

Global Temperature Record

This [interactive graph](https://www.temperaturerecord.org/) (<https://www.temperaturerecord.org/>) from [The 2 Degrees Institute](#) shows an increase in anomalies of the global average temperature record since about 1900, and the overall increase in fluctuations in temperatures away from the long term global average since the 1960s.

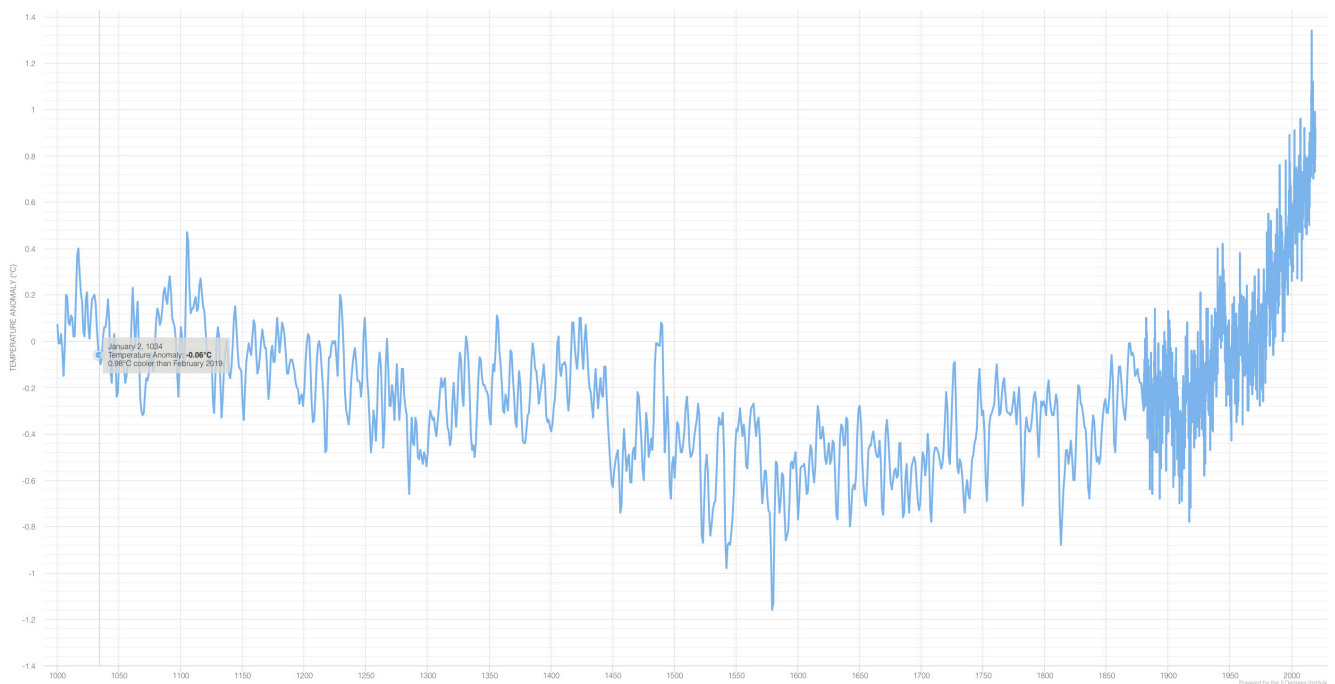
Vocab: ANOMALY

An anomaly is something out of the ordinary, something that doesn't occur how you might usually expect. For example:

- finding three yolks in an egg instead of one
- finding three Decembers in a row where average temperatures are two or three degrees higher than average
- having three major floods in an area within five years when we'd normally only expect one in a hundred years.

Year 1000 - present

The Global Temperature Record graph shows the ANOMALIES in global temperature (Axis X - vertical) over time (Axis Y - horizontal). Point out that it demonstrates the amount that the temperature differs from what would usually be expected. In some instances this means warmer winters and cooler summers. In others, there were record highs in summer and record lows in winter.



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From looking at this graph a couple of things are quite obvious:

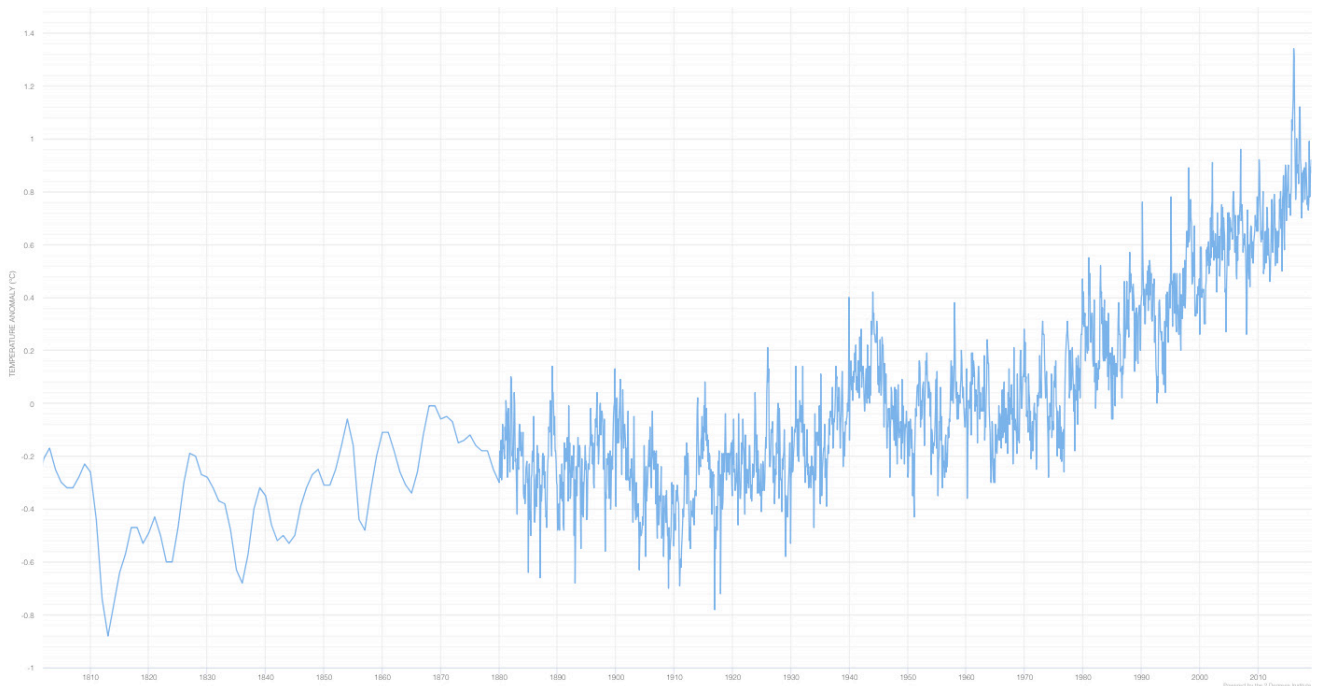
- It is usual for global temperatures to vary between seasons, and over time, and they aren't always predictable.
- There is an obvious increase in recorded anomalies (or changes) in more recent years.
- Global temperatures are changing much more rapidly in recent years than they have in the past 1000 years and are getting far more unpredictable.

FACT

Scientists analysing Antarctic ice have found there was a dramatic reduction in CO₂ levels around the year 1600. There is no current agreement as to why this occurred, but a lot of people think it might be related to the large amount of deaths that occurred in Mongol Invasion and the Black Death in Europe. After the Black Death many farms were left un-tended, leaving trees free to grow.

Zooming in to 1800 - present

This is the same graph zoomed in to show more detail from the year 1800 through to the present. At 1880, the temperature starts to suddenly shift more rapidly.



TIP: If you access the graph directly on the website you will be able to run the mouse over specific points for further information and zoom on any time period you wish.

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Optional extension:

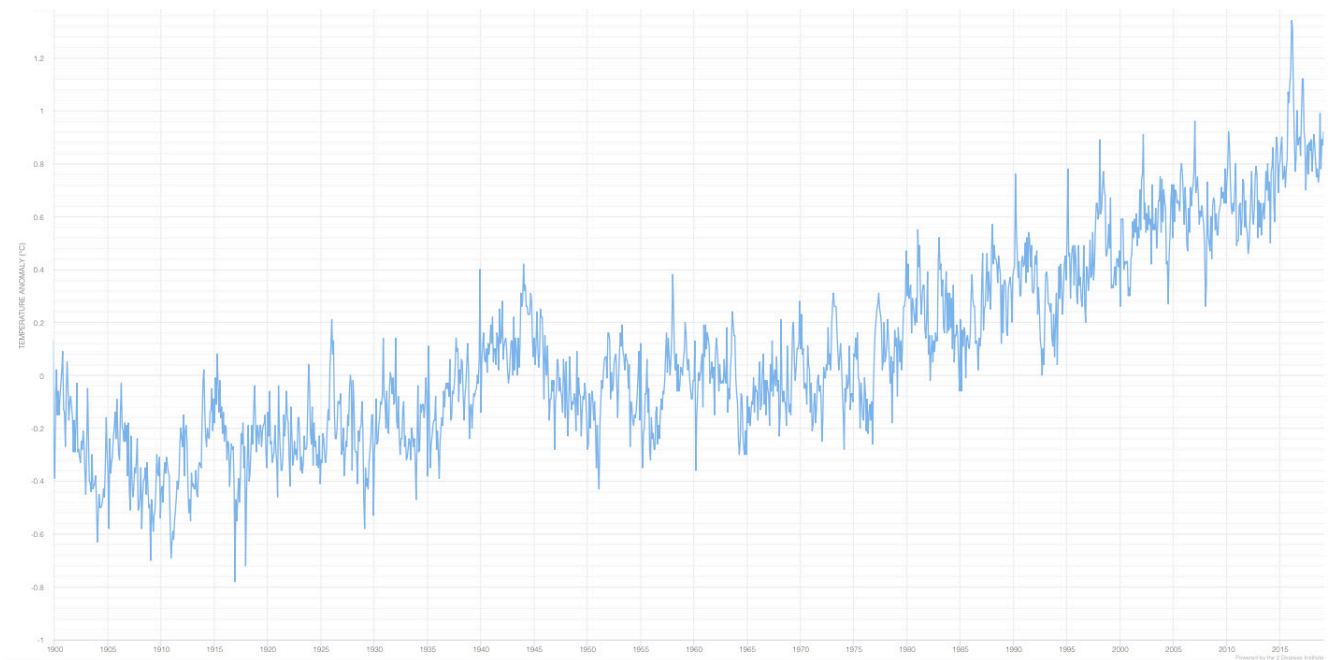
1. Ask students why they think the rapid shift in 1880 might have occurred. Point out that the industrial revolution started in 1760, through to 1820-1840 and was a time where new machinery was developed and people become increasingly reliant on fossil fuels. Could this have been a contributing factor? HINT: This issue was addressed in this [article](https://theconversation.com/the-industrial-revolution-kick-started-global-warming-much-earlier-than-we-realised-64301).
(<https://theconversation.com/the-industrial-revolution-kick-started-global-warming-much-earlier-than-we-realised-64301>)
2. Why do you think the first graph drops from 1450 to 1600? What events might have occurred leading to this? This is a big question that scientists are still trying to solve. (See <https://www.livescience.com/11739-wars-plagues-carbon-climate.html>)
3. Annotate the graph with some key moments in history that might have influenced changes in CO₂ and global temperatures.

FUN FACT

Mass production was invented to make weapons in 1798 and Henry Ford created the conveyor belt (like we still see in some supermarkets) for the production of cars in 1913. Before mass production, everything had to be made by hand and it was a much slower process. After mass production, humans were capable of producing many more items in a shorter time, with less cost.

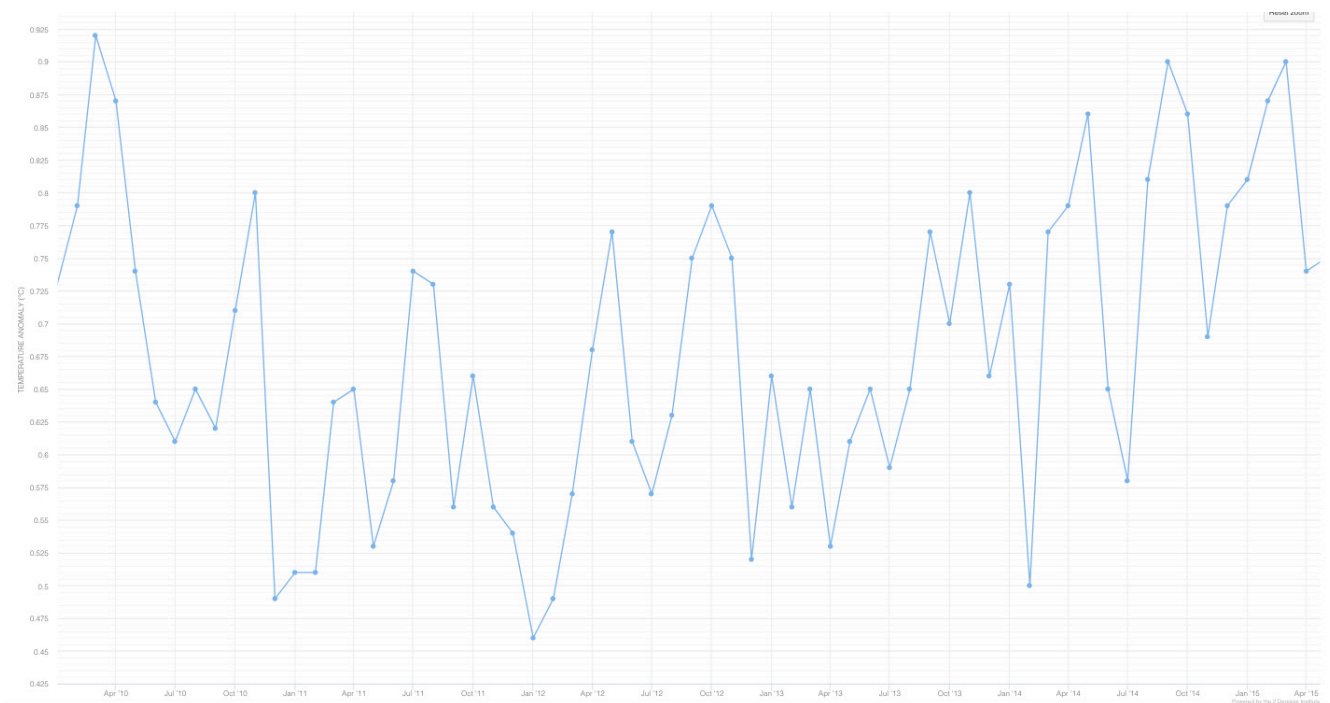
Zooming in again to 1990 - present

This graph shows the detail in changes in global temperature since 1990.



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You can see that it is still steadily rising. Draw a line through the approximate centre of the graph (if it is projected on a whiteboard) to show the general trend.



Zooming in further to 2010 - present

This graph is zoomed to 2010 - present and shows the plot points. This will give students an idea of how these graphs are constructed.

Remind the students of what Damon Gameau, the narrator of 2040, said about the change to the amount of CO₂ in the atmosphere since the Industrial Revolution, about 200 years ago (that would be approx 1820): that we have gone from an average of between 200 and 280 parts per million (or 0.028%) to about 410 parts per million (0.041%) in just a couple of decades.

This means that there's about double the amount of CO₂ in the atmosphere, trapping in heat - and warming our planet.

This is why temperatures - and severe weather events such as floods, cyclones, bushfires and storms - are on the increase.

Could the change in CO₂, extreme weather events and global temperature anomalies all be related? That's what many scientists believe and it is now widely accepted as true.