

SCIENCE

Student Book

▶ **4th Grade** | Unit 9

SCIENCE 409

THE PLANET EARTH

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LIFEPAC Test | **Pull-out**

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THE PLANET EARTH

In this LIFE PAC® you will learn about our planet Earth and its three parts: air (atmosphere), water (hydrosphere), and land (lithosphere). The earth is one of the eight planets in our solar system. You will learn about the atmosphere around the earth. You will study about the oceans and the land. You will learn more appreciation for the plentiful gifts of air, water, and land that God has given us. In this LIFE PAC you also will discover some exciting verses of the Bible that told man long ago about the earth.

“In the beginning God created the heaven and the earth.” This verse, Genesis 1:1, is the very first one in the Bible. This verse tells us who made the earth. God spoke and His own words created our great planet Earth. Did you know that the word *earth* is named 980 times in the Bible? God’s Word says a lot about the earth. He made a perfect place for His people to live. The mountains, rivers, lakes, oceans, animal life, and plant life make Earth a wonderful place.

Some unbelieving people say that the earth and the life on it were not created by God. They think that some kind of natural accident happened. We know that if they would read the first page of the Bible, they would find out that God had a reason to create the earth. It was not an accident. John 17:17 says, “...thy Word is truth.” Those who trust in God believe the Bible and agree with what it says about the earth’s creation.

Objectives

Read these objectives. The objectives tell you what you will be able to do when you have successfully completed this LIFEPAAC. Each section will list according to the numbers below what objectives will be met in that section. When you have finished this LIFEPAAC, you should be able to:

1. List the three main parts of the earth: air, water, and land.
2. Tell that the planet Earth was created by God, as written in Genesis 1:1.
3. Tell that the air and the clouds are a part of the earth.
4. Name the percentage of water on the earth.
5. Tell the differences between fresh water and ocean water.
6. Name the three main layers of the earth (crust, mantle, and core).
7. Explain that the earth is round like a ball.
8. List what God created each day on the earth.
9. Tell that we call our round earth a sphere.
10. Explain the meaning of gravity.
11. Tell the difference between a fault and an earthquake.



1. THE AIR (ATMOSPHERE)

Have you ever flown in an airplane? Did you know you were flying through part of the earth? You weren't flying through the solid part of the earth, but through the air. All of the air is really a part of the earth. This part of the earth is called the **atmosphere**.

The planet Earth is divided into three parts. First is the atmosphere, which is made up of the air and other gases. Second is the **hydrosphere**, which includes all of the bodies of water on the Earth. The third part is the **lithosphere**. The lithosphere includes all of the land on the Earth. In this section you will learn about the part of the Earth called the atmosphere.

Objectives

Review these objectives. When you have completed this section, you should be able to:

1. List the three main parts of the earth: air, water, and land.
2. Tell that the planet Earth was created by God, as written in Genesis 1:1.
3. Tell that the air and the clouds are a part of the earth.

Vocabulary

Study these new words. Learning the meanings of these words is a good study habit and will improve your understanding of this LIFEPAAC.

atmosphere (at' mu sfir): The air and other gases that surround the earth.

chemist (kem' ist): A person who is expert in chemistry.

condense (kun dens'): Change from a vapor or gas to a liquid.

element (el' u munt): One of the 118 substances making up matter that cannot be separated into simpler parts.

evaporate (i vap' u rāt'): Change from a liquid into gas or vapor.

hydrosphere (hī' dru sfir): The water part of the earth.

ionosphere (ī on' u sfir): A region of the atmosphere above the stratosphere extending from about 50 miles into space to 300 to 600 miles into space.

lithosphere (lith' us sfir): The solid, or land, part of the earth. It includes the crust and the uppermost mantle.

nitrogen (nī' tru jun): A colorless, odorless, tasteless gas (element) that forms about four-fifths of the atmosphere.

oxygen (ok' su jun): A colorless, odorless, tasteless gas (element) that forms about one-fifth of the atmosphere.

particle (pär' tu kul): A very little bit of something.

stratosphere (strat' u sfir): The region of the atmosphere above the troposphere, from 10 to 30 miles up into space.

troposphere (trō' pu sfir): The lowest region of the atmosphere extending about ten miles into space.

water vapor (wôt' ur vā' pur): Water that has changed into a gas.

Note: All vocabulary words in this LIFEPAAC appear in **boldface** print the first time they are used. If you are unsure of the meaning when you are reading, study the definitions given.

Pronunciation Key: hat, āge, cāre, fār; let, ēqual, tērm; it, īce; hot, ōpen, ôrder; oil; out; cup, pūt, rüle; child; long; thin; /TH/ for then; /zh/ for measure; /u/ or /ə/ represents /a/ in about, /e/ in taken, /i/ in pencil, /o/ in lemon, and /u/ in circus.

Regions of the Atmosphere

When you stand on the ground, everything above you that is not solid is the air, or **atmosphere**. The earth's atmosphere extends about 1,000 miles into space. In this section you will learn about the different levels or regions of the atmosphere.

Troposphere. The lowest region of the atmosphere is called the **troposphere**. It extends about ten miles into space. All weather changes occur in this region. Conditions in the troposphere cause our temperature changes, clouds, snow, rain, and storms.

Above a height of 9 miles in the atmosphere, people need special equipment and protection to stay alive. As you go higher in the troposphere, the temperature goes down. At a height of 8 to 10 miles above the earth, the temperature lowers to an average of -55° Fahrenheit (55 degrees below zero).

Stratosphere. The next level of the atmosphere extends from about 10 to 30 miles into space. This layer is called the **stratosphere**. The stratosphere contains the ozone layer. The ozone layer is a layer of air designed by the Creator to filter out harmful rays produced by the sun. Some scientists believe that man's overuse of pressurized sprays may destroy that protective layer. The stratosphere has no clouds and is very cold.

Mesosphere. Above the stratosphere is the mesosphere level of the atmosphere. It extends 30 to 50 miles above the earth's surface.

Ionosphere. The next region of the atmosphere is the **ionosphere**. It begins at about 50 miles above the earth and extends to about 300 miles into space (it can extend as far as 600 miles into space).

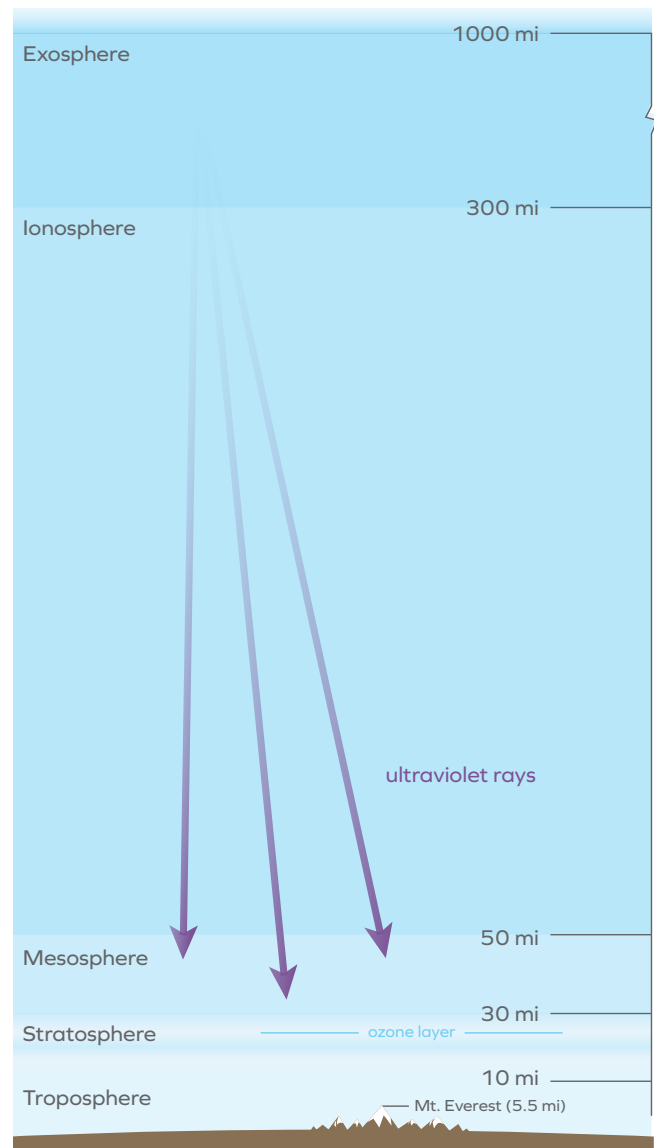


Figure 1 | Regions of the Atmosphere

The ionosphere is made up of layers of air. These layers are affected by the sun’s radiation. Because these layers are affected by the sun’s radiation, the ionosphere is used to send radio waves over long distances on earth.

The boundaries of the different levels of the atmosphere do not overlap. However, they do change for many reasons, including time of day and year, weather, sunshine, and location on the earth.

Exosphere. Beyond the ionosphere is the exosphere. It begins about 300 miles above the earth and eventually merges into space where no air exists.



Draw a line to match the columns.

- | | | |
|------------|--------------|-----------------|
| 1.1 | ionosphere | 1 to 10 miles |
| 1.2 | troposphere | 50 to 300 miles |
| 1.3 | stratosphere | 10 to 30 miles |



Complete the following sentences.

- 1.4** The _____ is used to send radio waves long distances on the earth.
- 1.5** Weather conditions are produced in the _____ .
- 1.6** The _____ contains the ozone layer.



Do this activity.

- 1.7** Read to find out more about the regions of the atmosphere. Draw the regions and color your own map. Label it with some of the other things you have discovered about the layers of the atmosphere.



Teacher check:

Initials _____ Date _____

Gases in the Atmosphere

Our atmosphere (air) is necessary for our lives. Every time you breathe you take air into your lungs. This air helps to keep your body working. Air is made up of a mixture of gases. Air also contains water vapor and small particles like dust and soot. In this section you will learn about the things in our air. Air is one part of the earth.

Gases. A long time ago an English **chemist** named Joseph Priestley (jo' sef preest' lee) discovered **oxygen**, a colorless, odorless, tasteless gas. Then, a French chemist, Antoine Lavoisier (an' twan la vwa' ziae'), gave oxygen its name. He proved that oxygen was a large part of the air around us. Later, it was found that oxygen is one-fifth of the air. Oxygen is also the most plentiful **element** on Earth. An element is one of the 118 substances making up matter that cannot be separated into simpler parts. Oxygen is the part of air that our body needs to work. It helps things to burn. Without oxygen a fire will not burn.

Although oxygen is very important for life, an atmosphere of pure oxygen would be dangerous. A small spark would start a fire. A house would burn almost instantly, with no time for the fire engine to come.

Another gas found in the air is **nitrogen**. It does not help things to burn. It is colorless, odorless, and tasteless. Nitrogen makes up about four-fifths of the air. The mixture of nitrogen, oxygen, and other gases in the air is just right for breathing.

Very small amounts of other gases like argon, neon, and carbon dioxide also are in the air. These gases make up only about 1 percent of air (one part out of 100).

You have learned from Science LIFEPAK 403 that our atmosphere protects us from getting too hot or too cold. God also designed the gases in the atmosphere perfectly for us to live and breathe on Earth. By His wonderful plan, He has made it possible for us to do His work. As we increase our understanding of God's plan, it is natural to say, "This is the day which the Lord hath made; we will rejoice and be glad in it."

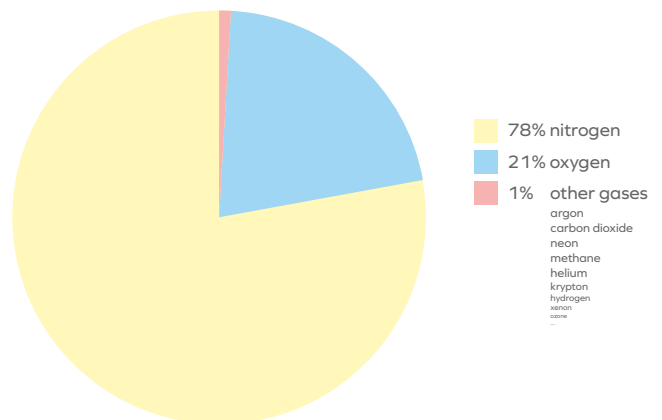


Figure 2 | Air



Write an answer from the list to complete each sentence.

- | | | | |
|-----------|----------|-------------------|------------------|
| one-fifth | nitrogen | earth | Joseph Priestley |
| oxygen | mixture | Antoine Lavoisier | |

- 1.8 Oxygen was discovered by _____.
- 1.9 Air is part of the _____.
- 1.10 The atmosphere is made up of a _____ of gases.
- 1.11 The element in air most needed for breathing is _____.
- 1.12 The element that makes up about four-fifths of the air is _____.
- 1.13 Oxygen makes up about _____ of the air.



Complete this activity.

- 1.14 Color the balloon red that stands for oxygen, the one for nitrogen yellow, and the one for neon, argon, and carbon dioxide blue.

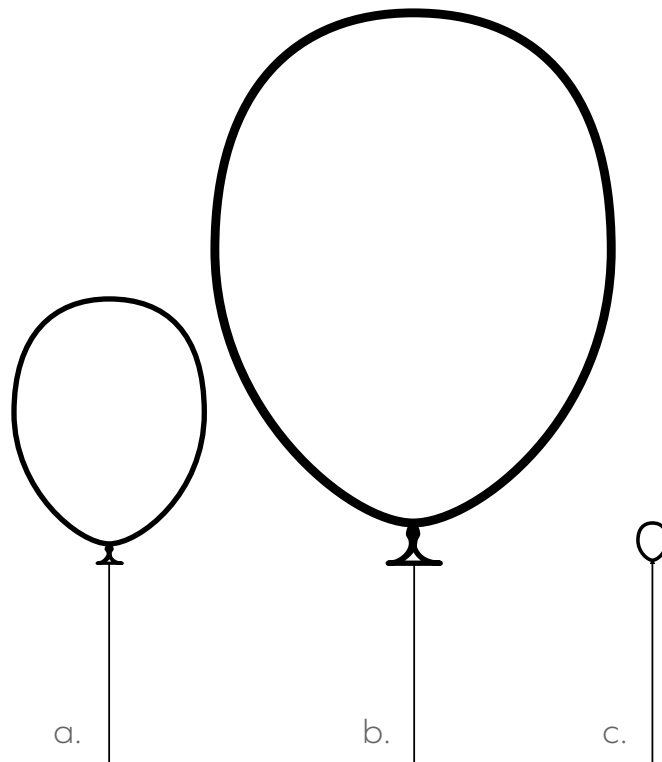


Figure 3 | Amount of gases in our air

Water vapor. Besides the gases in air, something else is very commonly present.

Water vapor, or water, that has changed into a gas is in the air. On a hot, sunny day, many **particles** (molecules) of water escape into the air. The air can hold only a certain number of molecules of water at any one temperature. Hot air can hold more water molecules than cold air. At any temperature, air can become saturated, or filled, with water. When the air already is full of water vapor, and more water is put into the air, some of it **condenses**. To condense is to change from a vapor, or gas, into a liquid. When water vapor condenses, it becomes liquid water. This change is called condensation. On hot days you have probably noticed water vapor condenses into water droplets on the outside of a cold drink glass.

The sun warms the water in oceans, rivers, lakes, and streams. Some of this water then **evaporates** and escapes into the air.

Evaporation is the changing of a liquid into a gas, or vapor. When part of the air above becomes filled, or saturated, with as much water vapor as it can hold, then any added water may condense on dust particles. When this water vapor condenses and forms on the dust particles in the sky, a cloud may form and rain may occur. If it happens near the ground, fog may form. God supplies water to the plants of the earth by the formation of clouds and rain. Clouds and rain are a part of the earth. Rain helps to make our crops grow. In this way God helps to provide us with food to eat.



Figure 4| Condensation

CONDENSATION



View 409
Condensation:
 Grade 4 Science
 experiments video



Figure 5 |
 Ice Cubes in Liquid

These supplies are needed:

- a drinking glass
- some ice cubes
- some flavored beverage
- a clean cloth or tissue

Follow these directions and answer the questions. Check the boxes as you do each step.

- 1. Completely dry the outside of the drinking glass and place it on the cloth or tissue.
- 2. Nearly fill the glass with ice cubes.
- 3. Pour in the flavored beverage and leave for ten minutes.
- 4. Examine the outside of the glass. Touch your tongue to the outside.
- 5. Lift the glass off the cloth and examine the cloth.

1.15 How did the glass feel? _____

1.16 Was the tissue wet? _____

1.17 Is there any colored spot on the tissue where the glass was resting?

1.18 When you touched your tongue to the outside of the glass, did you taste the flavor of the beverage? _____

1.19 Did the condensed droplets on the outside come from the liquid inside the glass or from the air? _____



Write *true* or *false*.

- 1.20** _____ When water escapes from an ocean or lake into the air, it is called evaporation.
- 1.21** _____ Water vapor is found in the air.
- 1.22** _____ Clouds are formed from condensed water vapor.
- 1.23** _____ Condense means the same as evaporate.
- 1.24** _____ Water vapor is water in the form of gas.



Review the material in this section to prepare for the Self Test. The Self Test will check your understanding of this section. Any items you miss on this test will show you what areas you will need to restudy in order to prepare for the unit test.

SELF TEST 1

Match these items (each answer, 3 points).

- | | | | | |
|--------------|-------|------------------|----|----------------------|
| 1.01 | _____ | troposphere | a. | gas into liquid |
| 1.02 | _____ | evaporation | b. | 10 to 30 miles |
| 1.03 | _____ | oxygen | c. | discovered oxygen |
| 1.04 | _____ | ionosphere | d. | atmosphere |
| 1.05 | _____ | sun | e. | warms the earth |
| 1.06 | _____ | air | f. | 0 to 10 miles |
| 1.07 | _____ | clouds | g. | liquid into gas |
| 1.08 | _____ | stratosphere | h. | water vapor and dust |
| 1.09 | _____ | condense | i. | 50 to 300 miles |
| 1.010 | _____ | Joseph Priestley | j. | one-fifth of air |
| | | | k. | solid to a liquid |

Write the correct word in each blank (each answer, 2 points).

troposphere	Antoine Lavoisier	oxygen	ozone
earth	protection	atmosphere	stratosphere

- 1.011** The _____ is one of the eight planets in our solar system.
- 1.012** Above nine miles in the atmosphere, people need special _____ to stay alive.
- 1.013** The lowest level of atmosphere is called the _____.
- 1.014** Oxygen was given its name by _____.
- 1.015** Without _____ fire will not burn.
- 1.016** When you stand on the ground, everything above you that is not solid is the _____.

1.017 The _____ extends about 10 to 30 miles into space.

1.018 Some scientists believe that man's overuse of pressurized sprays may destroy the _____ layer.

Make a list (each answer, 3 points).

1.019 List the three main parts of the planet Earth.

a. _____ b. _____ c. _____

Complete these sentences (each answer, 5 points).

1.020 Evaporation is _____

1.021 Water vapor is _____

1.022 Genesis 1:1 says that _____

1.023 Condensation is _____

1.024 When water vapor condenses near the ground _____

Choose the right suffix to make each sentence correct. Use only the suffixes *-ic*, *-ized*, *-ated*, and *-ing* (each answer, 5 points).

1.025 When oxygen is added to the air, the air is oxygen _____ .

1.026 When water becomes a gas, or vapor, it is vapor _____ .

1.027 Atmospher _____ conditions are conditions of the air.

1.028 Water escaping into the air in the form of vapor is evaporat _____ .

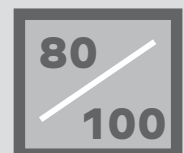


Teacher check:

Score _____

Initials _____

Date _____





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