

How do we know that humans are causing the Earth to warm and the climate to change?

Read below to learn about several lines of evidence that build upon each other to strengthen the concept that humans are responsible for global warming and climate change.

1

Simple chemistry since 1900s

Burning carbon-based fuels releases carbon dioxide into the atmosphere.



WOOD



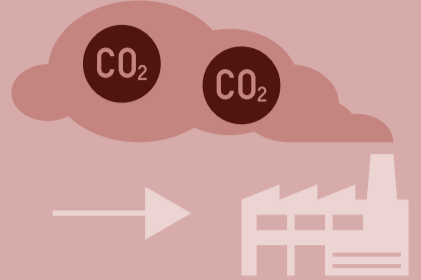
COAL



OIL



GAS



2

Basic accounting since 1970s

We keep track of and add up how much we burn and therefore can calculate how much CO₂ and other pollutants we emit.



3

Measuring in the atmosphere since 1950s

Measuring CO₂ in the atmosphere in remote locations shows that the increase in emissions is indeed increasing atmospheric concentrations.



CO₂ trapped in ice shows that levels today are much higher than over the past 800,000 years

4

Chemical analysis since 1950s

Chemical analysis of the CO₂ in the atmosphere reveals that the excess is from burning ancient plants that have been buried for millions of years (fossil fuels).



5

Basic physics since 1820s

Certain gases (such as CO₂) absorb heat emitted by Earth and prevent it from going to space.



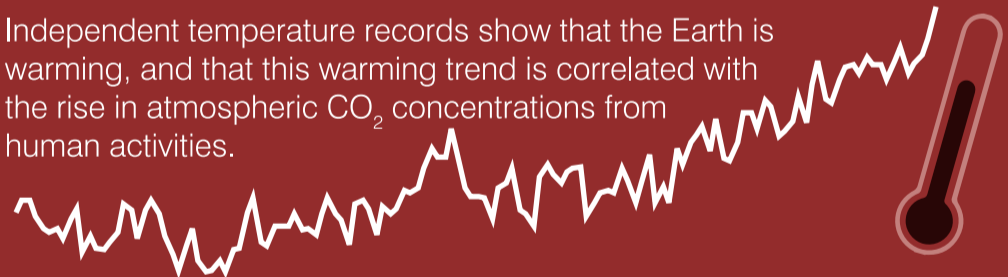
THIS EXPLAINS WHY:

1. A greenhouse is hot
2. The Earth isn't frozen
3. Venus is hotter than Mercury even though it is farther from the Sun—its atmosphere is filled with CO₂

6

Monitoring climate conditions since 1930s

Independent temperature records show that the Earth is warming, and that this warming trend is correlated with the rise in atmospheric CO₂ concentrations from human activities.



7

Ruling out natural factors since 1830s

Many factors can influence climate conditions. But monitoring and examining natural factors show that they have not played a major role in 20th Century warming.



THE SUN



OCEAN CYCLES



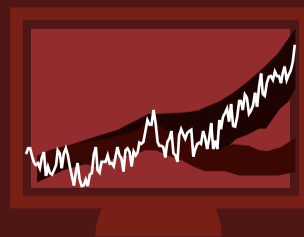
PLANTS

SCIENTIFIC ANALYSIS REVEALS THAT IT'S NOT:

8

Employing computer models since 1960s

Computer models are tools that scientists use as a virtual laboratory (because we can't experiment with the Earth!)



Only the inclusion of human activities in climate models can reproduce observed temperature warming.

9

Consensus among scientists since 1990s

Analyzing the above evidence for themselves, 97% of 12,000 climate scientists from 74 countries that published in the scientific literature from 1994 to 2011 agree that humans are the main cause of climate change.

