

Lab 65: History of Earth’s Atmosphere

Key Words: No new key words.

Getting Started:

- 1. Read the introduction and Challenge to Activity 65, “History of Earth’s Atmosphere,” in your Student Book.

Procedure:

- 1. Cut out the Atmosphere Cards that are attached to this packet. Read the information on each.
- 2. Place each card in order from oldest to most recent.
- 3. Complete the table, “Earth’s Atmosphere Through Time” by recording your order of the Atmosphere Cards and writing down information about the gases in the atmosphere and important events during that time.

Earth’s Atmosphere Through Time

Card	Gases Present in the Atmosphere (and percentage, if listed)	Important Date and Event

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Name _____

Date _____ Block _____

Follow-Up:

1. What are some of the major trends you observed from the Atmosphere Cards?

Analysis Questions:

1. Look carefully at your completed table.

- a. How has the amount of carbon dioxide gas in the atmosphere changed over the earth's history?
- b. How has the amount of oxygen gas in the atmosphere changed over the earth's history?

2. What effect have living organisms (including people) had on the composition of earth's atmosphere? Support your answer with examples from this activity.

3. **Reflection:** Do you think that the atmosphere will have different amounts of oxygen and carbon dioxide in the future? Explain your reasoning.

Atmosphere Cards

A The modern atmosphere is 78% nitrogen gas, 21% oxygen gas, and less than 1% carbon dioxide gas.

B The earth is more than 4.5 billion years old. At first, it contained large amounts of hydrogen and helium gases. Most of these gases escaped into space.

C The earth began to cool down and water vapor condensed into liquid water. Liquid water began to collect on the earth's surface in lakes and oceans. The amount of water vapor in the atmosphere decreased. The atmosphere was about 70% carbon dioxide gas and 30% nitrogen gas.

D The first land plants appeared on the earth about 400–500 million years ago. The plants took in carbon dioxide and produced oxygen gas through photosynthesis. The amount of oxygen gas in the atmosphere continued to increase, approaching 21%.

E

The earth was very hot, and there were many erupting volcanoes releasing gases. These gases—water vapor, carbon dioxide, nitrogen, and sulfur dioxide—created the atmosphere. There was no oxygen gas in this atmosphere.

F

The amount of carbon dioxide gas in the modern atmosphere is less than 1%, but recent measurements taken at a Hawaiian laboratory show that it is slowly increasing. In 1959, the percentage of carbon dioxide in the atmosphere was 0.0316%. In 2004, it was 0.0377%. This is a 19% increase in the amount of carbon dioxide in the atmosphere. The increased burning of fossil fuels by greater numbers of people is one reason for this change.

G About 2–3 billion years ago, some living organisms began to use energy from sunlight to turn carbon dioxide gas and water into sugar and oxygen gas (a process called photosynthesis). The amount of carbon dioxide gas was about 15%, but it began to decrease. The amount of oxygen gas was less than 1%, but it began to grow because of the oxygen produced by living organisms.

H A lot of carbon dioxide gas was absorbed by the oceans by about 3.5 billion years ago. This reduced the amount of carbon dioxide in the atmosphere to about 20%.