

Name: _____

**Atmosphere and Climate Change
Study Guide**

1. Which gas accounts for the largest percentage of greenhouse gases in the atmosphere?
CO₂
2. Greenhouse gases in the atmosphere trap heat near Earth's surface. List all greenhouse gas?
Carbon Dioxide CO₂
Methan CH₄
Water Vapor
Nitrous Oxide/ Nitrogen Oxide NO_x
3. Why is the ozone content of the stratosphere important to living organisms?
Ozone absorbs ultraviolet radiation from the sun

The following table identifies primary gases released by three active volcanoes.

Percent Composition of Gases from 3 Active Volcanoes				
H ₂ O	CO ₂	SO ₂	H ₂ S	HCl
95	1.1	1.5	0.07	0.006
96	1.9	2.3	0.08	0.004
97	1.1	1.5	0.07	0.006

4. These data allow scientists to use a volcano as a model for what?
sources for compounds in Earth's early atmosphere
5. Which trait is common in gases that contribute to Earth's greenhouse effect?
the ability to trap heat
6. On Mount Everest the temperature decreases as the altitude increases. The summit of this mountain is in what atmospheric layer?
troposphere
7. The stratosphere contains ozone (O₃) which interacts with the ultraviolet radiation that reaches Earth from the Sun. How does the action of ozone in the stratosphere affect Earth?
Ozone stores heat to be transferred to the surface of Earth
8. Use the table below to answer the question.

Venus-Earth Current Comparative Data				
Planet	Equatorial Radius (km)	Mean Density (kg/m ³)	Mean Atmospheric Temperature (C°)	Primary Atmospheric Gases (%)
Venus	6051.8	5243	464	69.5 CO ₂ 3.5 N ₂
Earth	6378.1	5515	15	78.1 N ₂ 21.0 O ₂

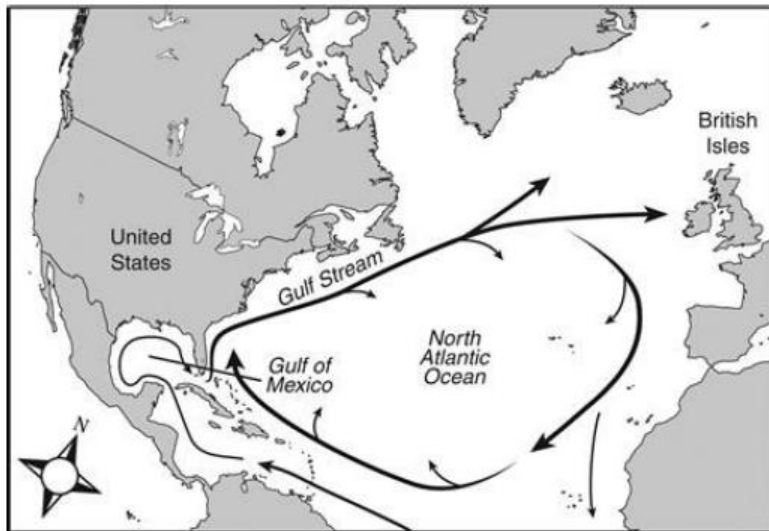
Studies of Venus indicate what can happen if the atmosphere of a planet contains a high percentage of carbon dioxide. The development of photosynthetic life removed much of the carbon dioxide from the atmosphere of Earth. This process released oxygen, which then bonded with iron on the surface to form redbeds. Compared to current conditions, what can be inferred about what Earth was like before the formation of the redbeds?

9. In which layer of the atmosphere does most of Earth's weather occur?
the troposphere, which is the lowest layer
10. One substance found on Earth is more stable as an elemental gas than as part of a solid compound. As a result, this substance is very abundant in the atmosphere. Which substance exhibits these traits?
nitrogen
11. Atmospheric greenhouse gases help heat the atmosphere by _____.
increasing the amount of solar radiation reaching Earth.
12. What gas has been controlled in an attempt to reduce the depletion of ozone in Earth's atmosphere?
use of chlorofluorocarbons (CFCs)
13. Without oceans, the temperatures of Earth would vary widely from temperatures that currently exist. Which characteristic of the ocean most likely helps to maintain the temperatures of Earth?
density of ocean water

14. Write a statement that best describes the climate of an area?

The average yearly rainfall in Nevada is approximately 23 cm.

15. The Gulf Stream is a warm ocean current in the North Atlantic that flows from the Gulf of Mexico, northeast along the U.S. coast, and from there to the British Isles. The Gulf Stream has a strong effect on the climate pattern in the British Isles.



Based on the climate pattern what climate patterns can be attributed to the Gulf Stream Current?

Winter in Great Britain is warmer and drier than other places of similar latitude.

16. An area is described as having mild temperatures in the summer and being cool and rainy in the winter. On a day in May, the area experienced snow. Which best describes this day in terms of weather and climate?

The weather was different from the normal climate for the area.

17. A tourist brochure states that “Los Angeles, California, has a pleasant, comfortable climate where the average rainfall is around 38 centimeters per year. The climate makes it suitable for outdoor activities, including biking and hiking.” Based on the brochure write out a factual statement?

The average rainfall in Los Angeles is about 38 centimeters per year.

18. El Niño is a term that refers to the oceanic phenomenon in which the surface water temperatures increase. The increase in water temperature usually occurs in the tropical Pacific Ocean. What will most likely occur as a result of this phenomenon to cause environmental changes?

an increase in the length of summers

19. A rain gauge measures the amount of rainfall at one location over a short time period. How can a rain gauge be most effectively used to provide a partial description of climate?

by making many observations over many years

20. Which of these events is an example of a change in climate?

The average amount of annual precipitation decreases

21. Which form of water, when present in the atmosphere, is most likely to contribute to global warming?

vapor

22. Eruption of a large volcano on a tropical island releases ash and gases into the atmosphere. After the eruption, the air temperatures on the island cool temporarily before returning to normal. What is the most likely reason for the temporary cooling of the island?

Fine particles of atmospheric dust block sunlight.

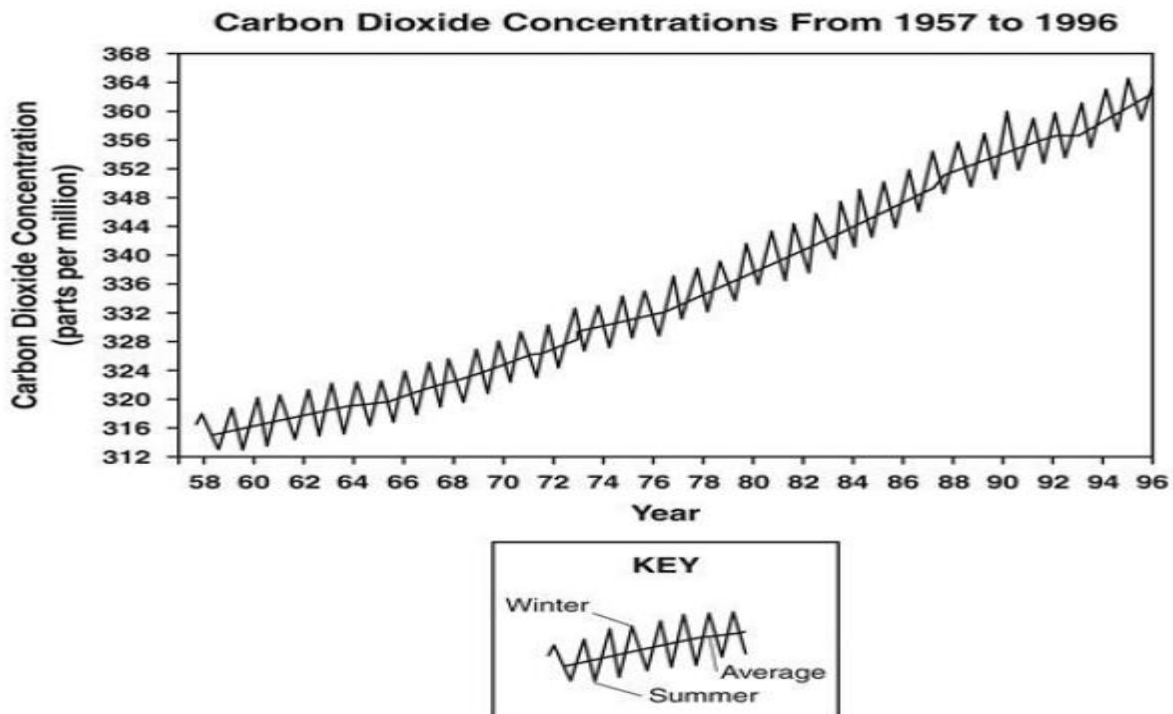
23. What change in Earth’s atmosphere made by early photosynthetic life?

increased level of oxygen

24. When compared to current average conditions, which term would best describe conditions in Earth’s lower atmosphere if greenhouse gases were absent?

cooler

25. When a large meteor strikes Earth, environmental changes may result as dust particles scatter throughout the atmosphere. What best describes how an increase in atmospheric particles would affect temperatures on the surface of Earth?
Temperatures would decrease because the particles would absorb solar radiation before it could reach the surface of Earth
26. The average temperature of Earth has increased approximately 0.8°C in the last one hundred years. What has most attributed to this temperature increase?
increased use of fossil fuels
27. Raising livestock, such as sheep and cattle, results in the production of large amounts of methane gas Methane (CH_4) has the same effect in the atmosphere as carbon dioxide (CO_2). As more livestock are raised to provide food for humans, what is the most likely effect of the increase in methane?
global warming
28. After a period of steady increase, the rate of coal consumption was 50% higher during 2009 than it was during the year 2000. If this trend continues, which impact will coal consumption most likely have on the environment after the year 2020?
increased levels of greenhouse gas emissions
29. The greenhouse effect is a process by which atmospheric gases, including (CO_2) help warm the atmosphere and surface of Earth. Some scientists think the greenhouse effect is increasing due to human activities. Which of these human activities has caused the greatest increase in concentrations of atmospheric (CO_2)?
burning fossil fuels
30. The average global ocean temperature in 1912 was 15.8°C , and in 2011 this temperature was 16.5°C . Algae have an optimal growing range of 16°C to 27°C . What is the predicted impact of the change in average ocean temperature on algae?
It increases their territories
31. Which of these situations potentially is a result of climate change?
Glaciers will become smaller, causing sea levels to rise
32. The graph shows the concentration of carbon dioxide (CO_2) in the atmosphere from 1957 to 1996.



- Carbon dioxide is associated with climate change. Which conclusion is most likely based on the data in the graph?
Carbon dioxide increased for the last fifty years and will start to decrease
33. The average temperature of Earth's surface has increased approximately 1°C in the past century. Which of the following can best explain this increase in temperature?
higher levels of carbon dioxide in the atmosphere

34. Which is a possible consequence of global warming?
an increase in the number of heat waves, causing droughts
35. Scientists use ice cores to identify and explain previous climatic trends. By correlating climatic conditions recorded in the ice, with solid, non snow particles also found in the ice, scientists can help to predict the climatic impact of what?
volcanic eruptions
36. As the amount of carbon dioxide in the atmosphere increases, which occurrence is most likely a long term result?
The polar ice caps will melt