



# Earth and Space Science

Robert Taggart

# Table of Contents

<i>To the Student</i> .....	v
<b>Unit 1: The Universe Around Us</b>	
Lesson 1: The Cosmos .....	3
Lesson 2: The Solar System .....	17
Lesson 3: Earth’s Moon .....	30
Lesson 4: Observations from Spaceship Earth .....	39
<b>Unit 2: The Atmosphere Around Us</b>	
Lesson 5: The Atmosphere: Our Life Support System .....	55
Lesson 6: Weather in the Atmosphere .....	65
Lesson 7: Winds in the Atmosphere .....	77
Lesson 8: The Changing Weather .....	85
<b>Unit 3: The Ground Beneath Us</b>	
Lesson 9: What Is Planet Earth? .....	107
Lesson 10: Within the Crust .....	119
Lesson 11: Beneath the Crust .....	133
Lesson 12: Earth’s History .....	147
<b>Unit 4: Earth’s Water Systems</b>	
Lesson 13: The Role of Water .....	161
Lesson 14: Ocean Water .....	171
Lesson 15: Surface Water .....	184
Lesson 16: Groundwater and Water Protection .....	197
<i>Appendixes</i>	
A. <i>Terrestrial Planets Chart</i> .....	213
B. <i>Jovian Planets Chart</i> .....	214
C. <i>Geologic Timetable</i> .....	215
<i>Glossary</i> .....	216
<i>Index</i> .....	252

# UNIT 2

## The Atmosphere Around Us



# LESSON 5: The Atmosphere: Our Life Support System

**GOAL:** To understand how Earth's atmosphere protects and supports life on Earth

## WORDS TO KNOW

altitude	mesopause	stratosphere
contract	mesosphere	thermosphere
energy budget	ozone layer	tropopause
expands	scattered	troposphere
gas	sea level	uniform gases
greenhouse effect	solar energy	vacuum
ionosphere	solid	variable gases
liquid	stratopause	volcanic outgassing

## The Origins of the Atmosphere

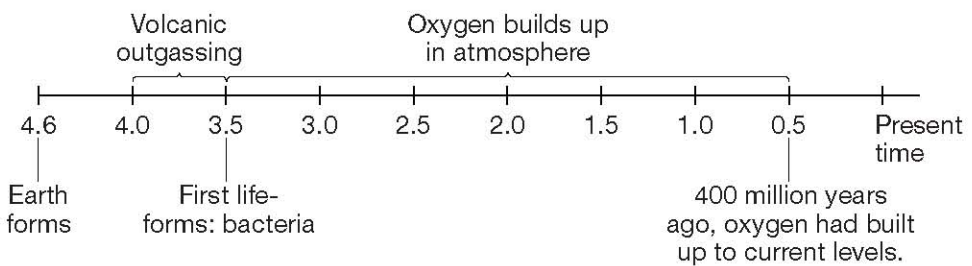
You live on the only planet in the solar system known to support life. Earth is like an oasis in the lifeless solar system. What makes Earth so different? Mainly, it is Earth's protective and supportive atmosphere. Earth's atmosphere is a thin layer of gas about 500 kilometers thick that surrounds the planet. Even though the atmosphere extends for miles above your head, it really is only a thin shell compared to the rest of Earth. This thin shell is the life support system aboard spaceship Earth.

The atmosphere gives Earth the oxygen you need to breathe. It filters out harmful radiation, traps heat, and cycles freshwater in the form of rain. Winds in the atmosphere circulate warmth and moisture around the entire planet.

When Earth formed 4.6 billion years ago, the thin gases that surrounded the planet soon escaped. For millions of years, there was no

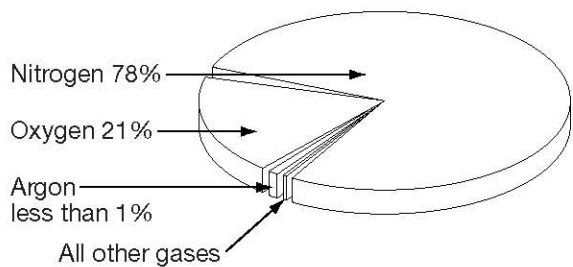
atmosphere on Earth. Between 3.5 and 4 billion years ago, gases trapped inside Earth were released during volcanic eruptions. This process is called **volcanic outgassing**. Volcanic outgassing produced a mixture of carbon dioxide, nitrogen, hydrogen, and water vapor.

In the early stages, Earth's atmosphere had no oxygen. Oxygen did not become part of the atmosphere until the first forms of life appeared about 3.5 billion years ago. These early life-forms were a type of bacteria that produced oxygen as a waste product. Over the next few billion years, oxygen gas built up in the atmosphere. Other life-forms evolved, and the amount of oxygen eventually leveled off about 400 million years ago.



**Time Line of Earth's Atmosphere  
(in billions of years)**

Today's atmosphere is made up of air (a mixture of invisible gases). Air is made up of 78% nitrogen, 21% oxygen, less than 1% argon, and trace (very small) amounts of neon, helium, methane, krypton, and hydrogen. These gases appear in the same percentages throughout most of the atmosphere. That is why they are called **uniform gases**.



**Composition of Air**

Air also contains several variable gases. **Variable gases** are gases whose levels change depending on the location and weather at the time. Variable gases, such as ozone, water vapor, and carbon dioxide, make up a tiny percentage of the atmosphere. Yet, as you will see, they are critical to weather, climate, and life on Earth.

## ■ PRACTICE 17: The Origins of the Atmosphere

Circle the answer that correctly completes each of the following statements.

1. The atmosphere on Earth formed \_\_\_\_\_.
  - a. when Earth formed
  - b. through volcanic outgassing
  - c. when the first forms of life appeared
2. Oxygen became part of the atmosphere about \_\_\_\_\_.
  - a. 3.5 billion years ago
  - b. 400 million years ago
  - c. 4.6 billion years ago
3. The largest part of the atmosphere is \_\_\_\_\_.
  - a. water vapor
  - b. oxygen
  - c. nitrogen
4. Gases whose levels change in the atmosphere are called \_\_\_\_\_.
  - a. uniform gases
  - b. variable gases
  - c. volcanic gases

## A Protective Atmosphere

The atmosphere contains four thin shells, or layers. The names given to the layers, from the inside out, are the troposphere, the stratosphere, the mesosphere, and the thermosphere. The height, or **altitude**, of each layer is measured from sea level. **Sea level** is the lowest part of the atmosphere. Sea level is the point midway between the highest seas and the lowest seas. The layers of the atmosphere are separated based on how temperature changes with altitude within each layer.

### ■ THINK ABOUT IT



All of the following words end with the suffix *-sphere*: *Atmosphere*, *troposphere*, *stratosphere*, *mesosphere*, *thermosphere*. Can you explain why? Write your answer on a separate sheet of paper.

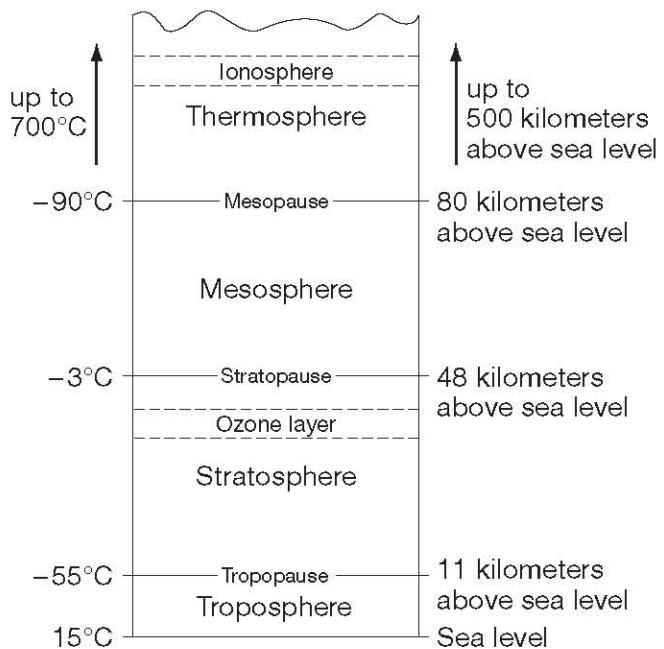
The tops of each of the lower three layers are called the **tropopause**, **stratopause**, and **mesopause**. These locations are the boundaries between each layer. At these boundaries, temperatures begin reversing direction. Temperatures *pause*, or stop increasing (or decreasing), with altitude and begin decreasing (or increasing) with altitude.

## The Troposphere

You live in the troposphere. The **troposphere** is the bottom layer of the atmosphere. Temperatures in the troposphere decrease with altitude. Temperatures vary from  $15^{\circ}\text{C}$  at Earth's surface (sea level) to  $-55^{\circ}\text{C}$  at the tropopause. On average, the troposphere extends to about 11 kilometers above sea level. It extends higher over the warm equator and lower over the poles. Only in the troposphere is the air "thick" enough to sustain most animal life. Also, most water vapor stays in the troposphere, along with all of Earth's weather systems.

## The Stratosphere

The **stratosphere** lies above the troposphere and extends to an altitude of about 48 kilometers above sea level. Strong, steady winds blow through the stratosphere. In the stratosphere, air temperatures increase with altitude. The temperatures vary between  $-55^{\circ}\text{C}$  at the beginning of the stratosphere to  $-3^{\circ}\text{C}$  at the stratopause.



**Layers of the Atmosphere**

This increase in temperature occurs partly because of the energy absorbed by the ozone layer. The **ozone layer** is a protective layer of the variable gas called ozone. You and many other forms of life could not survive the intensity of the Sun's energy without the ozone layer. Ozone absorbs the Sun's harmful ultraviolet waves that can cause sunburn, skin cancer, and damage to crops.

Scientists are concerned about a thinning of the ozone layer in locations over Antarctica and the Arctic. This thinning, also called the ozone hole, constantly changes. Measurements have shown that each year the hole gets a little larger. The ozone hole is caused by pollutants called chlorofluorocarbons, or CFCs, which are widely used as coolants in refrigerators and air conditioners. Life on Earth depends on the protection offered by the ozone layer. Countries all over the world have agreed to reduce the use of CFCs.

## The Mesosphere

The **mesosphere** lies between 48 and 80 kilometers above sea level. In the mesosphere, temperatures decrease with altitude. At the mesopause, air temperatures drop to  $-90^{\circ}\text{C}$ , which is the lowest temperature in the entire atmosphere.

## The Thermosphere

The **thermosphere** begins at an altitude of 80 kilometers and extends to about 500 kilometers above sea level. Here, the air is no longer the same mixture of uniform gases as in the lower atmosphere. Instead, the gas particles are so spread out that each gas settles into its own layer. The particles of gas within the thermosphere absorb solar energy. The result is that temperatures rise within the thermosphere to about  $700^{\circ}\text{C}$ . Most meteors burn up on their way through the thermosphere.

Within the thermosphere, there is a layer called the **ionosphere**. The atmospheric gases of the ionosphere are ionized, or electrically charged. This allows the ionosphere to reflect short-wavelength radio waves, making long distance radio communication possible.





# Earth and Space Science

Teacher's Guide

# Table of Contents

<i>To the Teacher</i> .....	<i>vi</i>
<i>Classroom Management</i> .....	<i>viii</i>
<i>Application Activity Rubric</i> .....	<i>ix</i>
<i>Use Chart</i> .....	<i>x</i>

## **Unit 1: The Universe Around Us**

Unit Overview .....	1
Additional Activity Suggestions .....	3

## **Unit 2: The Atmosphere Around Us**

Unit Overview .....	4
Additional Activity Suggestions .....	6

## **Unit 3: The Ground Beneath Us**

Unit Overview .....	7
Additional Activity Suggestion .....	9

## **Unit 4: Earth's Water Systems**

Unit Overview .....	10
Additional Activity Suggestion .....	12

<i>Answer Key</i> .....	13
<i>Graphic Organizers</i> .....	19
<i>Student Book Appendixes</i> .....	24
<i>Student Book Glossary</i> .....	26

---

# Unit 2: The Atmosphere Around Us

---

In this unit, students learn about Earth’s atmosphere, weather and winds, and climate. Lesson 5 helps students understand how Earth’s atmosphere protects and supports life on Earth. In Lesson 6, students are introduced to the tools that meteorologists use to predict weather. Lesson 7 compares and contrasts the winds that flow over Earth. In Lesson 8, students explore how weather systems form and why weather changes.

## Lesson 5—The Atmosphere: Our Life Support System

Goal: To understand how Earth’s atmosphere protects and supports life on Earth

### WORDS TO KNOW

---

altitude	mesopause	stratosphere
contract	mesosphere	thermosphere
energy budget	ozone layer	tropopause
expands	scattered	troposphere
gas	sea level	uniform gases
greenhouse effect	solar energy	vacuum
ionosphere	solid	variable gases
liquid	stratopause	volcanic outgassing

## Lesson 6—Weather in the Atmosphere

Goal: To understand the tools that meteorologists use to predict weather

### WORDS TO KNOW

---

air pressure	fog	specific humidity
barometer	frost	stratus
cirrus	humidity	temperature
condensation	isobars	temperature inversion
cumulonimbus	millibars	thermometer
cumulus	nimbostratus	water cycle
dew	precipitation	weather
dew point	relative humidity	wind chill factor
evaporation	saturated	

## Lesson 7—Winds in the Atmosphere

Goal: To compare and contrast the winds that flow over Earth

### WORDS TO KNOW

---

convection cell	monsoon winds	specific heat
Coriolis effect	planetary winds	trade winds
doldrums	pressure gradient	westerlies
jet streams	prevailing winds	

## Lesson 8—The Changing Weather

Goal: To understand how weather systems form and why weather changes

### WORDS TO KNOW

---

air mass	hurricane	temperate
climate	ice age	thunder
cold front	lightning	thunderstorms
continental air mass	low-pressure areas	tornado
El Niño	maritime air mass	tropical air mass
eye	occluded front	tropical depression
front	polar air mass	tropical storm
global warming	squall line	warm front
high-pressure areas	stationary front	wind shear

### Notes on Application Activities in Student Text

Activity	Skills Applied	Product(s)
Heating Earth's Surface	collecting data, taking measurements, making graphs, interpreting data from one graph	graph, chart
The Weight of Air	constructing a working instrument, collecting data, drawing conclusions	model, chart

## Additional Activity Suggestions

- Have learners research the four major types of air masses that affect weather in the United States. Each type of air mass brings different weather conditions. Have learners create a map of the United States that illustrates the areas for each of these four air masses.
- Visit the On-line Meteorology Guide ([ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/home.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/home.rxml)). Students can learn about clouds and precipitation, air masses and fronts, weather forecasting, severe storms, and much more. The site also includes classroom activities and student projects.

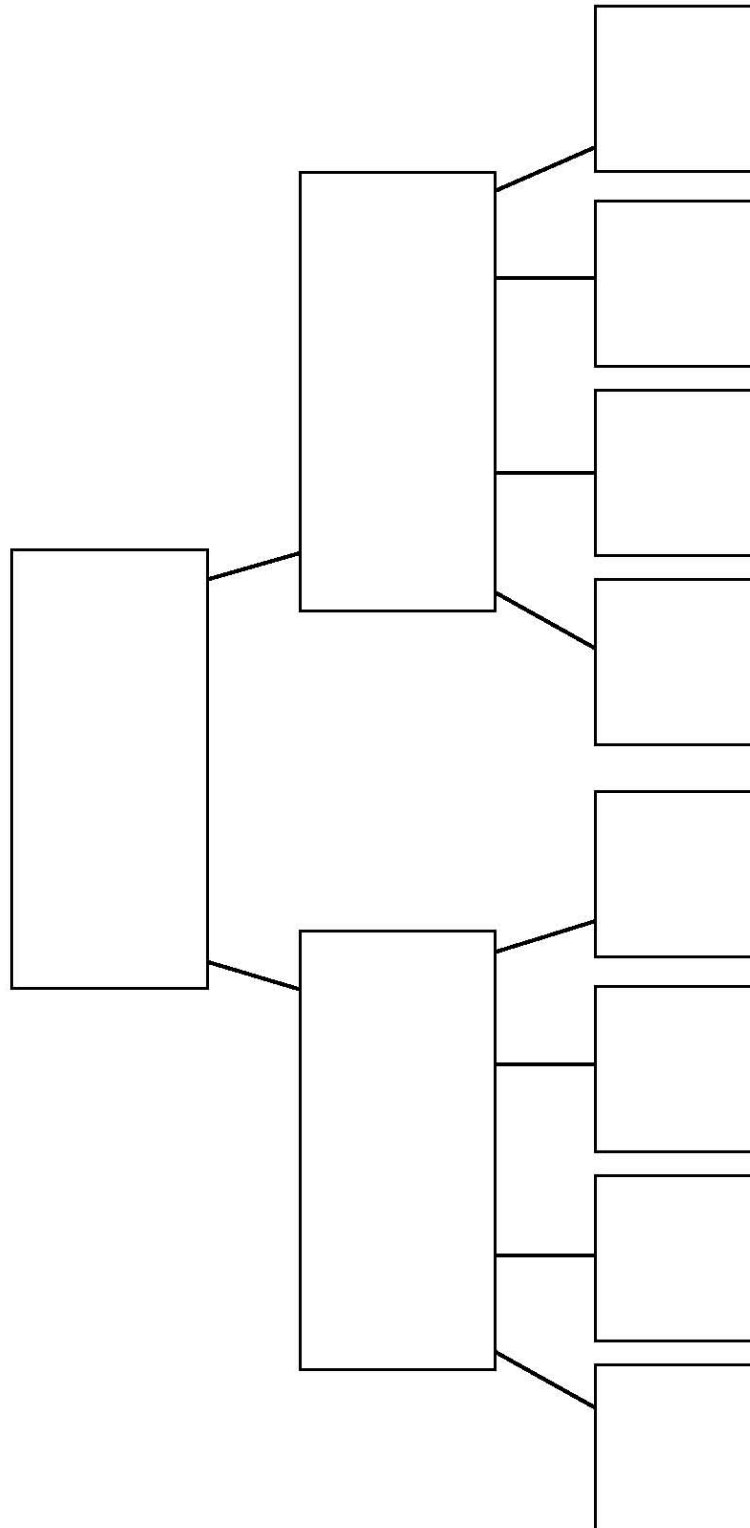


### Thinking Skills

- In this unit, learners discovered that uneven heating of the atmosphere causes wind patterns. Have students apply this information to explain what causes the wind that spins the blades on wind generators (such as windmills). Have learners speculate about energy production based on blade size.

# Hierarchical Diagram

Write the root of the hierarchy in the box at the top. Write the next level in the hierarchy in the boxes below the top box. Continue until you have added all the levels in the hierarchy. Add or delete lines and boxes as needed.





# Earth and Space Science

Workbook

# Table of Contents

*To the Student* .....vii

## Unit 1: The Universe Around Us

**Activity 1**  
Hypatia, Mathematician and Astronomer ..... 1

**Activity 2**  
Radiation ..... 2

**Activity 3**  
Invention of the Telescope ..... 3

**Activity 4**  
Galaxies ..... 4

**Activity 5**  
Solar Puzzle ..... 5

**Activity 6**  
Northern Lights ..... 6

**Activity 7**  
Planetary Puzzle ..... 7

**Activity 8**  
Carl Sagan ..... 8

**Activity 9**  
Europa ..... 9

**Activity 10**  
Halley and the Comets ..... 10

**Activity 11**  
Meteorite Impact Craters ..... 11

**Activity 12**  
Caroline Herschel ..... 12

**Activity 13**  
The Moon and Time ..... 13

**Activity 14**  
Lunar or Solar? ..... 14

**Activity 15**  
Solar Eclipse ..... 15

**Activity 16**  
Earth’s Greatest Tides ..... 16

**Activity 17**  
A Round Earth ..... 17

**Activity 18**  
Seasons ..... 18

**Activity 19**  
Constellation Search ..... 19

**Activity 20**  
Message in a Bottle ..... 20

## Unit 2: The Atmosphere Around Us

**Activity 21**  
Atmosphere Puzzle ..... 21

**Activity 22**  
Ozone and Greenhouse Gases ..... 22

**Activity 23**  
Can We “See” Air Pressure? ..... 23

**Activity 24**  
Weather Word Search ..... 24

**Activity 25**  
Snow ..... 25

**Activity 26**  
Buffalo Snow ..... 26

**Activity 27**  
Onshore and Offshore ..... 27

**Activity 28**  
Planetary Winds ..... 28

**Activity 29**  
Today’s Forecast ..... 29

**Activity 30**  
Tornadoes and Hurricanes ..... 30

**Activity 31**  
Ice Ages ..... 31

**Activity 32**  
The Chain Reaction of Global Warming ..... 32

**Activity 33**  
A Year Without a Summer ..... 33

**Activity 34**  
Mount Washington Observatory ..... 34

**Activity 35**  
No Boundaries for the Weather ..... 35



# Table of Contents, *continued*

## Unit 3: The Ground Beneath Us

<b>Activity 36</b>	
The Work of the Geodesist . . . . .	36
<b>Activity 37</b>	
Geothermal Energy . . . . .	37
<b>Activity 38</b>	
The Magnet Earth . . . . .	38
<b>Activity 39</b>	
Mercator Projection . . . . .	39
<b>Activity 40</b>	
Minerals . . . . .	40
<b>Activity 41</b>	
Diamonds . . . . .	41
<b>Activity 42</b>	
Mineral Puzzler . . . . .	42
<b>Activity 43</b>	
Mineral ID . . . . .	43
<b>Activity 44</b>	
Minerals in Sports . . . . .	44
<b>Activity 45</b>	
The Rock Cycle . . . . .	45
<b>Activity 46</b>	
Where Do They Come From? . . . . .	46
<b>Activity 47</b>	
Forming Petroleum . . . . .	47
<b>Activity 48</b>	
Wegener's Idea . . . . .	48
<b>Activity 49</b>	
The Drifting Continents . . . . .	49
<b>Activity 50</b>	
Earth's Giant Conveyor Belt . . . . .	50
<b>Activity 51</b>	
Explosive Volcanoes . . . . .	51
<b>Activity 52</b>	
Earthquake Word Search . . . . .	52
<b>Activity 53</b>	
The Quaking Earth . . . . .	53

<b>Activity 54</b>	
Olduvai Gorge . . . . .	54
<b>Activity 55</b>	
Leonardo the Geologist . . . . .	55
<b>Activity 56</b>	
The Age of Earth . . . . .	56

## Unit 4: Earth's Water Systems

<b>Activity 57</b>	
Inland Water . . . . .	57
<b>Activity 58</b>	
Weathering and Erosion . . . . .	58
<b>Activity 59</b>	
The Water Cycle . . . . .	59
<b>Activity 60</b>	
How Submarines Hide . . . . .	60
<b>Activity 61</b>	
Life Without the Sun . . . . .	61
<b>Activity 62</b>	
Beneath the Sea . . . . .	62
<b>Activity 63</b>	
Deep-Sea Trenches . . . . .	63
<b>Activity 64</b>	
Ben Franklin and the Gulf Stream . . . . .	65
<b>Activity 65</b>	
El Niño . . . . .	66
<b>Activity 66</b>	
<i>Kon Tiki</i> . . . . .	67
<b>Activity 67</b>	
Whirlpools and the Old Sow . . . . .	68
<b>Activity 68</b>	
Rogue Waves . . . . .	69
<b>Activity 69</b>	
Power From Water . . . . .	70
<b>Activity 70</b>	
River Puzzle . . . . .	71
<b>Activity 71</b>	
Agriculture of the Nile . . . . .	72

---

# Table of Contents, *continued*

---

<b>Activity 72</b>		<b>Activity 75</b>	
Flash Flood! .....	73	Geysers .....	76
<b>Activity 73</b>		<b>Activity 76</b>	
Vatnajökull .....	74	Sinkholes .....	77
<b>Activity 74</b>		<b>Activity 77</b>	
Great Lakes .....	75	The Everglades Aquifer .....	78

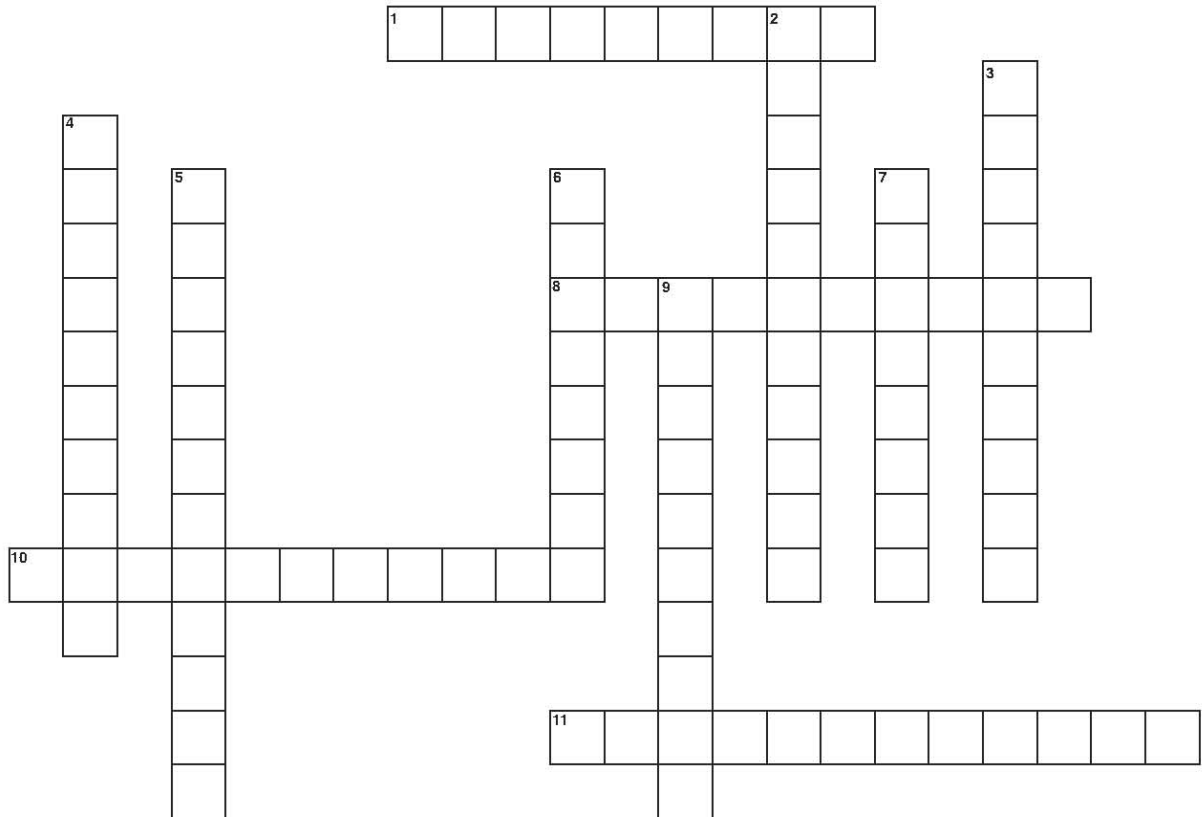
NAME: \_\_\_\_\_



## UNIT 2 • ACTIVITY 21

### Atmosphere Puzzle

Use the clues below to complete the crossword puzzle.



#### Across

1. This is the boundary between the mesosphere and the thermosphere.
8. This is the boundary between the troposphere and the stratosphere.
10. This is the lowest layer of the atmosphere, where weather occurs.
11. This is the region of the atmosphere above the mesosphere and below outer space.

#### Down

2. The boundary between the stratosphere and the mesosphere is \_\_\_\_\_.
3. A region in the upper stratosphere and lower mesosphere where radio transmission can be affected by solar radiation is the \_\_\_\_\_.
4. This is the region of the atmosphere above the stratosphere and below the thermosphere.
5. This is the region of the atmosphere above the troposphere and below the mesosphere.
6. This is the distance from sea level of a place to the atmosphere or to a mountaintop.
7. The lowest part of the atmosphere is \_\_\_\_\_ (2 words).
9. This region in the upper troposphere and lower stratosphere is where ozone collects as a result of solar radiation. This layer scatters ultraviolet radiation and keeps Earth safe for life (2 words).



**UNIT 2 • ACTIVITY 22****Ozone and Greenhouse Gases**

Ozone is a variable gas in Earth's atmosphere. This means the amount of it can change from one location to the next. The ozone layer is the zone in the atmosphere at the top of the stratosphere in which ozone can be found. It is located 10 to 50 kilometers above Earth's surface. Ozone absorbs the harmful ultraviolet (UV) radiation from the Sun that bombards Earth each day. All life depends on the ozone's protection.

Greenhouse gases include carbon dioxide, methane, and water vapor. When these gases accumulate in the atmosphere, they trap the heat energy from the Sun that radiates back from Earth. The heat energy is unable to escape from Earth's atmosphere. The result is a hotter planet.

Modern-day pollution has been affecting the levels of greenhouse and ozone gases. The governments of many nations, including the United States, have begun to measure, monitor, and study these gases. Two agreements have been made that will affect the health of the atmosphere: the Montreal Protocol and the Kyoto Protocol. The Montreal Protocol states that chemicals that deplete the ozone layer are to be phased out by 2005. More than 100 nations participated in this agreement. The Kyoto Protocol was an agreement between more than 160 nations to reduce greenhouse gases that can affect global warming.

Answer the questions below on the lines provided.

1. Why is the ozone layer important?

---

---

---

2. How do greenhouse gases affect Earth?

---

---

---

3. Do you think the nations of the world are doing enough to control gases that pollute?

---

---

---



NAME: \_\_\_\_\_



## UNIT 2 • ACTIVITY 23

### Can We “See” Air Pressure?

This experiment will help you find out how temperature changes air pressure.

#### Materials

- Empty plastic drink container with a screw-on cap
- Pan of very hot water
- Refrigerator or freezer

#### Safety Consideration

Be careful when using hot water.

#### Procedure

1. Take the cap off the bottle, and squeeze the sides in. Replace the cap tightly.
2. Think about what might happen if the air in the bottle heats up. Write your prediction on the line.  
\_\_\_\_\_  
\_\_\_\_\_
3. Submerge the bottle in the hot water.
4. What happened? Record what you observed. Explain why you think this happened.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. Place the bottle in the refrigerator or freezer. Predict what you think might happen to the bottle. Write your prediction on the line.  
\_\_\_\_\_  
\_\_\_\_\_
6. After five minutes, take out the bottle and record what you observe. Explain why you think the bottle changed again.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
7. Were your predictions correct? Explain what you learned from this experiment. How do you think this applies to Earth’s atmosphere?  
\_\_\_\_\_  
\_\_\_\_\_





# Earth and Space Science

Test Pack

# Table of Contents

---

To the Teacher .....	v
Testing Students Who Do Not Test Well .....	vi
Test-Taking Strategies for <i>Power Basics</i> ® .....	vii
<b>Pretest .....</b>	<b>1</b>
<b>Unit 1 Test: The Universe Around Us .....</b>	<b>7</b>
<b>Unit 2 Test: The Atmosphere Around Us .....</b>	<b>12</b>
<b>Unit 3 Test: The Ground Beneath Us .....</b>	<b>17</b>
<b>Unit 4 Test: Earth's Water Systems .....</b>	<b>22</b>
<b>Posttest .....</b>	<b>27</b>
Answer Key .....	33
Student Record-Keeping Form .....	34
Strategies for Standardized Testing .....	35



---

**EARTH AND SPACE SCIENCE • PRETEST**

---

Circle the letter of the correct answer to each of the following questions and statements.

1. Which of the following would be studied by a geologist?
  - a. Earth's orbit around the Sun
  - b. a flood in California
  - c. a hurricane in New England
  - d. a volcanic eruption in Italy

---
2. According to the Big Bang Theory, when did the Big Bang occur?
  - a. 50 million years ago
  - b. 130 million years ago
  - c. between 3 and 5 billion years ago
  - d. between 12 and 15 billion years ago

---
3. What are sunspots?
  - a. extra-hot regions on the surface of the Sun
  - b. magnetic storms on the surface of the Sun
  - c. solid areas on the surface of the Sun
  - d. thicker areas in the Sun's atmosphere

---
4. What can occur when solar wind interacts with Earth's magnetic field?
  - a. sunspots
  - b. aurora
  - c. earthquakes
  - d. hurricanes

---
5. Which of the following is not one of the Jovian planets?
  - a. Jupiter
  - b. Neptune
  - c. Pluto
  - d. Saturn



---

**UNIT 2 TEST • THE ATMOSPHERE AROUND US**

---

Circle the letter of the correct answer to each of the following questions.

1. Which of the following is a uniform gas?

- a. carbon dioxide
  - b. ozone
  - c. oxygen
  - d. water vapor
- 

2. Which of the following gases was not an important part of Earth's atmosphere until after the development of the first life forms?

- a. carbon dioxide
  - b. nitrogen
  - c. oxygen
  - d. water vapor
- 

3. What gas forms the largest part of Earth's atmosphere?

- a. argon
  - b. methane
  - c. nitrogen
  - d. oxygen
- 

4. How is the atmosphere principally warmed?

- a. by cosmic rays
  - b. by heat released from volcanoes
  - c. directly by the Sun's rays
  - d. indirectly by the ground, which has first absorbed energy in the form of light
- 

5. Which of the following is a greenhouse gas?

- a. carbon dioxide
- b. nitrogen
- c. oxygen
- d. ozone

6. What are isobars?
- a. closed curves on a weather map that join points of equal air pressure
  - b. closed curves on a weather map that join points of varying air pressure
  - c. closed curves on a weather map that join points of equal wind speed
  - d. closed curves on a weather map that join points of varying wind speed
- 

7. What is the air pressure at sea level?
- a. zero
  - b. 1013.25 millibars
  - c. 2500.05 millibars
  - d. 10,000 millibars
- 

8. In general, what type of weather does a low-pressure area bring?
- a. clear skies
  - b. cloudy skies
  - c. high temperatures
  - d. rainy weather
- 

9. In general, what type of weather does a high-pressure area bring?
- a. clear skies
  - b. cloudy skies
  - c. high temperatures
  - d. rainy weather
- 

10. What is the term for the center of a hurricane?
- a. eye
  - b. nimbus
  - c. peak
  - d. shear

---

**EARTH AND SPACE SCIENCE • POSTTEST**

---

Circle the letter of the correct answer to each of the following questions.

1. Which parts of the electromagnetic spectrum are visible to the naked eye?
  - a. gamma rays
  - b. light waves
  - c. microwaves
  - d. all of the above

---
2. Which type of telescope collects light waves with a curved mirror?
  - a. any optical telescope
  - b. a radio telescope
  - c. a reflecting telescope
  - d. a refracting telescope

---
3. Why has the Hubble Space Telescope been most useful?
  - a. It is above the Earth's atmosphere.
  - b. It is much bigger than other telescopes.
  - c. It is a better telescope than even the best on Earth.
  - d. It can see farther than any other telescope.

---
4. Which of the following is NOT one of the terrestrial planets?
  - a. Earth
  - b. Jupiter
  - c. Mars
  - d. Venus

---
5. What are comets made of?
  - a. collections of meteoroids
  - b. hydrogen gas
  - c. ice and dust
  - d. rock