

Student Answer Sheet

Name _____

Date _____

1. What do you think it would be like to live on the Greenland Ice Sheet and drill ice cores? What would you bring?
2. Why would scientists need to have a dome over their drilling rig in Greenland?
3. Why do you think that the thickness of the ice from 0-110,000 years is not proportional to the thickness of the ice from 110,000 years to 250,000 years? What is the general trend in thickness of the ice layers as you get deeper?
4. Speculate why it would take scientists ten years to drill through the Greenland Ice Sheet at its dome?
5. List five things that you would have to take with you if you were to go on an expedition to the Greenland Ice Sheet.
6. What was the coldest temperature during this time period?
7. Did the temperature change slowly or quickly during this time period? How fast was the fastest temperature change and how many degrees of change were there?

8. At what time did the largest change in the Methane gas concentration occur?

9. What was the lowest concentration of Methane gas on this graph and when did it occur? What was the highest concentration of Methane gas and when did it occur?(be careful with interpreting the concentration levels on the graph)

10. What is the general relationship between the Methane graph and the temperature graph?

11. At what time did the largest change in the Calcium dust concentration occur?

12. What was the lowest concentration of Calcium dust on this graph and when did it occur? What was the highest concentration of Calcium dust and when did it occur?(be careful with interpreting the concentration levels on the graph)

13. What is the general relationship between the Calcium dust and the temperature graph?

14. Why does this relationship between dust in the atmosphere and temperature occur?

(Hint: Think about reflected light)

15. At what time did the largest change in the Insolation occur?

16. What was the lowest values of Insolations on this graph and when did it occur? What was the highest values of Insolations and when did it occur?(be careful with interpreting the concentration levels on the graph)

17. What is the general relationship between Insolation and the temperature graph?

Questions for further investigation (part 1)

1. Does there seem to be a correlation between the variables and temperature, are they proportional or inversely proportional?

2. Describe how any part of the graph, for any of the variables, could be used to determine past or future climatic conditions.

3. Is the timing between a change in any variable and a corresponding change in temperature immediate or is there a delay? Why do you think a delay might exist?

4. Does there seem to be a correlation between each of the variables and temperature?

Are they proportional or inversely proportional?

5. Is the insolation record long enough to support scientist's claims of 21,000, 42,000, and 100,000 year solar cycles?

6. Explain the role of each variable in distributing the Sun's energy.

7. Describe how the dust, greenhouse gases, temperature, and insolation may influence each other.

8. Demonstrate which graph (for one of the three variables) is the best fit for the graph for temperature.

9. Explain why the graph for any of the three variables does not exactly match the graph for temperature.

10. Calculate and compare averages and ranges for each of the variables. The formula for calculating an average is: add up the total of the numbers and divide by the number of items; $\text{Average} = [x_1 + x_2 + x_3 \dots x_N] / N$

11. Calculate the ratio of change between a variable and temperature at any given time. Does this ratio remain constant throughout the last 40,000 years?