

SCIENCE 409: THE PLANET EARTH

CONTENTS

I. THE AIR (ATMOSPHERE)	4
Regions of the Atmosphere	4
Gases in the Atmosphere	6
II. THE WATER (HYDROSPHERE)	13
The Great Flood	14
Fresh Water	15
Water Cycle	17
Salt Water	19
III. THE LAND (LITHOSPHERE)	24
Layers of the Earth	25
Shape of the Earth	27
Earth's Land Formations	29
Earth's Forces	32
Earth's Rotation and Revolution	33

2017 Printing

The material in this book is the product of the Lord's blessing and many individuals working together on the teams, both at Alpha Omega Publications and Christian Light Publications.

Original material copyright ©1978 by Alpha Omega Publications
All rights reserved. Revised by permission.

CLP Revision copyright ©1980

Christian Light Publications, Inc.

Harrisonburg, Virginia 22802

Tel. 1-540-434-0768

Printed in USA

Copyrighted material. May not be reproduced without permission from the publisher.

I. 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 solid or land part of the earth. In this section you will learn about the part of the earth called the atmosphere.

SECTION OBJECTIVES

- ☐ **Read these objectives.** When you have completed this section, you should be able:

1. To list the three main parts of the earth: air, water, and land.
3. To tell that the air and the clouds are a part of the earth.

- ☐ **Restudy these words.**

atmosphere

hydrosphere

particle

chemist

ionosphere

stratosphere

condense

lithosphere

troposphere

element

nitrogen

water vapor

evaporate

oxygen

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 400 to 600 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 nine 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

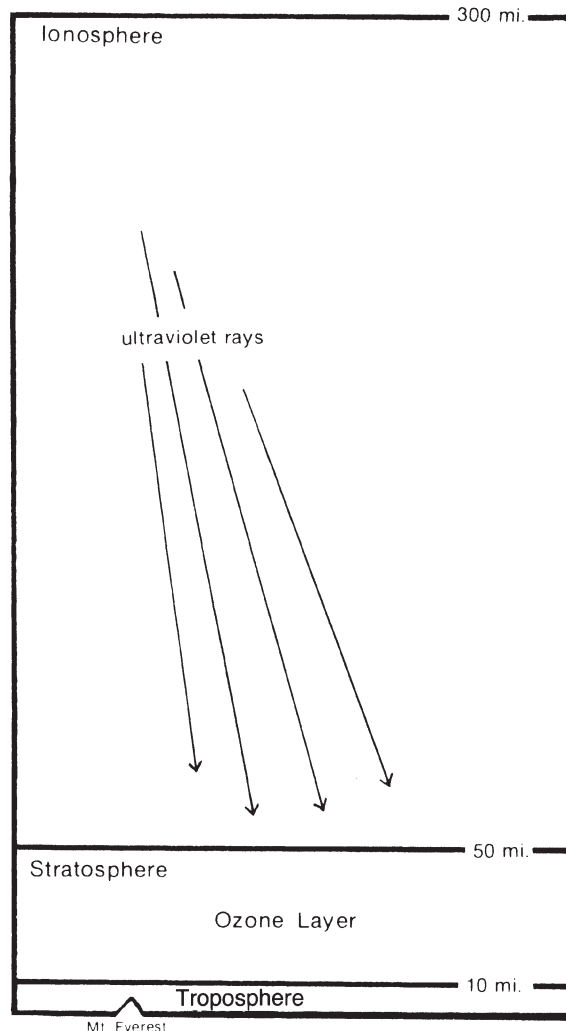


Figure 1: Regions of the Atmosphere

above the earth, the temperature lowers to an average of -70° Fahrenheit (70 degrees below zero).

Stratosphere. The next level of the atmosphere extends from about 10 to 50 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. It warms up gradually to a temperature of about 28° Fahrenheit near the top of the layer.

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).

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 troposphere, stratosphere, and ionosphere do not overlap. They do change for many reasons, including time of day and year, weather, sunshine, and location on the earth.



Draw a line to match the columns.

- | | | |
|-----|--------------|-----------------|
| 1.1 | ionosphere | 0 to 10 miles |
| 1.2 | troposphere | 50 to 300 miles |
| 1.3 | stratosphere | 10 to 50 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 (optional).



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



Give your map to your teacher.

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 such as 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 Priestly (jō' 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 106 known substances 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.

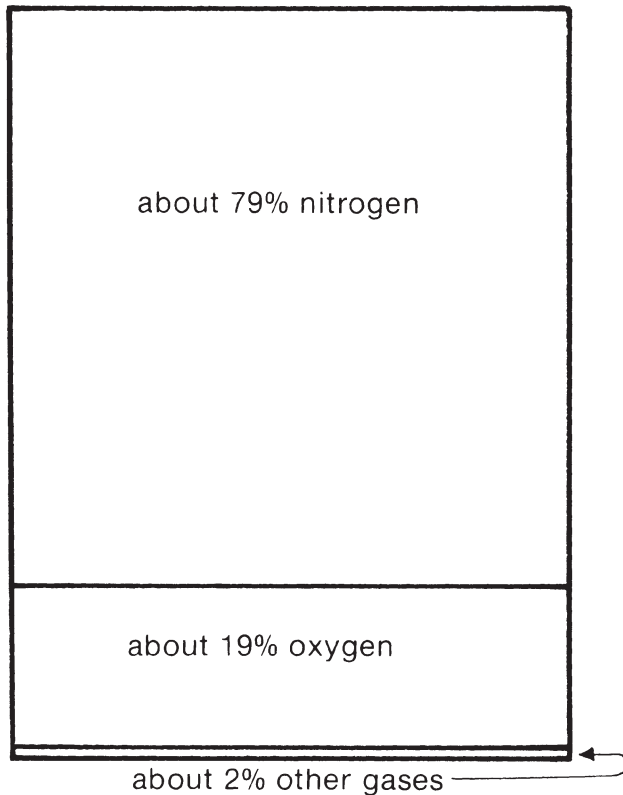


Figure 2: Air

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 such as argon, neon, and carbon dioxide also are in the air. These gases make up only about 2 percent of air (two parts out of 100).

You have learned from Science LIGHTUNIT 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."



Use a word from the list to complete each sentence.

Joseph Priestly

oxygen

nitrogen

one-fifth

Antoine Lavoisier

mixture

earth

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.



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

1.14

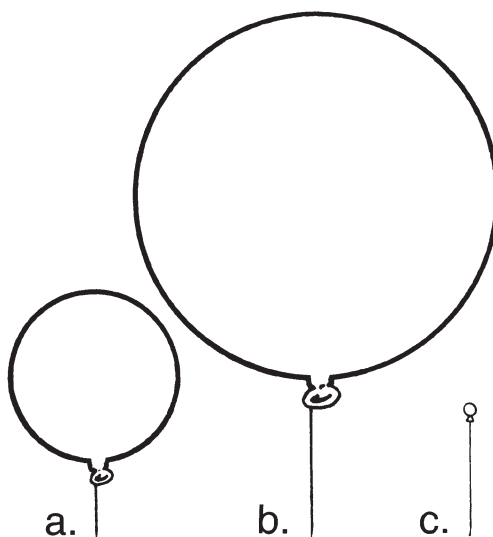


Figure 3: Amount of Gases in Our Air

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 glass filled with cold liquid.



Figure 4: Condensation

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 provides us with food to eat.



Try this experiment.



These supplies are needed:

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

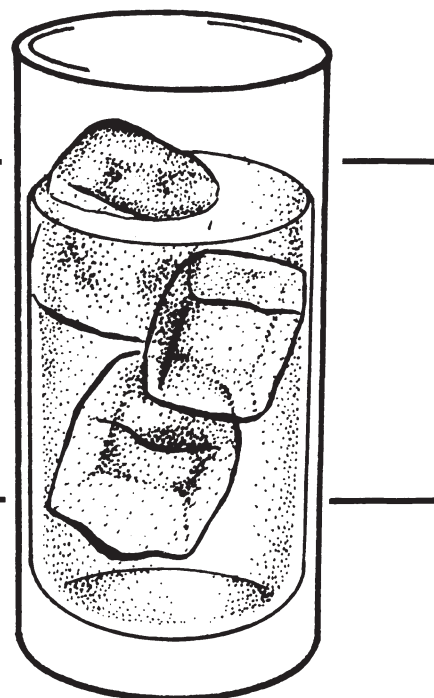


Figure 5: Ice Cubes in Water



Follow these directions and answer the questions. Put a check in the box when each step is completed.

- ☐ 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, **evaporation** occurs.

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.