# Assignment Summary

For this assignment, you will ask questions about the factors that have caused a rise in global temperatures over the past century. Then, you will conduct research to answer your questions. You will also graph provided information, analyze the graphs, and make conclusions based on the graphs. Finally, you will write a paper describing the conclusions of your research and graphs.

Background Information

Global temperature change is a gradual increase in the overall temperature of the Earth's atmosphere. Both human activity and natural processes have contributed to this temperature increase. Examples of human activities include the burning of fossil fuels, cement production, and agricultural activity. Examples of natural processes include changes in incoming solar radiation and volcanic activity.

Scientists present evidence for the rise in global temperature in the form of tables, graphs, maps, and models. For example, scientists build climate models (computer simulations of climate systems) to explore the causes and effects of global temperature change and to predict future trends. These models predict that the Earth’s average surface temperature will rise as greenhouse gas concentrations continue to rise. Based on these models, scientists predict that average surface temperatures could rise by between 2°C and 6°C by the end of the 21st century.

Materials

|  |  |
| --- | --- |
| * Internet
* Print resources
* Word-processing software
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Assignment Instructions

**Step 1: Prepare for the project.**

1. Read through this guide before you begin so you know the expectations for this project.
2. If anything is not clear to you, ask your teacher for assistance.

**Step 2: Write your questions.**

1. You are familiar with some of the factors that have contributed to the rise in global temperatures over the past century. Think of three questions that will help you clarify your understanding of how these factors lead to an increase in global temperatures. Consider the following when you come up with your questions:
	1. Ways in which natural processes and human activity have affected global temperature change over the past century
	2. The influence of these processes and activities on a gradual or sudden change in global temperature
2. Write your questions in the space provided at the end of this document.
3. Have your teacher review your questions. Once they are approved, you may begin Step 3.

**Step 3: Conduct research.**

1. Search for answers to each of your questions. Be sure to support your answers with scientific evidence from reliable sources.
2. The following are examples of some reliable sources you might use:
	1. The National Oceanic and Atmospheric Administration: [www.noaa.gov](http://www.noaa.gov)
	2. NASA: [www.nasa.gov](http://www.nasa.gov)
	3. *Nature* magazine: [www.nature.com](http://www.nature.com)

**Step 4: Create graphs.**

1. Use the information in the tables below to create two line graphs.
	1. The first graph should show the amount of carbon dioxide in the atmosphere from 2010–2017.
	2. The second graph should show the change in global temperature from 2010–2016.

**Table A. Carbon Dioxide (CO2) in the Atmosphere**

|  |  |
| --- | --- |
| **Year** | **Carbon Dioxide (CO2) in Atmosphere (ppm\*)** |
| 2010 | 390 |
| 2011 | 392 |
| 2012 | 394 |
| 2013 | 396 |
| 2014 | 399 |
| 2015 | 401 |
| 2016 | 404 |
| 2017 | 406 |

\*parts per million

**Table B. Change in Global Temperature**

|  |  |
| --- | --- |
| **Year** | **Change in Global Temperature (°C)** |
| 2010 | 0.71 |
| 2011 | 0.60 |
| 2012 | 0.63 |
| 2013 | 0.65 |
| 2014 | 0.74 |
| 2015 | 0.87 |
| 2016 | 0.99 |

1. Make sure your graphs have the following parts.
	1. A title that reflects the information in the graph
	2. Factors that are properly placed on axes (For example, does the year go on the *x*-axis or the *y*-axis?)
	3. Properly labeled axes
	4. A line that connects the points in the graph
2. Have your teacher check your graphs before you move on to the next step.
3. Use your graphs to answer the following questions. You will include the answers to these questions in your typewritten paper.
	1. What happened to the amount of carbon dioxide in the atmosphere from 2010–2017?
	2. How did the global temperature change from 2010–2016?
	3. What is the relationship between the amount of carbon dioxide in the atmosphere and global temperature?

**Step 5: Create a typewritten paper.**

1. For each of your questions, write one paragraph summarizing the answer based on your research.
	1. Cite evidence and patterns in data that connect natural processes and human activity to the rise in global temperature. Be sure to include as evidence the trends that you observed in your graphs and the conclusion you made about the relationship between the amount of carbon dioxide in the atmosphere and change in global temperature.
	2. Discuss the relationship between these processes and activities, the production of greenhouse gases, and the effects of greenhouse gases on the atmosphere.
2. Make sure your paragraphs use correct sentence structure, punctuation, grammar, and spelling.
3. Ask your teacher where you should save your work. Your teacher may also have specific guidelines about the file name you should use.

**Step 6: Evaluate your project using this checklist.**

If you can check each box below, you are ready to submit your project.

* Is your name on your typewritten paper?
* Did you do research to answer your questions?
* Did you create a graph that shows the amount of carbon dioxide in the atmosphere from 2010-2017?
* Did you create a graph that shows the change in global temperature from 2010-2016?
* Did you write three total paragraphs answering your questions?
* Did you cite scientific evidence that connects natural processes and human activity to the rise in global temperature?
* Did you include as evidence the trends that you see in your graphs and the conclusion you made about the relationship between the amount of carbon dioxide in the atmosphere and the change in global temperature?
* Did you discuss the relationship between natural processes and human activities, the production of greenhouse gases, and the effects of greenhouse gases on the atmosphere?
* Did you double check for correct sentence structure, punctuation, grammar, and spelling in your paper?

**Step 7: Revise and submit your project.**

1. If you were unable to check off all of the requirements on the checklist, go back and make sure that your project is complete. Save your project before submitting it.
2. Submit your typed paper through the Virtual Classroom.
3. Congratulations! You have completed your project.

Research Questions

Write your three questions in the space below.