

EVOLUTION OF THE EARTH'S ATMOSPHERE

Answer all the questions below then check your answers

1. Fill in the gap to complete the sentence below:

The most abundant gas in the Earth's present-day atmosphere is

_____.

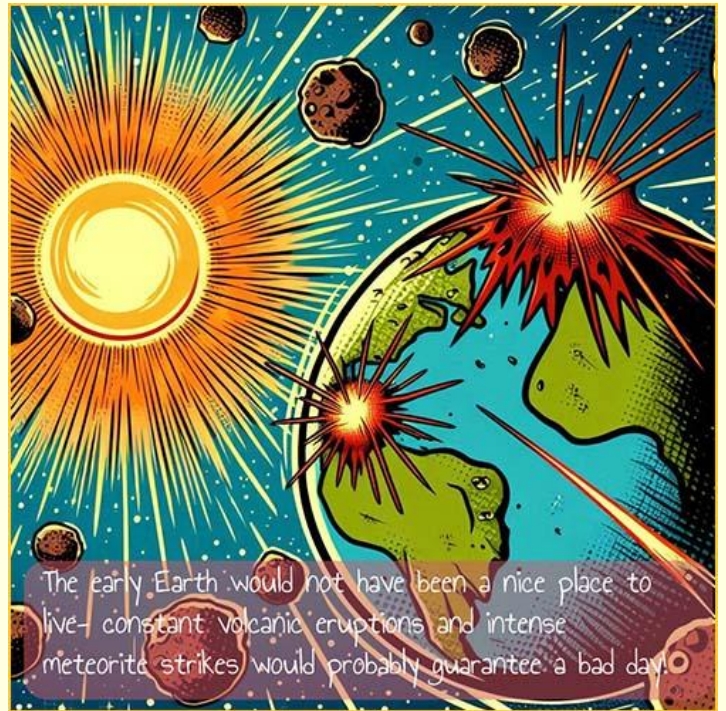
2. Which gas was NOT present in the early Earth's atmosphere?

- a) Carbon dioxide b) Methane
c) Oxygen

3. Which gas is primarily responsible for the absorbing UV radiation in the Earth's atmosphere?

4. Erupting volcanoes release large amounts of which gas?

5. Name two gases that make up the majority of the present-day Earth's atmosphere.



The early Earth would not have been a nice place to live—constant volcanic eruptions and intense meteorite strikes would probably guarantee a bad day.

6. Which two gases were common in the Earth's atmosphere about 1 billion years after it formed?

- a) Oxygen and Nitrogen
- c) Nitrogen and Argon

b) Methane and Carbon dioxide

7. Fill in the gap to complete the sentence below:

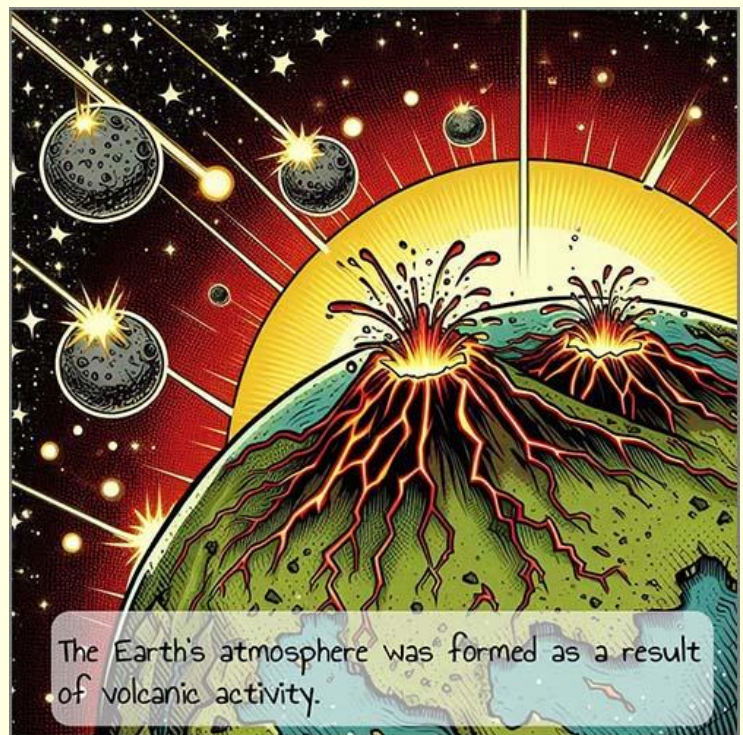
The formation of the ozone layer allowed _____ to develop on Earth.

8. Which planets have atmospheres similar to the early Earth's atmosphere? Name at least two.

9. What role did photosynthesis play in changing the Earth's atmosphere over the past 4 billion years?

10. Where did Earth's atmosphere come from? Select all that apply.

- a) Out gassing from volcanic eruptions
- b) Comets bringing water vapour and gases
- c) Direct condensation from the solar nebula
- d) Photosynthetic microorganisms



11. Explain how nitrogen and oxygen became major components of Earth's present-day atmosphere.

12. Describe the composition of the Earth's atmosphere about 1 billion years after it formed, how it changed over time, and the role of photosynthesis in this change.

13. Which gases do erupting volcanoes release? Choose all that apply.

a) Carbon dioxide

b) Methane

c) Sulfur dioxide

d) Oxygen

Answers

1. Fill in the gap to complete the sentence below:

The most abundant gas in the Earth's present-day atmosphere is _____.

Answer: Nitrogen

2. Which gas was NOT present in the early Earth's atmosphere?

- a) Carbon dioxide b) Methane c) Oxygen

Answer: c) Oxygen

3. Which gas is primarily responsible for the absorbing UV radiation in the Earth's atmosphere?

Answer: Ozone (O_3)

4. Erupting volcanoes release large amounts of which gas?

Answer: Carbon dioxide

5. Name two gases that make up the majority of the present-day Earth's atmosphere.

Answer: Nitrogen and Oxygen

6. Which two gases were common in the Earth's atmosphere about 1 billion years after it formed?

- a) Oxygen and Nitrogen b) Methane and Carbon dioxide
c) Nitrogen and Argon

Answer: b) Methane and Carbon dioxide

7. Fill in the gap to complete the sentence below:

The formation of the ozone layer allowed _____ to develop on Earth.

Answer: Complex life forms

8. Which planets have atmospheres similar to the early Earth's atmosphere? Name at least two.

Answer: Venus and Mars have atmospheres similar to the early Earth's atmosphere, which is rich in carbon dioxide and lacks oxygen.

9. What role did photosynthesis play in changing the Earth's atmosphere over the past 4 billion years?

Answer: Photosynthesis produced oxygen as a by product, significantly increasing oxygen levels in the atmosphere and decreasing carbon dioxide levels, enabling the development of aerobic life forms.

10. Where did Earth's atmosphere come from? Select all that apply.

- a) Out gassing from volcanic eruptions
- b) Comets bringing water vapour and gases
- c) Direct condensation from the solar nebula
- d) Photosynthetic microorganisms

Answer: a) Out gassing from volcanic eruptions, b) Comets bringing water vapor and gases, d) Photosynthetic microorganisms

11. Explain how nitrogen and oxygen became major components of Earth's present-day atmosphere.

Answer: Nitrogen was released into the atmosphere through volcanic activity and other geological processes. Oxygen was produced by photosynthetic organisms, particularly cyanobacteria, which released oxygen as a by product of photosynthesis. Over a vast period of time, about 2.5 billion years the amounts of these two gases began to build up, these processes led to the accumulation of nitrogen and oxygen in the atmosphere.

12. Describe the composition of the Earth's atmosphere about 1 billion years after it formed, how it changed over time, and the role of photosynthesis in this change.

Answer: About 1 billion years after the Earth formed, its atmosphere was primarily composed of gases like methane, ammonia, carbon dioxide, water vapour, and nitrogen, with little to no oxygen. As photosynthetic organisms like cyanobacteria evolved, they began to use sunlight to convert carbon dioxide and water into glucose and oxygen (photosynthesis). This process gradually increased the amount of oxygen in the atmosphere while reducing carbon dioxide levels. Over billions of years, this led to the development of an oxygen-rich atmosphere, which supports the diverse life forms present today.

13. Which gases do erupting volcanoes release? Choose all that apply.

a) Carbon dioxide b) Methane c) Sulfur dioxide d) Oxygen

Answer: a) Carbon dioxide, c) Sulfur dioxide