

# Lesson 1

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**ANSWER KEYS**

# Math Toolbox

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1. **Construct Graphs** ✍ Create a circle graph of the gases that make up air. Fill in the circle using percentages from the text. Use a different color for each gas and provide a key.

2. **Hypothesize** If gases like carbon dioxide and methane make up less than 1% of the total atmosphere, why is it important for scientists to monitor changes in percentages of these gases?

*These gases absorb large amounts of solar radiation. So, slight changes in their abundance can have big impacts on the system overall.*

## Composition of Air

*graph should show approximately  
78% nitrogen, 21% Oxygen,  
1% Other*

# Reading Checks

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**READING CHECK** **Summarize** How does altitude affect air pressure?

*As altitude increases, air pressure decreases.*

**READING CHECK** **Determine Central Ideas** Why is the atmosphere heated unequally by the sun?

*Solar energy from the sun hits some areas more directly because of Earth's tilt, and these areas are heated more than others.*

# Figures 2 & 3

## CCC Cause and Effect

How might suspended particles in the atmosphere affect life on Earth?

The particles might block the sun ray's, affecting plant life.

## Altitude and Air Density

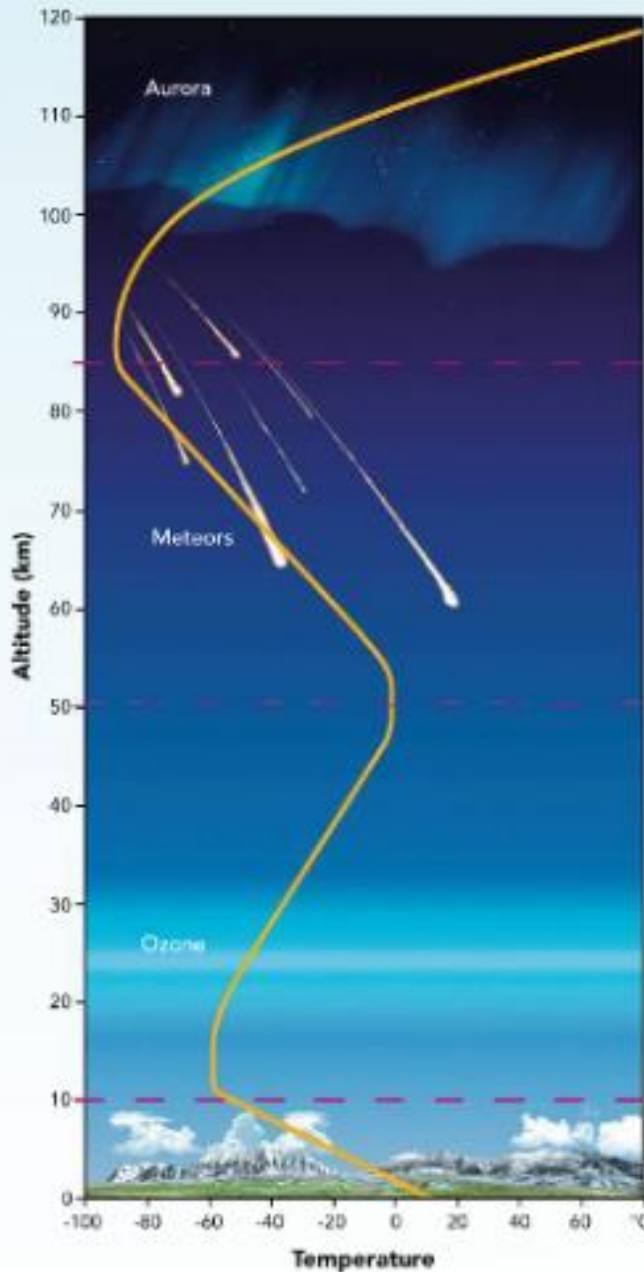
**Figure 3** The density of air decreases at higher altitudes because there is less pressure forcing the air molecules together.

### SEP Develop Models

Consider the molecules of air at different altitudes. The bottom magnification shows the air molecules near sea level. The center magnification shows the air molecules halfway up the mountain. Draw how you think the air molecules would be arranged at the top of the mountain.



# Figure 5



**Thermosphere:** This is the uppermost layer of the atmosphere, with the lowest density of air. The thermosphere is Earth's boundary with space. Radiation from the sun is absorbed by molecules in this layer, causing the temperatures to reach up to 1,800°C. But the molecules are so far apart that it would feel extremely cold.

Altitude Range: 85 km and above

**Mesosphere:** This layer of the atmosphere is directly above the stratosphere. It protects Earth from most meteoroids, which burn up due to friction as they strike the gases in this layer. The temperature in this layer decreases as the altitude increases.

Altitude Range: 50-85 km

**Stratosphere:** This layer of Earth's atmosphere contains the most ozone. As ozone in this layer absorbs ultraviolet radiation from the sun, it heats up the molecules of air. The temperature increases as altitude increases.

Altitude Range: 10-50 km

**Troposphere:** This is the layer where Earth's weather occurs. The troposphere is the closest to Earth's surface and experiences changeable conditions. This layer also contains 80 percent of the atmosphere by weight. The temperature decreases quickly as the altitude increases.

Altitude Range: 0-10 km