



CLIMATE CHANGE



BIG IDEAS & LEARNING OUTCOMES



REFLECTION TOOLS



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curated by



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Big Ideas & Learning Outcomes **CLIMATE CHANGE**

WHAT IT IS

Today's climate change is a long-term, large-scale rise in Earth's global average temperature, causing shifts in weather patterns. Some models predict rises in global temperature of 4 degrees Celsius by the end of the 21st Century, which could make advanced civilisation unsustainable, lead to a major reduction in the human population, and cause extinction for many other species. The UN aims to keep temperature rise to between 1.5 – 2 °C.

"The Earth's climate is changing at a rate that has exceeded most scientific forecasts"
UNHCR 2018.

"Our greatest threat in thousands of years. The "collapse of our civilizations and the extinction of much of the natural world is on the horizons".

Sir David Attenborough, UN Climate Change Conference, Dec 2018



Students can explain the significance of the threat that Climate Change potentially poses to life-forms on earth. They are aware that the speed of change is exceeding most scientific forecasts, and that 1.5 degree would be a prudent target.

REFLECTION TOOL

WHAT IS CLIMATE CHANGE?

Climate change is

A GLOBAL TEMPERATURE RISE OF 4°C WILL: (Tick ones you agree with)

- make advanced civilisation unsustainable
- lead to a major reduction in the human population
- cause extinction for many other species
- bring no big change in human lives

Please give reasons:

HUMAN ROLE

97% Climate scientists agree that humans are the main cause of the climate change we see today. Earth's climate is always changing and a handful of climate scientists still think what we are seeing is natural. However, temperature rises are accelerating far beyond anything in history.

"Climate change is no longer some far-off problem; it is happening here, it is happening now."

Barack Obama.



Students understand that the **scientific consensus** is that humans burning fossil fuels is causing today's climate change. They are aware that there are alternative points of view.

REFLECTION TOOL

IS EARTH'S CLIMATE ALWAYS CHANGING?

- yes
- no

ARE TEMPERATURE RISES CURRENTLY ACCELERATING FAR BEYOND ANYTHING IN HISTORY?

- yes
- no

97% OF SCIENTISTS THINK CLIMATE CHANGE IS CAUSED BY:

- humans burning fossil fuels
- cars driving dangerously
- burning fossil fuels in the past
- the ice-caps melting
- the sun getting hotter

HOW IT WORKS

Greenhouse gases in the atmosphere (like CO₂) soak up the sun's radiation and trap it as heat. Human consumption currently relies on burning fossil fuels for energy, rather than sustainable energy sources. We need this energy for agriculture, factories, cooking, construction, heating, computer data storage/streaming, cars, planes and other transport).



Students are able to make the link between patterns of human consumption and Climate Change. They can explain the processes that cause climate change, name some of the activities that are responsible and make the connection between these and things that they consume.

REFLECTION TOOL

WHAT TRAPS THE SUN'S RADIATION AS HEAT IN THE ATMOSPHERE?

WHAT EFFECT DO THE FOLLOWING HAVE ON CLIMATE CHANGE?

(Write I = Increase climate change; R = Reduce climate change; D = Depends; ? = Don't know)

- Beef farming
- Driving a car
- Using Solar power
- Building a new hospital
- Buying a new pair of shoes
- Planting trees
- Watching Netflix

INDUSTRIAL ECONOMIES

- > 1. <https://edgar.jrc.ec.europa.eu/overview.php?v=book-let2018&dst=CO2pc&sort=des9>
- > 2. <https://www.theguardian.com/environment/2011/apr/21/countries-responsible-climate-change>

Most of the greenhouse gases that we humans have added to the atmosphere come from a process of global industrialisation (from the 1800s on) by the Minority World countries (in Europe & North America); and more recently the Majority World (esp. China, India). It's being driven by a global economic system that encourages **over-consumption**, including demand for energy and consumer goods (especially from the wealthy Minority World countries). The result has been an increase of CO₂ by almost 50% since 1750 (the pre-industrial era). However, most of the people in the world still use very little energy and consume little.¹ In 57 of the least developed countries people consume less than 1 metric tonne of CO₂ each a year, while in North America people emit 16.4 tonnes CO₂.² The question of who's **responsible** for all this CO₂ is tricky. Some countries are producing more CO₂ in recent times, some have been producing a lot of CO₂ for a long time. If something is produced in China for someone in Europe, is China or Europe responsible for the CO₂?



Students can describe the link between past industrial development and current Climate Change. They can explain how what we consume results in CO₂ production. They are able to support their views on who is responsible with clear arguments.

REFLECTION TOOL

THE BIGGEST CONSUMERS IN THE WORLD ARE : (CIRCLE AS APPROPRIATE)

Europe – Africa – South Asia – North America

IS THERE A LINK BETWEEN PAST INDUSTRIAL DEVELOPMENT AND CURRENT CLIMATE CHANGE?

- yes
- no
- unsure

CIRCLE THE APPROX CARBON EMISSION (TONNES OF CO₂ PER PERSON PER YEAR) IN:

- The 57 lowest income countries: less than 1 5 8
- North America: 5 12 16
- Europe: 5 9 12

THE IMPACT ON THE NATURAL ENVIRONMENT

The **impact on the natural environment** of climate change can be seen in global temperatures, warming oceans, rise in sea-levels and extreme weather events (like heatwaves, extreme rain, floods, drought).

“Global sea levels rose about 8 inches in the last century. The rate in the last two decades, however, is nearly double that of the last century” – NASA, 2018.

Impact on people, animals and plants. These changes could have extreme consequences for humanity and other life-forms. The greatest initial impact is currently on millions of people especially in the more vulnerable hotter majority world countries, in coastal communities, low-lying countries, and wildlife (especially in the Arctic), but Climate Change will increasingly affect us all. Millions of poor farmers in the majority world, who were not responsible for creating the problem, are trying to adapt to challenges like hotter climate and different rainfall patterns. As crops fail, many people are already forced to migrate, creating a new phenomenon of Climate Refugees³. However, people fleeing their homes “due to climate change” are not legally protected by the UN refugee convention, as climate change alone is not listed as criteria to qualify as a refugee. There has been “an average of 22.5 million people displaced by climate- or weather-related events since 2008” UNHCR 2018.). In Europe, Climate change events are already creating high economic costs (coastal erosion, storms, floods, damaged infrastructure).⁴ The World Health Organisation and the World Bank are now concerned that hundreds of thousands more people will die each year from disease, malnutrition and heat stress, and force 100 million people into extreme poverty by 2030.⁵

> 3. UN Global Compact for Migration July 2018 is the first time governments recognise the climate migrants; (<https://www.un.org/sustainabledevelopment/blog/2019/06/lets-talk-about-climate-migrants-not-climate-refugees/>)

> 4. <https://www.ecologic.eu/sites/files/publication/2018/2811-coacch-review-synthesis-updated-june-2018.pdf>

> 5. <https://edition.cnn.com/2019/01/16/health/climate-change-health-emergency-study/index.html>; <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>



Students can name some different consequences of climate change and how these affect people, animals and plants.

Students can explain how and why Climate Change effects some places and communities more than others e.g. people in the majority world. They can describe in simple terms the connection between climate change and migration.

REFLECTION TOOL

HOW ARE THESE CONNECTED TO CLIMATE CHANGE? (Number from 1 to 5 to make a sequence)

- Migration
- Crop failure
- Hotter weather
- Food shortage
- Hunger

IS IT EASY FOR FARMERS IN POOR COUNTRIES TO ADAPT TO CLIMATE CHANGE?

- Yes No Unsure Don't know

Because

ON WHICH LIFE-FORMS WILL CLIMATE CHANGE HAVE AN IMPACT? (Tick as appropriate)

- People Animals Plants

DISCUSSION ABOUT FUTURES

- > 6. <https://www.un.org/sg/en/content/sg/state-ment/2018-12-03/secretary-generals-remarks-opening-cop-24>
- > 7. <https://www.worldbank.org/content/dam/Worldbank/document/Climate/dd/decarbonizing-development-report.pdf>
- > 8. <https://www.un.org/sg/en/content/sg/state-ment/2018-12-03/secretary-generals-remarks-opening-cop-24>; <https://www.bbc.co.uk/news/science-environment-46398057>

Climate change is accelerating, and it's "a matter of life and death".⁶ The global consensus is that we are just seeing the initial phase of Climate Change, with relatively small effects. Most scientific models predict much more drastic changes. We can expect to see some of these in all our life-times. Addressing the problem of Climate Change has stimulated discussion of how to address the underlying cause – human consumption. The relationship between the prevalent model of economic growth and consumption is now being examined. Experts and global organisations, like the World Bank, say reducing net emissions of carbon dioxide (CO₂) to zero by 2100 is the only way to slow Climate Change sufficiently.⁷

"We are in deep trouble.. (the world is) nowhere near where it needs to be (in the transition to a low-carbon economy)".⁸

Antonio Guterres, UN Secretary-General, Dec, 2018



Students understand that Climate Change will have an effect on the future of their and the lives of everyone in the world.

They know that there are a number of different possible futures, and what individuals and the global community as a whole do now, will determine the probable future in terms of life on Earth.

They can name consequences if we do not take care of the environment and understand Climate Change is an environmental threat to human civilisation on a planetary scale.

REFLECTION TOOL

WILL CLIMATE CHANGE HAVE AN EFFECT ON YOUR LIFE?

- Yes No Unsure Don't know

SHOULD GOVERNMENTS DO SOMETHING ABOUT CLIMATE CHANGE?

- Yes, the governments of the most affected countries should take action
 Yes, all governments must do something
 No, nothing can be done
 Unsure
 Don't know

WHY?

ADDRESSING CLIMATE CHANGE

Because of the potentially catastrophic consequences of climate change, scientists have encouraged world leaders to adopt a '**precautionary principle**' to avoid tipping points and address the main causes – over-consumption and use of fossil fuels - before it's too late. This means changing our behaviour. Many different types of action will be needed to avoid the worst scenarios predicted by scientific models. These include actions to both mitigate climate change and to adapt to it. Governments are being forced to consider laws that help stop the worst scenarios materialising. One solution is 'lifestyle change'; this may mean addressing the contradiction between people's awareness about the issue and individual people changing how they act.



Students understand that action on Climate Change is taking place at 3 levels across the world. They can explain why action on all of these levels is important to address Climate Change.

They can explain the importance of the role that individuals can play. Students understand that there frequently a disjuncture between people's awareness of the problem and people actually changing their behaviour.

REFLECTION TOOL

HOW IMPORTANT ARE THE FOLLOWING IN TACKLING CLIMATE CHANGE? (Score each 0 -10)

- Groups & Organisations
Governments
Individuals

MITIGATING AND ADAPTING TO CLIMATE CHANGE

There are many actions we can take to mitigate climate change, including **capturing** CO₂ and **reducing emissions** through use of **renewable energy** (which derives from natural sources like water, wind and sun). Renewable energy sources do not run out unlike fossil fuels like gas and oil. These actions include:

Producing '**clean electricity**' from renewable sources, rather than fossil fuels. (Wind turbines and solar panels produce enough electricity to power entire communities, or your own home)

- Using electricity as our main source of energy (e.g. for cars and heating homes), or, where necessary switching to lower-carbon fuels (like biomass or natural gas).
- **Consuming less** and **wasting less** (e.g. making more efficient machines and reusing things)
- Protecting and **renewing natural carbon sinks** (e.g. plants, soil, oceans), which take carbon out of the atmosphere.

If these efforts are successful, we will still need to adapt to the effects of climate change – e.g. to increased drought and rainfall through new farming techniques.



Students can name some different types of renewable energy.

They can explain the main strategies to slow Climate Change.

They can explain why reducing our consumption is an important strategy to reduce the global production of CO₂.

Students can explain the difference between mitigating and adapting to Climate Change.

REFLECTION TOOL

CAN THESE REDUCE CLIMATE CHANGE?

- | | | |
|-------------------------|---------------------------|--------------------------|
| Consuming a little more | <input type="radio"/> Yes | <input type="radio"/> No |
| Plants | <input type="radio"/> Yes | <input type="radio"/> No |
| Natural Gas | <input type="radio"/> Yes | <input type="radio"/> No |
| Solar power | <input type="radio"/> Yes | <input type="radio"/> No |
| Consuming less | <input type="radio"/> Yes | <input type="radio"/> No |

DO YOU ACTUALLY DO THINGS TO STOP CLIMATE CHANGE?

- yes
 no

Please give examples:

ACTION

- > 9. <https://nypost.com/2018/12/03/un-chiefcalls-climate-change-mostimportant-is-sue-we-face/> “Even as we witness devastating climate impacts causing havoc across the world, we are still not doing enough, nor moving fast enough, to prevent irreversible and catastrophic climate disruption”
UN Secretary General, 2018
- > 10. <https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers>
- > 11. <https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warn-landmark-un-report>

195 **Governments** worldwide have come together to combat “our greatest threat in thousands of years”⁹ - climate change - signing the 2015 Paris Climate Agreement. This aims to strengthen the ability of countries to deal with the impacts of climate change and emphasises the need for collective action to limit overall temperature rises. The 2018 UN Intergovernmental Panel on Climate Change¹⁰ report states that global CO₂ emissions need to decline 45% by 2030 to keep the temperature rise to 1.5°C¹¹.



Students can name the most recent prominent agreement signed to address climate change and can describe the main aims of the agreement. They understand that international agreements take place are strengthened by individual and collective actions and are unlikely to solve the issue on their own.

REFLECTION TOOL

WHICH AGREEMENT WAS SIGNED BY GOVERNMENTS WORLDWIDE TO COMBAT CLIMATE CHANGE IN 2015?

ACTION

Many **individuals** are looking at their carbon footprint and reducing their consumption – using and buying less e.g. reducing their food waste and the amount of clothes they buy, buying renewable energy and electric cars, nurturing carbon sinks by planting trees or forests.

“Defence of our resources is just as important as defence abroad. Otherwise what is there to defend?” Robert Redford.



Students can explain what a Carbon Footprint is and describe practical things people can do to reduce their footprint. They are aware that people in wealthy Minority World countries have much bigger footprints – and that individual people reducing their footprint is an important part of the collective effort to slow Climate Change.

REFLECTION TOOL

TO ADDRESS CLIMATE CHANGE:

- I can make a difference
- I can't make a difference
- I'm not too worried
- I don't know!

A CARBON FOOTPRINT IS:

- a kind of fossil
- the CO₂ a person uses
- a BBQ gone wrong

THE BEST WAY TO REDUCE YOUR FOOTPRINT IS:

- eating less
- using less
- buying smart

Please give examples:

ACTION

Collective responses. There are many collective groups taking action. Farmers' organisations across the world are taking action. People join campaigning groups, or lobby organisations they are already members of. Businesses are responding to this 'demand' by providing more environmentally-friendly products and services (e.g. power). These collective and individual actions can help governments to make policy changes.



Students can explain the importance of people participating in Collective action on Climate Change and give examples of successful collective actions (e.g. the replanting of forests in Kenya, the lobbying of governments)

REFLECTION TOOL

NAME SUCCESSFUL EXAMPLES OF COLLECTIVE ACTION TO COMBAT CLIMATE CHANGE

LOCALLY:

INTERNATIONALLY: