

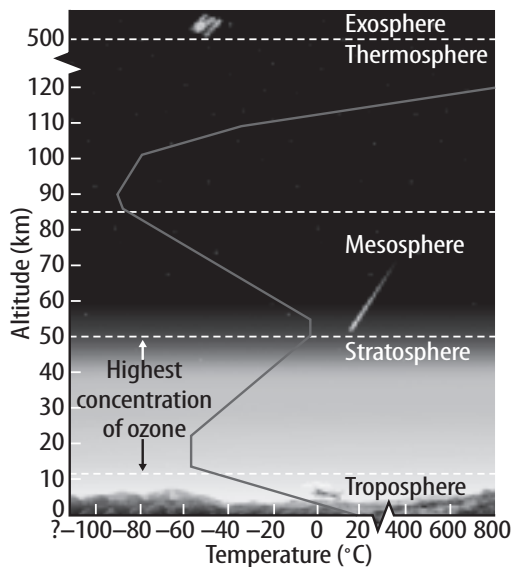
Air Pressure and Altitude

Gravity is the force that pulls all objects toward Earth. When you stand on a scale, you can read your weight. This is because gravity pulls you toward Earth. Gravity also pulls the atmosphere toward Earth. The pressure that a column of air exerts on anything below it is called air pressure. Gravity's pull on air increases its density. At higher altitudes, air is less dense. Air pressure is greatest near Earth's surface because the air molecules are closer together. This dense air exerts more force than the less-dense air near the top of the atmosphere. Mountain climbers sometimes carry oxygen tanks at high altitudes because fewer oxygen molecules are in the air at high altitudes. ✓

Temperature and Altitude

The figure below shows how temperature changes with altitude in different layers of the atmosphere. If you have ever been hiking in the mountains, you know that the temperature cools as you reach higher elevations. In the troposphere, temperature decreases as altitude increases. Notice that the opposite is true in the stratosphere. As altitude increases in the stratosphere, the temperature increases. This happens because of high amounts of ozone in the stratosphere. Ozone absorbs energy from sunlight, which increases the temperature in the stratosphere.

In the mesosphere, as altitude increases, the temperature again decreases. In the thermosphere and exosphere, temperatures increase as altitude increases. The small number of particles in these layers absorbs large amounts of energy from the Sun. This creates high temperatures. ✓



✓ Reading Check

12. Explain How does air pressure change as altitude increases?

✓ Key Concept Check

13. Explain How does temperature change as altitude increases?

✓ Visual Check

14. Identify Which layer has a temperature pattern most like the troposphere's?

..... After You Read

Mini Glossary

atmosphere (AT muh sfih): a thin layer of gases surrounding Earth

ionosphere: the region within the mesosphere and thermosphere containing ions

ozone layer: the area of the stratosphere with a high concentration of ozone

stratosphere (STRA tuh sfih): the atmospheric layer directly above the troposphere

troposphere (TRO puh sfih): the atmospheric layer closest to Earth's surface

water vapor: water in a gaseous form

1. Review the terms and their definitions in the Mini Glossary. Write a sentence explaining why the ionosphere has that name.

2. Use what you have learned about the layers of Earth's atmosphere to complete the table.

Layer	Two Characteristics of the Layer
Troposphere	<ul style="list-style-type: none"> • •
Stratosphere	<ul style="list-style-type: none"> • •
Mesosphere	<ul style="list-style-type: none"> • •
Thermosphere	<ul style="list-style-type: none"> • •
Exosphere	<ul style="list-style-type: none"> • •

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What do you think **NOW?**

Reread the statements at the beginning of the lesson. Fill in the After column with an A if you agree with the statement or a D if you disagree. Did you change your mind?



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Lesson 1 | Describing Earth's Atmosphere (continued)

Main Idea

Composition of the Atmosphere

I found this on page _____.

I found this on page _____.

I found this on page _____.

Details

Assess information about the atmosphere. Read each statement below. If the statement is true, write true on the line. If the statement is false, write false on the line and rewrite the underlined portion so that it is true.

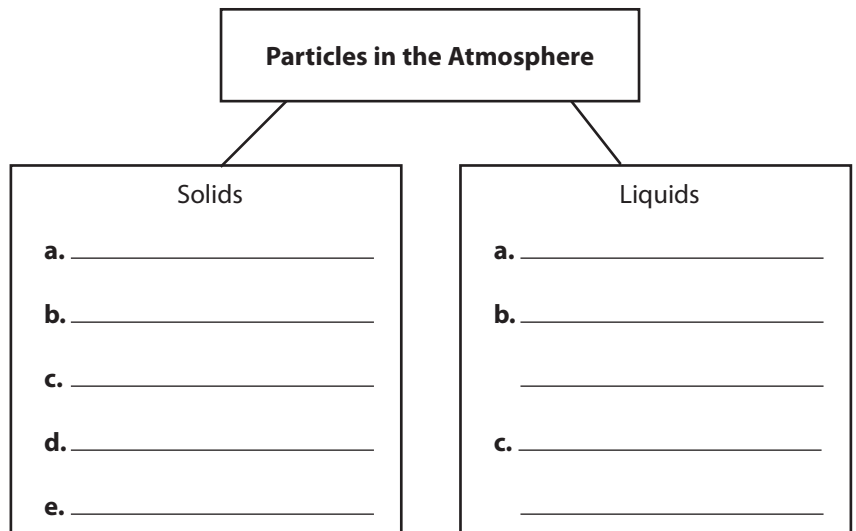
Earth's atmosphere is mostly made of visible gases, including nitrogen, oxygen, and carbon dioxide.

Solid and liquid particles are also present in the atmosphere.

Identify the gases that make up Earth's atmosphere.

Gases in the Atmosphere	
Percent	Gas
78	
21	
1	a. b. c. d.

Identify solid and liquid particles in the atmosphere.



Lesson 1 | Describing Earth's Atmosphere (continued)

Main Idea

Layers of the Atmosphere

I found this on page _____.

I found this on page _____.


I found this on page _____.

I found this on page _____.

I found this on page _____.

I found this on page _____.

Details

 **Describe** the layers of the atmosphere. First, list the layers in order from the surface to space. Identify the height of each layer. Then describe each layer.

Layers of the Atmosphere	
Layer and Height above Earth's Surface	Description
_____ above 500 km	
Thermosphere	
_____ extends from about 50 km to about 85 km	
Stratosphere	
_____ from the surface to a height of 8–15 km	

Distinguish ozone from oxygen.

Ozone	Oxygen

Lesson 1 | Describing Earth's Atmosphere (continued)

Main Idea

I found this on page _____.

I found this on page _____.

Air Pressure and Altitude

I found this on page _____.

Temperature and Altitude

I found this on page _____.

Details

Identify the 2 layers of the atmosphere that contain the ionosphere.

1. _____ 2. _____

Explain, in your own words, how auroras form in the ionosphere.

Describe the relationship between altitude and air pressure.

As altitude _____, air pressure _____.

Identify the changes in temperature and altitude in the different layers of the atmosphere.

Layer of the Atmosphere	Altitude	Temperature
Troposphere	↑ increases	
Stratosphere	↑ increases	
Mesosphere	↑ increases	
Thermosphere	↑ increases	
Exosphere	↑ increases	

Connect It Suppose that you move from a town near the ocean to a town in the mountains. To what atmospheric changes would your body need to adjust?
