

Greenhouse Gases of the Past

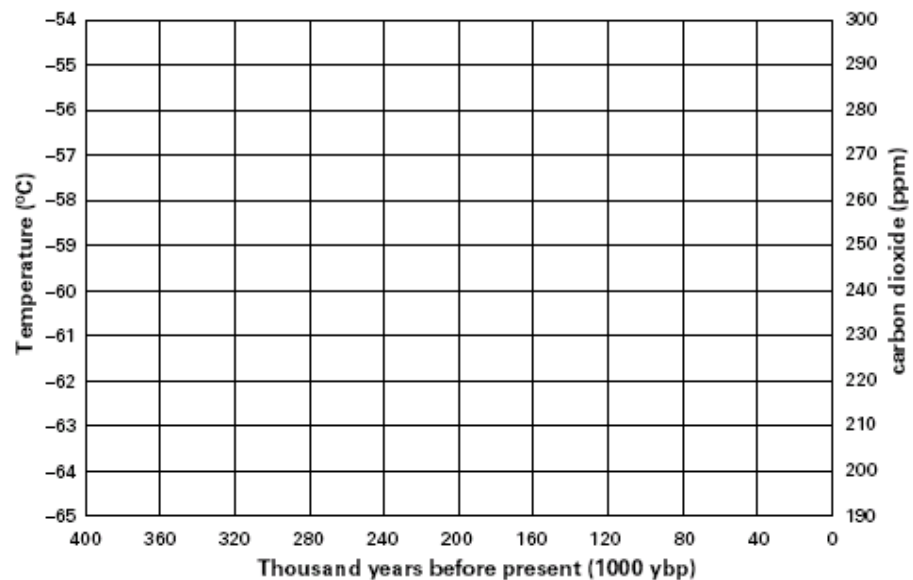
Background - Greenhouse gases are gases [carbon dioxide, methane, water vapor, nitrous oxide] that trap heat in Earth's atmosphere and warm Earth. Many scientists believe that human activities such as the burning of fossil fuels have increased the amount of greenhouse gases and have caused the temperatures on Earth to rise.

Question - How have greenhouse gases changed throughout Earth's history?

Using one color, graph the amounts of carbon dioxide over the last 400,000 years with a line graph.

Carbon Dioxide and Temperatures in Antarctica

Time (thousands of years ago)	Carbon Dioxide (CO ₂) in parts per million
400	279
360	210
320	272
280	221
240	214
200	240
160	193
120	264
80	226
40	201
0	280



Now, using a different color, graph the temperatures over the last 400,000 years with a line graph on the same grid.

Time (thousands of years ago)	Temperature in degrees Celsius
400	-55.3
360	-60.6
320	-54.8
280	-60.8
240	-60.8
200	-57.9
160	-62.2
120	-54.8
80	-59.1
40	-61.2
0	-55.0

Remember, when you have negative numbers, the larger the digit, the smaller a number it is!

Ex: -55 is a smaller number than -50.

Analysis

1. What patterns do you notice?
2. How many times over the last 400,000 years have the temperatures in Antarctica been **over** -56°C ?
3. How do the changes in temperature seem to be related to the changes in the amount of carbon dioxide?
4. Many scientists believe that modern day humans have been around for 200,000 years. If the data in our graph goes back 400,000 years, can you suggest an idea for how we got that data?
5. The Industrial Revolution began about 200 years ago. This was when humans started burning fuels in larger amounts in their homes and in factories. Where would we look on the graph to see how the amount of carbon dioxide changed during this time?
6. What reasons can you suggest for why the amounts of carbon dioxide and the temperatures increased a few times over the history of Earth even before humans were thought to have been around?
7. What is the purpose of graphing two sets of data on the same graph?
8. If you overheard a scientist talking to the President of the U.S. and they were blaming all global warming on humans, would you agree or disagree? Use the graph to prove your point.
9. What are three effects of increased temperatures on Earth?
 - a.
 - b.
 - c.