Latitude and Longitude

The maps you have used above all show small areas with great detail. These are called **large scale** maps. On the other hand, a map showing your country, East Africa or the whole world shows a very large area but with little detail. These are called **small scale** maps. When we want to describe the exact positions of features or places on small scale maps, we use latitude and longitude.

Lines of latitude

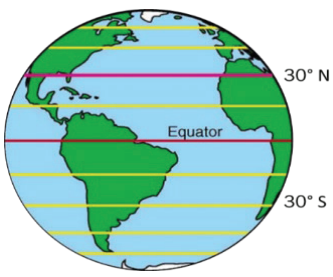
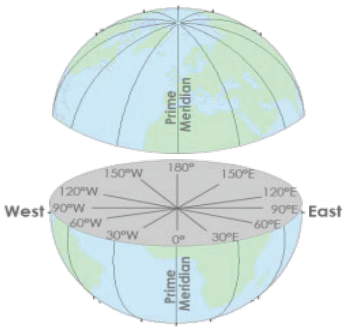


Figure 3.14: (a) Lines of latitude



(b) How the equator divides the world

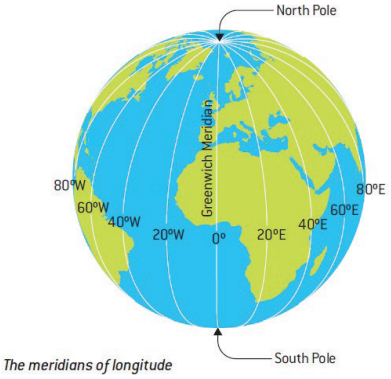
Activity 3.16: Understanding latitude

In pairs, look at Figure 3.14 and do the following:

1. Discuss what you understand by latitude.
2. In your notebook, write at least two sentences explaining latitude.
3. Suggest how lines of latitude are determined and marked on maps.
4. Share what you have written with the class.

Latitude measures how far north or south of the equator a place is located. The equator is the starting point for measuring latitude. For this reason, it is marked as the 0 (zero) degree latitude. It divides the world into two equal parts – north and south, as shown in Figure 3.17 (b). What do we call these parts? The number of latitude degrees increase as we move further away from the equator, all the way up to the 90 degrees latitude at the poles.

Lines of longitude



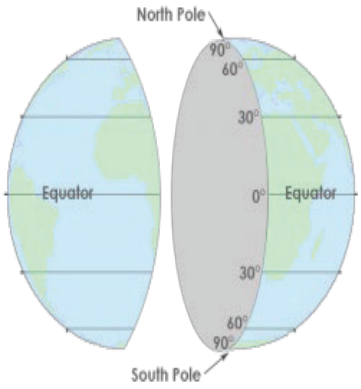


Figure 3.15 (a): Lines of longitude ***(b) How the Prime Meridian divides the earth***

Activity 3.17: Understanding longitude

In pairs or individually, look at Figure 3.15 and do the following:

1. In your notebook, write at least two sentences explaining what you understand by longitude.
2. Suggest how longitudes are determined and marked on maps.
3. How are longitudes different from latitudes?
4. Share what you have written with the class.

Longitude measures how far a place is east or west of the major vertical line called the **Prime Meridian**. The Prime Meridian runs through Greenwich in England. Because of this, it is also called the **Greenwich Meridian**. It is the starting point for measuring longitude. It is marked as the 0 (zero) degree longitude. It divides the earth into two equal parts – west and east, as shown in Figure 3.15 (b).

Using latitude and longitude

Lines of latitude and longitude also form a grid system on the map. To find a location on the grid system, simply read the latitude along which a place or feature lies in degrees. Then read the longitude.

At the point where the two lines meet, state the two numbers. These give the coordinates of the feature. For example, in Figure 3.16, Kampala City lies at latitude 0.2 degrees north of the equator and at longitude 32.35

degrees east of the Greenwich Meridian. So the position of Kampala can be stated as 0.2°N 32.35° E.

Figure 3.16: Map of Uganda with latitude and longitude

Activity 3.18

1. Study Figure 3.16 and do the following:
   Using latitude and longitude, find the position of:

   (i) Arua, (ii) Lira, (iii) Mbarara, (iv) Soroti, (v) Moroto and

   (vi) Jinja

2. Now open your atlas and look for the world map showing political units or countries. Using the map:
   i) Find out the lines of latitude and longitude between which the following countries lie: Angola, Chad, Australia, Ecuador, Uganda, Egypt, India and Iran.
   ii) Find the cities lying at the following locations:
   5.19°N 4.01°W; 33.56°S 18.28°E; 38.45°S 62.15°W; 0.19°N 32.35°E; 1.20°N 103.45°E; 41.50°N 87.45°W; and 15.20°S 28.14°E

Activity of Integration

Ask your teacher to provide you with a topographic map (scale 1:50000) of the area where your school is found. Study the map and find out places that you would wish to visit if given a chance to go on a geography tour towards the end of the school term.

1. Choose a route that you would follow in order to see a good number of interesting features. Draw a simple map with marked stopover points. Write at least two sentences describing the activities you would do at each stopover point.
2. Determine the distance (in kilometres) your journey would cover from the school to the furthest place you would wish to visit.
3. Estimate the total amount of money you would spend on transport, including the return journey, if the transporter charges 100,000 shillings per kilometre.

Chapter Summary

In this chapter, you have learnt:

1. that all human beings, including you, move around places using mental and drawn maps.
2. that a map is drawn in plan as if one is looking at features on earth directly from above.
3. that objects or features are represented on a map using symbols.
4. that all features on a map are smaller than their real size because they are reduced using scale.
5. how to draw a map of a local area using symbols and a scale.
6. how to use the linear or bar scale of a map to measure distance and estimate the area or features on the real ground. You can do these using different methods.
7. the difference between small scale and large scale maps.
8. how to find places and the positions of features on maps of different scale.

Chapter Four

Ways of Studying Geography

Govt urged to boost tourism using lakes

Investment. South African Airways observes that Uganda is not effectively utilising its water bodies to attract tourists unlike other countries.

BY STEPHEN OTAGE
sotage@ug.nationmedia.com

KAMPALA. South African Airways has advised the government to copy from prominent global tourism destinations and popularise tourism investments around and on the country's water bodies.

Speaking in an interview on Monday, Ms Yogi Biriggwa, the South African Airways country manager, said prominent destinations such as Mauritius, Rio-de-Jenairo in Brazil, Southern France, Durban in South Africa, and Mombasa in Kenya are popular globally because of their locations and investments on and around the water bodies.

She said this makes them attractive and easy to market internationally.

"We do not have water sport, no cruises, no weddings, no speed boats, no beaches, no floating restaurants, and this is what people always ask for immediately they arrive here," she said, adding: "You can make a lot of money. Ugandans are doing nothing about it yet they are sitting on a gold mine," Ms Biriggwa said.

She said if someone invested in speed boats between Entebbe and Port Bell of Ggaba beach, the visitors' unforgettable experiences would market Uganda abroad.

Some of the boats at Ggaba Landing Site in Kampala. PHOTO BY STEPHEN OTAGE

"Apart from mountain gorillas, Uganda has a lot to offer. If Ssese Islands were in another country, they would be filled with water sports. Southern France, Mombasa and Durban in South Africa are beautifully built around the ocean," YOGI BIRIGGWA, SOUTH AFRICAN AIRWAYS COUNTRY MANAGER

"When they [visitors] return home, these are the positive stories they will be narrating to their relatives and friends who will, in turn, pick interest in visiting the country," Ms Biriggwa said.

Yesterday, Tourism South Africa, the national body which rebranded South Africa to erase the dark image that had been created by Apartheid, sponsored 10 successful women from Uganda to visit South Africa's prominent tourism attractions. This was aimed at turning them into ambassadors who will influence similar investments to come to Uganda or mentor indigenous Ugandans to set up similar businesses.

The one-week tour is a package will see them experience the balloon safari, visit the Malaria-free Pilansberg National Park, five star accommodation at Saxon Hotel, Intercontinental, Oliver Reginald Tambo Hotel, the Palace Hotel Sun City and 12 Apostles, among other destinations.

Key Words	By the end of this chapter, you should be able to:
• Fieldwork • Observation • Questionnaire • Aerial photograph • Ground photograph • Horizon • Oblique photograph	a) understand how to use and apply different techniques used in fieldwork and apply these to studying a local area. b) use maps, aerial images, photographs, graphs and charts to communicate data. c) analyse and present statistics gathered in fieldwork. d) write conclusions to summarise fieldwork. e) know the three different angles from which photographs can be taken and the terms used to describe the different parts of a photograph. f) appreciate the effect of perspective on oblique photographs. g) understand the difference between photographs and maps. h) recognise features on a photograph and make a sketch of an area from a photograph. i) appreciate that fieldwork and photographs are important because geography is the study of the real world. j) use fieldwork to study a local area

Introduction

In this chapter, you are going to learn how and where you can find geographical information. After reading about and using the different sources of geographical information, you will be able to suggest which source is most important and why.

Activity 4.1: Finding out information

In pairs, study Figure 4.1 and do the activities that follow:

(a)

Year	Amount of crop produced in tonnes		
	Paddy rice	Maize	Wheat
2010	25,070	23,000	16,670
2012	23,040	25,000	14,290
2014	24,950	25,040	15,710
2015	24,880	23,530	16,000
2016	25,280	23,180	16,830

(b)

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Some of the boats at Ggaba Landing Site in Kampala. PHOTO BY STEPHEN OTAGE

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(c)

Figure 4.1: Some sources of geographical information

1. Summarise the information presented in the table, newspaper extract and photograph.
2. Using the information provided in the table, draw a graph to show the production of any **one** crop from 2010 to 2016.
3. Discuss the advantages and disadvantages of each source of information.
4. In your opinion, which source is most effective in giving geographical information? Give reasons why you think it is the most effective.

Studying Geography through Fieldwork

Activity 4.2: Finding out from the field

In groups, go outside the school and:

1. ask people in the local area about the different activities they do.
2. look around and write down the different things you see in the area.
3. write a report about the area studied.
4. through discussion, share your findings with other groups.

You have probably found out from field information about the activities carried out by people in the area around your school. You have also seen the natural features found in the area. The information you collected from the field is the geography of the area around your school. So, the field is one of the sources of geographical information. Visiting an area and collecting information about it is called **fieldwork** study.

How can we Study Geography through Fieldwork?

To be able to understand the steps and methods involved in carrying out fieldwork, do the following activity.

Activity 4.3: Exploring steps in fieldwork

In a group or as an individual:

1. Choose a topic to be studied in the area outside the classroom.
2. Decide the reasons (objectives) for doing the fieldwork.
3. Decide how you are going to collect information while in the field.
4. Go out to the field and collect the information, emphasising how the natural environment and human features are related.
5. Draw a map showing how physical and human features are distributed in the area.
6. If possible, you may carry out measurements of particular things in the field or you may ask people how much land is used for each activity, how many buildings of a certain kind are in the area, etc.
7. After collecting all the information needed, write a report about the area studied. Through discussion, compare group reports.

While in the field, you collected some information such as that about the relief of the area, vegetation types, and crops grown or how people use their land, type of buildings and so forth, by looking around and seeing things by yourself. This is called **observation**.

Your teacher could also have given you a number of questions to ask people in the field in order to get information from them. This list of questions is called a **questionnaire.**

Activity 4.4: Understanding methods

In pairs, discuss and suggest possible names for the following methods you could have used to get some information while in the field. Through discussion, share the names you have suggested with the rest of the class.

1. Talking to the local people and asking them questions about the things they do.
2. Measuring the size of gardens, market stalls, buildings and other features in the field.
3. Drawing sketch maps, field transects and panoramas.

Writing a Report about Fieldwork

You collected information about the area you studied during fieldwork. How do you think one can know what the geography of the area you studied is like? Possibly you have thought of telling and explaining to the person what you found out. Since it is not possible to tell everybody what we have got from the field, we write it down so that others can read for themselves. The information we write about the area studied is called a **fieldwork report**. To be able to write a report about your study, do Activity 4.5 below.

Activity 4.5

Using the information you collected during the field study you did in Activity 4.2 above, follow the steps below and prepare a fieldwork report. Present the report to your teacher for any assistance you may need.

1. Remember the topic and objectives of your study.
2. State the topic and summarise your objectives at the beginning.
3. Briefly describe the area studied, possibly with a map.
4. Write down the information you got about every objective in words.
5. Analyse the statistics you got, if any, and present them in tables, charts or graphs.
6. Include photographs or other maps, if any.
7. Summarise what you found out from the fieldwork, including the relationships between the people of the area and their physical and human environment.

Learning Geography through Photographs

If we cannot reach a place very easily, we can learn about it by looking at its **photographs.** These can tell us a lot about the geography of even those areas we have never been to. To understand this, do the following activity.

Activity 4.6

Study Figure 4.2 and do the activities that follow.

Figure 4.2: Photograph as a source of geographical information

1. In your notebook, write down the natural and human features you see in the photograph.
2. Explain how any two human features are influenced by the natural environment.
3. In what ways do you think human activities might affect the natural environment shown in the photograph?

All that you have written about Figure 4.1 is the geography of the area where the picture was taken. So studying photographs is another way in which we can get geographical information.

Types of photographs

Photographs are of different types. These depend on the angle at which the photographer looks at the features on the ground through the camera. Which types do you know? Those taken while the photographer is standing on the ground or on another feature connected to the ground are called **ground** photographs. Photographs can also be taken from the air, i.e. when the photographer is not directly connected to the ground. Such photographs can be taken from an aeroplane, a very tall building or a flight balloon. These are called **aerial** photographs. To understand this further, do Activity 4.7.

(a)

(b)

Figure 4.3: The Rift Valley in Uganda

(a)

(b)

Figure 4.4: Kampala City

Activity 4.7

Look at Figures 4.3 and 4.4 and:

1. identify and write in your notebook the buildings and vegetation in each photograph.
2. explain the differences between the photographs shown in each figure.
3. suggest what type of photograph each one is. Give reasons to support your opinion.

You could have realised that aerial photographs are not the same. This is because while in the air, the photographer can look at features on the ground at different angles. Photographs taken when looking at features vertically, i.e. at an angle of 90°, are called **vertical aerial** photographs. These show only the top views of the features on the ground, with all features appearing as flat objects. Those photographs taken looking at features at an angle less than 90° are called **aerial oblique** photographs. These show both the top and side views of objects.

Describing where things are on a photograph

In Chapter Three, you learnt the different ways in which you can find things on maps of different scale. Which one of these can you remember? However, with a photograph we do not usually know which direction the camera was pointing when the person took the photograph. So we cannot use compass points.

When describing features on the ground and aerial oblique photographs, you divide the photograph into regions depending on how far away from the observer the features are. These are foreground, middle ground and background. The part of the photograph which shows the sky is called the horizon. We do not divide this into regions. Can you suggest why this is so?

Figure 4.5: Divisions of a photograph

If you want to give the exact positions of features, you subdivide the above three grounds into other regions. These are left foreground, right

foreground; left middle ground, right middle ground; left back ground and right back ground.

Activity 4.8

Look at photograph (a) in Figure 4.1 again and do the following:

1. Using a straight edge, draw in your notebook, the outline of the photograph and divide it into the first three regions.
2. Subdivide it further into six regions.
3. Identify the features found in each region and write them down.
4. Subdivide it further into nine regions and suggest which names you can give to the new regions.
5. Swap your work with one of your neighbours and comment on each other's work.

When you look at photograph (b) in Figure 4.4, you realise that it does not have any foreground or background. What type of photograph is it? You have probably suggested that it is a vertical aerial photograph. So, when interpreting such a photograph, you use terms like **bottom**, **top**, **left, centre** and **right** to describe where things are.

Activity 4.9

Using these words: bottom, top, left, centre and right, describe the area shown on the photograph in Figure 4.4 (b)

Note: On photographs we can describe activities which are taking place as well as what the place looks like.

Drawing a sketch from a photograph

Sometimes it is useful to draw a sketch based on a photograph to show the **most important** features of the photograph. You do not need to show everything on the photograph but simply what kinds of things are found in each area. For instance, areas of buildings, main roads, types of vegetation, areas of farming, swamps, rivers or lakes, flat land or hills. Try to divide the photo into just three or four kinds of areas. To understand this better, see Figure 4.6.

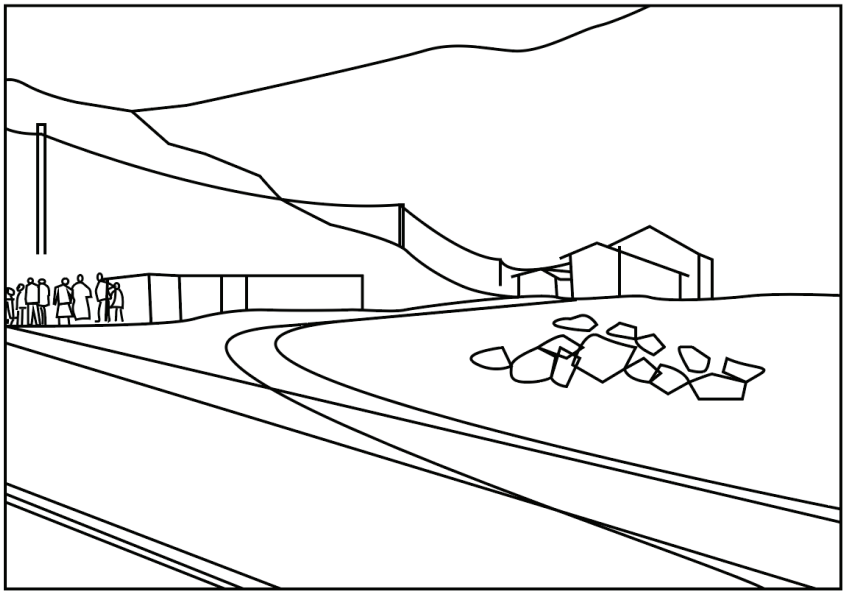


Figure 4.6 is a sketch of the area shown in Figure 4.2.

Activity 4.10

Study Figure 4.7 and do the tasks that follow.

Figure 4.7: Photograph showing Rukiga Hills, Kabale

1. Draw a sketch of Figure 4.7 to show the main features on the photograph.
2. Divide the sketch you have drawn into appropriate divisions.
3. Name the features on the sketch.
4. Describe the area shown in the photograph.

Research Task

Individually:

1. Conduct a library or internet search about the sources of geographical information and write a report of your findings.
2. In your opinion, which source is most important? Give reasons why you think it is the most important.
3. Present your report to the class through discussion.

Activity of Integration

1. Abu Saidi, a student of Ife High School in Nigeria, wants to study the geography of Tanzania. He has visited your school looking for assistance on how he can find out the information he wants.
2. Using the knowledge and skills you have learnt under this topic, write an advice note of about one page to help him get the information about the geography of Tanzania. Suggest to him which method/methods would be the most useful and why.

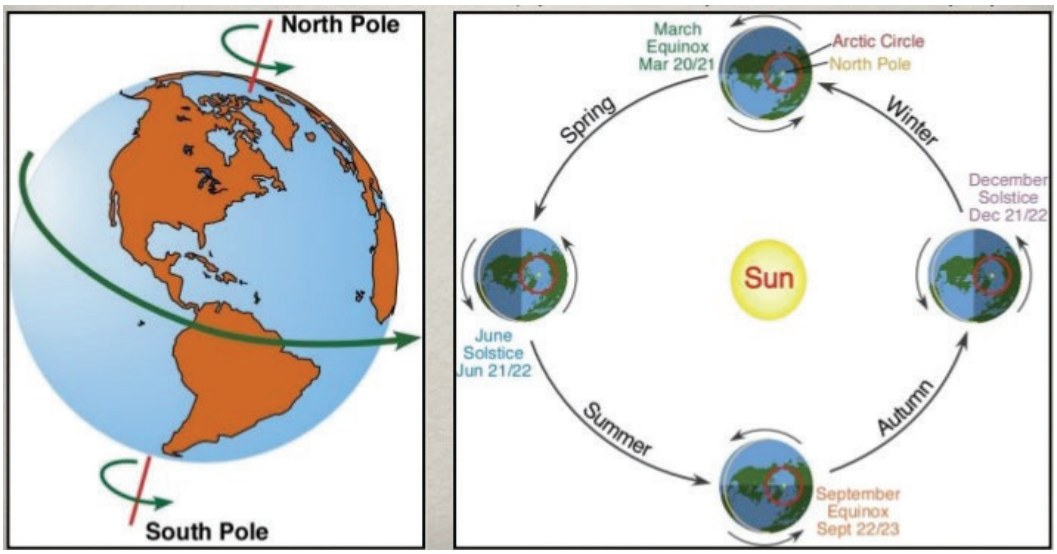
Chapter Summary

In this chapter, you have learnt:

1. that we can get geographical information from various sources including maps, statistics, graphs, charts, newspapers and other mass media.
2. the advantages and problems associated with each source of information.
3. that photographs are of different types depending on the angle at which they are taken.
4. how to conduct a fieldwork study and record the geography of an area.
5. that fieldwork and reading photographs are very important because they tell us what exactly a place looks like.
6. how to communicate geographical information using tables of statistics, graphs, charts and maps.

Chapter Five

The Earth and Its Movements



Key Words	By the end of this chapter, you should be able to:
• Axis • Oblate spheroid • Rotation • Revolution • Equinox • Solstices • Summer • Autumn • Winter	a) understand the relationship between the earth and the sun and how this affects temperatures and seasons. b) draw diagrams to show the relationship between the earth and the sun's rays and the causes of temperature variations and use these to show why the earth can be divided into tropical, temperate and polar regions. c) understand how the earth's rotation causes day and night. d) calculate time using longitude. e) appreciate how the movement of the earth in relation to the sun affects the way people live: the effect of temperatures and seasons, lengths of day and night.

Introduction

In Primary school, you learnt about the solar system and the position of the planet earth in relation to the sun. In this chapter, you are going to learn about the shape of the earth, the movements of the earth and how these movements affect time, climate and people's ways of life in the different parts of the world.

What Shape is the Earth?

The earth is the planet on which we live. All other living things live on earth. It is the only planet with life. This is because it has enough supply of oxygen and water, which are needed for life. Also, since the earth is not very far from the sun, it has moderate temperatures, that is, it is neither too cold nor too hot. What do you know about the shape of the earth?

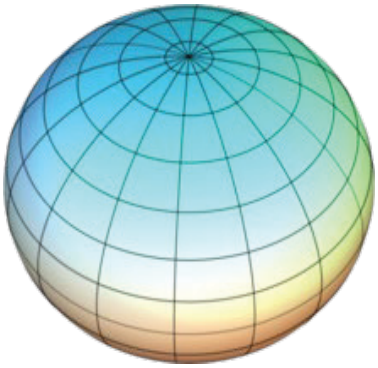


Figure 5.1: A model showing the shape of the earth

Activity 5.1

In pairs, look at Figure 5.1 above and do the following tasks:

1. Identify the positions of the poles, and the equator.
2. Describe what the earth looks like at the poles and at the equator.
3. Describe the shape of the earth.

Through discussion, share what you have written with the class.

You have probably described the earth as a round planet. However, when you look at Figure 5.1, you will realise that the earth is flattened at the North Pole and the South Pole. Again, you will see that it is enlarged at the

position of the equator and becomes smaller as one moves towards the poles. So it is not perfectly round or spherical. This shape is called oblate. Therefore, the true shape of the earth is an **oblate spheroid** or a geoid. The bulging of the earth at the equator is caused by its **rotation**.

Movements of the Earth

Activity 5.2

1. Draw a diagram showing the shape of the earth and on it include the main lines of latitude and longitude.
2. Conduct internet or library research about the solar system and make notes with diagrams.
3. Find out why it is called so and how many planets make up the solar system.

All the nine planets in the solar system move around the sun. Each follows a particular path called an **orbit**. No planet enters the orbit of another planet. Imagine what would happen if two huge planets met.

Because you live on the surface of the moving earth, it is not easy to know that it is actually moving. In fact, the earth makes two types of movement. Firstly, it spins or rotates on its axis. This movement is called the earth's **rotation**. Secondly, it moves around the sun. This is called the earth's **revolution**.

The rotation of the earth

What time of the day do you feel the most heat outside? Is it hottest during the middle of the night, during the morning, or during the afternoon? If we receive heat from the same sun, with the same temperature, then why doesn't temperature outside remain the same the whole day? All these happen because every day the earth rotates on its axis. Figure 5.2 shows the earth's axis.

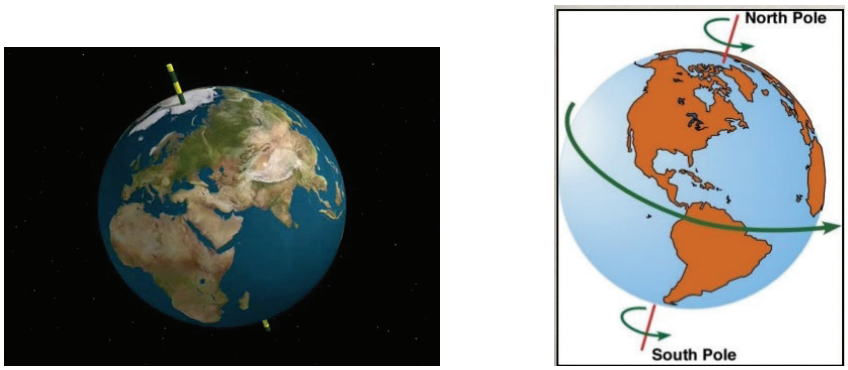


Figure 5.2: The earth rotates on its axis

Activity 5.3

1. In pairs, get a globe or football, torch and marker or bold ink.
2. Using a marker or bold ink, put an X-mark on the ball, in case you do not have a globe.
3. Hold the globe or ball in your hands such that your friend standing at the opposite side flashes a torch upon it.
4. Spin the globe or ball and observe what happens.
5. Write a paragraph to explain what you have observed.
6. Explain how we get daytime and night-time on earth.

In a similar way, the earth normally moves on its axis from the east to the west once every 24 hours. That is one complete rotation. This is why we see the sun rising in the east and setting in the west every day. As the earth rotates, it exposes half of itself to the sun while the rest of it is in darkness. The part of the earth facing the sun experiences daytime while the one hidden away is in night-time.

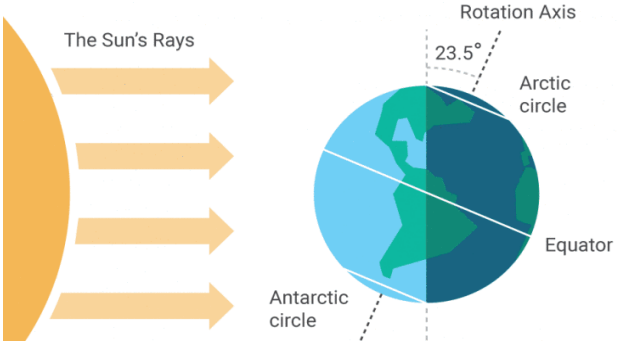


Figure 5.3: Rotation of the earth around the sun

Why places on earth have different time

Apart from causing day and night, the rotation of the earth also results in time differences. For every 15^0 of longitude we move from the Prime Meridian eastwards, we gain one hour. And as we move westwards, for every 15^0 of longitude, we lose one hour.

The sun reaches the highest position in the sky at 12 noon. At that time, the Greenwich Meridian lies under the sun. This is called 12 noon local time along the Prime Meridian. Local time at the Greenwich is called **Greenwich Mean Time** or simply GMT. All meridians to the east of the Greenwich Meridian have sunrise before the Prime Meridian. Local time along these meridians is ahead of GMT. Meridians to the west have sunrise after the Greenwich, and the local time is behind GMT. See Figure 5.4.

Fig 5.4: Longitude and time

Activity 5.4

1. If the time at place X is 1600 hours and GMT is 1400 hours, find out:
   i) How many hours X is from GMT.
   ii) The longitude at which place X lies.
2. If the time at Greenwich is 7.00 GMT, calculate the time at:
   (i) 75^0 E (ii) 75^0W

Revolution of the earth

The earth takes one year or 365 ¼ days to complete its journey around the sun. This journey is called a **revolution**. After every four years, the earth

takes 366 days to complete this same journey. The fourth year is called a **leap year**. All other years have 365 days. The earth's axis always points in the same direction in the sky. It is permanently tilted at an angle of $66^1/2^0$ to the earth's path.

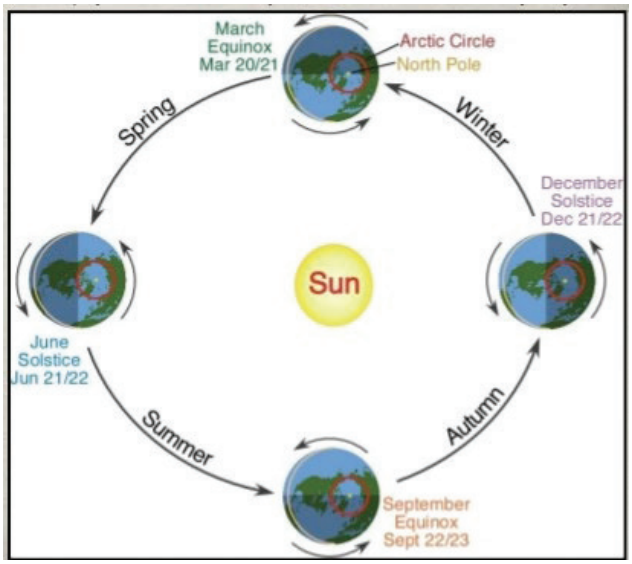


Figure 5.5: Revolution of the earth

The movement of the earth around the sun leads to changes in the position of the latitudes in relation to the sun. On 21st March, the sun is overhead at the equator. This is called the **equinox**. Another Equinox occurs on 23rd September. On 21st June, the sun is overhead at midday at the Tropic of Cancer. This is called the **summer solstice**. On 22nd December, the sun is overhead at midday along the Tropic of Capricorn. This is called the **winter solstice**.

Activity 5.5

Study Figure 5.4 above and do the following:

1. Find out the hottest months in places along the equator.
2. When is it summer in the Northern Hemisphere?
3. When is it spring in the Southern Hemisphere?
4. When is it summer in the Southern Hemisphere?

5. Conduct internet or library research about how the four seasons influence people's activities and way of life.

Why is the Earth Divided into Zones with Different Temperatures?

Activity: 5.6

1. Conduct internet or library research about world climate zones and in your notebook:
   i) draw the earth, mark and name the equator, the tropic lines, and the Arctic and Antarctic Circles.
   ii) mark out the tropical, temperate and the polar zones.
   iii) describe the characteristics of each of these zones.
   iv) explain the other factors that cause temperature differences in an area.
   v) share your report with the class through discussion.

Look at Figure 5.2 again and find out whether the earth is upright. If it is not upright, estimate the angle at which it is inclined. You have realised that the earth slants at an angle of 66.5^0 degrees from the sun. This makes different places on earth lie at different angles from the sun. The places are hit by the sun rays at different angles and so they receive different amounts of heat. At the equator, the sun rays strike the earth directly over a small area. The heat is concentrated over a small area, thus increasing the temperatures.

At higher latitudes, the rays are slanting and spread over a large area. The heat is spread over a large area, thus reducing the temperatures. The distance travelled by the sun rays to strike different places varies. The distance is short at the equator while at the poles it is very long. This partly brings about the temperature differences. The shorter the rays, the greater the heat and the longer the rays, the less the heat. This explains why the temperatures in the areas near the equator are constantly hot. The division of the earth into zones is based on the differences in temperature.

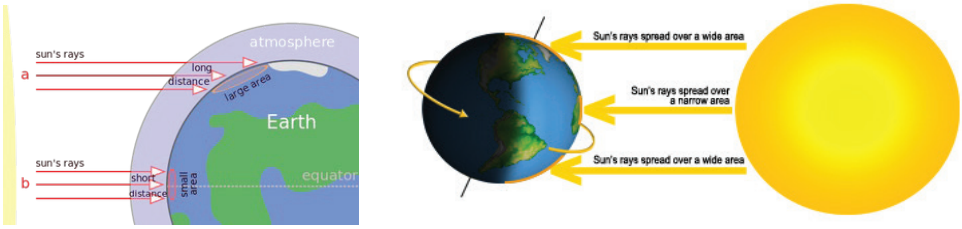


Figure 5.6: Sun's rays striking the earth's surface

Activity of Integration

Imagine one of the daily newspapers in your country has published an article entitled "The sun will soon stop moving". The National Science Forum has organised a conference to discuss the newspaper article, and your school has been invited to participate in the discussion. Using the knowledge you have learnt in this chapter, prepare a paper of at least one and a half pages that you will present at the conference. In your paper, point out the likely effects on time and people's lives if the sun stopped moving.

Chapter Summary

In this chapter, you have learnt:

1. that the earth is the only planet with living things because it has large amounts of water and oxygen, and moderate temperatures.
2. that the earth is spherical in shape.
3. that the sun lies at the centre of the solar system and all planets in this system move around the sun following particular orbits.
4. that the earth makes two movements: rotation and revolution.
5. that the rotation of the earth leads to day and night while the revolution causes seasons.
6. how the distance of a place farther north and south of the equator brings about differences in temperature and climate.

Chapter Six

Weather and Climate

Key words	By the end of this chapter, you should be able to:
• Climate • Condensation • Dew point • Humidity • Isohels • Isohyets • Isonephs • Millibars • Okta • Precipitation • Sleet • Weather • Weather log	a) understand the difference between weather and climate. b) understand the main elements of weather and climate. c) understand how to record the main elements of weather. d) know how to plot weather on maps and the terms used for plotting. e) make some simple instruments for measuring and recording weather. f) read or use maps and graphs to describe weather and climate. g) know the names and characteristics of the main types of clouds and rainfall. h) appreciate that weather affects your day-to-day life and activities. i) appreciate the importance of recording weather for farmers and others.

Introduction

In Primary school, you learnt about the solar system and the position of the planet earth in relation to the sun. In this chapter, you are going to learn about the shape of the earth, the movements of the earth and how these movements affect time, climate and people's ways of life in the different parts of the world.

In your home area, people usually take weather and climate to mean the same thing. In this topic, you are going to learn the difference between weather and climate and how you can measure and record weather in an area. Also, you are going to learn how weather and climate affect your own life and the way people in other parts of the world live.

Weather and How it is Measured

Activity 6.1: Understanding weather

1. Look outside. How would you describe the weather around your school?
2. What was the weather like around your school yesterday?
3. Is today's weather different from that of yesterday or the last three days? If yes, describe the differences.
4. In your own words, explain what you understand by weather.

When we talk of **weather**, we are actually talking about the conditions of the air or atmosphere at a certain time. The weather may be sunny or cloudy. It may be hot or cold, windy or calm. It may be rainy. Our country has many different kinds of weather at any one time. You have probably realised that even a small area like the one where you live or go to school has different weather conditions every day.

Activity 6.2: Identifying weather conditions

In pairs, study the photographs in Figure 6.1 below and do the following:

1. Identify the different weather conditions in each.
2. Write a paragraph of at least four lines describing the weather conditions in each photograph.
3. Present what you have written to the class.

a

b

c

d

Figure 6.1: Conditions in the atmosphere

What are Elements of Weather?

Activity 6.3: Understanding elements of weather

1. In pairs, discuss and list the things you talked about when describing weather in the two activities above.
2. Write them down and share your list with the rest of the class.

The conditions that prevailed in the atmosphere around your school yesterday could have been different from what they are now. What are those conditions called? The things you have listed in Activity 1.3 (a) are called **elements of weather.** Rainfall, sunshine, heat and coldness (temperature), air pressure, air humidity or moisture in the air and clouds are all things which determine the weather conditions of a place.

How is Weather Different from Climate?

Activity 6.4: Understanding the difference between weather and climate

In groups, do the following:

1. Discuss the pattern of weather in a year in the area where you live.
2. Write at least two paragraphs describing that pattern.
3. Through discussion, share what you have written with the rest of the class.
4. Suggest a name we can give that weather pattern.

In your description, you have probably written about the times of the year or seasons in which you can expect heavy rain or drought in the area where you live. Or you may have talked about the months when temperatures become hotter than usual. When you describe such a pattern of weather, you are talking about the climate of your area. The kind of weather a place has over a long period of time is its **climate**. The two most important elements used to describe climate are **precipitation** and temperature.

What is precipitation?

Activity 6.5: Understanding precipitation

In groups, study the pictures in Figure 6.2 and do the tasks that follow.

a

b

c

d

Figure 6.2: Types of precipitation

1. Identify the type of precipitation you see in each picture and write it in your notebook.
2. Which of those types of precipitation do you usually experience in your home area or around your school?
3. Write two sentences explaining what you understand by precipitation.

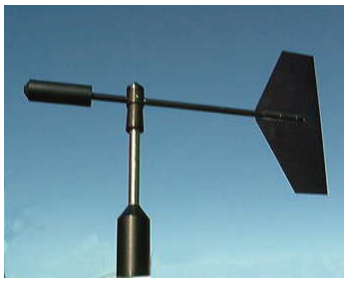
The earth's surface receives moisture from the atmosphere in different forms. All forms of moisture falling from the atmosphere are called **precipitation.** It may be in the form of rain, snow, hail, sleet or mist. In Uganda and the rest of East Africa, rainfall is the most common and important form of precipitation received.

What is temperature?

Have you ever woken up in the morning when there is mist in the air outside the house? What did you feel on your body? What do you always feel when you sit under the sun? You have probably thought of coldness in the case of a misty morning, and hotness in the case of sitting under the sun. The atmosphere usually has different amounts of heat at different times. The amount of heat in the air is called air **temperature**. When you say the morning is cold or the afternoon is hot, you are actually talking about the temperature of the air surrounding you.

Measuring and recording elements of weather

Activity 6.6: Measuring weather

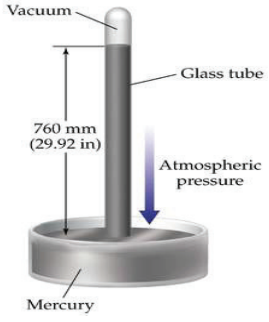


a

b

c

d



e

f

Figure 6.3: Some weather measuring instruments

Study Figure 6.3 above and do the following:

1. Using previous knowledge, identify the weather instrument shown in each picture.
2. Copy and fill in the table below.

Picture	Name of weather instrument	Element of weather it measures
a.		
b.		
c.		
d.		
e.		
f.		

3. For each instrument you have identified, write at least three sentences explaining how it is used to measure and record weather.
4. Present what you have written to the class.
5. What is the name of the place where all weather recoding instruments are kept and used?

Weather changes are very important in our daily lives. This is the reason we have to record weather conditions every day in order to make weather forecasts. Weather forecasts enable people to plan their activities and to take precautions against bad weather.

A place where weather is measured and recoded is called a **weather station**.

Project: *Measuring and recording elements of weather in the local area*

You are going to carry out a project to measure and record elements of weather around your school. You will need a book where you will record information about the weather conditions on a daily basis. This is called a **weather log.**

Activity 6.7(a): Making a weather log

1. Write your name on a clean notebook.
2. Write out the days and dates of the month for which you will be recording temperature and rainfall.

Activity 6.7(b): Measuring temperature

Work as a group to carry out this activity at school on a daily basis for a period of three months. You will have to keep a record of the weather elements at your school in your weather log for those three months.

1. Get a thermometer from the science laboratory.
2. Measure and record the lowest and highest temperatures of the day.

The lowest temperature should be measured between 6.00 a.m. and 7.00 a.m. The highest temperature should be between 2.00 p.m. and 3.00 p.m.

Activity 6.7 (c): Rainfall and how it is measured

You are going to make a rain gauge which you will use to measure rainfall. This is a short-term gauge so it is checked after each downpour. Collect the materials listed below and follow the steps outlined to make the gauge.

Materials

- Sharp scissors
- Fine mesh screen/a transparent polythene sheet
- Nail file
- 2 two-litre bottles (or funnel)
- Permanent marker
- Ruler
- Masking tape
- Saucepan or basin

Read the following instructions before beginning the activity:

1. Carefully cut a two-litre bottle with straight sides and a flat bottom into half to make a funnel. File any sharp edges.
2. Place the cut bottle on the uncut bottle so that the spouts/edges are touching and in line.
3. Tightly fix the funnel onto the top of the bottle using the masking tape. Place a transparent polythene sheet over the funnel opening and press it slightly inwards. Tape it in place. Make a hole inside the polythene sheet to direct water into the bottle.
4. Mark the bottle from the bottom ½ cm apart upwards with the permanent marker. For more accurate readings, tape a ruler to the side of the bottle. Each ½ cm represents 500 millimetres.
5. Place the rain gauge outside in an open place.
6. Read off and record in your log book the amount of rainfall received once every 24 hours.

The amount of rainfall recorded during the month is the **monthly total rainfall**. The amount of rainfall recoded for a whole year is the **annual total rainfall**. Some months are wet while others are dry. To get the average picture of rainfall received in an area, we divide total annual rainfall by the 12 months in a year. The result is the **mean monthly rainfall**. Rainfall figures for all the months in a year can be represented on a bar graph. This enables us to describe the rainfall pattern of an area.

To show how rainfall is distributed over a country like Uganda or a larger region like East Africa, places receiving equal rainfall amounts are plotted on maps and joined using lines called **isohyets.** The map produced is called a **rainfall map** or **precipitation map** (see Figure 6.4).

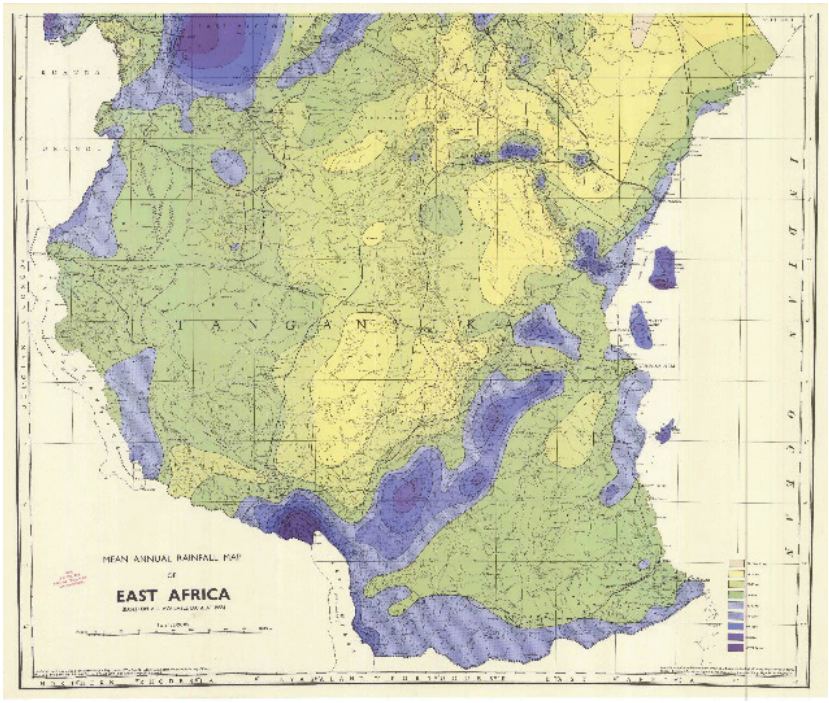


Figure 6.4: Rainfall map of part of East Africa

Atmospheric or Air Pressure

Have you ever slept on a hard surface for long hours? How did you feel when you got up? Why do you think you felt that way? You probably felt some pain in your body. This is because the weight of air that surrounds us or the atmosphere was pressing your body against the ground. This weight is called **atmospheric pressure.**

Measuring atmospheric pressure

Atmospheric pressure is measured using a **barometer**. There are two types of barometer, as shown in Figures 6.5 and 6.6 below.

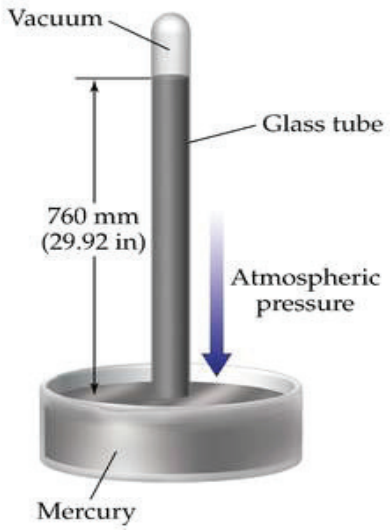


Figure 6.5: A mercury barometer ***Figure 6.6: An aneroid barometer***

The mercury barometer consists of a bowl in which mercury is put. A glass tube filled with mercury is then inverted into the bowl. As the air in the atmosphere uses its weight to push down the mercury in the bowl, the mercury level in the glass tube falls while the mercury level in the bowl rises. When the atmospheric pressure falls, the mercury in the glass tube also falls.

When the mercury levels stabilise, the column of the mercury in the glass tube is equivalent to the atmospheric pressure. Atmospheric pressure is measured in units called **millibars**.

Activity 6.8: How the aneroid barometer works

1. Carry out internet or library research on how the aneroid barometer is used to measure atmospheric temperature.
2. Write down your findings and present them to the rest of the class through discussion.

Atmospheric Humidity or Air Humidity

Most of the time, the air around us is not dry. It contains some amount of water in the form of an invisible gas. This gaseous water or moisture is

called **water vapour**. The amount of water vapour held in air is called **humidity**. The water in air comes from different sources, such as from open water bodies and soil by evaporation and from vegetation and other plants by transpiration. Humidity influences the formation of clouds and precipitation.

Activity 6.9: Proving that air contains water

Get a cold mirror or a piece of glass or if your classroom has glass windows, close the window and do the following:

1. Breathe onto the mirror or glass. What do you notice? Have you seen anything coming out of your mouth? Do you see anything on the glass? What happens when you let the glass stay for some time?
2. Write down your observations and share what you have written with your friends.

How is humidity measured?

Humidity in the atmosphere is measured using a **hygrometer**. The simplest hygrometer is a sling psychrometer. It consists of two thermometers, a wet bulb and a dry bulb thermometer. The wet bulb is wrapped in a wet cloth and dipped into a bowl of water. This keeps the muslin wet. The wet bulb records a lower temperature.

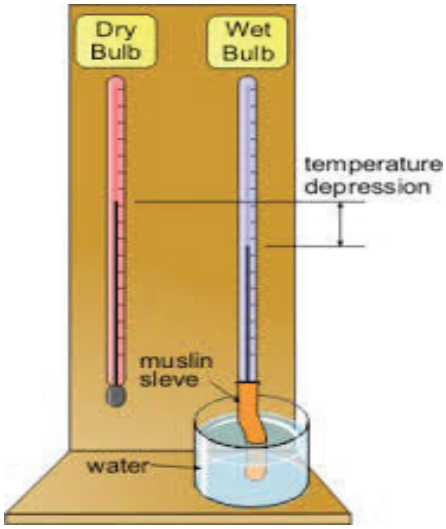


Figure 6.7: A hygrometer

When water evaporates from the wet cloth it takes away heat with it. This leads to cooling on the wet bulb thermometer, thus giving a lower reading. The dry bulb records the hotter temperature. It is kept in the normal environment. The difference in temperatures recorded by the two thermometers gives the humidity in the air. A large difference means humidity is low and a small one means humidity is high. If there is no difference, the air is said to be **saturated**. This means that the air cannot take in any more water vapour.

Humidity is recorded as a percentage of the amount of water vapour that the air is holding compared to the amount the same air can hold before it gets saturated. This is called **relative humidity**.

Sunshine and How it is Measured

In most parts of our country, the sun shines almost every day. Sunshine benefits us in many ways.

Activity 6.10: How important is sunshine?

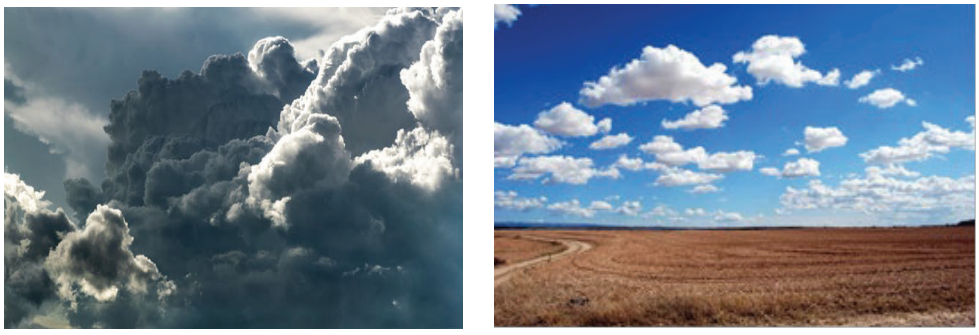
In your notebook:

1. explain how sunshine benefits you and your local area.
2. write an article for a local newspaper explaining what would happen if it did not shine for three months in Uganda.

Figure 6.8: A Campbell Stokes sunshine recorder

Sunshine is recorded using a Campbell Stokes **sunshine recorder.** This consists of a glass sphere held by a metal frame. Inside the frame is a sensitive card labelled in hours and minutes at the margins. As the sun apparently moves across the sky, its rays burn traces on the card if the sunshine is not constant. If the sunshine is constant, its rays burn a continuous line on the card. The lengths of the burnt sections are added to get the total hours of sunshine for the day. We record sunshine on maps by drawing lines showing places with equal amounts of sunshine. These are called **isohels**.

Clouds



(a) (b)

Figure 6.9: Cloud cover

Activity 6.11: Finding out about clouds

In groups, go outside the classroom, observe the sky and:

1. describe the appearance of the clouds.
2. describe the cloud cover using the key provided in Figure 6.10 below.
3. list the types of clouds that you know.
4. explain the importance of clouds to human beings.
5. write and present a report about cloud cover in the area around your school.

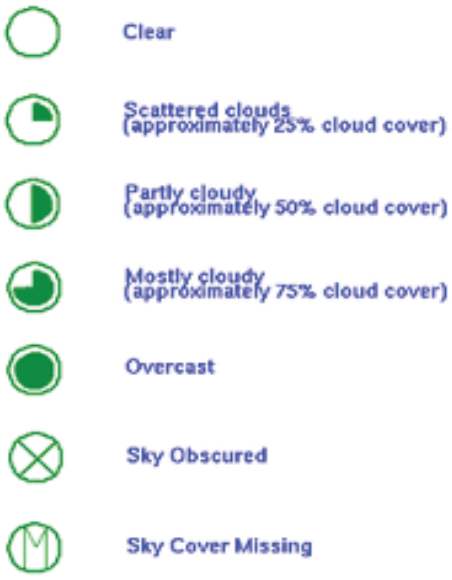


Figure 6.10: Key for cloud cover

Types of clouds

Activity 6.12

In pairs, carry out library research on the types of clouds and fill in the table below.

Name	Height	Appearance
Cirrus		
Nimbus		
Stratus		
Cumulonimbus		

The amount of cloud cover is estimated in **oktas**. One okta represents approximately one eighth of the sky covered with clouds. Cloud cover can be represented on maps using lines. These lines join areas with equal average cloudiness over a certain period. They are called **isonephs**.

Effects of Weather on your Life and that of your Community

You have already learnt how the different elements of weather affect people's ways of life. A number of your activities and those of other people in your community depend mainly on sunshine, temperature and rainfall. During the rainy season, vegetation flourishes and people are busy in their gardens. Weather changes can affect you and your community positively or negatively.

Activity 6.13

In your notebook, copy and fill in the table below:

Weather condition	Benefits	Negative effects
Rainfall		
Sunshine		
Temperature		

Activity of Integration

A rural farmers' cooperative society has just acquired a piece of farmland in an area they have never lived in before. They intend to start a mixed farm where they will cultivate crops and keep animals. They need to know the weather pattern of the area in order to carry out farming successfully. The local government Secretary for Production and Marketing has chosen you to give advice to the farmers.

Write an advice note to the farmers' cooperative society, pointing out:

1. the most important elements of weather they need to record and study and why you think they are the most important to them;
2. the instruments they can use to record those elements and the kind of information they should keep about each element;
3. and four ways in which they can use weather information to run the farm.

Chapter Summary

In this chapter, you have learnt:

1. that weather is the condition of the air around us at a certain time and it is described using its elements.
2. that weather changes in a short time, while climate takes long to change.
3. how to measure and record different elements of weather.
4. that precipitation and temperature are the most important elements of weather used to describe the climate of our country.
5. that weather affects our day-to-day activities and general way of life.

Chapter Seven

Location, Size and Relief Regions of East Africa

Key Words	By the end of this chapter, you should be able to:
• Cliff • Deposition • Drainage • Earthquake • Erosion • Faulting • Glacier • Landform • Lava • Magma • Plate tectonics • Rift valley • Rock • Volcano • Vulcanicity • Warping Wave	a) use maps, statistics, graphs and diagrams to analyse population. b) appreciate that East African countries vary greatly in area and population. c) know the East African countries, their approximate population and area. d) use contours to show physical features and draw cross-sections from simple contour maps.

Introduction

From your Primary school, you have always heard your teachers and other people say that our country, Uganda, is found in East Africa. Again, if you have ever travelled to places far away from your home area, you could have noted that the physical features in those places are somewhat different from those around your home. This is because although East Africa is one region, its relief is not uniform everywhere. In this chapter, you are going to learn about the position of East Africa on the African continent, the size of East Africa, the relief features of East Africa and how they were formed.

What is East Africa?

Activity 7.1: Understanding East Africa

In groups, study the atlas and,

1. identify the countries making up East Africa and list them.
2. draw a sketch map to show the location of East Africa.
3. discuss and agree on what is meant by East Africa; then share your views and sketch map with other groups in a whole class discussion.

You have realised that different groups have identified different countries making up East Africa. Some have identified three countries while others have identified six countries. This comes about because of the way we look at East Africa as a region.

Those who have identified three countries look at the traditional East Africa. Those who have identified six countries look at the East African Community. In studying Geography, you are going to take East Africa as **Uganda, Kenya** and **Tanzania**.

Location and Size of East Africa

Activity 7.2:

1. Describe the position of East Africa in relation to other countries and regions.
2. Describe the position of East Africa using latitude and longitude.
3. Draw a sketch map to show the location of East Africa.

Activity 7.3:

In pairs, search the Internet or any other source for figures (data) showing the size of East African countries.

1. Copy the information into your notebook and use it to draw a pie chart or bar graph.
2. Using the diagram you have drawn, determine the:
   i) Largest country in East Africa,
   ii) Smallest country in East Africa.
3. Estimate how many times the largest country is larger than the smallest one. Give a reason to support your estimate.
4. Share what you have written and the diagram you have drawn with other pairs in a whole class discussion.

Activity 7.4:

1. Individually, look for data about the population of the East African countries from any source you can come across.
2. Draw a pie chart to represent the data you have got.
3. Which country has the:
   i) Largest population
   ii) Smallest population

The Relief Regions of East Africa

In your home area or in the area around your school, there are several physical features, which may include mountains, hills, valleys, outcrop rocks and flat plains. All these can be used to describe the appearance of the landscape in the area. These features are called relief features or landforms. Similar features are also found in other parts of Uganda and

the rest of East Africa. A large area of land with almost similar relief features is called a **relief region**. `

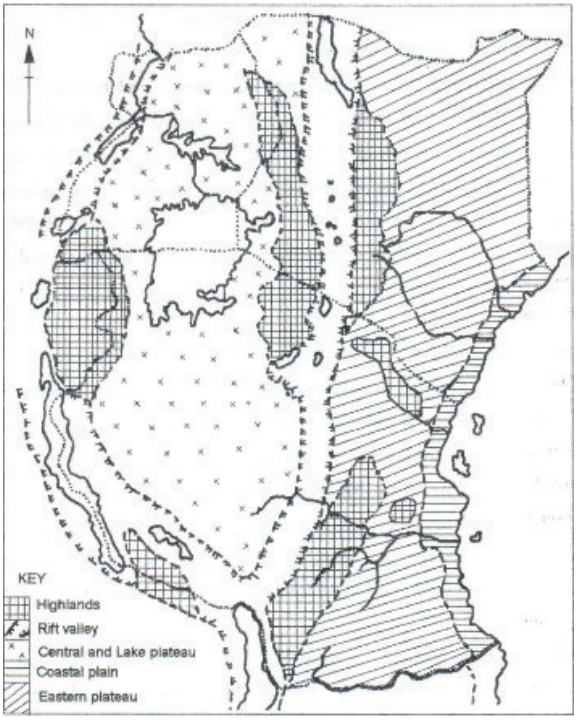


Figure 7.1: Map showing the relief regions of East Africa

Activity 7.5

In groups, study Figure 7.1 and do the following tasks:

1. Copy the map in your notebook and on it name:
   i) the countries.
   ii) the different relief regions of East Africa.
   iii) at least two mountains in each country.
2. Which relief region covers the largest part of East Africa?
3. Identify the relief region in which your home area is found.

In the above activity, you have found out that East Africa is divided into five major relief regions. Each region has certain characteristics which make it different from other regions. The largest part of Uganda is covered by the **plateau** region. The most important differences between regions lie in the appearance of the landscape and the height. These relief regions have an influence on the local weather and climate. This, in turn,

determines the economic activities people in each region do and their ways of life in general. You are going to find out more about this influence in the following activity.

Activity 7.6

In groups:

1. Choose one or two relief features in the area around your school and conduct a field study of the feature/features.
2. Use a range of methods to collect information about the feature/features.
3. Explain how the feature/features may influence the weather conditions and climate of the area.
4. Explain how the relief features in the area influence the activities people carry out and the way they live.
5. Draw a sketch map to show the physical environment and human activities carried out in the area.

a

b

C

d

e

Figure 7.2 Natural hazards

The area you have studied could have experienced some unusual natural events which have had negative effects on people's lives, property and the environment. Such events are called **hazards**. Think of any hazard which has occurred in another part of your country or elsewhere in East Africa. To understand this better, study the pictures in Figure 7.2.

Activity 7.7

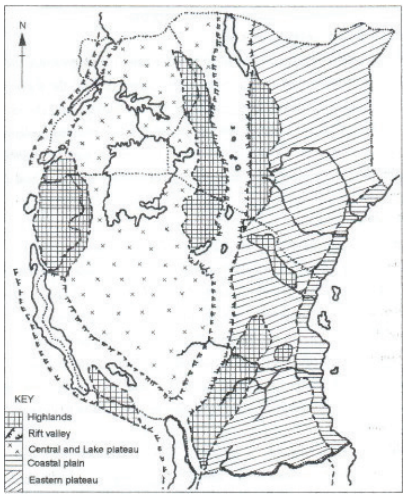
In the same groups you used in Activity 7.6:

1. Ask people living in the area about places which have experienced hazards in the past and the kind of hazards they were. Also identify places which may experience hazards and the kind of likely hazard for each. Mark both places on the sketch map you have drawn.
2. Ask the local people how much harm each hazard caused. Using that information, suggest how harmful the likely hazards might be.
3. Suggest steps that can be taken to prevent such hazards from taking place again.
4. Through discussion, share your findings with the rest of the class.

Activity of Integration

1. Suppose you have been given a chance to migrate and live in another East African country, which relief region would you prefer to live in the new country? Give reasons for your preference.
2. Suggest the disasters which might strike your new home area and how each might affect you.
3. Suggest ways you would assist people in your new home area to reduce the effects of the disasters.

Support: Relief regions of East Africa



Chapter Summary

In this chapter, you have learnt that:

1. the features that can be used to describe the physical appearance of an area are called landforms.
2. a large area of the earth's surface with almost similar landforms is called a relief region. A relief region may be hilly, mountainous, or almost flat.
3. the largest part of East Africa is covered by the plateau.
4. the economic activities that people carry out in any area and their ways of life are partly influenced by the relief.
5. some relief regions experience severe natural events which affect communities negatively. Such events are called **natural hazards.**