



# Session 3 – Climate change and impacts

## Summary

In this session, take a closer look at what climate change may mean for the UK and around the world. Is the future of climate change already decided? No! Find out how we can make some simple changes to reduce emissions and work together to make our planet a safer place, today and for the future.



60-90 minutes

allow additional time for discussion and activity suggestions



### Materials required

- Climate Change and impacts slides
- Climate Impacts Quiz - cut out cards prior to lesson [copies depend on class size] Recommend 1 per pair or small group. - [https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/assets/metofficegovuk/pdf/weather/learn-about/met-office-for-schools/resources-11-14/exploring-climate-impacts\\_quiz.pdf](https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/assets/metofficegovuk/pdf/weather/learn-about/met-office-for-schools/resources-11-14/exploring-climate-impacts_quiz.pdf)
- Paper/Pens for poster making.

## Activity Steps

### 01 Impacts of climate change in the UK

Tell the groups that in the last session, we learned about how our climate is changing. We learned that the climate is warming as a direct result of human actions. Humans are contributing to increased greenhouse gases in the atmosphere, like carbon-dioxide, which are acting to warm the Earth. We also began to discuss the term 'impacts' – this is where we learned about what the changes actually mean for our day-to-day lives. We also created our own 2050s forecasts.

Explain to the group that one of the ways that climate change affects us is by increasing the chances of certain types of weather events happening, such as extreme flooding or heatwaves. Scientists at the Met Office have been using computer models to look at these long-term changes. These models work in a similar way to the weather forecast, but look at changes further into the future. We call these climate projections. The Met Office has looked at climate projections for the UK in detail – these projections tell us that over the coming century, we expect our climate in the UK to shift to 'warmer wetter winters, and hotter drier summers'.

Let's take the example of 'hotter drier summers'. Show Slide 2 - Here is a map of what this may look like in the UK. This map shows projections for summer mean temperatures in a high emissions scenario/future, this is the average projected temperature, by 2080-2098. But what about our day-to-day weather? We will still see variation, some days in summer will still be cooler and wetter. But overall, we'll experience a shift towards these warmer conditions. This also means that the chances of experiencing extreme weather events also increases.

One type of extreme weather event which is expected to occur more frequently, is heatwaves which you will have forecast in the previous session. We have also provided a low emissions scenario on slides 3 and 4 to compare

**Additional Activities** - Show slides 5-7, these show the different scenarios in precipitation between 2080-2098. When we mention precipitation, it refers to water that falls to the ground and includes rain, snow and hail. Encourage the children to compare these two projections.

Suggested questions below when looking at the projections:

- Prompt questions: In which scenario (high or low emissions) is there greater precipitation, meaning that it is wetter? Are there any impacts that you can think of associated with increased precipitation? Which world would you rather live in?



15 minutes



Slides

Show slides 5-7

- Which projection is wetter? The high-emissions future is wetter. This means increased emissions will lead to wetter winters.
- Which projection is more extreme? The higher-emission future is more extreme.
- What are some possible impacts of the changes you have observed? Increased precipitation may lead to increase chance of flooding, which can damage buildings, cause travel disruption and can affect farmland if soils are washed away or fields are underwater.
- Which future world would you rather live in? Hopefully following a discussion on impacts the group may decide that lower emissions is a 'safer' world.

You can also find out more about climate change in your local area in this climate change visualisation tool - <https://www.bbc.co.uk/news/resources/idt-d6338d9f-8789-4bc2-b6d7-3691c0e7d138>. This tool is a collaboration with the BBC. It uses our climate projections and records to visualise climate change in the UK.

## 02 Impacts of Climate Change globally

Tell the group that so far, we have been discussing the impact of climate change here in the UK, but what about climate change across the world. What impacts will other people feel elsewhere in the world? Take some suggestions.

It's very important to think about how climate change in other countries is affecting local people. These impacts may also have effects on us here in the UK. One example is how farmers in India may have less water to water/irrigate their crops as meltwater from glaciers becomes less predictable. This can lead to crop failure as there isn't enough water for the plants to grow. What would happen if there was crop failure in India? Would this affect us? If so, how? Well, we import lots of our food and other resources from other countries around the world. An extreme event in India, that results in crop losses, could cause global food prices to rise or possibly even shortages in the UK as there is less food to trade/import.

This is a knock-on effect and shows us how impacts of climate change all around the world are highly connected. This means that the impacts of climate change are even more wide-reaching than just our local changes in weather.

**Additional activities** - Exploring impacts quiz or you can research new article surrounding the crop failures in India. What impacts has it had on the local community? Is the future of Climate Change already decided?



15 minutes



15 minutes

### 03

Discuss with the group that when scientists talk about future climate projections, they often use phrases like ‘the climate may warm by this amount’ and they often refer to “possible futures”. Why do scientists use these words?

Scientists aren’t exactly sure what will happen because it is not possible to know what decisions humans will make in the future. Whilst scientists have lots of evidence to show that climate change is already happening, the way in which it may continue is still to be decided.

Will climate change continue at the same rate as we see today? Will climate change happen faster, or will we be able to reverse some of the effects we are already seeing?

Refer to session 2 where it was discussed how greenhouse gas emissions are contributing to global climate change. This means, that an increase in global emissions will lead to higher levels of warming around the world. If there is more warming, then we expect the impacts of climate change to be more extreme. But this also works in reverse. If we reduce the rate of global emission rise, then we may be able to limit the levels of climate change for the future. This means we can reduce some of the impacts of future climate change. So, when scientists refer to different possible futures, this is because the future of climate change is still to be decided by the actions of people.

Ask the group if they remember the map showed earlier of warming across the UK in summer at the end of the century?

**Show slide 2 again.**

At the top here it says ‘high emissions’. This means that this map is looking at what warming may be like if we continue to increase the levels of carbon-dioxide and other greenhouse gases in our atmosphere.

Now let’s look at the same map but for a lower-emissions scenario, where we emit less carbon-dioxide and other greenhouse gases. **Show slide 3.** Ask the group if they can see the difference in the colours. They are lighter shades. If we look at the scale at the bottom, we can see that these colours suggest that warming across most of the UK will be between 1 and 2 degrees Celsius. This is compared to around the 5 degrees Celsius warming we saw earlier. This means that the high-emissions world has higher temperatures than the lower-emissions world. And don’t forget, it’s not just that the temperatures are hotter, but the impacts will be greater too. This shows us that the amount of greenhouse gases we emit now will have a direct impact upon the climate we experience in the future. Which world would you rather live in?



10 minutes



Slides

Show slide 2 and 3

## 04 How can we reduce the impact of Climate Change?

Tell the group it's not all doom and gloom! The message on climate change is simple. Action now will make a difference, especially to what could happen by the end of the century. The later we leave it to take action, the worse the problems may become. But how do we achieve a low-emissions future? Take suggestions from the group.

Move to slide 8. One way in which the issue of climate change is being addressed is through international action at government level. You might have heard in the news about something called COP (Conference of Parties). At events like this, nations across the world come together annually to discuss the issue of climate change, and to work together to decide targets for future emissions reductions. For example, at COP21 which took place in 2015, the nations signed a treaty to keep global temperatures below 2 degrees above pre- industrial levels. This treaty is very famous and is called the Paris Agreement – ask the group if they have heard of it.

Within your lifetime, COP26, was hosted in Glasgow Scotland in 2022, COP27 was hosted in Egypt and more recently COP28 in Dubai, nations came together again. These events were great opportunities to strengthen international commitment to climate change goals.

**Extra activity** – research what outcomes arose from each COP since COP21. Have they stuck to these agreements? Where are COP29 and 30 being held? It might also be useful to research Youth4Climate.

**Move to slide 9.** Tell the group that since the Paris Agreement, several nations and organisations, big and small, around the world have committed to working towards Net Zero. The UK government for example has committed to reducing its emissions to 'Net Zero' by 2050 and the Met Office is aiming to reach Net Zero by 2030.

## 05 Net Zero and emission reduction challenge

Ask the group if they understand what net zero means? Discuss their ideas.

### Explanation of net zero

On average, we are not adding greenhouse gasses to the atmosphere. You can think of this like filling a sink with water. If you turn the tap on, with the plug in the bottom, then the sink will fill. If you take the plug out, then the water will drain away. You can think about emissions in the same way. To achieve net zero, we need to make sure that the emissions we produce, in the



20 minutes



10 minutes



Slides

Show slide 9



20 minutes



Group discussion

example the water from the tap, are balanced by what are removed, in this example the water that drains away. To achieve this, we need to both reduce the emissions we produce and also work to remove emissions, for example by planting more trees. Whilst it is important that our governments work together internationally on the issue of climate change, it is also very important that each one of us thinks about changes we could make in our own lives to help make a difference to global emissions.

Tell the group that there's evidence of human influence on changes in extreme weather such as heatwaves, heavy rainfall, droughts and tropical cyclones. This has strengthened in recent years, with some recent hot extremes considered virtually impossible without human influence – for example the UK heatwave in July 2022. Our website <https://www.metoffice.gov.uk/weather/climate-change/effects-of-climate-change> has information about current and future impacts on people and ecosystems for the globe and the UK.

We can all make some simple changes to the way we live to help to reduce the emissions. Here are six ways in which we can help reduce our emissions. **Show slide 10.**

### **UK and further details about extreme weather**

1. **Reduce, re-use and recycle** - making new materials, such as clothes and electronics, uses energy in factories. This energy usually comes from fossil fuels, such as oil and gas, which contribute to greenhouse gas emissions. Also, these products may be produced abroad, and so are transported large distances to reach their new owners. Recycling these products also uses energy. To reduce the amount of greenhouse gases going into our atmosphere, the best thing to do is reduce the amount of stuff we buy. Next best is the re-use, and then if you can't reuse it, recycle it.
2. **Transport** – Some common forms of transport, such as cars and aeroplanes, contribute a significant amount to carbon emissions. Why not choose to cycle or walk to school if you can? Perhaps you could take the train or share a car with someone who lives near you. If you travel abroad, why not take a train instead of flying, as this helps to reduce emissions for the same journey.
3. **Green Energy use** – This is perhaps one of the easiest changes to make. Turn off lights and appliances when they aren't in use – like a phone charger or TV. When you are a bit chilly inside in the winter, add an extra layer like a warm jumper instead of turning the heating up. These will all help to reduce energy consumption and costs.



Slides

Show slide 10

4. **Plant trees and plants** – Why not plant a tree? Or better yet, maybe you could work with your school to plant a woodland area. Trees help to remove carbon dioxide from the atmosphere. They can also create a great habitat for wildlife!
5. **Food** – What we eat and where we buy it from can be very important. The production of meat contributes to increased emissions, so you could choose to increase the number of vegetarian meals you eat. You could also choose to shop locally and to buy seasonal fruit and vegetables. This usually means that they haven't been transported large distances and therefore help to reduce emissions. For example, tomatoes, it's much better to buy organic Spanish ones, than ones that have been grown in the UK. To get tomatoes all year round in the UK you have to heat the greenhouses/polytunnels with CO<sub>2</sub>, and this causes a much bigger carbon footprint than shipping in overland from Spain.
6. **Encourage others** – The more people who are talking about the issue of climate change, the better. Perhaps you could tell those who you live with about what you learned today. Maybe you could encourage them to make some of the same changes you are making. Together, we can all work to make a difference.

**Set a challenge to the group** - the challenge is to think of some ways of helping reduce emissions. These could be small, or really big! They can use the ideas above or come up with their own.

For example, create an invention for a way to make aeroplanes carbon neutral. Be as creative as you like... they don't necessarily need to be achievable. The students can work individually or as part of a group to complete their challenge and produce a poster of their thoughts. There's no idea too big or too small for this activity!

## 6. Review

Review suggestion given by the groups. They could also share their suggestions with the rest of the school or friends and family.

Emphasise to the group that the future of our planet is in our hands – the decisions we make today will have a direct impact on the future of climate change and its impacts.

### **This is good news!**

It means that we can all work together to help make our planet a safer place, today and for the future.



Group challenge



10 minutes