

Name: _____ Date: _____ Period: _____

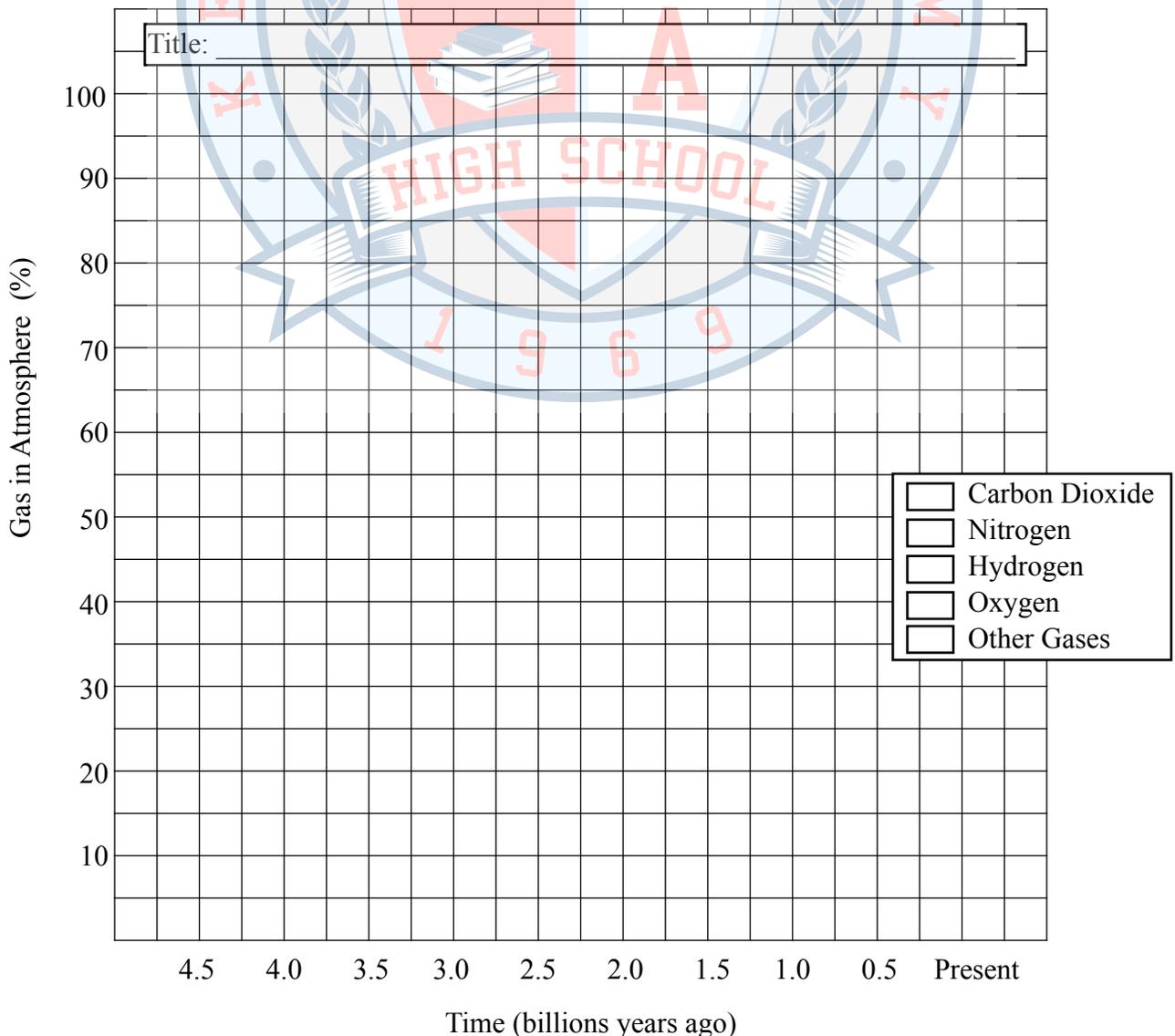
Evolution of the Atmosphere

Scientists believe that the Earth formed about 4.6 billion years ago. The atmosphere that you breathe today has not always been present. The **atmosphere** can be described as the gases surrounding the Earth. It is important for scientists to understand the composition of the atmosphere and how it has changed over time in order to understand how life on Earth has changed over time.

Directions: Use the data provided in Figure 1 to create a cumulative graph of the atmosphere over time.

Figure 1. Atmosphere from Formation to Present (billion years ago)

Gas	4.5	4.0	3.5	3.0	2.5	2.0	1.5	1.0	.5	Present
% of CO ₂	80	20	10	8	5	3	1	0.07	0.03	0.04
% of Nitrogen	10	35	55	65	72	75	76	77	78	78
% of Hydrogen	5	3	1	.5	0	0	0	0	0	0
% of Oxygen	0	0	0	0	0	1	5	10	15	21
% of Other gases	5	42	34	26	23	21	18	13	7	1



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Directions: Complete the questions below using the graph on the front of this page.

Graph Analysis Questions

1. (IOD 401) Which of the following is the gas that takes up the majority of the area of the graph?
 a. hydrogen b. nitrogen c. carbon dioxide d. oxygen
2. (IOD 401) All types of gases decreased between 4.5 bya and 4 bya except -
 a. hydrogen b. nitrogen c. carbon dioxide d. oxygen
3. (IOD 401) Identify the gas based on each description:
 _____ This gas began as a small percent of the atmosphere when Earth began. Over the next two billion years, the amount decreased until there was no trace remaining.
 _____ This gas made up the majority of the atmosphere when Earth began, but sharply decreased over the next 0.5 billion years, and then slowly decreased until almost disappearing throughout the rest of Earth's history.
 _____ This gas began as a small percent of Earth's atmosphere 4.5 bya, but increased significantly over the next two billion years. The amount of this gas has changed insignificantly from 2.5 bya to the present.
4. (IOD 501) Examine the gases in the present atmosphere. List them in order from most to least abundant.
 _____, _____, _____, and _____.

Directions: The following statements describe stages in the evolution of the atmosphere. Refer to the graph to draw lines that match each time to the best description and explanation for the atmosphere at that time.

Time	Description	Explanation
4.5 billion years ago	The appearance of oxygen in the atmosphere.	Many active volcanoes on the surface of Earth release large quantities of gases such as carbon dioxide.
3.5 - 3 billion years ago	There is an abundance of carbon dioxide in the atmosphere.	The evolution of the first aquatic plants that use carbon dioxide and release oxygen.
2 - 1.5 billion years ago	The amount of other gases such as water vapor in the atmosphere decreased.	An abundance of land plants evolved allowing for more life on Earth.
0.5 - present	The amount of oxygen increased significantly while the amount of nitrogen and carbon dioxide stabilized.	As Earth cooled, water vapor condensed eventually leading to the formation of oceans.