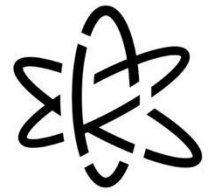




# Seventh Grade Science

## 7th Science Activity #3

How can we show the impact of human activity on the climate through graphing?



Directions: This handout goes with a KCS Teacher Video. If you have access to the video, watch the video while doing this activity. You can find the videos here <https://www.knoxschools.org/Page/21816>

**Preferred Materials:** Paper, colored pencils

**Introduction:** We are using the standard 7.ESS3.2 Engage in a scientific argument through graphing and translating data regarding human activity and climate.

**Our goal:** We will identify why CO<sub>2</sub> causes temperature change **AND** graph man-made CO<sub>2</sub> levels over time.

### Instructions for Part 1:

1. Read the short passage below that covers a few key vocabulary terms for this standard (bold words are vocabulary terms).
2. Follow along with the teaching video to DRAW a diagram of sun radiation and CO<sub>2</sub>.
3. Answer the question(s) at the bottom of the page.

### Reading Passage:

The **greenhouse effect** is a process that occurs when gases in Earth's atmosphere trap the Sun's heat. This process makes Earth much warmer than it would be without an atmosphere. The greenhouse effect is one of the main reasons Earth is warm enough for organisms to live and grow. **Greenhouse gases** include methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), **carbon dioxide (CO<sub>2</sub>)**, ozone (O<sub>3</sub>), chlorofluorocarbons (**CFCs**), carbon monoxide (CO), and sulfur dioxide (SO<sub>2</sub>).

The **greenhouse effect** starts with the Sun! The Sun releases light in the form of *short wave radiation* that travels thru space to Earth. Earth's atmosphere blocks some of the Sun's short wave radiation but the rest is absorbed into the surface of the Earth. The Earth then releases warmth as *long wave radiation*. Greenhouses gases such as **CO<sub>2</sub>** trap this long wave radiation heat in Earth's atmosphere.

CO<sub>2</sub> is a product of cellular respiration. This means that organisms, including humans, produce carbon dioxide all the time. CO<sub>2</sub> is also produced when burning fossil fuels such as gasoline and coal. Most cars, construction and farming equipment, and factories all burn a form of fossil fuels to create the power needed to run correctly. The more industries that are burning fossil fuels, the more CO<sub>2</sub> is being produced.

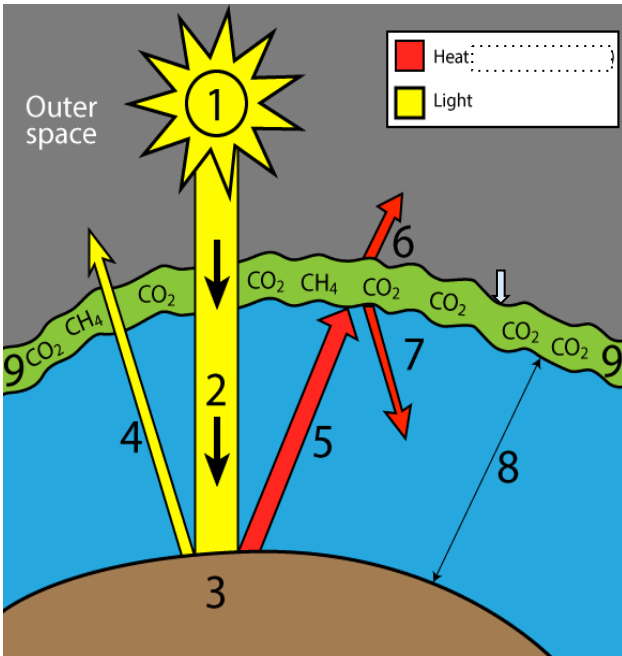
### **Reading comprehension questions:**

1. List all of the sources that release CO<sub>2</sub> that you can think of in the space below.



2. What gases are considered greenhouse gases?

This is a diagram of the greenhouse effect. Draw your own version in the space on the right. Include short wave radiation, long wave radiation, Earth's surface, the Sun, the atmosphere (sky above the earth), and greenhouse gas.



3. **Construct an explanation:** What do you think could happen to the temperature of the planet if more greenhouse gases are in the atmosphere? Explain your reasoning in at least one full sentence.

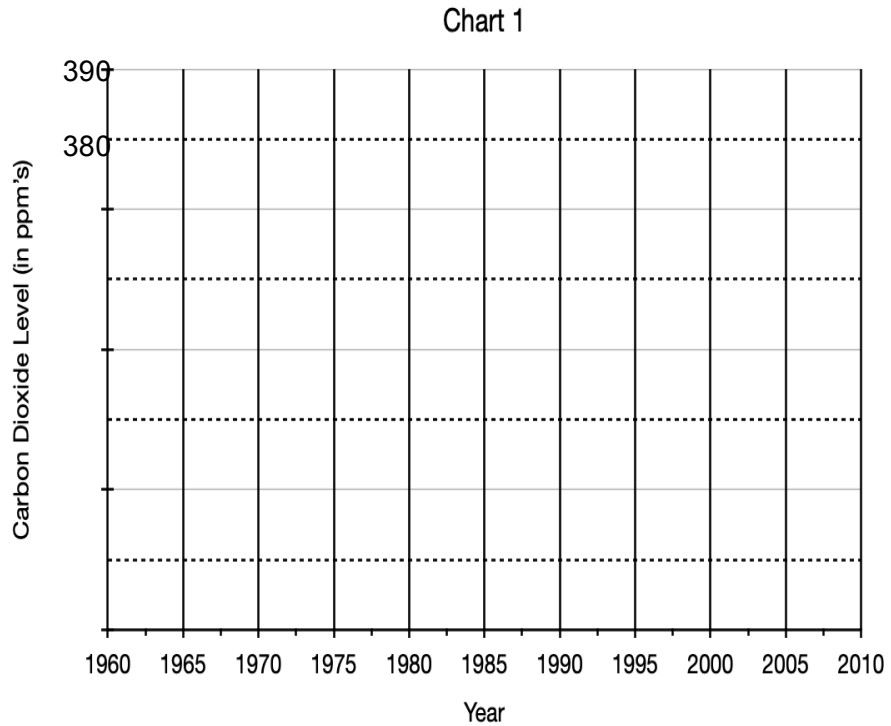
**Instructions for Part 2:**

Before we start graphing we need to decide what type of graph would work best for this data. The options are bar graph, line graph, or pie chart.

4. Explain which graph you think will work best for this data before graphing.

Use the space below to graph the numbers in this data table of CO<sub>2</sub> levels in Earth's atmosphere and the year.

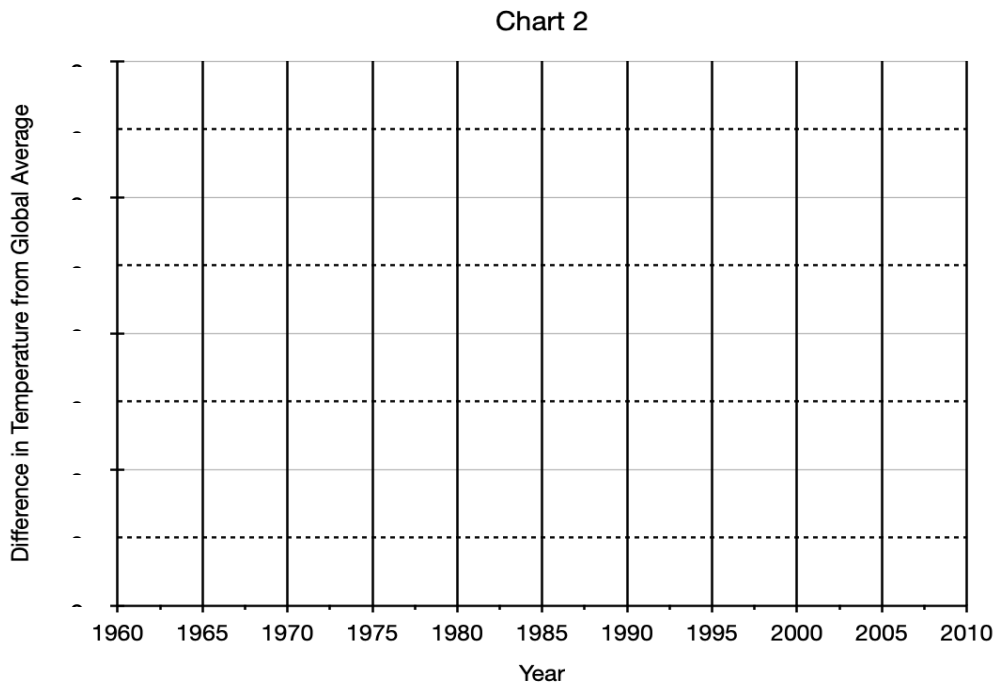
Year	CO <sub>2</sub> Concentration (ppm)
1960	316
1965	320
1970	326
1975	331
1980	339
1985	346
1990	354
1995	361
2000	369
2005	380
2010	390



Source: NOAA-ESRL annual data is posted at [ftp://ftp.cmdl.noaa.gov/ccg/co2/trends/co2\\_annmean\\_mlo.txt](ftp://ftp.cmdl.noaa.gov/ccg/co2/trends/co2_annmean_mlo.txt)

- Use the space below to make **Graph 2** using the table on the left of average global temperature changes and year. Make a **Line Graph**.

Year	Difference from average global temperature
1960	-0.02
1965	-0.11
1970	0.02
1975	0.0
1980	0.26
1985	0.12
1990	0.45
1995	0.45
2000	0.40
2005	0.68
2010	0.72



Source: [https://data.giss.nasa.gov/gistemp/graphs/graph\\_data/Global\\_Mean\\_Estimates\\_based\\_on\\_Land\\_and\\_Ocean\\_Data/graph.txt](https://data.giss.nasa.gov/gistemp/graphs/graph_data/Global_Mean_Estimates_based_on_Land_and_Ocean_Data/graph.txt)

- Answer the question(s) about the graphs as we go through the work on the video.
5. In graph 1, are carbon dioxide levels changing over time? Explain your answer.
  6. In graph 2, is the average temperature changing over time? Explain your answer.
  7. Compare graph 1 and graph 2. Explain how the increasing CO<sub>2</sub> levels could cause changes in the average temperature.
  8. Conclusion: Refer back to the diagram on greenhouse gas effect. How could humans producing increased amounts of CO<sub>2</sub> affect the global temperature?