

# FOSSIL FUELS

Name

Teacher

Date

## CO<sub>2</sub> and Global Temperature

### Learning Objectives

- Be able to plot and analyze a graph showing the relationship between atmospheric carbon dioxide levels and global temperature

Since the Industrial Revolution in the 1800s, fossil fuels such as coal, oil and gas have been extracted from the Earth and burned for energy. When fossil fuels are combusted they produce water and the greenhouse gas carbon dioxide (CO<sub>2</sub>) and climate scientists have concluded that there is a relationship between the levels of atmospheric CO<sub>2</sub> and global temperatures.

Scientists have been monitoring the quantity of CO<sub>2</sub> in the atmosphere (measured in parts per million of air, ppm) and the difference between the long-term average temperature and the actual temperature. This difference is known as a **temperature anomaly** – a positive value and it is hotter than normal; a negative value and it is cooler than normal.

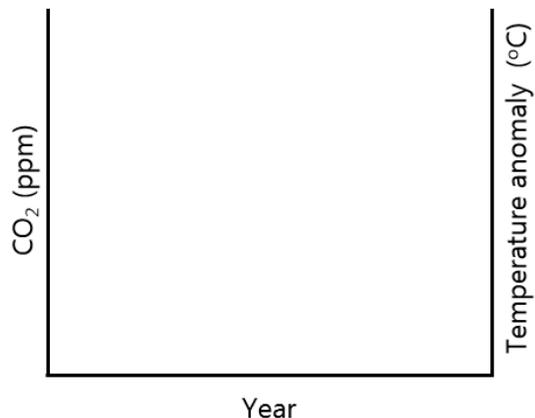
Using the data given plot a graph to show the relationship between atmospheric carbon dioxide levels and global temperatures.

Year	CO <sub>2</sub> levels (ppm)	Temperature Anomaly (°C)
1970	325	0.0
1975	330	0.02
1980	338	0.2
1985	345	0.23
1990	354	0.34
1995	360	0.37
2000	369	0.5
2005	379	0.6
2010	389	0.62
2015	399	0.8
2020 (estimate)	412	0.91

Data from <https://climate.nasa.gov>

## Graph

You are expected to complete two graphs on one piece of graph paper. As a guide the labels for the axis are given shown:



What is the relationship between atmospheric CO<sub>2</sub> and global temperature anomaly?

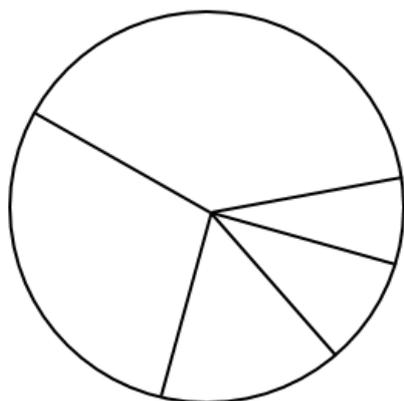
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### Fast Finishers – complete when you have had your graph marked

97% of climate scientists now agree that climate changes over the last 100 years are due to human activity. One of the effects of climate change is that the quantity of Arctic sea ice is changing. Using the data in the table and example perform calculations to show how much it has decreased each decade.

Year	Sea Ice (million sq. km)	% Change
1980	7.9	NA
1990	6.3	<b>1.</b> $(7.9-6.3)/7.9 = 0.2$ <b>2.</b> $0.2 \times 100 = 20\%$
2000	6.4	
2010	4.9	
2015	4.6	

One method of reducing CO<sub>2</sub> in the atmosphere is to use renewable and nuclear energy sources. Using the data below label the pie chart showing the energy source in the USA in 2017.



In 2017 80% of energy use in the USA came from the combustion of fossil fuels; 37% from petroleum, 8% less from natural gas and the remainder from coal. Of the 20% of energy that came from other sources 9% was from nuclear power and 11% from renewable sources.

