

### ABOUT THIS WORKSHEET

Students will examine and analyze factors controlling Earth's climate and describe human impact on climate change. Students will describe methods to mitigate impacts of climate change.

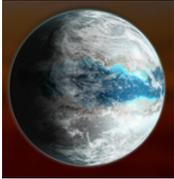
### PROCEDURE

Use the [Paleoclimate: A History of Change](#) Click & Learn to answer the following questions:

1. List three greenhouse gases:
2. Which is the most important of these gases in terms of amplification of climate effects?
3. Describe how these gases act like a "thermal blanket."

"The story of Earth's climate has been a story of massive changes. Earth has been much warmer and much colder than it is today, including times when there were no ice caps and times when the entire planet was nearly frozen over."

4. Based on this statement, should changes in Earth's climate cause anxiety? If you answer yes, please support your opinion with factual information. If you answer no, please explain why we should not worry.
5. What are the main factors that affect Earth's climate?
6. We know from the relative amounts of  $^{16}\text{O}$  and  $^{18}\text{O}$  that global temperatures and global climate have changed over time. Why is it important for scientists to be able to explain how they know that climate has changed over time and that they are able to repeat experiments that support this information?
7. Atmospheric changes in Earth's history have caused large temperature changes through time. Explain how knowledge of these past connections between atmosphere and climate can inform us about modern-day climate change.
8. Explain how the ability to describe the pattern of ice ages over the past million years helps us to assess what is a "normal" variation in Earth's atmosphere.
9. Changes in atmosphere are not the only changes that impact climate. How can changes in Earth's orbit impact temperature?



10. Describe how small changes in Earth's orbit around the sun explain the pattern of glacial and interglacial periods over the past million years.
  
11. Based on the information you have just learned, please explain how Milankovitch cycles can be used to predict future changes in Earth's climate.
  
12. Using the chart titled *CO<sub>2</sub> and Temperature Fluctuations During the Past 800,000 Years*:
  - a. describe the fluctuations in CO<sub>2</sub> and temperature over the past 800,000 years, and explain why you see oscillations.
  
  - b. explain the cause for the significant changes seen at 0 years before present on the *CO<sub>2</sub> and Temperature Fluctuations During the Past 800,000 Years* chart.
  
13. What is the big concern about the **rate** of CO<sub>2</sub> change in Earth's climate?
  
14. Using the information provided for the past 800,000 years:
  - a. estimate the length of time that it took for CO<sub>2</sub> to go from 200 to 300 ppm. \_\_\_\_\_
  - b. estimate the length of time that it took for CO<sub>2</sub> to go from 300 to 400 ppm. \_\_\_\_\_
  - c. Compare the rate of change from 300 ppm to 400 ppm to the rate of change from 200 to 300 ppm.
  
15. What has happened in the past 150 years that has caused this rise in the rate at which CO<sub>2</sub> is added to the atmosphere?
  
16. List five potentially severe impacts of rapid climate change:
  1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_
  4. \_\_\_\_\_
  5. \_\_\_\_\_
  
17. Explain the importance of educating others about climate change consequences. Describe how you would present the information in a way that would cover the most important points, as well as emphasizing that changes in human behavior can make a difference in the ultimate impacts of climate change.