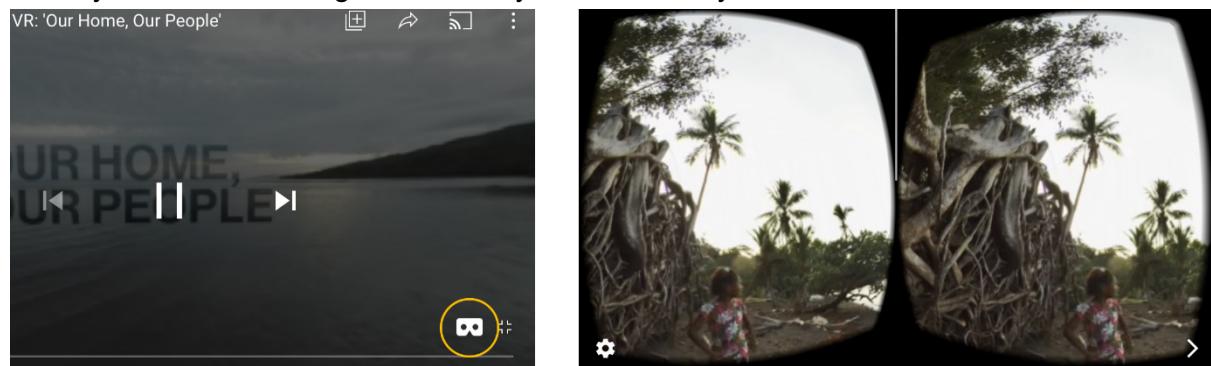
## Virtual Reality

Inexpensive Virtual Reality (VR) headsets can be purchased for as low as \$5 USD.



### 1: YouTube

YouTube has video fit for VR. When watching on a smartphone, you'll find an icon. Once you hit that you'll see your video double and slightly distorted. Put the smartphone in the VR cardboard and ready for a wonderful show. Your students can watch the video 360 degrees. When you have a 360 degree camera, you can record your own videos.

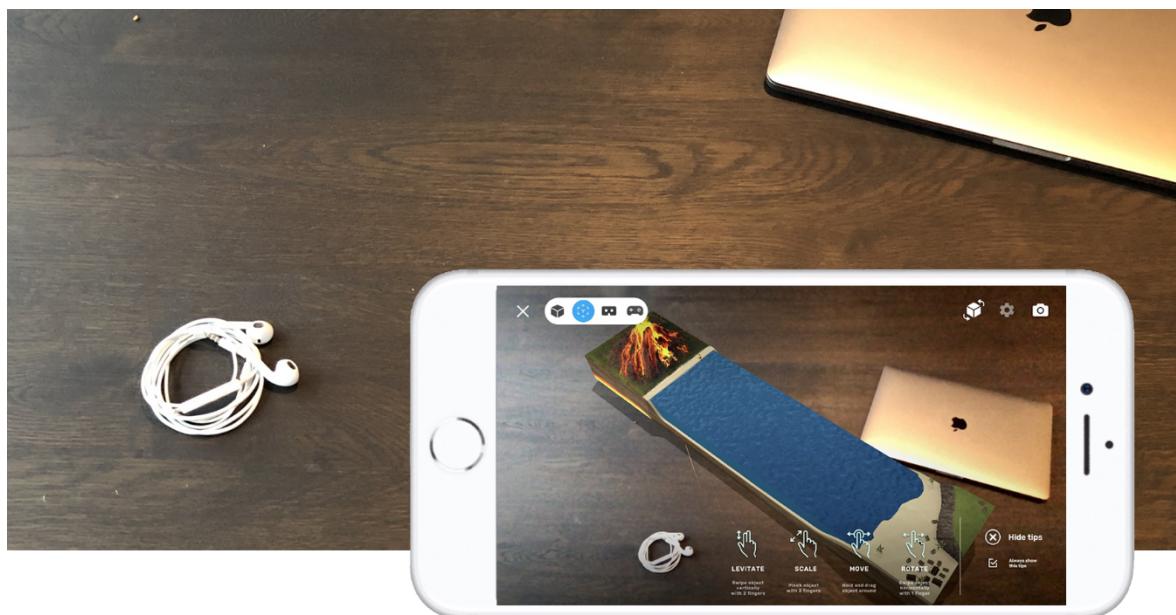


### 2: Apps

Several apps are made for VR. Google Expeditions is a wonderful, free app which allows you to places such as the Louvre Museum, coral reefs, Machu Picchu, and many other places.

#### Augmented reality

Augmented reality puts an extra layer to what you see. By using certain apps on a smartphone (Assemblr) you can put a tsunami, skeleton, and many other objects at your own table or your classroom's floor, and you can explore in 3D, 360 degrees.



### Gamification versus game based learning

Students can learn by playing computer games as well. So, what's the difference between gamification and game based learning?



- **Game-based learning** uses game elements to teach a specific skill or achieve a specific learning outcome. Games are used to learn.

**Example:** students use Minecraft to create an eco-friendly world.

- **Gamification:** Gamification is the application of game-design elements and game principles in non-game contexts. Teachers use concepts of popular computer games like badges, levels and credits during learning during their classes or are using learning management systems (Moodle, Blackboard) with those elements.

**Example:** students are focusing on pollution in the classroom and can earn credits and badges, and can advance in levels.

## Project-based and Problem-based learning (PBL)

Problem-based learning is an inquiry-based approach in which students have to focus on a problem and work in groups or independently to solve that (real-world) problem. In case this is a series of activities across various moments, this is also called project-based learning.

### Example:

Students have to find solutions for climate change or environmental issues.



Some teachers claim that asking students to memorize facts doesn't make any sense. They often believe assessment doesn't make any sense either since students can find all information on Google. Regardless of the fact that Google can redirect to websites with inaccurate information or even fake news, it is crucial to have ready knowledge. Simply put: in case you don't know the capitals, names of rivers, multiplication tables, your countries' history, how the human body works, etc, you will not be able to book a flight, pay correctly while going to a store, create a website, or have a decent phone call.

So shifting to other learning systems is crucial but

- Not at all times - all alternatives require instruction to offer context and background to students
- Knowledge is important and cannot be replaced by Google
- Different topics, different ages and cultures require a different approach

## Important skills

Did you know there are already drones which can be controlled by your [mind](#)? Did you know Google Duplex allows your phone to order a pizza without the person at the other side of the call even noticing they are having a conversation with an app?

Due to Artificial Intelligence and other technologies certain jobs will disappear. It will be key for people to have some skills not to be replaced by machines. Those skills are often referred to as the 21st Century Skills. While shifting to other learning approaches, it is important to address these skills:

- Creativity
- Collaboration
- Problem-solving
- Empathy
- Critical thinking
- Communication
- Technology literacy

## Systems Thinking

Systems thinking is important when looking at the causes of, and solutions to, climate change, and for identifying the steps to a more sustainable future.

### **Helping to make connections**

Systems thinking is a transformational approach to learning, problem-solving and understanding the world. Students are encouraged to step back and see the whole picture, rather than focusing on just its parts. They learn to identify connections and patterns among people, places, events and nature and to start thinking about how to use these interconnections to improve their world.

### **Increasing engagement with learning**

As well as enhancing the curriculum, systems thinking can increase students' engagement in their own learning. They put the pieces of a puzzle together, look for patterns, and work collaboratively to ask questions and find answers across disciplines.

### **Developing problem-solving skills**

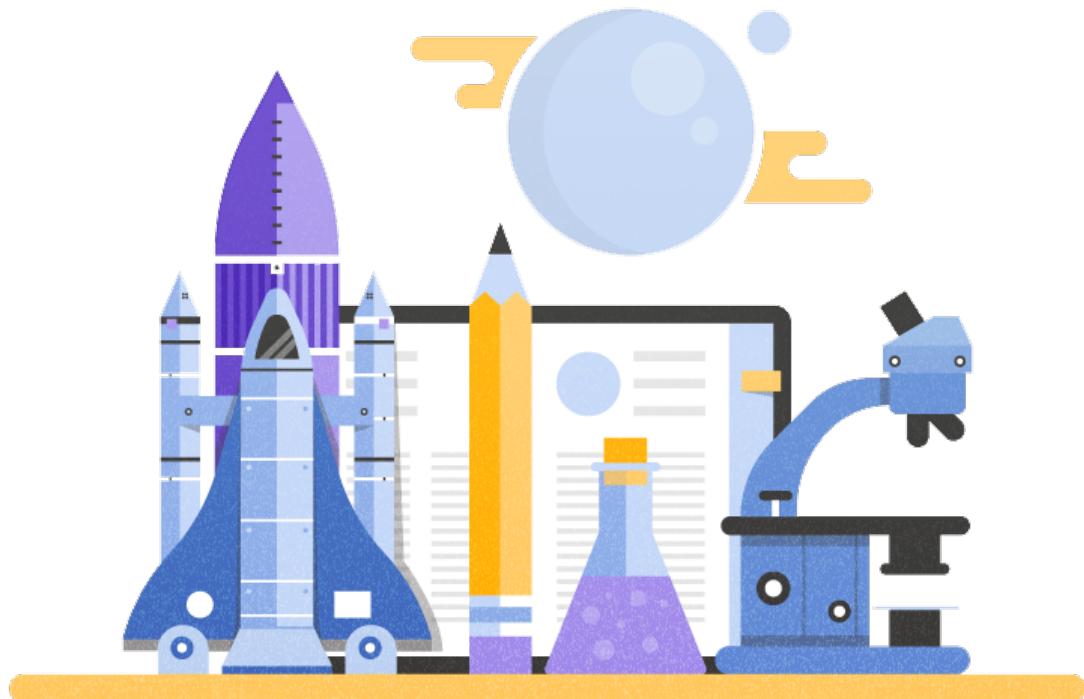
Systems thinking helps to equip students with the skills and perspectives they will need to address the complex social, economic and environmental problems that will face them in the future. When looking for solutions, it helps to move from a simplistic linear way of thinking to identifying more effective types of action.

## 4. Lesson plans and Activities

### Lesson plans

Lesson plans can be downloaded here: <https://www.climate-action.info/download-curriculum-2020>

### Activities



Some activities by teachers:

- **The seedling experiment** by Olivier (Belgium)
- **Plantable Seed Paper** by Kristine (Canada)
- **Create your solar oven** by Koen (Belgium)
- **Climate Change Go Bingo** by Anne (Ireland)
- **Create a Vertical Garden from Trash** by Stephen (USA)
- **Literature Circle** by Marj (South Africa)
- **Growing plants with 80% less water via Aquaponics** by Mike (USA)
- **Create your own Bioplastics** by Magdalena (Argentina)
- **Create a solar light** by Ines (Portugal)
- **How to make your own biogas Plant** by Olalekan (Nigeria)
- **How to make edible Water Bubbles** by Kristine (Canada)
- **How to create a solar driven car** by Koen (Belgium)
- **Multiple Intelligences Matrix** by Rene (South Africa)

Find them all: <https://www.climate-action.info/learning-resources>

## For your inspiration: Compass Education

The Compass allows students to brainstorm about a certain object, person, process, by focussing on N, E, S, W: Nature, Economy, Society and Wellbeing. The tool allows you to find out about benefits and drawbacks for these 4 directions. This way students will learn that cars, clothes, meat, taking an airplane, their school may have certain economical benefits but also an ecological footprint.



### THE DEVELOPMENT COMPASS ROSE

#### NATURAL

Questions about energy, air, water, soil, living things and their environment

#### ECONOMIC

Questions about money, buying and selling, jobs and producing things



#### WHO DECIDES?

Questions about who makes decisions, what choices there are, who benefits and who loses out

#### SOCIAL

Questions about people, their relationships, culture, traditions and the way they live

Adapted from Tide~ Global Learning.

Template:

	+	-
Nature		
Economy		
Society		
Wellbeing		



Example CAR:

CAR	+	-
Nature		carbon dioxide - air pollution
Economy	jobs	Too many car producers
Society	saving time	
Wellbeing	flexibility, independence	-Ill due to air pollution, climate change effects -less healthy than bycycle -traffic -accidents



Other examples: your school, smartphone, jeans, ... The examples depend heavily on culture. While Western students may be interested in exploring "Jeans", "Chocolate", Eastern students have other interests.

## 5. Climate Action Project

### About the project

The Climate Action Project was launched in 2017 and runs for 6 weeks in October. Students from more than 100 countries across every continent explore, discuss, create and share findings for certain topics by posting a weekly video to [www.climate-action.info](http://www.climate-action.info). This way they can share findings about local causes, effects and solutions for climate change and take action. By watching each other's videos, students gain deeper understanding from climate change and environmental issues across the world. The project also allows them to have live virtual interactions and through webinars experts are able to share expertise. During the past years Rick Davis (head of Mars Mission, NASA), explorer Céline Cousteau, Matt Larsen-Daw (Education Manager for WWF-UK) and many others have been part of these webinars. The project is supported by Ministries of Education in 15 countries. The project is in partnership with WWF and endorsed by Jane Goodall, Princess Esmeralda, Kumi Naidoo and the Irish president to name a few.



The project is free and has several objectives:

- Students are able to learn directly from peers living in other countries.
- Teachers are able to share best practices, concerns through the platform. They receive weekly guidelines
- Engaging activities like sending a message to Mars and a global tree planting #PlantED ([www.plant-ed.net](http://www.plant-ed.net))

Teachers globally can join for free via <https://www.climate-action.info/joinus>

### Past impact: you can do this!

During the past years - as part of the Climate Action Project - teachers' passion and expertise and students' energy have been creating an overwhelming amount of impact in their country and community. The following list is very incomplete but shows how the efforts

of a few individuals can lead to something big: a new invention, calling on governments, teaming up with companies, with or without technology. Ten stories of impact:

### Malawi - Tree planting Malawi



Students in Malawi helped spearhead a project to plant 60 million trees along four main rivers leading into Lake Chilwa. Andrew Nchessie's aim was to replant the trees that have been cut down along the four main rivers that bring water into lake Chilwa and avoid the lake from drying again, a scenario that occurred in 2018.

Read more: <https://www.climate-action.info/story/tree-planting-malawi>

In 2020 Father Benigno from the Philippines will plant 1 million trees during one single day.

### Canada - 3D printing to restore coral reefs



Canadian students connected with experts - including Catherine McKenna (Canadian Minister of the Environment), Celine Cousteau (granddaughter of the famous oceanographer Jacques Cousteau) and Chris Lowe (shark expert) - through Skype and undertook an inquiry into the use of 3D printing to help offset the coral bleaching crisis. With their teacher Kristine Holloway they investigated different materials which would be most suitable for 3D printed reef and concluded that limestone would be the best; given that it is made of organic sea creatures. Recently there was even a 3D reef installed in Maldives to help save the coral. The students also have been creating edible water bubbles.

### Sweden - Visiting prime minister



How to bring change in your country? Teacher Emma Nääs took her students for a trip to their capital Stockholm by train. They visited their prime minister and showed him their "invention": the Equality Machine. And that allowed them to ask for substantial change as well. This was covered by national television.

## Ireland - Green dot movement



Kate Muray's school in Ireland had to close during the Climate Action Project in 2017 due to Hurricane Ophelia, which caused extensive damage and loss of life in the country. She and her students focused on the recycling symbols used on packaging and noticed they were inconsistent and confusing. They set up the Green Dot Movement and invited the Minister for Climate Action to the school asking him to change the waste management symbols. This way they brought about national change. Later they received a letter from their President, congratulating them on their work. One of the students Katelyn Culleton delivered the opening speech at the first Irish Youth Assembly on Climate which was covered by national television.

## USA - Solar Suitcase



Koen Timmers decided to increase the level of education in Kakuma Refugee camp by teaching the refugee students through Skype. For this he had to send his own laptop to the camp and had to set up an internet connection and provide power supply. He asked his friend American teacher Brian Copes (Alabama) to come up with some kind of a solar suitcase with a solar panel and battery which would provide one African school with free electricity. It only took Brian's students a few months to come up with a suitcase which allows them to charge a few laptops, phones per day and provide light to one classroom. Brian, Koen and Australian teacher Ken Silburn met in Dubai later that year and it was Ken who brought the suitcase to the refugee camp. One year after Koen and Jennifer from TAG built 2 eco-friendly schools in Kakuma refugee camps with sufficient solar panels so even the UN's buildings now don't require diesel generators. Read more about the solar suitcase and the schools: <https://innovationlabschools.com>

## Nigeria - Biomass plant



Nigerian students created their own small biomass plants with their teacher Olalekan Adeeko. Biomass is plant or animal material used for energy production (electricity or heat). Once finished the students brought these small plants to their communities to replace fires.

## Indonesia - Ecobricks



Indonesian students teamed up with a company (Texas Instruments) to make learning more authentic. They developed eco-bricks which allows them to recycle and reuse materials to develop something new. This was covered by national television.

## Belgium - Inviting parents to classroom



How to bring change? Teacher Olivier Dijkmans invited the students' parents to his classroom to show them how the students feel about pollution, the use of water, recycling, being transported by car and showcased the students' solutions. The parents had a discussion with their children and this approach is a great way to bring change bottom-up.

## USA - Aquaponics



Mike Soskil's students have been making virtual connections with African students for years. In 2018 they spoke with students in Malawi who claimed that they are having insufficient rain to grow plants. Because of that the students create a solution with aquaponics which allows them to grow plants with 80% less water. They shared their solution with their friends in Malawi and later that year Mike was invited by Oxford University (UK) to share more about this project.

## 50 countries - Minecraft eco-world



Technology has the potential to unite people globally. American teacher Joe Fatheree decided to set up a Minecraft server allowing students globally to create a new, eco-friendly world. During every moment of the day students across 50 countries built solar panels, hyperloops and other eco-friendly buildings.