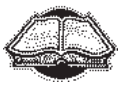


What Is This Module About?

Have you ever experienced going up a very high mountain? If you have, you probably noticed that the higher you go, the harder it is to breathe. If you could go up much higher, you would find it even harder to breathe. This probably gives you an idea that there is a blanket of air or gases covering the earth. This blanket of air or gases is called the **atmosphere.**

In this module, you will learn about the atmosphere and all its wonders. You will find out a lot of things about the atmosphere from the following lessons:

Lesson 1 – *Layers and Composition of the Atmosphere*

Lesson 2 – *Weather and Climate*

Lesson 3 – *Philippine Climate*

What Will You Learn from This Module?

After studying this module, you should be able to:

- describe the atmosphere;
- differentiate weather from climate;
- explain the different types of climate;
- describe the effects of climate on the natural environment;
- describe the effects of climate on human activities;
- describe the Philippine climate; and
- describe how Filipinos adapt to changes in climate.

Let's See What You Already Know

Before studying this module, take the following simple test to determine what you already know about the topics to be discussed. Encircle the letter of the correct answer.

1. This refers to the nearly transparent gases that cover the earth.

   a. troposphere
   b. atmosphere
   c. mesosphere
   d. stratosphere

2. What happens to particles from space when they hit the atmosphere?

   a. They penetrate the atmosphere.
   b. They burst into flames.
   c. They become bigger.
   d. None of the above.

3. The layer of the atmosphere that is closest to the earth is the _____.

   a. thermosphere
   b. troposphere
   c. stratosphere
   d. mesosphere

4. The atmosphere is comprised mainly of _____.

   a. nitrogen and carbon dioxide
   b. nitrogen and oxygen
   c. oxygen and carbon dioxide
   d. argon and water vapor

5. The condition of the atmosphere at any given time is referred to as _____.

   a. climate
   b. weather
   c. sunny
   d. temperature

6. Climate in the areas far from the equator is generally _____.

   a. cold
   b. hot
   c. dry
   d. none of the above

7. Which of the following shows an effect of climate?

   a. Many cars are stalled because of heavy fog.
   b. Flights were cancelled due to a storm.
   c. Many crops died because of a drought.
   d. All of the above.

8. The Philippines has a _____ climate.

a. tropical
b. polar
c. subtropical
d. cyclonic

Well, how was it? Do you think you fared well? Compare your answers with those in the *Answer Key* on page 29.

If all your answers are correct, very good! This shows that you already know much about the topics in this module. You may still study the module to review what you already know. Who knows, you might learn a few more new things as well.

If you got a low score, don't feel bad. This means that this module is for you. It will help you understand some important concepts that you can apply in your daily life. If you study this module carefully, you will learn the answers to all the items in the test and a lot more! Are you ready?

You may go now to the next page to begin Lesson 1.

Layers and Composition of the Atmosphere

Have you ever asked yourself how we are able to breathe? Or where does the air we breathe come from? Did you know that what makes it possible for us to breathe is the same thing that is responsible for the weather? This is what Lesson 1 is all about.

After this lesson, you should be able to:

- describe the atmosphere;
- identify what the atmosphere can do for us;
- identify the layers of the atmosphere; and
- identify the gases that comprise the atmosphere.

Let's Think About This

Have you ever thought about what the sky holds? Have you ever imagined what it must be like to go up in the sky? Well, the sky that you see is but part of the atmosphere. Do you know what the atmosphere is? What does it do for you and the earth in general?

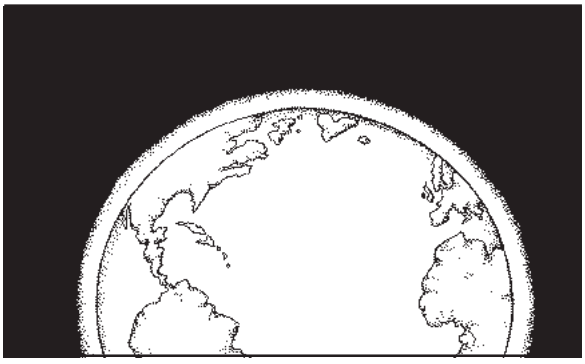
Find out the answers in the following section.

Let's Learn

What is the atmosphere?

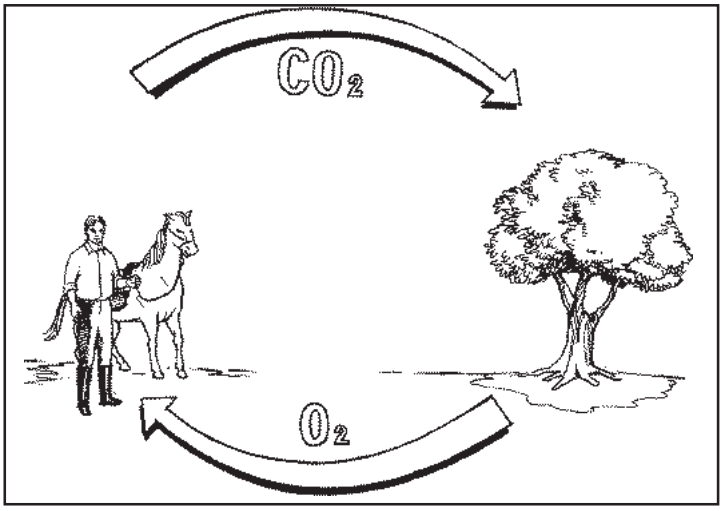
The **atmosphere** is a nearly transparent envelope of gases that clings tightly to the earth by the attraction of gravity.

What does the atmosphere do for us? Well, a lot.



The atmosphere supports all life on earth.

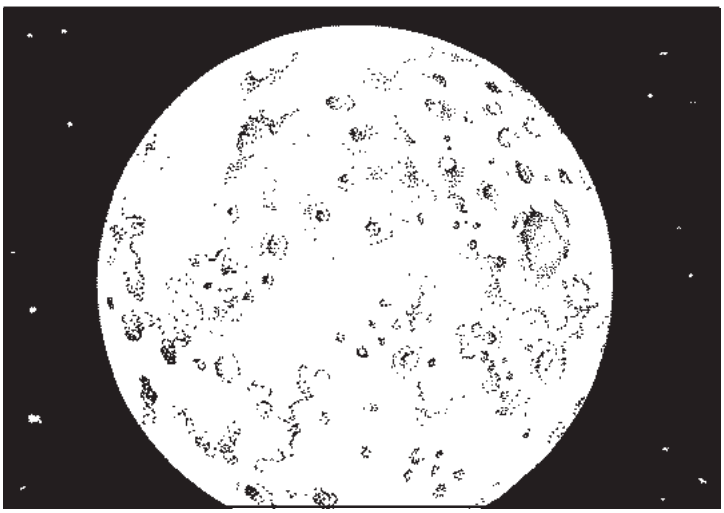
Two of the gases found in the atmosphere are oxygen and carbon dioxide. Oxygen is the life-giving gas that all animals, including human beings, inhale to survive. It is given off by plants. Carbon dioxide, on the other hand, which is exhaled by all animals, is essential to the survival of plants. Aside from oxygen and carbon dioxide, many other substances which both plants and animals need are found in the atmosphere.



Scientists believe that it is unlikely that we will find life as we know it on other planets. Not that other planets have no atmosphere, but their atmospheres do not contain the gases essential to life. Some of the gases that are found here on earth are also present in other planets but not in the amounts that will support life.

Let's Study and Analyze

Look at the picture of the moon below. What do you notice?



Did you notice the many craters around the moon?

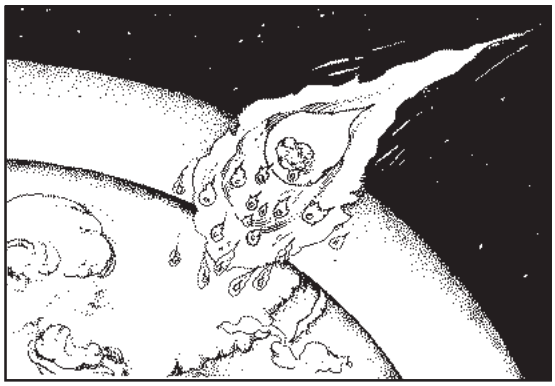
The moon is a perfect example of what could happen if the atmosphere were absent. Millions of particles from outer space strike the moon's surface, forming craters of all sizes. The moon doesn't have an atmosphere to protect it from meteor showers.

Let's Learn

This leads us to another benefit we get from the atmosphere:

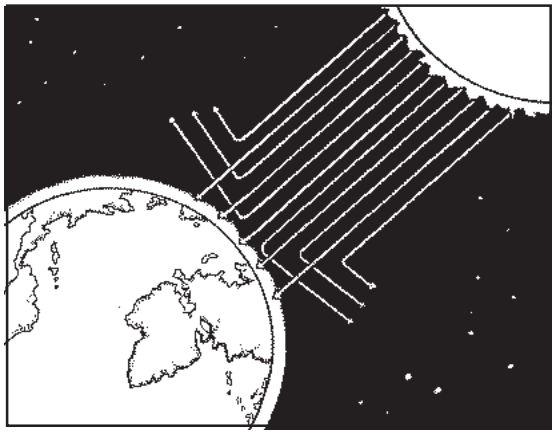
The atmosphere covering the earth protects us from space particles striking the earth.

Outer space is filled with trillions of very small rocks and dust particles. The earth's gravitational field attracts millions of these particles and the earth is constantly being hit by these particles. Scientists note that millions of such particles strike the earth every single day. Amazingly most of us are not aware of these falling bodies unless we see them across the sky as shooting stars. Particles that burn up completely before they reach the earth's surface are called **meteors.** Even if millions of meteors hit the planet, they do not stay big enough to reach the earth's surface. The minute these particles hit our atmosphere, they burst into flames because of friction. They are reduced to gas or dust long before they reach the ground or the bodies of water.



The atmosphere regulates the earth's surface temperature.

The atmosphere partly deflects the sun's rays, letting only enough heat to get through. It traps some of this heat long enough to reduce the cold during the night. When nighttime falls, this heat collected from the day is slowly released back into space moderating the cold of the night.



The atmosphere makes weather and climate possible.

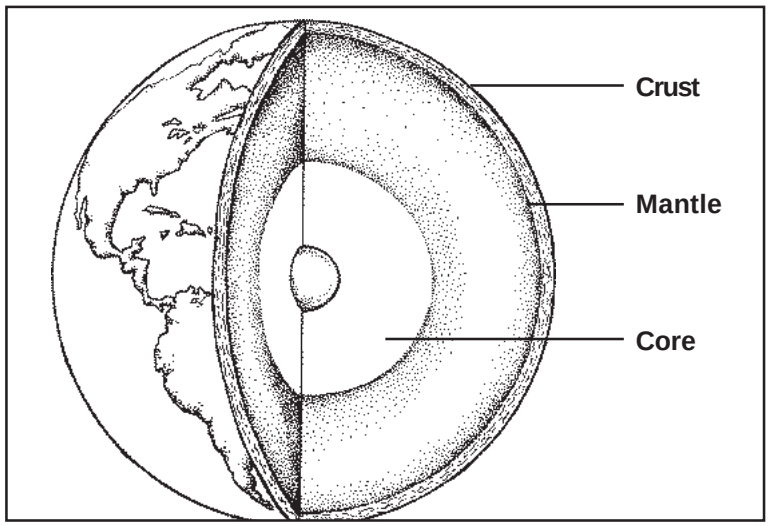
Temperature differences in the atmosphere cause changes in weather. Heat turns water to gas in the process of evaporation. The water vapor rises into the air, forms clouds and falls back onto the earth again. The atmosphere therefore strongly influences the environmental conditions on the earth's surface. It is very much responsible for typhoons, floods, weathering and erosion, for polar ice caps and a lot more. Without the atmosphere, there would be no rainfall to nourish the plants and trees of the forests and mountains. We wouldn't have rainbows. There wouldn't be lakes, rivers, seas and oceans to support life.

Let's Think About This

The earth is made up of different layers. Do you know what these layers are?

The layers of the earth are the **core, mantle** and **crust.** The crust is the outermost layer.

In the same manner, the atmosphere has different layers. Let's find out what these layers are.



The layers of the earth

Let's Learn

Layers of the Atmosphere

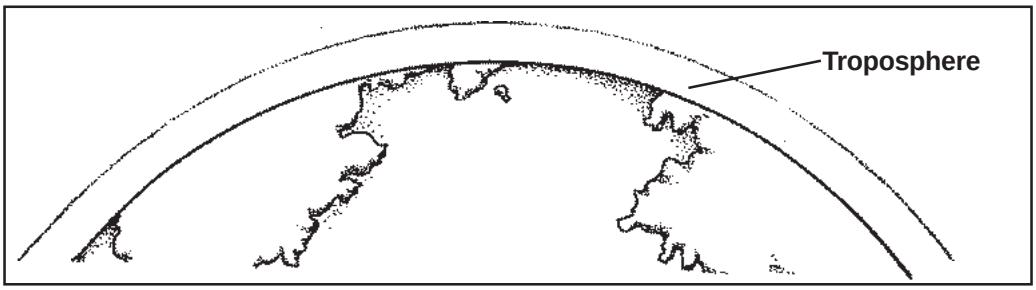
Scientists who study the atmosphere are called **meteorologists.** They have discovered four major layers that make up the atmosphere.

The layers of the atmosphere extend from the earth's surface to outer space. In order of increasing elevation, these four layers are the **troposphere, stratosphere, mesosphere** and **thermosphere.**

Troposphere

The layer of the atmosphere closest to the earth's surface is called the **troposphere.** It is within this region that we do most of our activities since it closest to the earth and touches the ground. It extends to about 15 kilometers (km) high above sea level.

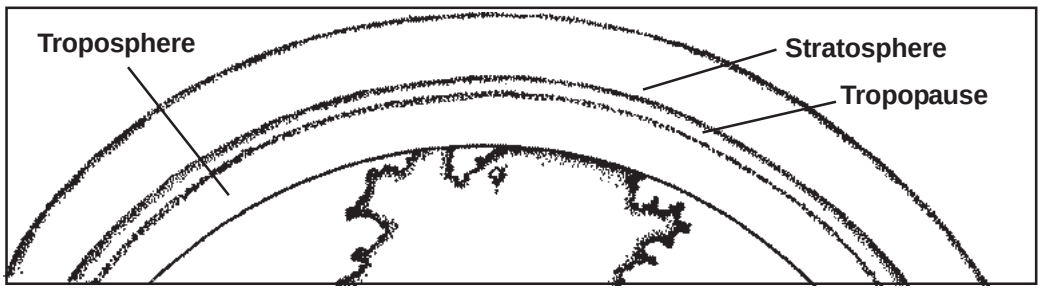
This layer is most important to us since it is within this layer that we breathe and live. This is where our mountains rise, our oceans spread and our planes fly. It is within this layer that most clouds lie over us. It is also where most of the planet's weather takes place.



Stratosphere

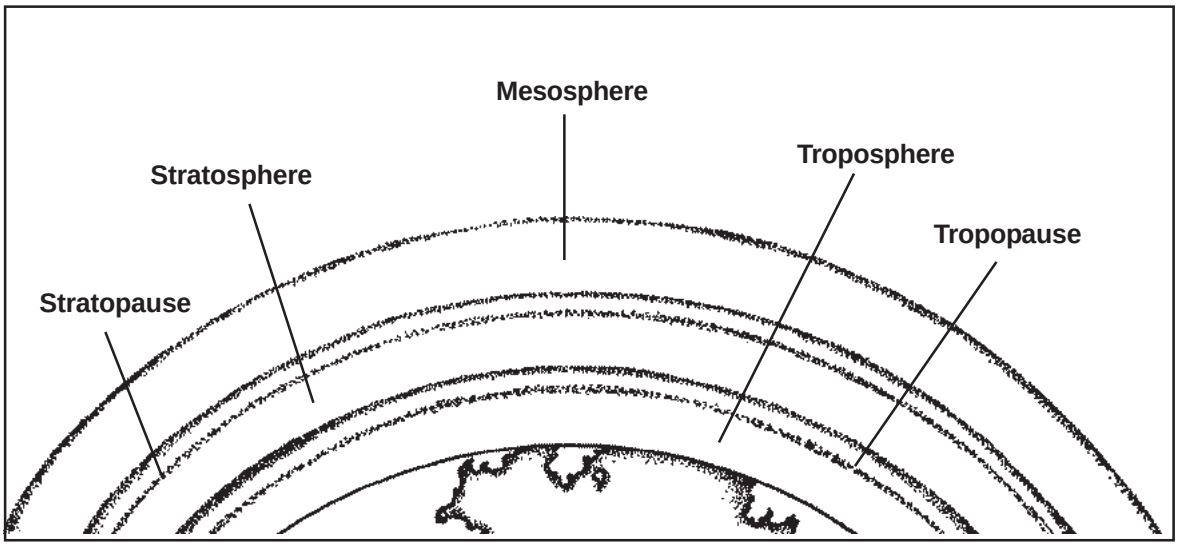
This is the second layer of the atmosphere. This layer stretches out to a height of about 50 km from the **tropopause,** a thin layer just above the troposphere.

The stratosphere is vital to us since a part of it protects us from the harmful rays of the sun. This part of the stratosphere is called the **ozone layer.** It is made up of ozone (O_3), triatomic molecules of oxygen shielding the earth from the sun's ultraviolet rays, which can cause skin cancer. However, the ozone layer already has a big hole made by the harmful chemicals we release into the atmosphere. These chemicals are emitted by substances in aerosol cans, air conditioners, refrigerators, Styrofoam containers, etc.



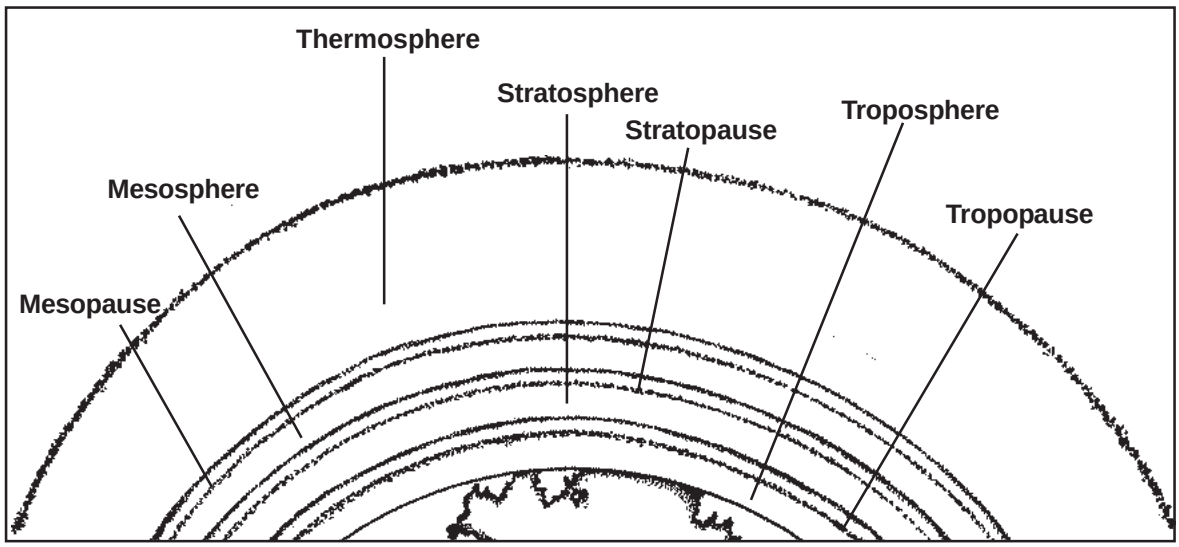
Mesosphere

A layer called the **stratopause** separates the stratosphere from the third layer. We call this third layer of the atmosphere **mesosphere.** It is within this third layer that atmospheric particles absorb much radiation coming from the sun. It is located from about 50 km to 80 km above sea level. The **mesopause** separates the mesosphere from the fourth layer. Some portions of this layer consist of ions, particles that make radio communication possible. This portion is called **ionosphere.**



Thermosphere

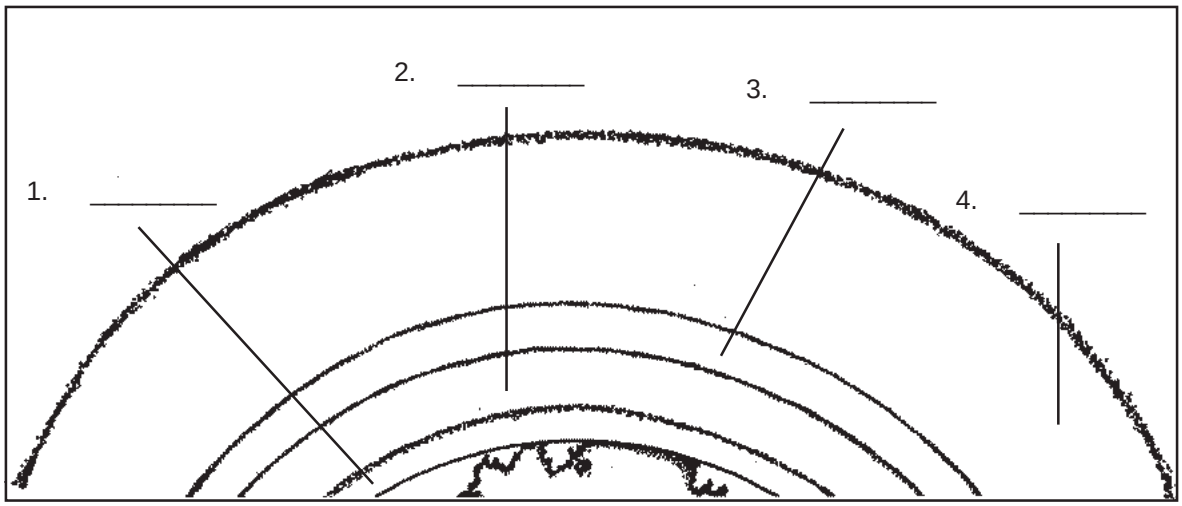
This is how we call the fourth layer. This layer is the farthest from the earth. From an altitude of 80 km, it stretches to about more than 300 km above sea level.



Let's Review

Let's see if you remember what we have discussed about the layers of the atmosphere.

Label the illustration below.



Show your answers to your Instructional Manager or Facilitator.

Let's Think About This

Do you know how to cook? What dishes do you cook? What ingredients do you use? Write down your answers on the lines below.

_____

_____

_____

Did you know that just like different dishes, the atmosphere has many ingredients? Let's find out what these are.

Let's Learn

Composition of the Atmosphere

Different substances make up the atmosphere in various proportions.

The atmosphere is almost entirely composed of nitrogen and oxygen gases. Nitrogen accounts for about 78% of the gases in the atmosphere. Most of it comes from plants. Oxygen, which is vital to life, accounts for about 21% of the gases in the atmosphere. The remaining one percent is made up of argon (0.9%) and carbon dioxide, water vapor and trace gases such as neon, helium, methane, krypton, hydrogen, xenon, ozone, nitrous oxide and radon (0.1%).

Substance	Percentage
Nitrogen	78%
Oxygen	21%
Argon	0.9%
Carbon dioxide, water vapor and other gases	0.1%

Although carbon dioxide and water vapor make up only a small amount of the atmosphere, they play a very significant role in the earth's changing environmental conditions. Carbon dioxide is essential in trapping heat from the sun to moderate the temperature of the earth, while water particles present in the atmosphere are vital to the water cycle.

Let's See What You Have Learned

Write **T** if the statement is true and **F** if the statement is false. If your answer is false, explain why.

1. The atmosphere is comprised mostly of oxygen.
2. Nitrogen is the life-giving gas that plants and animals need.
3. The atmosphere protects us from space dust and particles
4. The ozone layer is a part of the mesosphere.
5. The layer within which we breathe is called the troposphere.

Check your answers against the *Answer Key* found on page 29. Did you get a perfect score? If you did, that's very good. If you did not, that's okay. Just review the parts of the lesson you did not understand very well before you proceed to Lesson 2.

Let's Remember

- The atmosphere is a thick blanket of gases surrounding the earth.
- The atmosphere is valuable for the following reasons:
  - It makes life on earth possible.
  - It protects us from space dust and particles hitting the earth.
  - It regulates the earth's temperature.
  - It makes possible varying weather and climatic conditions.
- The four layers making up the earth's atmosphere are the:
  - **Troposphere**—layer we are in contact with, where we live and do most of our activities;
  - **Stratosphere**—where the ozone layer is found;
  - **Mesosphere**—absorbs most of the sun's radiation and makes radio communication possible; and
  - **Thermosphere**—farthest from the earth.
- The atmosphere contains different kinds of gases: nitrogen, oxygen, argon, carbon dioxide, water vapor and trace gases.

Weather and Climate

Do you wonder why sometimes it rains and sometimes it doesn't, or why it's sometimes warm and at other times cool? Do you wonder where typhoons that visit our country every year come from? The answers to these questions lie in understanding weather and climate.

You will learn about the atmospheric phenomena of weather and climate in this lesson. By the end of this lesson, you should be able to:

- differentiate weather from climate;
- explain weather;
- explain the different types of climate;
- describe the effects of climate on the natural environment; and
- describe the effects of climate on human activities.

Let's Try This

How is weather different from climate? Write your answer in the space provided below.

_____

_____

_____

_____

_____

Find out if your answer is correct by reading the following section.

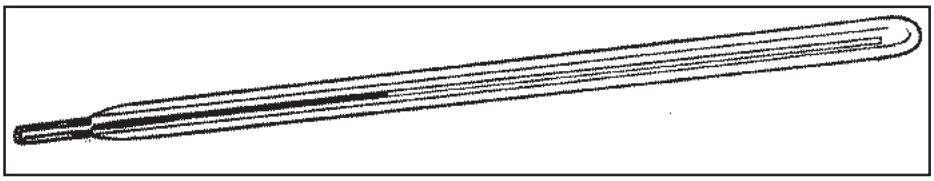
Let's Learn

Weather and Climate

Weather is the condition of the atmosphere at any given time over any place on the earth's surface. Weather depends on various factors such as rainfall, temperature, pressure, cloudiness and wind. Many of our activities are affected by the weather. Work, recreation and travel are influenced by the weather. The types of weather are rainy, windy, cloudy and sunny. Because of this, we need to be able to know what the weather will be like at any given time. Because weather is always changing, it has to be monitored constantly in order to be prepared for it.

Mon	Tue	Wed	Thu	Fri	Sat	Sun
						

Meteorologists measure weather conditions using standard instruments. Temperature, for instance, is measured with a **thermometer.** A thermometer is usually a glass tube containing a column of mercury whose height varies with the temperature.



Meteorologists have proven that in a fixed place, over an extended period of time —say, a year—there would be average measurements of atmospheric rainfall, humidity, temperature, pressure and wind. This would give a profile of the usual weather conditions in that place. This profile is called the **climate** of that place.

Let us focus on some major factors that affect weather—atmospheric temperature, wind and water currents and topography.

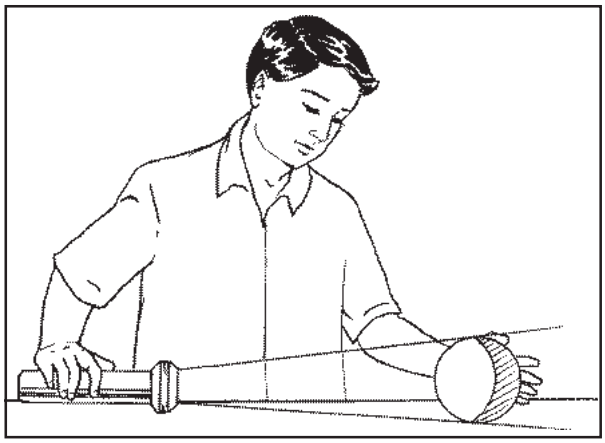
Temperature

Temperature is the degree of hotness or coldness of a body as measured by a standard instrument.

What causes variations in temperature? Read on to find out.

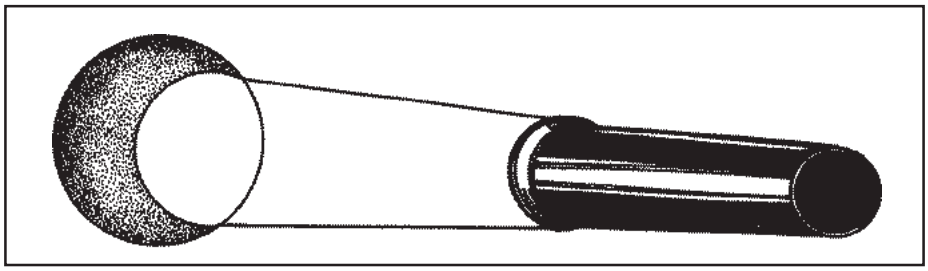
Let's Try This

Place a ball on a table. Get a flashlight, turn it on and focus the light directly on the ball.

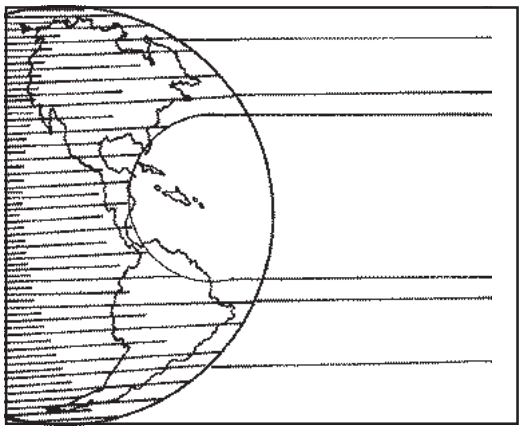


Did you notice that only one part of the ball is lit? How is this related to atmospheric temperature? You see, variations in atmospheric temperature are caused by the earth's rotation. It is cooler at nighttime than it is at daytime because the earth rotates on its axis. One part of the earth turns away from the sun's heat at night.

Get the ball and flashlight which you used in the activity above. This time, direct the light onto the center of the ball.

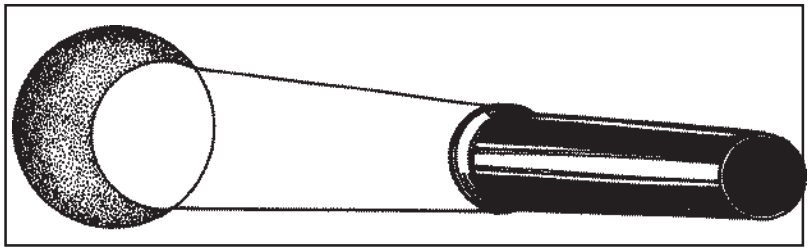


Did you notice that the center of the ball is intensely lit while the areas above and below it are not as well-lit?



This is similar to daytime when the sun's rays strike the earth. The amount of heat that a place receives at a certain time of the year varies. It depends on how far the place is from the North and South poles. Temperature is generally higher in the tropical zones or in countries near the equator and lowest in countries near the North and South poles.

What about the rays of the sun in the early morning and in late afternoon? You can also demonstrate this using the ball and the flashlight. This time move the flashlight to the left or right of the ball.



Did you notice that the lighted area on the ball became elongated?

This is how the sun's light and heat are distributed over the earth's surface at the equator in the early morning or late afternoon. The sun's rays strike the earth at an angle. This is because the earth's axis is tilted. It is coolest in the early morning or late afternoon and it is hottest at noon because noontime is generally the time when the sun is directly overhead and its heat is thus concentrated over a small area. In the morning and afternoon, the sun shines on you at an angle and thus spreads its heat over a wider area.

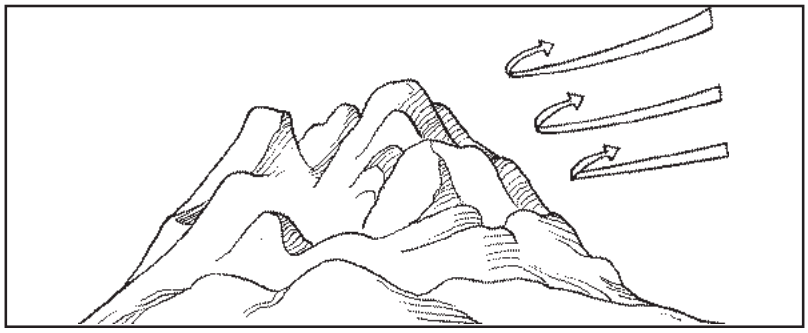
Let's Learn

Wind and Water Currents

Wind and water currents refer to the direction of the flow of wind and water. They affect the weather by regulating the temperature of the earth's surface. The wind and water currents do this by delivering cooler air and water to regions that might otherwise overheat. Given the tendency of air and water to move from cooler to warmer regions, wind and ocean currents generally flow toward the equator.

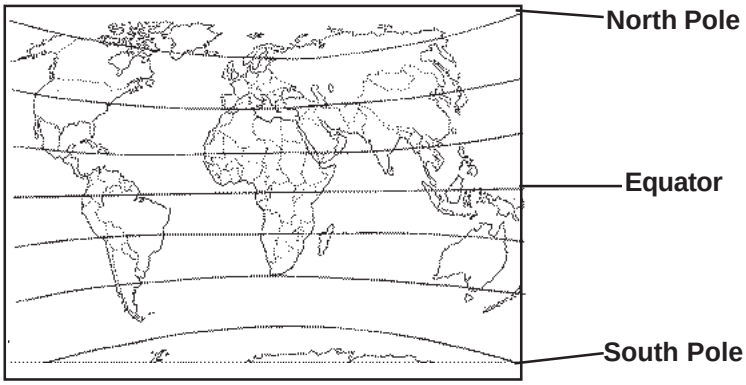
Topography

The shape of an area's landscape or **topography** affects weather conditions. The presence of mountains can cause changes in wind direction. Mountains can act as shields or barriers preventing air outbreaks.



Let's Study and Analyze

Look at the world map below. In what areas do you think the climate is hot? In what areas do you think the climate is cold?



The horizontal lines are called the **parallels of latitude.** The latitude of a place is the north-south location of that place on earth. The horizontal line across the center is the **equator.** The farther a country is from the equator, the colder the climate of that country.

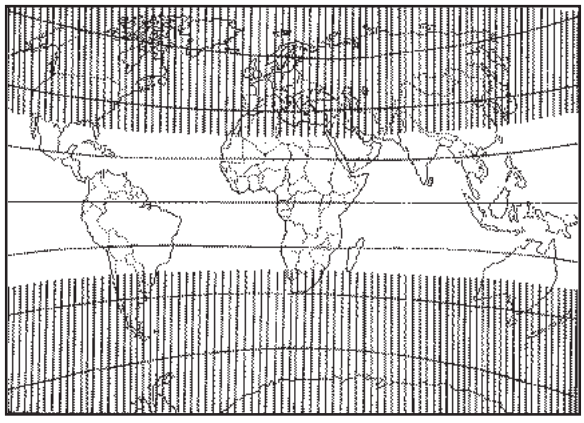
Let's find out more about climates.

Let's Learn

Climate

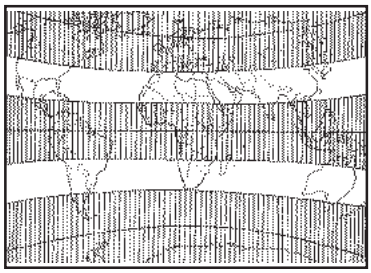
Climatic conditions vary from place to place and from season to season. But there is a recognizable pattern in this great variety of climates. Temperature is also an important aspect of climate. Based on variations in temperature, there are five types of climate in the world.

- **Tropical climate**—This is experienced by countries that lie between 0º and 30º latitude. Countries in the tropical zone have climates that are warm all year round and have no winter season. The average temperature ranges from 26ºC in the wet tropics to 54ºC in the deserts. Seasons here more or less alternate between wet and dry. Vegetation varies from none at all in the deserts to tall grass and scattered trees in the wet-and-dry tropics, to rain forests of broad-leaved evergreens in the wet tropics. The Philippines experiences this type of climate.



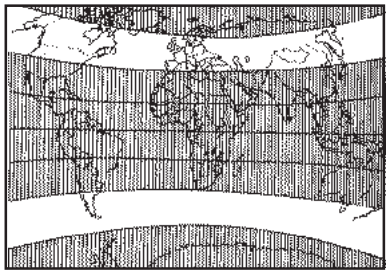
The unshaded region experiences tropical climate.

- **Subtropical climate—**This climate occurs in countries that lie between 20º and 40º latitude. Winters here are more dramatic than in other zones because they are cold and wet. The temperature range in this climate is quite high. It is below freezing in winter and up to 43ºC in summer. Because of adequate rainfall, forests grow abundantly in some areas.



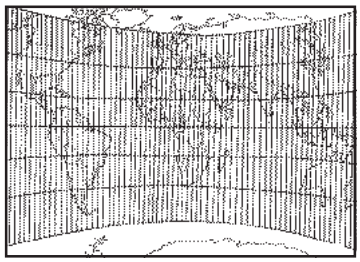
The unshaded regions have a subtropical climate.

- **Cyclonic climate**—This is experienced in countries that lie between 35º and 70º latitude, mostly in the Northern Hemisphere (the region above the equator). In summer, temperature here ranges from 10º to 27ºC, while in winter temperature ranges from 4.5º to a bitterly cold –70ºC. There is scarce vegetation in the deserts of the dry continental areas and the permafrost of the subarctic areas. There are tall prairie grasses in some humid continental areas and deciduous and coniferous forests elsewhere.



The unshaded regions experience a cyclonic climate.

- **Polar climate**—In the polar regions, temperatures seldom rise above the freezing point. If they do they are not likely to go beyond 13ºC. In the winter, temperature can drop to –70ºC. The tundra has very scarce vegetation while the ice caps have no vegetation at all.

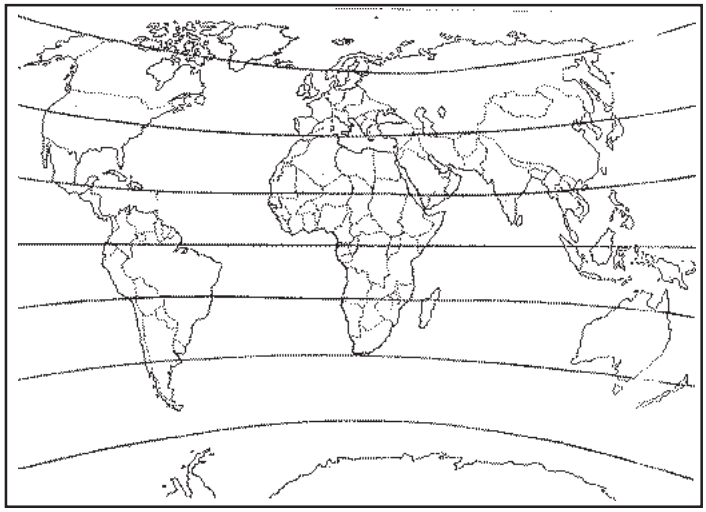


Polar climate is experienced by the unshaded regions.

Let's Try This

Locate the Philippines on the map on the right. Based on the location of the Philippines and its latitude, what type of climate do we have?

If your answer is tropical, you are right! You will learn more about this in Lesson 3.



How do you think climate affects the environment? Write your answers on the lines below.

_____

_____

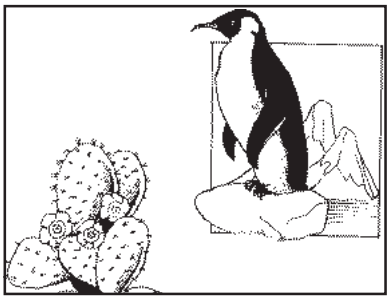
_____

Let's find out if your ideas are correct. Read on.

Let's Learn

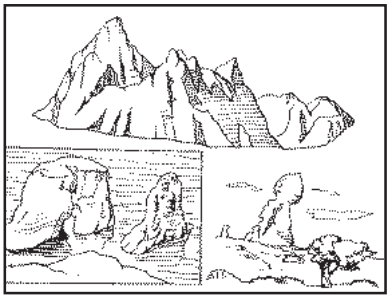
Effects of Climate

Climate affects the environment in many ways.



Climate affects plants and animals. Each plant and animal specie survives only within certain limits of sunlight, temperature, rainfall, humidity, soil moisture and wind. Prolonged freezing or excessive heat can cause death to plants and animals. Plants demand temperatures within a certain range, enough sunshine and the right amount of soil moisture.

Climate affects soil. Weathering and formation of soil are more rapid in warm and wet climates than in cool and dry ones. As a result, soils are generally thicker in the wet tropics than in deserts or polar forested areas. Soil composition also depends on the effect that climate has on the type of vegetation that eventually decays and becomes part of the soil. That is why grassland soils are more fertile than forest soils.



Climate affects landforms. In humid areas where water is the chief cause of erosion, landforms tend to have rounded contours. Landforms shaped under arid conditions are more likely to be jagged (uneven) and angular (sharp-cornered). This is partly because wind erosion is more dominant. Stream erosion in dry areas, while infrequent, tends to be sudden and torrential (rapid), and the water runoff is not slowed down as much by plant cover.

Let's Try This

How do you think climate can affect humans?

_____

_____

_____

_____

_____

Let's find out if your answer is correct.

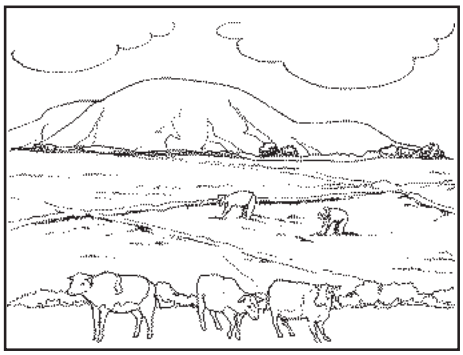
Let's Read

Climate and Human Activities

As part of the natural environment, climate greatly affects human activities.

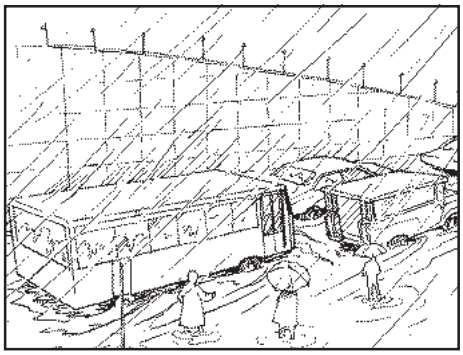
Climate affects agriculture.

Climatic factors such as length of growing season, the total amount and seasonal distribution of precipitation and the daily and seasonal ranges of temperature restrict the kinds of crops and the types of livestock that can be raised.



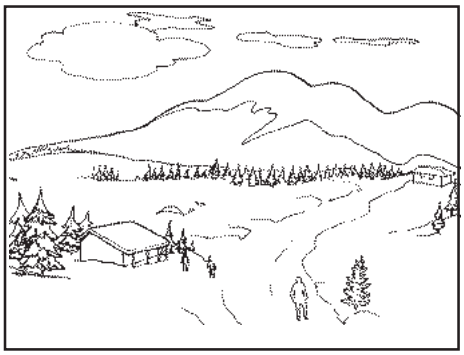
Climate affects transportation.

In areas of frequent storms and recurring fog, transportation movements are frequently slowed or interrupted. Water transportation in many areas is completely halted by winter ice. Land transportation may be blocked by heavy snowfall. Air travel is especially affected by stormy climatic conditions.



Climate affects major concentrations of population.

Places with extreme (very hot or very cold) climatic conditions affect the development of agriculture. As a result, these areas are scarcely populated.



However, the effects of climatic conditions on human activities can now be controlled due to different advances in human technology in terms of agriculture, transportation, climate control, etc.

Let's See What You Have Learned

Fill in the blanks with the correct answers. Choose from among the words in the box.

temperature	mountains	tropical
weather	South Pole	subtropical
equator	climate	North Pole

1. _____ is the condition of the atmosphere at any given time over a place.
2. _____ is the degree of hotness or coldness of a body.
3. _____ can act as barriers to prevent air outbreaks.
4. The nearer a country is to the _____ the hotter its climate.
5. The Philippines has a _____ climate.

Compare your answers with those found in the *Answer Key* on page 30.

Let's Remember

- Weather has to do with rainfall, humidity, temperature, pressure, cloudiness and wind.
- Climate is the average measurement of atmospheric rainfall, humidity, temperature and wind over a period of time.
- Variations in temperature are caused by the earth's rotation on its axis. Part of the earth turns away from the sun's rays when the earth rotates.
- The farther a place from the equator, the cooler its climate is.
- Wind and water currents as well as topography are other factors that affect the climate.
- The different types of climate are tropical, subtropical, cyclonic and polar.
- Climate affects vegetation, soil and landforms among others.
- Climate affects human activities. People adapt to the climate.

Philippine Climate

After learning what weather and climate are as well as their effects on the environment and human activities, you can now make a profile of the climate in the Philippines.

In this lesson you will learn to identify and describe the factors affecting Philippine climate.

After this lesson, you should be able to:

- describe Philippine climate; and
- describe how Filipinos adapt to the climate.

Let's Try This

If a foreigner would ask you to describe the climate of the Philippines, what would you say? Write your answer in the space provided below.

_____

_____

_____

Let's find out if your answer is correct.

Let's Learn

General Climate

The Philippines is located 14 degrees north of the equator. Its climate is therefore tropical. It is generally warm all year round. The climate is characterized by the following seasons:

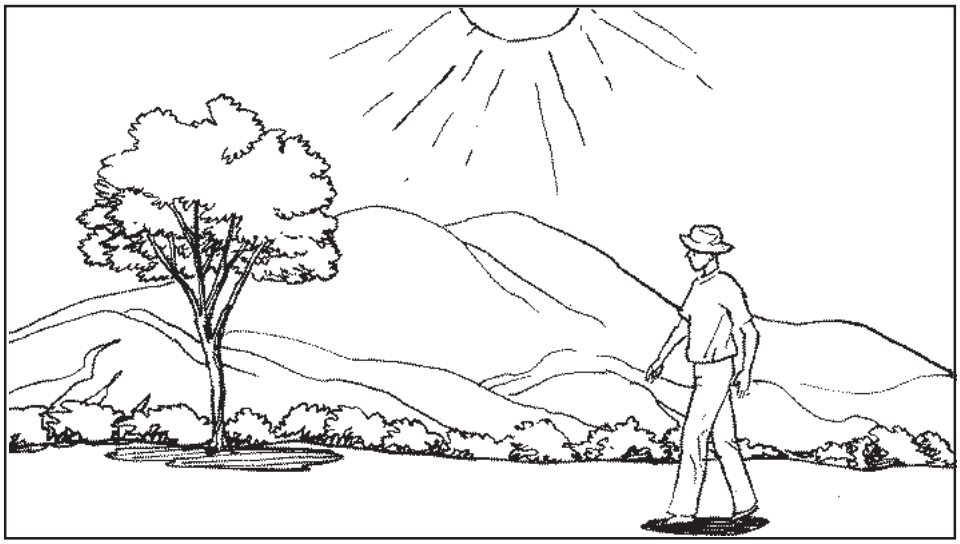
- **Cool and dry season** (from late November to early March)
- **Warm and dry season** (from late March to early June)
- **Rainy season** (from late June to early November)

In the Philippines, January is the coolest month while the warmest months are April and May.

Temperature

Because the Philippines is near the equator, warm temperatures prevail throughout the year. The climate accounts for the soil conditions, vegetation and animal life found in the islands.

The annual temperature range between the coolest and warmest months is usually less than 5.6ºC. During the day, temperatures normally climb the high 20s and low 30s. At night they fall into the low 20s. The lowest temperature recorded in Manila was 15ºC. Temperatures are usually highest during the warm and dry season, from March through June.



Typhoons

Most rains arrive in short, heavy showers, often causing severe flooding. The northern and eastern sections of the Philippines are exposed to violent tropical storms called **typhoons.** These cyclonic storms originate in the western Pacific Ocean, normally during the summer and early fall months. Coming from along the equator, these strong winds may join forces with heavy cloud formations and move westward. As these winds get closer to the Philippines, they twist a bit and turn northwest. Thus, the parts of the Philippines most frequently visited by typhoons are the ones in Northern Luzon and Eastern Visayas.

There are, on average, six typhoons each year. The typhoons are characterized by extremely powerful winds, typically in excess of 160 kilometers per hour, and very heavy rains. In 1911, one such typhoon, which hit the upland resort city of Baguio in Luzon, deposited 117 centimeters of rain within a 24-hour period—a world record. The winds, heavy rains and their associated high seas and flooding can be very destructive.

Typhoons hit the Philippines during the rainy season. From the months of June to November, we generally experience wet conditions. But some parts of the Philippines experience more than just rains. Some parts are more often along the direction of these tropical cyclones of varying wind speed:

1. **Typhoon signal number 1** (Maximum wind speed of 50 to 89 km per hour)
2. **Typhoon signal number 2** (Maximum wind speed of 90 to 119 km per hour)
3. **Typhoon signal number 3** (Maximum wind speed exceeding 120 km per hour)

Let's Try This

If you live in an area where a typhoon almost always occurs, what type of house would you build? Write your answer on the lines below.

_____

_____

_____

_____

Discuss your answer with your Instructional Manager or Facilitator.

Let's Read

Batanes is an example of a province often swept by typhoons. Batanes is found on the northern tip of Luzon. Houses there are made of big chunks of stone; some are even made of adobe.

The people here rely on agriculture—planting and raising livestock. Since their area is often hit by heavy typhoons, they have come up with ways to chart down specific periods in which it is safest to plant crops. They also know how to hasten harvesting.

How else do Filipinos adapt to the climate? Let's find out in the following section.

Let's Learn

Adapting to the Climate

Climate affects many of our activities. In agriculture, most Filipino farmers are mindful of rainy and dry periods when planting crops. It is very devastating for them—and for the Philippines as a whole—if whole hectares of fields are gone to waste because of typhoons and floods.

In transportation, many transportation systems rely on the sophisticated forecasting capabilities of our weather bureau, the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA). Flight schedules for example are cancelled right away when rains are heavy.

Typhoons almost always cause floods in many areas. For this reason, parents are told to use their discretion when there is a typhoon as to whether they will allow their children to go to school or not. During the summer, many of us go to the beach to cool ourselves.

Let's See What You Have Learned

1. What are the seasons in the Philippines? Differentiate each from the others.
2. What are the three typhoon signals?
3. What kind of place do you live in? What kinds of adaptation do you make to climatic changes in your area?

Compare your answers with those in the *Answer Key* on page 30. Did you get a perfect score? If you did, that's very good. If you did not, don't worry. Just review the parts of the lesson you did not understand very well before you move on to the next part of this module.

Let's Remember

- The Philippines' climate is tropical. As such, it is generally warm all year round. Typhoons regularly visit the country specially during the months of June to November.
- Filipinos have learned to adapt to this climate, preparing for the rains and enjoying the warm weather.

You have now reached the end of the module. Congratulations! Did you enjoy studying this module? Did you learn a lot from it? The following is a summary of its main points to help you remember them better.

Let's Sum Up

- The atmosphere is a thick blanket of gases surrounding the earth.
- The atmosphere is valuable for the following reasons:
  - It makes life on earth possible.
  - It protects us from space dust and particles striking the earth.
  - It regulates the earth's temperature.
  - It makes possible varying weather and climatic conditions.
- The four layers making up the earth's atmosphere are the troposphere, stratosphere, mesosphere and thermosphere.
- The atmosphere contains different kinds of gases: nitrogen, oxygen, argon, carbon dioxide, water vapor and trace gases.
- Weather has to do with rainfall, humidity, temperature, pressure, cloudiness and wind.
- Climate is the average measurement of atmospheric rainfall, humidity, temperature and wind over a period of time.
- The different types of climate are tropical, subtropical, cyclonic and polar.
- Climate affects vegetation, soil and landforms.
- Climate affects human activities. People tend to adapt to the climate.
- The Philippines' climate is tropical. As such, it is generally warm all year round. Typhoons regularly visit the country specially during the months of June to November.
- Filipinos have learned to adapt to this climate, preparing for the rains and enjoying the warm weather.

What Have You Learned?

Congratulations! You have now finished studying this module. By this time you already know about the atmosphere, weather and climate. You are also now able to explain how these conditions affect our activities. Test what you have learned by answering the following questions.

1. Define **atmosphere.**

   _____

   _____

2. What does the atmosphere do for us?

_____

_____

3. What are the four layers of the atmosphere?

_____

_____

4. Identify at least two types of gases that are found in the atmosphere.

_____

_____

5. Differentiate weather from climate.

_____

_____

6. What are the factors that influence climate?

_____

_____

7. What kind of climate does the Philippines have?

_____

_____

8. Describe the climate of the Philippines.

_____

_____

Check your answers against the *Answer Key* on pages 30 and 31.

If you got a score of:

0–3 You should study the whole module again.

4–6 Good! Just review the parts of the module that you did not understand very well.

7–8 Very good! You learned a lot from this module. You are now ready for the next module.

Answer Key

A. Let's See What You Already Know *(pages 2–3)*

1. **(b)** The other options are layers of the atmosphere.
2. **(b)** Friction in the atmosphere causes the particles to burst into flames.
3. **(b)** It is within the troposphere that we live and breathe.
4. **(b)** The atmosphere is comprised mainly of nitrogen (78%) and oxygen (21%).
5. **(b)** The day-to-day variations in rainfall, temperature and pressure make up the weather. Climate is the average of these variations over a period of time.
6. **(a)** The sun's rays directly hit the center of the earth—the equator—thus the areas at the center of the earth are generally warmer than the areas that are far from it.
7. **(d)** Climate greatly affects our life in many ways. Fogs, storms and drought are all part of climate.
8. **(a)** The Philippines is located 14 degrees north of the equator. Its climate is generally warm all year round.

B. Lesson 1

Let's See What You Have Learned (page 11)

1. **F** The atmosphere is comprised mostly of nitrogen (78%).
2. **F** Oxygen and carbon dioxide are the gases that plants and animals need.
3. **T**
4. **F** The ozone layer is part of the stratosphere.
5. **T**

C. Lesson 2

Let's See What You Have Learned (page 21)

1. Weather
2. Temperature
3. Mountains
4. equator
5. tropical

D. Lesson 3

Let's See What You Have Learned (page 30)

1. The seasons that occur in the Philippines are:
   a. cool and dry—from late November to early March
   b. warm and dry—from late March to early June
   c. rainy—from late June to early November
2. The typhoon signals are:
   a. signal number 1—maximum wind speed of 50 to 89 km per hour
   b. signal number 2—maximum wind speed of 90 to 119 km per hour
   c. signal number 3—maximum wind speed exceeding 120 km per hour
3. Answers will vary. Have your answer checked by your Instructional Manager or Facilitator.

E. What Have You Learned? *(pages 27–28)*

1. The atmosphere is a nearly transparent envelope of gases that surrounds the earth.
2. The atmosphere supports all life on earth, protects us from space dust and particles, regulates the earth's temperature and makes weather and climate possible.
3. The four layers of the atmosphere are the troposphere, stratosphere, mesosphere and thermosphere.
4. Choose two from the following: nitrogen, oxygen, argon, carbon dioxide, water vapor and trace gases.

5. Weather is the day-to-day variations in temperature, rainfall, humidity, wind and cloudiness. The average of these variations over a period of time is referred to as climate.

6. Some of the factors that influence climate are temperature, wind and water currents and topography.

7. The Philippines has a tropical climate.

8. The climate in the country is warm all year round and has no winter season. Seasons alternate between wet and dry.

Glossary

Coniferous Of or referring to mostly green trees and shrubs including forms (as pines) with tree cones.

Continental Of, relating to, or characteristic of a continent.

Crater A depression formed by the impact of a meteorite.

Deciduous Having the dominant plants shedding leaves seasonally at a certain stage of development in their life cycle.

Deflect To turn aside from a straight course.

Desert An arid barren land, especially a tract incapable of supporting any considerable population without an artificial water supply.

Erosion The process of wearing away by the action of water, wind or glacial ice.

Permafrost A permanently frozen layer at variable depth below the surface in intensely cold regions on earth.

Prairie Land in or predominantly in grass.

Rain forest A tropical woodland with an annual rainfall of at least 100 inches (254 centimeters) and marked by lofty broad-leaved evergreen trees forming a continuous canopy.

Tropics The region on the earth where the sun is directly overhead when it reaches its most northerly or southerly point of the sky.

Tundra A level or treeless rolling plain characteristic of arctic and subarctic zones; consists of black mucky soil and has a dominant vegetation of mosses, lichens, herbs and dwarf shrubs.

Vegetation Plant life.

Weathering The physical disintegration and chemical decomposition of earth materials at or near the earth's surface.

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