

Earth's Atmosphere

When the word atmosphere is used, it usually is referring to air. In reality, this air is made up of layers of gases that surround the planets. Earth and most of the planets in the Solar System have an atmosphere, though each atmosphere is different than the others. For example, the atmosphere of the Sun is mainly made from hydrogen gas. Earth's atmosphere or air is made up of gases and particles. The main gases in our atmosphere are: oxygen, nitrogen, and argon. There are also other gases present in the atmosphere in small amounts, such as carbon dioxide and ozone. It is the presence of these gases that protect our planet from the direct effects of the Sun, keep us warm, and make life on Earth possible. If these gases were not present in such a balance, then there would be no life on Earth. In addition to these gases, there are particles present such as water, dust, and pollen particles flying around.

Earth's atmosphere reaches up to a distance of around 6,000 miles, though the first 16 miles are more compressed and bulkier. This means that the further up one goes, the less compressed and bulky the atmosphere is. It gets lighter the more you go up and less pressure is applied on things.

Scientists have divided Earth's atmosphere into different layers. They determined the layers based on the type and features of the gases that are found in each height.

- The first layer is the troposphere. This is the layer that is closest to Earth and it extends to around 10 miles above the surface of the Earth. This layer is where we would see most of the clouds and where most of the weather conditions would take place. The troposphere is made up of different gases like water vapor, carbon dioxide, nitrous oxide, and others. The presence of these gases allows the atmosphere to keep some of the heat and then send it back to the surface of the Earth to warm it.
- The second layer is the stratosphere. This layer is from 10 to 30 miles above the surface of the Earth. The main thing about the stratosphere is that it has the ozone, which is made up of ozone molecules that absorb the ultraviolet rays from the Sun and shield us from its extremely harmful effects.
- The third layer is the mesosphere. This layer is around 30 to 50 miles above the surface of the Earth. The mesosphere is the coldest part of the atmosphere and this is where meteors usually burn up when they enter Earth's atmosphere.

Earth's Atmosphere (Cont'd)

- The fourth layer is the thermosphere (also called the ionosphere). This layer extends from 50 to 180 miles from the surface of the Earth. The thermosphere has very high temperatures, which are in the thousands of Fahrenheit degrees. It is said that because of the extreme low pressure, a person would not feel the heat. This layer also produces auroras, which are natural bright colored display of lights in the sky. They are mainly seen at night and in the Polar Regions.

- The fifth layer is the exosphere. This layer is from 180 to 500 miles. It is the most outer layer of the atmosphere that if gone beyond would leave Earth's atmosphere and enter space.

Between each of these layers are limits or boundaries. Scientists have named these boundaries to refer to the beginning of the next layer. The boundary between the troposphere and stratosphere is called the tropopause. The next one delineating both the stratosphere and the mesosphere is called the stratopause. The limit coming after and separating the mesosphere from the thermosphere is called the mesopause. The last one dividing the thermosphere from the exosphere is called the thermopause.

Name _____

Date _____

Earth's Atmosphere Questions

Multiple Choice:

1. The main three gases in Earth's atmosphere are:
 - a. Oxygen, nitrogen, and helium
 - b. Hydrogen, oxygen, and helium
 - c. Oxygen, nitrogen, and argon
 - d. Oxygen, nitrogen, and hydrogen

2. Auroras usually take place in:
 - a. Exosphere
 - b. Thermosphere
 - c. Mesosphere
 - d. Stratosphere

Matching:

- | | |
|---------------------|---|
| ___ 3. Mesosphere | a) Beyond that layer is outer space |
| ___ 4. Troposphere | b) Includes the ozone |
| ___ 5. Stratosphere | c) The coldest part of the atmosphere |
| ___ 6. Exosphere | d) Most weather conditions take place in that layer |

Fill In:

7. The atmosphere of the Sun is mainly made from _____ gas.
8. Earth's atmosphere or air is made up of gases and _____.
9. The limit separating the mesosphere from the thermosphere is called the _____.
10. The ozone molecules absorb the _____ rays from the Sun and shield us from its extremely harmful effects.

True or False:

- ___ 11. The boundary dividing the thermosphere from the exosphere is called the exopause.
- ___ 12. The thermosphere has very high temperatures, which are in the thousands of Fahrenheit degrees.

Earth's Atmosphere Answers

Multiple Choice:

1. The main three gases in Earth's atmosphere are:
 - a. Oxygen, nitrogen, and helium
 - b. Hydrogen, oxygen, and helium
 - c. **Oxygen, nitrogen, and argon**
 - d. Oxygen, nitrogen, and hydrogen
2. Auroras usually take place in:
 - a. Exosphere
 - b. **Thermosphere**
 - c. Mesosphere
 - d. Stratosphere

Matching:

- | | |
|-------------------------|---|
| ___c___ 3. Mesosphere | a) Beyond that layer is outer space |
| ___d___ 4. Troposphere | b) Includes the ozone |
| ___b___ 5. Stratosphere | c) The coldest part of the atmosphere |
| ___a___ 6. Exosphere | d) Most weather conditions take place in that layer |

Fill In:

7. The atmosphere of the Sun is mainly made from ___ **hydrogen** ___ gas.
8. Earth's atmosphere or air is made up of gases and ___ **particles** ___.
9. The limit separating the mesosphere from the thermosphere is called the ___ **mesopause** ___.
10. The ozone molecules absorb the ___ **ultraviolet** ___ rays from the Sun and shield us from its extremely harmful effects.

True or False:

- ___ **F** ___ 11. The boundary dividing the thermosphere from the exosphere is called the exopause.
- ___ **T** ___ 12. The thermosphere has very high temperatures, which are in the thousands of Fahrenheit degrees.