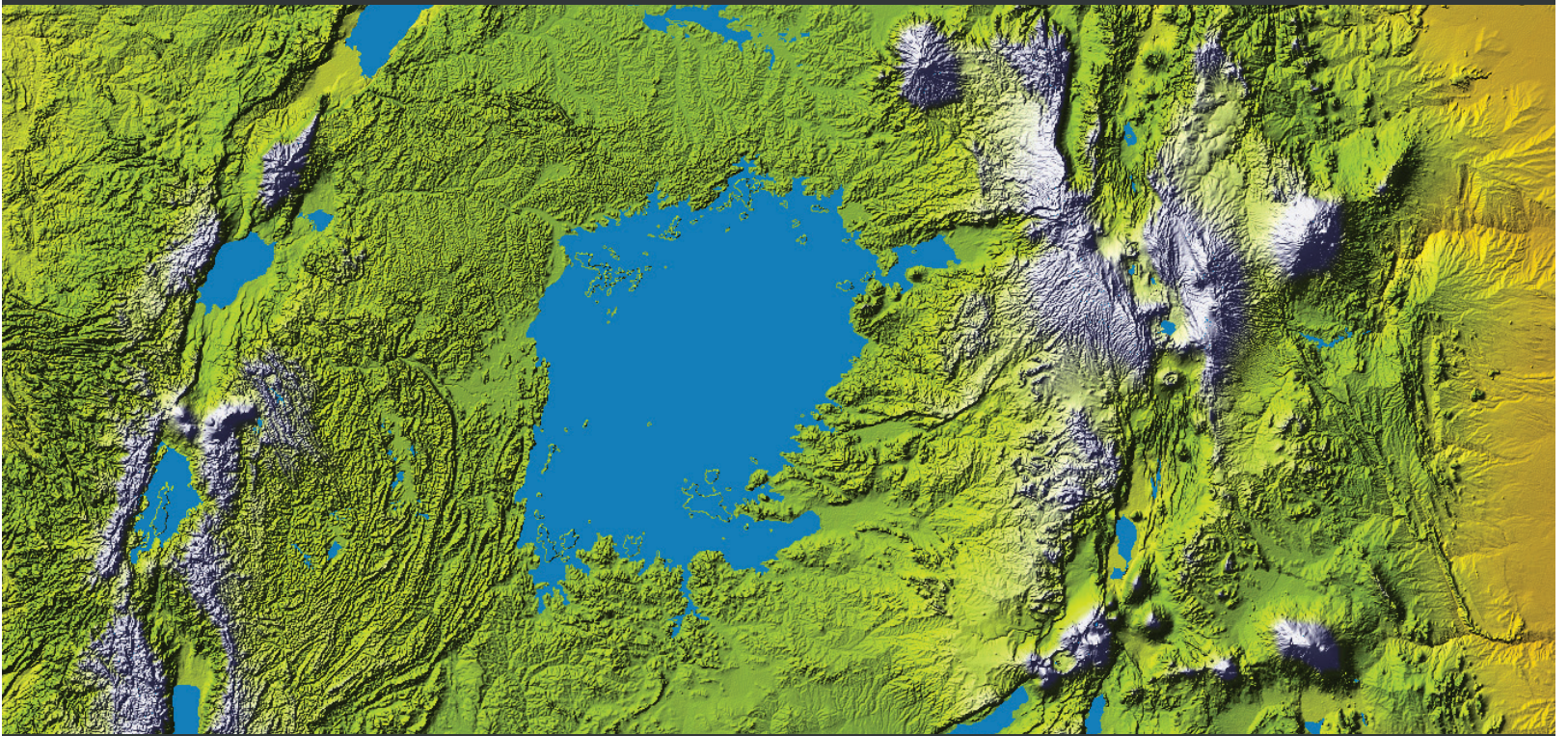


PROTOTYPE



NCDC
NATIONAL CURRICULUM
DEVELOPMENT CENTRE



GEOGRAPHY

TEACHER'S GUIDE

SENIOR ONE



**LOWER SECONDARY
CURRICULUM**

PROTOTYPE



GEOGRAPHY

TEACHER'S GUIDE

SENIOR ONE



LOWER SECONDARY
CURRICULUM



Published 2020

This material has been developed as a prototype for implementation of the revised Lower Secondary Curriculum and as a support for other textbook development interests.

This document is restricted from being reproduced for any commercial gains.

National Curriculum Development Centre
P.O. Box 7002,
Kampala- Uganda
www.ncdc.co.ug



Contents

Preface	iv
Acknowledgements	v
Chapter One: Introduction to Geography	1
Chapter Two: Showing the Local Area on a Map	9
Chapter Three: Maps and Their Use	15
Chapter Four: Ways of Studying Geography.....	36
Chapter Five: The Earth and its Movements.....	51
Chapter Six: Weather and Climate.....	59
Chapter Seven: Location, Size and Relief Regions of East Africa	76
Chapter Eight: Formation of Major Landforms and Drainage in East Africa	85
Chapter Nine: Climate and Natural Vegetation of East Africa	105

Preface

This Teacher's Guide has been designed to enable the teacher to interpret the revised curriculum and use the accompanying Learner's Textbook effectively. The Teacher's Guide provides guidance on what is required before, during and after the teaching and learning experiences.

To ease the work of the teacher, all the activities and instructions in the Learner's Textbook have been incorporated in this Guide but with additional information and possible responses to the activities. The guide has been designed bearing in mind the major aim of the revised curriculum which is to build in the learners the key competences that are required in the 21st century while promoting values and attitudes and effective learning and acquisition of skills, to prepare the learner for higher education and eventually the world of work.

This book has been written in line with the Revised Lower Secondary School Curriculum. The book has incorporated knowledge and skills partly required to produce a learner who has the competences that are required in the 21st century; promoting values and attitudes; effective learning and acquisition of skills in order to reduce unemployment among school graduates.



Associate Professor Betty Ezati

Chairperson, NCDC Governing Council

Acknowledgements

National Curriculum Development Centre (NCDC) would like to express its appreciation to all those who worked tirelessly towards the production of the Teacher's Guide.

Our gratitude goes to the various institutions which provided staff who worked as a panel, the Subject Specialist who initiated the work and the Production Unit at NCDC which ensured that the work produced meets the required standards. Our thanks go to **Enabel** which provided technical support in textbook development.

The Centre is indebted to the learners and teachers who worked with the NCDC Specialist and consultants from Cambridge Education and Curriculum Foundation to ensure the Guide meets the needs of the target group.

Last but not least, NCDC would like to acknowledge all those behind the scenes who formed part of the team that worked hard to finalise the work on this Learner's Book.

NCDC is strives at upholding the standards, ethics and values of publishing. In developing this material, several sources have been referred to which we might not fully acknowledge.

We welcome any suggestions for improvement to continue making our service delivery better. Please get to us through P. O. Box 7002 Kampala or email us through admin@ncdc.go.ug.



Grace K. Baguma

Director, National Curriculum Development Centre

Chapter One: Introduction to Geography

Overview

In this topic, focus the learners to understand the meaning of geography, including its branches and the value of studying it. Encourage the learners to visit the local area to get firsthand information about their environment, how the lives of people are affected by the environment, how the activities of people affect the environment and how to conserve the environment.

You are advised to use a number of interactive methods to enable learners to develop the skills listed under each activity. Ensure that all learners participate in class and group discussions.

ICT has been integrated and where possible, make use of it to make the learning process interactive and interesting.

In this topic, the learner should be able to:

- a) use fieldwork to observe, name and classify human and physical features.
- b) know the meaning of geography and environment.
- c) understand that the environment is all the things around us.
- d) realise that geography is the study of the relationship between people and their environment.
- e) appreciate that the study of geography helps us to understand how our lives are affected by the environment and how we can preserve the environment so it remains useful to us.
- f) appreciate that caring for and preserving resources in the local environment, community and country are signs of love for one's country.

What is Geography?

Activity 1.1: Exploring our environment

In groups, go outside the classroom and do the following:

1. Observe and draw a sketch diagram of the area and on it name all the things you can see.
2. Draw a table to divide the things you have written into natural things and those made by people.
3. Discuss the way you have classified the things in the table and make some changes where necessary.
4. As a class, display the field diagram you have drawn, the names of features in the area and the table you have made. Comment on each group's work and ask each other questions.
5. Share your views on what you understand by environment.

Resources to use: The local environment outside the classroom and recording tools

Skills: Observation, recording information, analysing, interactive skill, reporting and critical thinking

Teacher Instruction

1. Lead learners outside and guide them to do Activity 1.1 in the Learner's Book.
2. Observe learners as they do the activity and assist them where they get challenges.

3. In a discussion, ask learners to explain their classification of things in the environment as natural and human.
4. Emphasise that each group comes up with a write-up about the area of study.
5. Observe learners in groups as they discuss and review their work to ensure that interactive skills and critical thinking are developed.
6. Lead learners in a discussion to share their field sketches, findings and what they understand by environment as a class.
7. Wrap up the activity by pointing out that in geography we study about human beings and their environment.

Hint: Emphasise that the environment is all the things around us, both natural and those made by people. Also emphasise that, plants such as trees, and water bodies such as lakes, can be natural or human-made depending on how they have come to be where they are.

Possible Responses

Encourage learners to give their different views in support of their ideas as a way of developing skills of communication, critical thinking and social interpersonal relationships, among others.

1. Field sketches will depend on the area where the school is found; should have both physical and built features. The features may include trees, buildings, roads, farms, a compound, a playground, grass, hills, bush, stream, water spring, etc.
2. Table showing natural things and things made by people in the local area:

Natural things	Things made by people
Trees	Trees
Grass	Buildings
Bush	Roads
Stream	Compound
Hill	Farms
	Water spring

The environment is the natural things surrounding us.

Both the natural and human things surrounding human beings.

The learners should have found out that the area around their school has both natural things and things made by people. In their classification, they have probably categorised trees, grass, soils, rocks and streams as natural things and buildings, roads, gardens, factories and playgrounds as things made by people. All these things are called our surroundings or **environment**. The natural things make up our **physical environment**. All things made by people make up the **human environment**. The human environment is also called the **built environment**.

Activity 1.2: Study Figure 1.1 and do the activities that follow.



Figure 1.1: Photographs showing the geography of different areas

- i) Identify and write down in your notebook the natural and human features shown in each photograph.
- ii) Explain how the human activities carried out in each picture are related to the natural environment.
- iii) In what ways do you think human activities in each picture might affect the natural environment?

Resources to use: Pictures are already presented in the Learner's Book

Skills: Picture interpretation, analysing, critical thinking

Teacher Instruction

1. Ask the learners to study the pictures in Figure 1.2, in the Learner's Book.
2. Move around, observe learners as they do the activity, and assist them where they may get challenges.
3. Ensure that everybody engages actively with the pictures. Let them consult one another.
4. Randomly, select a few pairs and ask them to present what they have written to the whole class. Ask the rest to comment on each presentation.
5. In a discussion, ask learners why they have classified features in the pictures the way they have done. Probe learners to explain their points further and to support their answers with evidence/examples from the pictures provided.
6. Wrap up the activity by pointing out that since photos are taken from the real world, then what they have written about each picture is the true geography of the area represented by the picture.

Hint: Discuss instances where photographs may not give us up-to-date geographical information.

Possible Responses

1. Photo (a)
 - Natural features: Lake/sea/water body, island/flat land, vegetation/forest.
 - Human features: Boat, oars
- Photo (b)
 - Natural features: Hills, valley, vegetation/trees.

- Human features: Buildings/houses, planted trees
2. Photo (a)
- Fishing is carried out due to the presence of extensive water body which contains fish.
- Photo (b)
- Construction of houses is possible due to the presence of gently sloping hill slopes.
 - The planting of trees or amenity forestry is carried out because the area receives heavy rainfall which allows trees to grow.
3. Photo (a)
- Natural vegetation cut down in order to get the fishing gear
 - Removal of fish in large amounts might lead to the exhaustion of the fish/depletion of the lake
- Photo (b)
- Construction of houses/settlement leads to clearing of natural vegetation
 - Poor disposal of wastes from settlements might lead to pollution of the environment
 - Settlement on hill slopes might accelerate soil erosion
 - Planting of trees/amenity forestry modifies local temperatures as trees create cool conditions

Activity 1.3: Understanding the meaning of geography

1. In groups, search the internet or carry out a library research about what geography is.
2. Write a brief definition and description and share these with other groups through a class discussion.
3. After agreeing on the meaning of geography, make corrections in your work if necessary.

Resources to use: Computers, textbooks, writing materials

Skills: Information gathering, report writing, collaboration, communication

Teacher Instruction

1. Organise learners into convenient groups and guide them to do Activity 1.3 in the Learner's Book.
2. Observe groups and individuals as they discuss and write down their definition of geography on the chalkboard.
3. Ensure that everybody is actively involved in the discussion.
4. Discuss with them about what they have used to come up with the definition.
5. Ask the rest of the class to comment on group presentations and guide them to correct any mistakes made.
6. Ensure that learners come up with original definitions of geography.
7. Wrap up the activity by pointing out that geography is concerned with studying the things that surround us, how they affect one another, how they affect our lives and how we also affect them.

Possible Responses

1. The study of natural things and human things around us.
2. The study of the relationship between people and the things that surround them (environment).
3. The study of the earth and how man interacts with it. Etc.

Branches of Geography

You have already learnt that in geography, we study the natural and human environments and how these affect our lives. So geography has two branches, namely physical geography and human geography.

Activity 1.4: Exploring the nature of geography

In groups, study the list below showing things in our environment. Fill in the table to show which branch of geography studies each of these things.

Resources to use: An elaborate list of things in the environment already provided in the Learner's Book

Skills: Analysing, comparison, forming own opinions

Teacher Instruction

1. Guide learners to individually do Activity 1.4 in the Learner's Book.
2. Observe learners as they do the activity and ensure that everyone actively participates. Encourage them to ask one another.
3. Ensure that everyone comes up with a fully filled-in table.
4. In a discussion, ask learners to explain why they have put each thing in the column where they have placed it. Observe how they defend their views.
5. Wrap up the activity by pointing out that physical geography studies only natural things while human geography studies things made by people.

Hint: Point out instances where vegetation may be studied under human geography.

Possible Responses

Physical geography	Human geography
Weather and climate	Towns and cities
Rivers and lakes	Roads
Rocks	Railways
Hills and mountains	Farms
Soils	Fishing
Vegetation	Mining
	Factories

The Value of Studying Geography

Activity 1.5: Relating geography to your own life

In groups:

1. Discuss how studying geography may benefit you, your community and country.
2. Write down the benefits in your notebooks.
3. Through discussion, share what you have written with other groups.

Studying geography has several benefits. These include helping us make wise use of our environment and conserving it for the future. It gives practical skills in making and using maps, collecting and presenting information about our surroundings; and creates awareness about other parts of the world. This makes it possible to exchange resources through trade. Geography also helps us to develop values such as teamwork and respect for people doing work using their own hands. The learners will find out more about the value of the subject as they study it.

Tools to use: No specific tools needed

Skills: Interpersonal skills, critical thinking, teamwork, forming own opinions

Teacher Instruction

1. Organise learners into discussion groups depending on the number in class. Allow each group to elect a chairman and secretary; then introduce the topic.
2. Observe learners as they discuss in their groups and see how well they relate with one another. Ensure that everybody takes an active part.
3. Call upon groups to present their ideas. Summarise their views on the chalkboard and correct any mistakes made.
4. Call upon the class to critique group presentations.
5. In a discussion, encourage learners to explain and defend their views.
6. Mark learners' work and provide feedback and guidance.
7. Wrap up the discussion by summarising the benefits of studying geography.

Hint: Ensure the development of the skills listed above.

Possible Responses

Responses will vary from group to group. Benefits of studying geography may include:

1. Helps us to know our environment and how to conserve it.
2. Introduces us to different parts of the world, including places we have never been to.
3. Helps us to understand local weather and climate so that we can plan our activities accordingly.
4. Gives practical skills needed in our day-to-day life, e.g. reading and using maps, collecting, analysing and presenting information.
5. Enables us to understand the resources in our environment and how we can use these for development.
6. Creates a foundation for future careers, e.g. professional geographers, meteorologists, cartographers (map makers), environmentalists, surveyors, pilots, urban and land use planners, etc.

How we Use Our Environment

The learners are probably aware that most of the things we do in the places where we live depend mainly on the environment we live in. Guide them to understand this better by the end of this topic.

Activity 1.6: Exploring how you relate with the environment

1. Identify and make a list of the ways you and your family use the environment around your home.
2. How do the activities you carry out affect the local environment?
3. Think of any other place you know or you have read about where people use the environment in ways which are different from those in which you use it. What kind of environment is in that place, and how is it different from the one where you live?
4. Share what you have written with the rest of the class.
5. Write a plan for caring for and conserving the natural environment in your home area so that it remains useful to you and the people who will live there in future.
6. Through discussion, share your action plan with the rest of the class so that you comment on each other's views.

Resources to use: No specific resources needed

Skills: Analysing, comparison, creative thinking, forming own opinions

Values: Conserving the environment

Teacher Instruction

1. Guide learners to individually do Activity 1.6 in the Learner's Book.
2. Observe learners as they do the activity and ensure that everyone does the task.
3. Ensure that everyone comes up with a write-up based on their home area.
4. Write their ideas on the chalkboard as they share in a whole class presentation.
5. In a discussion, ask learners to explain their views in detail. Observe how they defend their views.
6. Assess each learner's action plan and give immediate feedback.
7. Wrap up the activity by pointing out that our own activities can affect our environment negatively and emphasise the need and responsibility to conserve it.

Possible Responses

These will depend on the learner's home area and the area chosen for comparison.

Activity of Integration

Tools to use: No specific tools

Skills: Critical thinking, creative thinking, problem solving

This task is aimed at assessing the extent to which the learner has grasped the concept of geography and the relevance of studying it to his/her own life and community. Encourage learners to come up with original views based on their own locality and imagination.

Teacher Instruction

1. Ask learners to do the task at the end of Chapter One in the Learner's Book individually. Give a time frame to ensure timely application of the acquired knowledge.
2. Ensure that every learner produces written responses to the task.
3. Mark their work and give feedback and guidance where needed.

Possible Responses

Personal views depending on the locality, resources present, nature of the community, level of development and economic activities people engage in.

Evaluation grid for the integration activity

Output	Criterion 1	Criterion 2	Criterion 3	Criterion 4
	Relevance	Accuracy	Coherence	Excellence
Advisory letter	Score 3: If the learner applies knowledge about the local environment and how 4-5 human activities are related to that environment. Score 2: If the response points out limited knowledge about the local environment and how 2-3 human activities are related to that environment. Score 1: If the response points out very limited knowledge about the local environment and how 1 human activity is related to that environment. x/3	Score 3: If the learner gives at 3-5 occupations a friend can engage in. Score 2: If the learner gives at least 2 occupations a friend can engage in. Score 1: If the learner gives one occupation a friend can engage in. x/3	Score 3: If the learner explains well at least 3 occupations a friend can engage in using geographic knowledge and skills. Score 2: If the learner explains with minimal distortion 2 occupations a friend can engage in using geographic knowledge and skills. Score 1: If the learner explains one occupation a friend can engage in using geographic knowledge and skills. x/3	Score 1: If the learner uses original ideas relating to the value of learning geography or the local environment where the friend lives. x/1
Total				x/10
A learner will be considered to have achieved the competency if s/he attains 2/3 of the total scores available (or of the assessment criteria).				

Chapter Two: Showing the Local Area on a Map

Overview

The concept of a map is not new in the minds of the learners. In this topic, the focus should be on the learners practicing and understanding how we generate maps and the qualities of a good and effective map. The learners will understand this best by using knowledge of the local area, including the school's immediate environment.

In this topic guide learners to:

- know what a map is and how this can be used to show places.
- understand that a map can tell us about places we have never seen.
- understand that maps shrink or reduce the real sizes of things to fit them on paper.
- realise that different kinds of maps can show areas of different sizes: local maps, wall maps, atlases and globes.
- draw a map of a local area.
- follow a map to get to the school or other places in the local area.
- appreciate that maps can help us move around an area and give us information about an area we have never visited.

What is a Map?

Think of the route you always follow as you travel from your home to the market or place of worship. Do you always use a map? Every day we use maps to move to different places. These maps are not always drawn but exist in our minds. They are called **mental maps**. There are also maps drawn on flat surfaces such as paper. These represent part of the earth or the whole earth. In the next Topic, you will learn that reading and using maps is one of the ways in which we can find out information about the earth.

Activity 2.1 Understanding What a Map Is

Study Figure 2.1 and do the activity that follows.

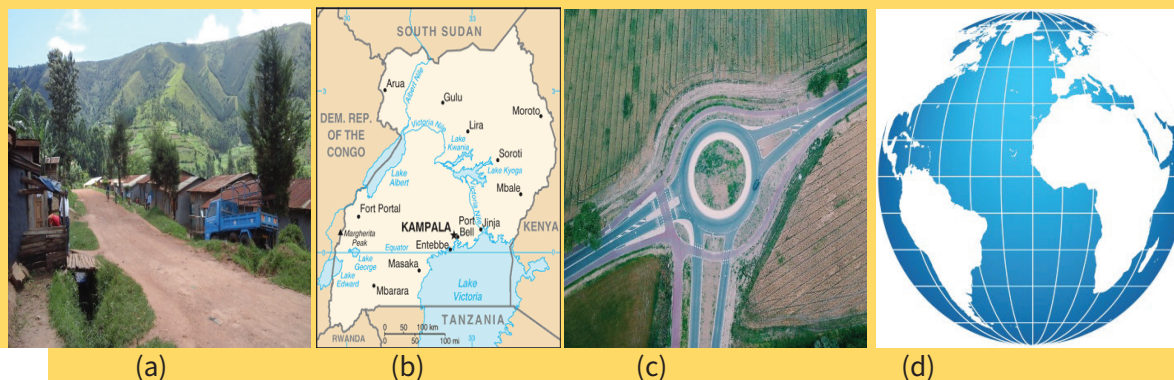


Figure 2.1: Maps and photographs

1. Decide which of the above drawings are maps e. Give reasons to support your views.
2. Which ones are photographs? Give reasons to support your views.
3. What kind of features can be shown on maps?
4. How can a photograph be useful when constructing a map of an area?
5. Write at least one sentence explaining what a map is and share it with the rest of the class.

Resources to use: Maps and photographs already presented in the Learner's Book

Skills: Observation, analysing drawings, finding out information

Teacher Instruction

1. Ask the learners to do Activity 2.1 in the Learner's Textbook.
2. Observe learners as they do the activity and assist them where they get challenges.
3. In a discussion, ask learners to explain why they have categorised the drawings the way they have done.
4. Call upon some learners at random to share with the class what they have written.
5. Challenge the rest of the class to comment on the views presented by the selected learners.
6. Lead learners in a discussion to share their comments as a class and to explain what a map is in their own words.
7. Wrap up the activity by pointing out that on a map, all features are reduced in size, drawn in plan, and represented using symbols.

Possible Responses

1. (b) and (d) are maps. This is because the features shown on these drawings are drawn in plan but not as actual objects. They show only a few selected features in the areas they represent.
2. (a) and (c) are photographs. This is because the features are shown as actual objects. They show all features in the areas they represent.
3. Features which are fixed in specific places on earth; mobile objects like vehicles cannot be represented on maps.
4. Photographs show the positions of features in an area and can be changed into maps by drawing such features in plan/as seen by the observer directly from the air.
5. The explanations may vary but should point out the idea: a representation of the earth or part of the earth with features drawn in plan or as seen directly from the air.

A map is a special kind of drawing of the earth's surface. It can show the whole world or part of it. The learners have learnt that we represent features on a map by means of outlines but not as pictures. The features on the ground are drawn in **plan** as if the observer is seeing them directly from the air.

On a map, real features and places are represented using **symbols**. These may include signs, colours, shades and abbreviations. How do features appear on a photograph? The place on the map where all symbols are explained is called a **key**. The learners are going to learn more about these later in this topic.

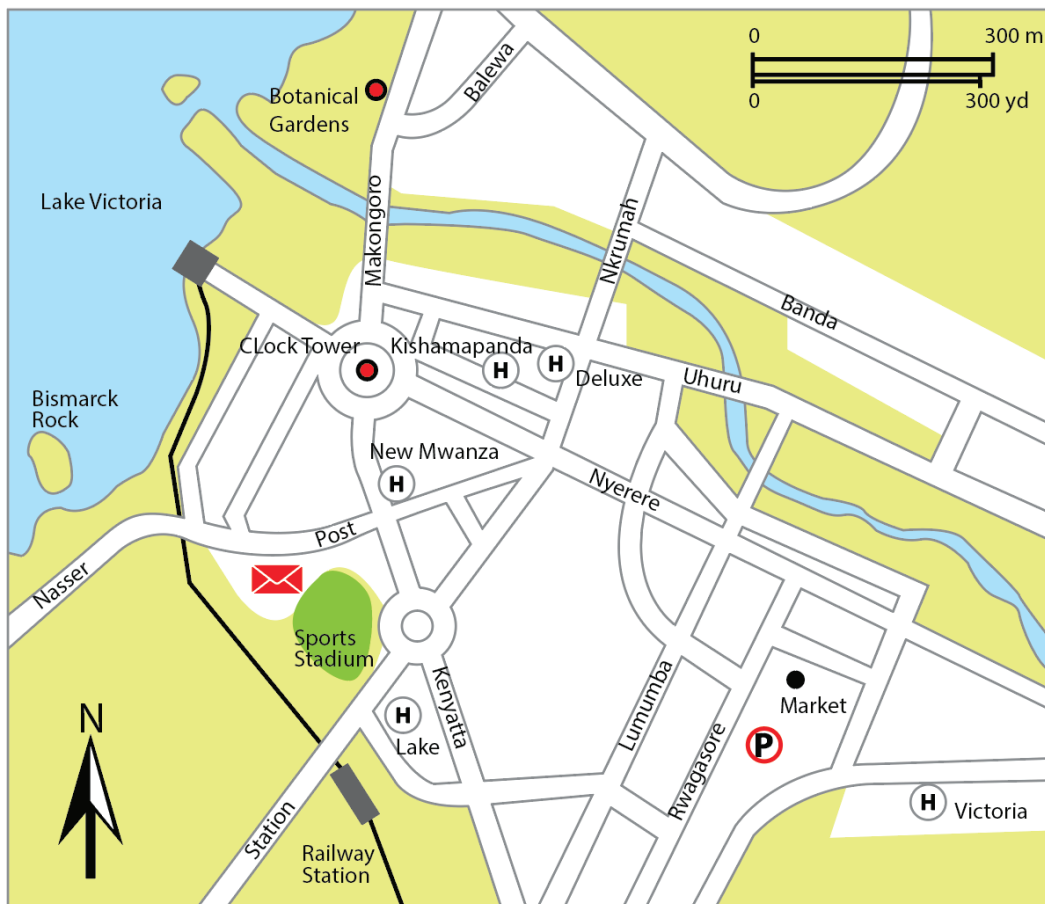


Figure 2.2: Map of Mwanza Town-Port

Activity 2.2: Representing Features on a Map

Look at Figure 2.2 above and do the following:

1. Identify the symbols used to represent the hotels, botanical garden, market, stadium, railway line, lake, rocky island and ferry terminal.
2. In your notebook, construct a key for the map.

Resources to use: Map already presented in the Learner's Book

Skills: Observation, finding out information, interpreting a map

Teacher Instruction

1. Ask the learners to do Activity 2.2 in the Learner's Book.
2. Observe learners as they do the activity and assist them where they get challenges.
3. In a discussion, ask learners to explain how they have arrived at the symbols they have identified.
4. Mark the learners' work and give immediate feedback.

Possible Responses

- Hotels – encircled letter H; botanical garden – violet colour; market – light purple/violet colour; stadium – yellow colour; railway line – solid black line; lake – light blue/water – blue colour; rocky island – solid land encircled with light blue line; and ferry terminal – black square.
- The key should consist of the labeled drawings of the symbols listed in (1) above.

Mapping a Local Area

The learners now know what a map is and how physical and built features can be shown on a map. Every time you move to a different place, there are certain important features which you see along the way. These assist you in tracing the place you are going to. Ask the learners to think of those features and make a list of them. The features they have listed are called **landmarks**.

Activity 2.3: Drawing a map of a small area

- Draw a map to show a visitor to your area how to get to your school.
- Exchange your map with your neighbour.
- Discuss and comment on each other's maps.
- Share your comments with the rest of the class.

Resources to use: No special tools needed; knowledge of representing features on a map

Skills: Map drawing, interpreting a map and using a map, analysing information.

Teacher Instruction

- Organise the learners into pairs and ask them to do Activity 2.3 in the Learner's Book.
- Observe the learners as they do the activity and assist them where they get challenges.
- Ensure that pairs exchange maps and comment on each other's maps.
- In a discussion, ask how they can represent the features in their area on a map.
- Guide learners in a discussion to share comments on each other's maps; and correct the mistakes made, if any.
- Wrap up by pointing out that on a route map, we put major features that other people can use to follow the route (map).

Possible Responses

- Maps drawn will vary depending on the area in which the school is found.
- Comments will depend on individual maps; but should point out how well the symbols used represent the real features in the area mapped.

Qualities of a Good Map

Not every map drawn can be used to find our way about or to describe an area. When we draw maps, we take great care to ensure that other people can read, interpret and use our maps. Such maps are called good maps.

For us to be able to use maps to move around places or to guide other people to places they have never been to, or to describe an area, the map should have certain features that assist us in doing so. The learners, in their discussions, may have probably pointed out that they could follow a map to reach each

other's home using a map title, key and a **compass rose** or direction finder. These are called qualities of a good map.

Activity 2.4: Identifying qualities of a map

1. In pairs, draw a map showing the route from your school to home that included the physical and human features along the way.
2. Swap the maps so that each can find out where the other lives.
3. Can you follow that map and reach your friend's home?
4. What things on the map can help you to reach there?
5. Ask your friend to describe the things on your map that can help him/her to follow the map up to your home.

Resources to use: No special tools needed; knowledge of the local area

Skills: Observation, analysing, map drawing, map reading

Teacher Instruction

1. Organise learners into pairs and ask them to do Activity 2.4 in the Learner's Book.
2. Observe learners as they do the activity and assist where they get challenges.
3. In a discussion, ask learners to explain the major landmarks (features) each will look for as they follow the map to each other's home.
4. Wrap up the activity by emphasising the features that make a map a good source of geographical information and guiding tool when we are using it.

Hint: Ensure that learners come up with maps basing on their knowledge of the local area, and also develop the required skills.

Possible Responses

1. The maps drawn will vary depending on which direction from the school the learner lives.
2.
3. Subjective(Yes/No)
4. Map title, direction finder or compass rose, key interpreting symbols.
5. Map title, direction finder or compass rose, key interpreting symbols.

Activity of Integration

Using the knowledge you have got from this topic, write a letter of not more than one page to your friend in another school explaining how they can produce a map of their home area and how they can use it to understand the local geography of the area.

Tools to use: No specific tools

Skills: Critical thinking, creative thinking, problem solving

This task is aimed at assessing the extent to which the learner has grasped the skill of mapping a local area and using the map to find out about the area. Encourage learners to come up with original ideas based on the process of producing a map, qualities of a good map and their own imagination.

Teacher Instruction

1. Ask learners to do the task at the end of Chapter Two in the Learner's Book individually. Give a time frame to ensure timely application of the knowledge learnt and skills acquired.
2. Ensure that every learner produces written responses to the task.
3. Mark the learners' work and give feedback and guidance where needed.

Possible Responses

Explanation of how one can represent three-dimensional features on a flat piece of paper; using different symbols; and the qualities the map should have so that other people can read and understand it. Also, how the map can be used to move around, interpret and record the geographical features in the area.

Chapter Three: Maps and Their Use

Overview

In this topic, help learners to understand the different ways in which they can use maps in their day-to-day lives and in the world of work, including finding out geographical information, travelling from one place to another, land use planning and the development of regions, and the conservation of resources.

In this chapter, guide learners to:

- a) use and interpret symbols and identify features on a map using a key.
- b) identify directions on a map, using basic compass points.
- c) follow routes using a map.
- d) draw a map using a simple scale and using scale on a map.
- e) use letter and number co-ordinates or bearings and directions to locate places on a map.
- f) locate places on an atlas map using latitude and longitude and describe the places from information on the map.
- g) understand the difference between a map and a photograph.
- h) understand that there are many types of maps on different scales.
- i) use a linear scale and representative fraction.

Map Scale

In order to represent features and places on a map, we reduce their actual size by a certain amount. To understand this, let us see how scale is used in pictures or photographs.

Activity 3.1: Understanding scale



Figure 3.1: Joel

Look at the picture of Joel in Figure 3.1 and do the following:

1. Measure the length of his arm and leg in centimetres.
2. Measure his height in centimetres.
3. Do you think that is the real size and height of Joel?
4. If it is not, explain what has happened to Joel's real size.

Resources to use: Measuring tool calibrated in centimetres

Skills: Observation, measuring, critical thinking

Teacher Instruction

1. Guide learners to do Activity 3.1 in the Learner's Book.
2. Observe learners as they do the activity and assist where they get challenges.
3. In a discussion, ask learners to imagine the real size of Joel and explain why he looks much smaller and shorter in the photograph.
4. In a discussion still, lead learners to find out the different types of scale.
5. Wrap up the activity by pointing out that without using a scale, we cannot fit real objects on a map; and that for a map to be a true representation of real features on earth, all features have to be reduced by the same amount.

Hint: Ensure the acquisition and development of the skills listed above. Use the ideas got from the photograph to guide learners to understand the concept of a scale.

Possible Responses

1. Arms = 2 cm.
2. Legs, approximately 2.5 cm.
3. Height, approximately 5 cm
4. No
5. Real size reduced in order to fit on a small paper/in small space.

Types of Scale

Map scale can be expressed in different ways. Such different ways of expressing the scale are called **types of scale**. Whichever way it is stated the scale can assist you in using the map. In Activity 3.1 above, you have learnt that the scale used to fit Joel in the photograph is 1:30. This means that every part of Joel on the photograph is $\frac{1}{30}$ its real length and size. This is called the **representative fraction scale**. You will find this scale on many maps you are going to use in this chapter. It tells you how much the area shown on the map has been reduced. Thus you can use it to find out how big the place on the map is on the real ground.

On most maps, a scale is usually represented as a straight line divided into several numbered units. This is called a **linear scale** or bar scale. It helps you to find how far one place is from another. It also helps you to measure distance along roads, railways and other linear features on the map.

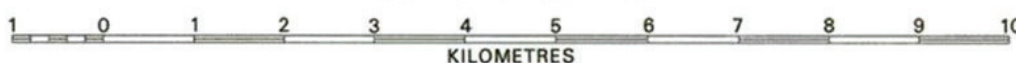


Figure 3.3: A linear scale

Guide learners to find out this on the map in Figure 3.2. Let them measure the length of each unit on the scale. What distance does one centimetre represent? You have probably found out that every 1 cm on the line scale stands for 500 m or half a kilometre on the ground. If you convert kilometres to centimetres, you will find that 1 cm stands for 50,000 cm. Express it as a representative fraction and see what it comes to. This means that on the map every 2 cm represent 1 km.

Activity 3.2: Exploring scale

In groups, go outside the classroom and do the following:

1. Using a metre rule or a measuring tape, measure the length and width of your classroom block.
2. Draw a map of the classroom block on paper to scale.
3. State the scale you have used to draw the whole block on paper as:
 - i) a representative fraction
 - ii) a linear scale.

A scale can also be expressed in words. Ask the learners to look at Figure 3.2 again. Let them write its scale, 1: 50,000 in words. They could have written it as “Every one unit on the map represents one unit on the ground where the map was taken from” or “One centimetre on the map represents five thousand centimetres”. What they have written is called a **statement scale**.

Resources to use: Metre rule/measuring tape and drawing tools

Skills: Collaboration, observation, measuring, scaling features in the real world, drawing a map.

Teacher Instruction

1. Organise learners into groups. Lead them outside and guide them to do Activity 3.2 in the Learner’s Book.
2. Observe learners as they do the activity and notice how they share responsibilities and exchange views in each group. Ensure that every learner actively participates in the activity.
3. Ensure that every group produces a drawn map to be shared and compared with those drawn by other groups.
4. Call upon group representatives to display their maps together with the types of scale and ask the class to comment on each.
5. Guide learners to express the representative fraction and linear/bar scale as a statement.
6. Wrap up the activity by pointing out the three ways in which we can express the scale of a map.

Possible Responses

1. Will depend on the size of the classroom block.
2. Will depend on the size and shape of the classroom block.
3. Will vary from one group to the other.

Using the Linear Scale to Measure Distance on a Map

Whenever we are going on a journey, we need to get prepared. We need to estimate the amount of money and time we shall spend. This is not always easy if we do not know the distance we are going to travel.

When we have a map of the area, it is possible to estimate the whole journey by using its linear scale. What we need is to know the scale of the map.

Activity 3.3: Applying scale

In groups:

Discuss and suggest the tools you need to measure the distance of the walkway or footpath from the main road to the office of your head teacher.

1. Get any one of the tools you have suggested, move outside and measure that distance.
2. Share your results with other groups.
3. Are all your results the same? If not, why do you think they are different?

Resources to use: Measuring tools to be suggested by the learners, these may include: meter rule, measuring tape, foot ruler, strings, paces or strides

Skills: Communication, collaboration, measuring, recording, interactive skills

Teacher Instruction

1. Organise learners into groups and guide them to do Activity 3.3 of the Learner's Book.
2. Guide learners in a discussion to suggest the tools they may need to measure distance.
3. In a discussion, ask learners to give reasons for their choice of measuring tools.
4. Observe learners in each group as they measure distance. Notice how they share responsibilities and ideas, and give assistance where they may have challenges.
5. Guide learners in a discussion to share and compare the results got from the field.
6. Call upon group representatives to present their results.
7. Wrap up the activity by pointing out that the tools they have used to measure distance on the real ground cannot be used on maps. So on maps we use different methods to find out distance along features and between places.

Using a Pair of Dividers

Activity 3.4: Using dividers

Get a pair of dividers, foot ruler (scale) and a pencil and do the following:

1. Look at Figure 3.5. From where the road begins, identify a portion which is almost straight. Mark it off using a pencil and give it a number.
2. Repeat this until you have divided the whole road into fairly straight portions.
3. Using a pair of dividers, measure the length of the first portion.
4. Transfer the pair of dividers onto the foot ruler; place the left hand pointer of the divider at zero cm and read off the length indicated by the right hand pointer.
5. Record the length in your notebook.
6. Repeat steps (3), (4) and (5) above until you have measured all portions of the road.
7. Add up all distances measured in order to get the total length of the road.
8. Share your answer with the rest of the class and see whether you all have got the same length.



Figure 3.5: A road with bends



Figure 3.4: How to measure distance using a pair of dividers

Resources to use: Pair of dividers, foot ruler, and writing tools

Skills: Measuring, recording, communication

Teacher Instruction

1. Guide learners to do Activity 3.4 in the Learner's Book.
2. Ensure that each learner has the necessary tools and can use them correctly.
3. Observe learners as they do the activity and assist where they get challenges.
4. In a discussion, ask learners why in step (4) they transfer their measurement on to the foot ruler. Ask for the equivalent of a foot ruler on a map.
5. Wrap up the activity by asking learners to summarise the steps involved in measuring winding distances using dividers in their notebooks.

Hint: Ensure the acquisition and development of the skills listed above.

Possible Responses

Length of the road is 10.8 cm – 11.0 cm

Using a Straight Edge of Paper

Activity 3.5: Measuring distance with a piece of paper

In pairs, get a pencil, foot ruler and a small but long piece of paper with a straight edge.

Using Figure 3.5 again, do the following:

1. Towards the end of the left hand side of the edge of paper, put a mark to show the starting point of the road and place it along the road with the marked point against the starting point of the road.
2. Hold the paper firmly against the starting point and turn it along the road until part of the road disappears underneath the edge of paper.
3. Put a mark on both the paper and map at the point where the road leaves the edge of paper. When you do this, then you have measured off a fairly straight portion of the road.
4. Starting at the point you have marked, repeat steps (2) and (3) until you reach the end point of the road and mark it on the edge of paper.
5. Transfer the edge of paper onto the foot ruler and read off the length of the road.
6. Compare your result with the one you got in Activity 3.4.

Resources to use: Blank piece of paper with a straight edge, foot ruler and writing tools

Skills: Measuring, recording, communication

Teacher Instruction

1. Guide learners to do Activity 3.5 in the Learner's Book.
2. Ensure that each learner has the necessary tools and can use them correctly.
3. Guide learners to study Figure 3.6 in the Learner's Book in order to understand the steps involved in using the measuring method.
4. Observe learners as they do the activity and assist where they get challenges.
5. Wrap up the activity by asking learners to summarise the steps involved in measuring winding distances using a straight edge of paper.

Hint: Ensure the acquisition and development of the skills listed above.

Possible Responses

Length of the road is 10.8 cm – 11.0 cm.

Measuring Distance with a Thread

Activity 3.6: Measuring distance using a thread or thread

1. Carry out library research on how we can use a string or thread to measure distance on a map.
2. Make notes pointing out all the steps involved.
3. Share your notes with the rest of the class.
4. Why do you think it is advisable to use cotton thread when measuring distance?
5. Use the string or thread method to measure the distance along any one road on the map in Figure 3.5 above.

Resources to use: Cotton thread/string, foot ruler and writing tools

Skills: Measuring, recording, communication

Teacher Instruction

1. Guide learners to do Activity 3.6 in the Learner's Textbook.
2. Ensure that each learner has the necessary tools and can use them correctly.
3. Observe learners as they do the activity and assist where they get challenges.
4. Guide learners in a discussion to share their research notes. Summarise their presentation on the chalkboard and correct mistakes, if any.
5. Wrap up the activity by asking learners to summarise the steps involved in measuring winding distances using a string or thread in their notebooks.

Hint: Ensure the acquisition and development of the skills listed above.

Possible Responses

2. Notes pointing out steps involved in using a string or thread to measure distance. These should include:
 - i) Get a string or thread and if possible wet it so that it can be aligned to the winding feature.
 - ii) Identify the two points between which distance is to be measured and mark them using a pencil.
 - iii) Align the string or thread with the winding feature between the two points following all the bends.
 - iv) Mark the two end points on the string or thread.
 - v) Transfer the string or thread on to the linear scale of the map and read off the distance.
3. Length of the road, 10.8 cm – 11.0 cm.
4. The cotton thread can measure distance with a high degree of accuracy since it is not elastic.
5. The comparison of results should give much the same road distance.

Using the Linear Scale to Calculate Area on a Map

When using a map, we may be interested in knowing how big certain features are, for example, a farm, forest, swamp, township or an airfield. Some of these features have shapes which are similar to those of polygons, which you have learnt about in mathematics. These are called features with **regular shapes**. Other features have shapes which do not resemble any polygon. These are called **irregular shapes**. Ask the learners to look at the map of Uganda and find out the kind of shape Lakes Victoria and Kyoga have. Whatever shape a feature may have, we can estimate its size or area.

Activity 3.7: Applying formula

In small groups, get a metre rule or any other measuring tool and do the following:

1. Look around your classroom. What kind of shape is it?
2. Draw its outline in your notebook.
3. Calculate the area of the classroom.
4. Explain how you have got the area.

Resources to use: Metre rule/foot ruler/measuring tape and writing tools

Skills: Measuring, recording, drawing a map, calculating area

Teacher Instruction

1. Organise learners into groups and guide them to do Activity 3.7 in of the Learner's Book.
2. Ensure that each learner has the necessary tools and can use them correctly.
3. Observe learners as they do the activity and assist where they get challenges.
4. In a discussion, ask learners why they have decided to use the formula they have applied.
5. Wrap up the activity by emphasising that when calculating areas of features on a map, we use the linear scale. For features with regular and irregular shapes, we use different methods to calculate their areas.

Hint: Make use of the learners' prior knowledge of calculating area got from mathematics to guide them to calculate areas of features on maps.

Possible Responses

1. Will depend on the shape of the classroom.
2. Outline to depend on the shape of the classroom.
3. To depend on the dimensions of the classroom.
4. The formula will depend on the shape of the classroom. Area to be recorded in square units.

The learners their classroom resembles a certain shape. So to get the area of the classroom they have used the formula for calculating the area of that shape. In the same way, we use mathematical formula to calculate areas of features with regular shapes. Remind them to use the linear scale in order to get the measurements or dimensions of the features.

Activity 3.8: Using a formula on a map

In pairs, study Figure 3.7 and do the following:

- a) Calculate:
 - i) the area of the aerodrome,
 - ii) the area of the railway quarters.

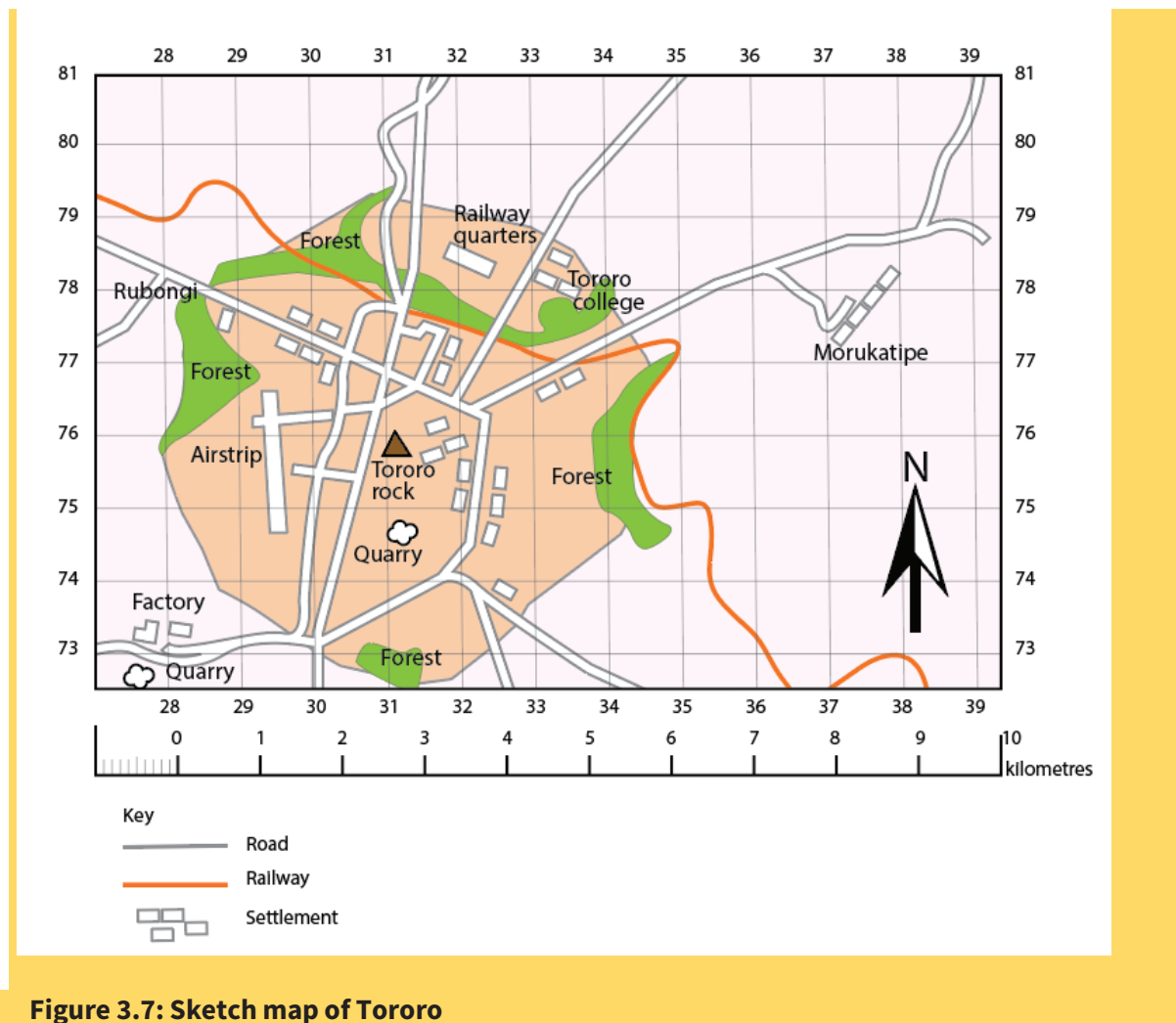


Figure 3.7: Sketch map of Tororo

Resources to use: Sketch map is already presented in the Learner’s Book, dividers, edge of blank paper, and writing tools

Skills: Reading a map, measuring, recording, calculating area

Teacher Instruction

1. Organise learners into groups and guide them to do Activity 3.8 in the Learner’s Book.
2. Ensure that each learner has the necessary tools and can use them correctly.
3. Observe learners as they do the activity and assist where they get challenges.
4. In a discussion, explain to the learners why they have to subdivide the aerodrome into several pieces.

Hint: Make use of the learners’ prior knowledge of calculating area got from mathematics to guide them to calculate areas of features on maps.

Possible Responses

To depend on the dimensions of these features on the sketch map.

Using the Map Grid

Think of physical and human features in the area around your school or home area with irregular shapes. Make a list of those features. If we want to find out the area of such features on a map, we can use the **map grid** or graph paper method. On most topographic maps, each grid square is usually 1 square kilometer. So the total number of squares covered by the feature is equal to the area of the feature.

Activity 3.9: Estimating area

Individually, look at Figure 3.8 and:

1. Identify the area covered by the lake.
2. Count all grid squares which are fully covered by the lake (assume that each square has an area of 1 square kilometre). Write the number in your notebook.
3. Count all squares which are touched but not fully covered by the lake and divide their number by 2. Write the result in your book. Why do you think we divide these by 2?
4. Add the values you have got in steps (2) and (3) above. Your final result is the area of the lake.
5. State the formula you have used to get the area of the lake.
6. Swap your results with your friend, and then discuss them with your teacher.

Resources to use: A picture is already presented in the Learner's Book.

Skills: Measuring, recording, calculating area

Teacher Instruction

1. Guide learners to do Activity 3.9 in the Learner's Book.
2. Observe learners as they do the activity and assist where they get challenges, especially on deciding which grid squares are full and which ones are not.
3. In a discussion, ask learners why we divide the sum of all grid squares not fully covered by the feature by 2.
4. Ensure that every learner comes up with the formula used to calculate the area of the lake; correct any mistakes in the formula.
5. Wrap up the activity by emphasising that on most topographic maps each grid square is usually 1 square kilometer. So the total number of squares covered by the feature is equal to the area of the feature.

Hint: Ensure the acquisition and development of the skills listed above.

Guide learners to divide irregular features into regular shapes and estimate the area.

Possible Responses

Area of the lake = 12 square kilometers.

Using a Mathematical Formula

Alternatively, we can divide the irregular feature into several shapes whose areas can be calculated using known mathematical formulae. Do Activity 3.10 in order to understand this.

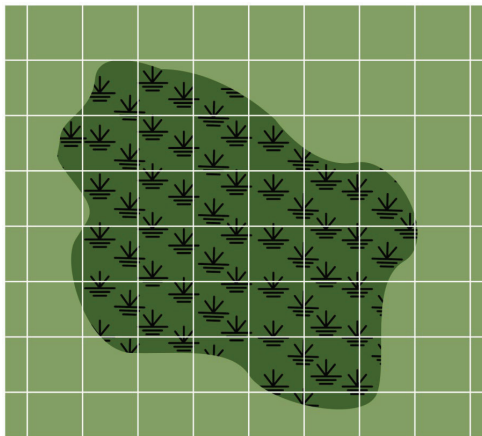


Figure 3.9: Map of a swamp

Activity 3.10: Applying a formula to irregular features

In pairs, look at Figure 3.9 and do the following:

1. Divide the swamp into figures with regular shapes and give each figure or polygon an identification number.
2. Measure the dimensions of each polygon in kilometres.
3. Using a suitable formula, calculate the area of each polygon.
4. Add the areas of all polygons to get the total area of the swamp.

Resources to use: A picture is already presented in the Learner's Book, a pair of dividers/thread/strip of paper, foot ruler

Skills: Measuring, recording, calculating area

Teacher Instruction

1. Organise learners into pairs and guide them to do Activity 3.10 in the Learner's Book.
2. Observe learners as they do the activity and assist where they get challenges.
3. In a discussion, ask learners the possible regular shapes/polygons the swamp can be divided into and the formula for calculating the area of each.
4. Mark the learners' work and give prompt feedback.
5. Wrap up the activity by emphasising that the area of the swamp obtained is an estimate since some parts of the swamp might not have come out as regular polygons.

Hint: Ensure the acquisition and development of the skills listed above.

Possible Responses

The area of the swamp to range from 14–15 square km.

How to Find Places and Features on a Map

On the surface of earth and on maps, different features are found in different places. To be able to use the map, you need to describe where features are found. Now you are going to learn how you can do this.

Activity 3.11: Identifying features on a map

Look at Figure 3.2 again and do the following:

1. Identify:
 - i) any three rivers shown on the map.
 - ii) one permanent swamp on the map.
 - iii) one place where a school is found.
2. Explain how you have been able to find those features.

Resources to use: A sketch map is already presented in the Learner's Book

Skills: Reading a map, communication

Teacher Instruction

1. Guide learners to do Activity 3.11 in the Learner's Book.
2. Observe learners as they do the activity and assist where they get challenges.
3. In a discussion, ask learners to explain the method they have used to identify the features on the map.

Hint: Ensure that every learner does the activity individually in order to develop the skills outlined above.

Possible Responses

1. i) Rivers: To depend on the map.
 ii) Permanent swamp: To depend on the map.
 iii) Place with a school: To depend on the map.
2. Looked at the key for symbols representing the features, then read names/labels written along or against the features.

Grid and Grid References

Topographic maps have a network of lines drawn all over them. These are called grid lines. They cross one another at right angles and form a grid of squares. These lines can also help you to find features anywhere on the map. The vertical lines are called '**eastings**' as they increase in value as you move east on the map. The horizontal lines are called '**northings**' as they increase in value as you move north on the map. (see Figure 3.10).

Activity 3.12: Using grid reference

In pairs, look at Figure 3.10 and:

1. state the four-figure grid reference of points B, C and D.
2. state the six-figure grid reference of points A, B and C.
3. write at least two sentences explaining the advantages of using four-figure and six-figure grid references to locate features on a map.

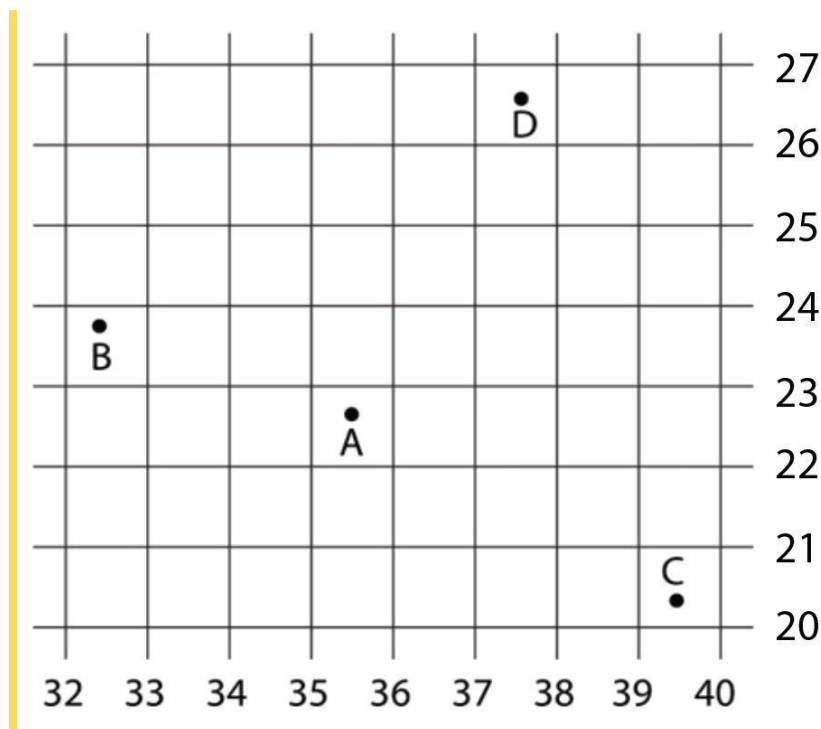


Figure 3.10: Map grid

Resources to use: Foot ruler, pencil and grid, which is already presented in the Learner's Book

Skills: Reading a map, using number co-ordinates, communication

Teacher Instruction

1. Organise the learners into pairs and guide them to do Activity 3.12 in the Learner's Book.
2. Observe learners as they do the activity and assist where they get challenges.
3. In a discussion, ask learners to describe the steps they have followed to come up with the grid references.

Hint: Make use of the learners' knowledge of number co-ordinates learnt in mathematics to guide them to develop the skill further.

Possible Responses

1. The four-figure grid reference for B is 3224, C is 3921 and D is 3726.
2. The six-figure grid reference for A is 354234, B is 323241 and C is 393212.
3. The four-figure grid reference enables a map user to estimate the position of a feature
4. The six-figure grid reference enables the map user to accurately locate a feature on the map. It gives the actual position of the feature

Compass Directions

Activity 3.13: Revising a compass

Using your knowledge from primary school,

1. explain what you understand by a compass.
2. draw a diagram of a compass showing the cardinal points.

Resources to use: Foot ruler, protractor, pencil

Skills: Drawing, measuring, using a compass

Teacher Instruction

1. Guide learners to do Activity 3.13 in the Learner's Book.
2. Observe learners as they do the activity and assist where they get challenges.

Hint: Ensure that every learner does the activity individually in order to develop the skills outlined above.

Possible Responses

1. It is an instrument/tool that we use to find the direction of something. Or It is an instrument used by sailors, pilots and ship captains to find the direction they want to take.
2. A four-point compass rose; with the directions N, S, E, W marked and named.

The line diagram which the learners have drawn in Activity 3.13 is not the actual compass. It is called a **compass rose** or a direction finder. To be able to use the compass to find directions more accurately, we further subdivided the cardinal directions into four other directions. These are called **intermediate directions** or inter-cardinal points. They are northeast (NE), southeast (SE), southwest (SW) and northwest (NW).

Note: Inter-cardinal points combine two directions, e.g. northeast, meaning that you move east, then north, at the same time. In other words, northeast lies north of the east.

Activity 3.14: Subdividing a compass

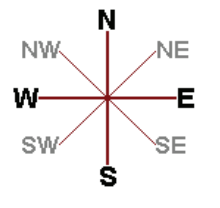


Figure 3.12: An eight-point compass rose

Copy the compass rose in Figure 3.12 into your notebook.

1. Using a protractor, measure and state:
 - i) the angles between nearby cardinal directions.
 - ii) the angles between cardinal directions and intermediate directions.
2. Divide the angles between cardinal directions and intermediate directions halfway using straight lines and measure the angle of each.
3. Name the new directions created by subdividing the intermediate directions.

Resources to use: The diagram of a compass rose is already presented in the Learner's Book, protractor, foot ruler

Skills: Drawing, measuring, using a compass

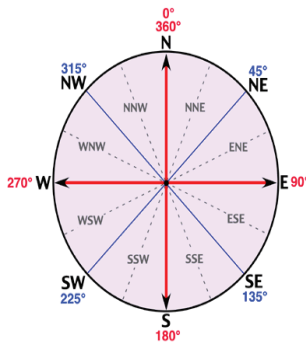
Teacher Instruction

1. Guide learners to do Activity 3.14 in the Learner's Book.
2. Observe learners as they do the activity and assist where they get challenges.

Hint: Ensure that every learner does the activity individually in order to develop the skills outlined above.

Possible Responses

A sixteen-point compass rose with all directions labeled.



In Activity 3.14 the learners have come up with a compass rose with 16 points. This is called a **sixteen-point compass**. The new directions they have got combine three directions. These enable you to find and describe directions of all places and features accurately. See Figure 3.12.

To determine the direction of one feature or place from the other, draw a compass rose at the point from which you want to describe direction. Then draw a straight pencil line connecting the two points. Read off the direction corresponding or closest to the point whose direction you want to find.

Bearing

You can also describe the position of a feature or place from another using their distance apart in the form of an angle. The angle is measured clockwise from the north line. This angular distance is called a bearing. It is stated with three figures. For angles less than 100o we write a zero before the measured angle, for example, 045o instead of 45°. To understand this better, follow the steps below.

To determine the bearing of one point from another, draw a compass rose at the centre of the point from which you want to determine the bearing. Then draw a line joining the two points. Using a protractor, measure clockwise the angle between the north and the line you have drawn joining the two points. Look at Figure 3.13 and state the bearing of A from B and of B from A.

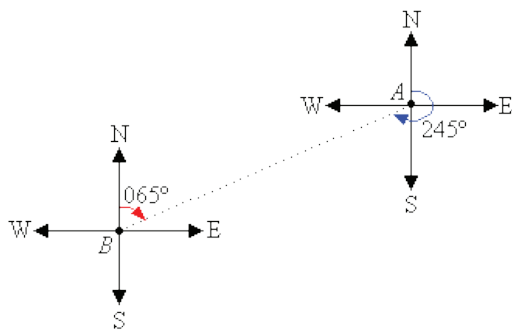


Figure 3.13: How to determine bearing

Activity 3.15: Finding bearing

Study the sketch map of Tororo in Figure 3.7 and determine:

1. the bearing of the cement factory from the quarry in Tororo municipality.
2. the bearing of Tororo College from the ginnery near Mudodo river.
3. the bearing of the ginnery near Mudodo river from Tororo College.

Resources to use: A sketch map as presented in the Learner's Book, protractor, foot ruler

Skills: Drawing, measuring, determining bearing/locating features using bearing

Teacher Instruction

1. Guide learners to do activity 3.15 in the Learner's Book.
2. Ensure that every learner has the necessary tools and uses them accurately.
3. Observe learners as they do the activity and assist where they get challenges.

Hint: Ensure that every learner does the activity individually in order to develop the skills outlined above.

Possible Responses

1. $247^\circ/248^\circ/249^\circ$
2. $79^\circ/80^\circ/81^\circ$
3. $259^\circ/260^\circ/261^\circ$

Using Latitude and Longitude

Lines of Latitude

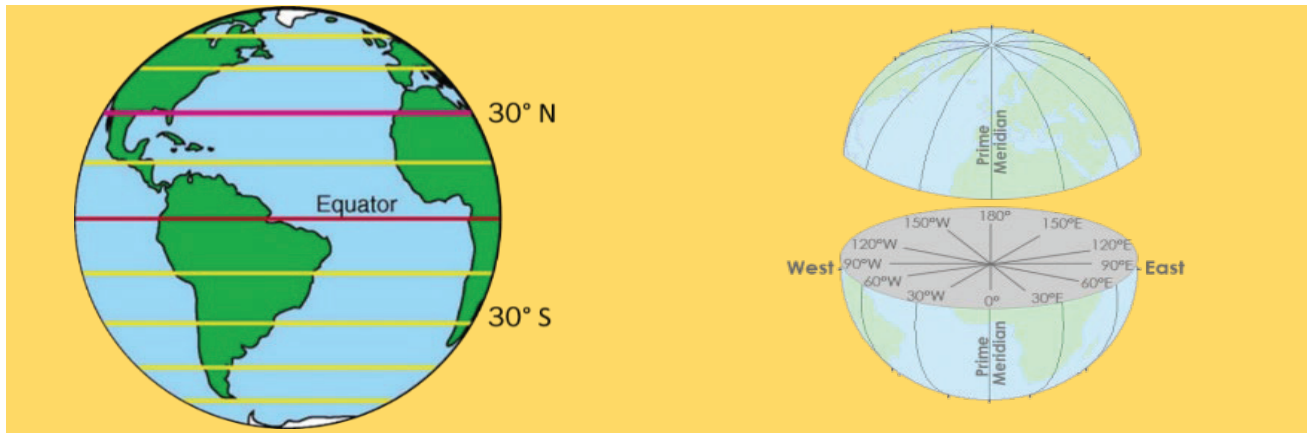


Figure 3.14: (a) Lines of latitude (b) How the equator divides the world

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.

Resources to use: Diagrams are already presented in the Learner's Book.

Skills: Interpreting diagrams, Critical thinking

Teacher Instruction

1. Organise the learners into pairs and guide them to do Activity 3.16 the Learner's Book.
2. Ensure that every learner takes an active part in the discussion.
3. Observe learners as they do the activity and assist them where they get challenges.
4. Guide the learners in a whole class discussion to share the ideas raised by each pair.
5. In a discussion still, ask learners how they can crosscheck the accuracy of their answers. Guide them to use the Internet and textbooks to verify all their answers.

Hint: Emphasise that every learner does the activity individually in order to develop the skills outlined above.

Possible Responses

1. Parallel lines drawn on the map running from west to east. They are imaginary lines drawn on maps showing how far places are from the Equator.

2. First, by measuring the distance of places using angles from the centre to the surface of the Earth. Then places lying at equal distance round the world are joined using a line of latitude.

Activity 3.17: Understanding longitude

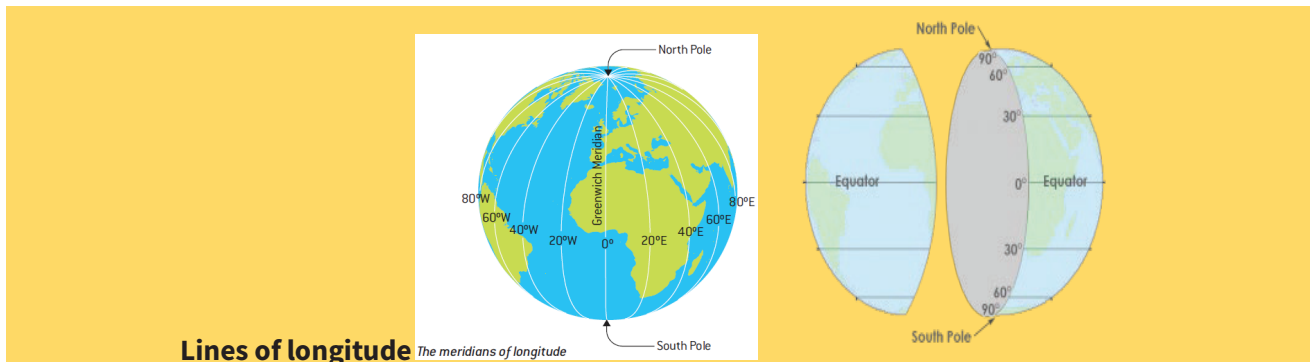


Figure 3.15 (a): Lines of longitude

(b) How the Prime Meridian divides the earth

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.

Resources to use: A sketch map is already presented in the Learner's Book, atlases

Skills: Reading a map, using a map

Teacher Instruction

1. Guide the learners do Activity 3.17 in the Learner's Book.
2. Observe learners as they do the activity and assist them where they get challenges.
3. Randomly select some learners and ask them to present their ideas to the class. Ask the whole class to critic the ideas presented by each selected learner.
4. In a discussion still, ask learners to ask one another questions and to defend the ideas they raise. Guide them to use the Internet and textbooks to verify their answers.

Possible Responses

1. Parallel lines drawn on the map running from the North Pole to the South Pole. They are imaginary lines drawn on maps showing how far places are from the Prime Meridian.
2. First, by measuring the distance of places using angles from the centre to the surface of the Earth. Then places lying at equal distance round the world are joined using a line of longitude.
3. Lines of longitude run North-South while lines of latitude run East-west

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: Using longitude and latitude

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

Resources to use: A map is already presented in the Learner's Book, Atlas

Skills: Reading a map, using a map

Teacher Instruction

1. Guide the learners do Activity 3.18 in the Learner's Book.
2. Observe learners as they do the activity and assist them where they get challenges.

3. Randomly select some learners and ask them to present their ideas to the class. Ask the whole class to critic the ideas presented by each selected learner.
4. Guide the learners to use the Internet or Library search to verify their responses.

Possible Responses

1. Arua -3.0°N, 30.9°E; Lira – 2.2°N, 32.9°E; Mbarara – 0.6°S, 31°E; Soroti – 1.7°N, 33.6°E; Moroto – 2.5°N, 34.7°E; Jinja – 0.3°N, 32.6°E
2. Angola - 11.2°S, 17.9°E; Chad – 15.5°N, 18.7°E; Australia – 25.3°S, 133.8°E; Ecuador – 1.8°S, 78.2°W; Uganda 1.5°S, 32.3°E; Egypt – 26.8°N, 31°E; India – 21.0°N, 79°E; Iran – 32.4°N, 53.7°E.
3. Abidjan; Cape Town, Bahia Blanca, Kampala, Singapore, Karla, and Lusaka

Note: The responses that have been given by the learners are not very accurate because they are just estimates. Assure the learners that through continuous practice, they will be able to determine latitude and longitude more accurately

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.

This task is aimed at assessing the extent to which the learner has grasped the skill of reading and using a map to find out about the area. Encourage learners to come up with original ideas based on the survey map provided.

Teacher Instruction

1. Ask learners to do the task at the end of Chapter Three in the Learner's Book individually. Give a time frame to ensure timely application of the knowledge learnt and skills acquired.
2. Ensure that every learner produces written responses to the task.
3. Mark the learners' work and give feedback and guidance where needed.

Tools to use: No specific tools

Skills: Reading and using a map, drawing a sketch of a given map, measuring distance on a map, critical thinking, problem solving

Possible Responses

Responses will depend on the locality and the map provided.



1. The route chosen should be one along which the learner can view a range of interesting features. This will vary depending on one's interest. The tourist activities at stopover points (itinerary) will depend on the features of interest.
2. Distance will vary depending on the route chosen.
3. Cost of the journey will depend on the route taken.

Chapter Four: Ways of Studying Geography

Overview

In this topic, help the learners to understand ways in which they can find out geographical information about both local and faraway places. Use a range of interactive methods to enable the learners to develop the skills listed under each activity.

In this topic, guide learners to:

- understand how to use and apply the different techniques used in fieldwork.
- use maps, aerial images, photographs, graphs and charts to communicate data.
- analyse and present the statistics gathered in fieldwork.
- write conclusions to summarise fieldwork findings.
- know the three different angles from which photographs can be taken and the terms used to describe the different parts of a photograph.
- appreciate the effect of perspective on oblique photographs.
- differentiate between photographs and maps.
- make a sketch of an area on a photograph and describe an area seen on a photograph.
- appreciate that fieldwork and photographs are important because geography is the study of the real world.
- use fieldwork to study a trading centre, town or other urban area.

In this topic, the learners are going to learn how and where they can find geographical information. After reading about and using the different sources of geographical information, they should 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.

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

(a)

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.

"Apart from mountain gorillas, Uganda has a lot to offer. If Ssesse 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

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.



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

(b)



(c)

Figure 4.1: Some sources of geographical information

1. Summarise the information presented in the table, newspaper extract and photograph.
2. Draw a graph to show the production of any **one** crop shown in the table 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.

Resources to use: Graph paper, foot ruler, lead pencil, coloured pencils

Skills: Collaboration, analysing information, summarising information, critical thinking, representing numerical data

Teacher Instruction

1. Organise the learners into pairs and ask them to do Activity 4.1 in the Learner's Book.
2. Observe the learners as they do the activity and guide them accordingly.
3. In a discussion, ask the learners to explain how they have selected the information they have included in the summaries.
4. Observe the learners as they discuss and assess how well they respect each other's views.
5. Wrap up the activity by emphasising that these are not the only sources of geographical information.

Hint: Ensure the acquisition and development of the skills listed above.

Possible Responses

1.

Table

- The table shows that there are three crops produced in the area where the data was taken from: paddy rice, maize and wheat. The crops were produced for five selected years: 2010 to 2016.
- Paddy rice was produced in the least amount in 2012, and highest amount in 2014; maize in 2010 and 2015, respectively; wheat in 2015 and 2016, respectively. Generally, paddy rice is the most produced and wheat the least produced from 2010 to 2016. The production of each crop rose and fell (fluctuated) over the period.

Extract

- The Government of Uganda is advised to increase tourism in the country by investing more money in tourist attractions related to the country's water bodies in addition to the mountain gorillas.
- Such attractions include water sports, cruises, beaches, speed boats between Entebbe and Port Bell or Ggaba beach, and weddings. These will give visitors unforgettable experiences which they would use to market Uganda back in their home countries.

Photograph

- Highland/mountainous area with a river valley in the middle. The river flows from the highlands. The river valley is shallow with numerous large rocks (boulders) lying on its floor.
 - Land is higher in the background and on the left hand side, and lower in the middle and right hand side.
 - It is about ways of promoting tourism in Uganda.
 - The highlands have very little, short vegetation. Some parts on the slopes of the highlands are bare. Scattered trees are found on both sides (banks) of the river valley.
 - There are some settlements on the upper (upstream) end of the river valley.
2. The advantages and disadvantages of the sources will depend on the opinions of the learners.
 3. These will vary depending on the learners' opinions.

Studying Geography through Fieldwork

Activity 4.2: Finding out from the field

In groups, go outside the school and:

1. ask the 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.

Resources to use: Organised study groups, local environment

Skills: Collaboration, interactive skills, observation, critical thinking, field sketching, analysing and report writing.

Teacher Instruction

1. Organise learners into groups and guide them to do Activity 4.2 in the Learner's Book.
2. Lead learners to the field and guide them through data collection.
3. Observe learners while in the field and notice how they interact with the local people, and how they collaborate in a group.
4. In a discussion, ask the learners to explain the different ways through which they have found out information about the physical environment and human activities in the area.
5. Guide the learners through a discussion so they can share their findings as a class.
6. Wrap up the activity by emphasising the relationships existing in the area studied between the natural and created environments.

Hint: Ensure the acquisition and development of the skills listed above.

Possible Responses

Fieldwork report to depend on the nature of the area studied.

How Can We Study Geography Through Fieldwork?

Activity 4.3: Exploring steps in fieldwork

In a group or individually:

1. Choose a topic to be studied in the area outside class.
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 you need, write a report about the area studied. Through discussion, compare group reports.

Resources to use: Metre rule/foot ruler/measuring tape, clipboard, writing tools, magnetic compass, and local environment

Skills: Collaboration, interactive skills, critical thinking, drawing field sketches, writing a report

Teacher Instruction

1. Organise learners into groups or as individuals and guide them to do Activity 4.3 in the Learner's Book.
2. Observe learners as they do the activity and notice how well they collaborate and express themselves.
3. In a discussion, ask learners to explain the names they suggest for the methods used to collect information.
4. Guide the discussion to assist learners in sharing the names they have suggested. Correct the mistakes made, if any.

Possible Responses

1. Topic to depend on the individual
2. Objectives to depend on the area to be studied but should be logical and geographical.
3. Methods may include:
 - Talking to the people in the area
 - Measuring the height and size of features
 - Drawing a map
4. Findings to depend on the locality
5. Sketch map: to depend on the area studied, but should have features represented using suitable symbols, title and key/labels.
6. Measurements to depend on the features in the field and tools used.
7. A fieldwork report containing topic, objectives, findings with illustrations and conclusions.

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.

Resources to use: Organised study pairs, no special tools needed

Skills: Collaboration, communication, analysing information

Teacher Instruction

1. Organise the learners into pairs and ask them to do Activity 4.4 in the Learner's Book.
2. Observe the pairs as they discuss and assess how well they cooperate and respect each other's views.
3. Ensure that each pair comes up with a write-up to share with the rest of the class.
4. Guide the learners in the discussion as pairs share their views and correct the mistakes made, if any.

Possible Responses

1. Interviewing/oral interview
2. Measurement/measuring
3. Field sketching/drawing and annotating

Writing a Fieldwork Report

Activity 4.5: Steps in writing a fieldwork report

Using the information you collected during the field study you did in Activity 4.3, 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 and follow them to make your report.
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.

Resources to use: Field information gathered in Activity 4.3

Skills: Writing a field report, effective communication

Teacher Instruction

1. Ask learners individually to do Activity 4.5 in the Learner's Book.
2. Observe learners as they do the activity and assist them where they get challenges.
3. Ensure that every learner participates in the activity and comes up with an individual field report.
4. Mark the learners' reports and give prompt feedback.

Hint: Emphasise that learners build their report using the information gathered in Activity 4.3.

Possible Responses

Fieldwork report to depend on the area studied and, topic and objectives of the study. It should be organised in a logical order: Topic, objectives, findings, and conclusions made. It should contain relevant examples, tables, annotated sketch maps, and other diagrams.

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.

Activity 4.6: Geography through Photographs

Study Figure 4.1 and do the activities that follow.



Figure 4.1: A 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?

All that you have written about Figure 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.

Resources to use: No special tools needed

Skills: Interpreting photographs, finding out information, analysing information

Teacher Instruction

1. Ask the learners individually to do Activity 4.6 in the Learner's Book.
2. Guide the learners on how they can use a photograph to find out information about an area.
3. Observe the learners as they do the activity and assist them where they get challenges.
4. Mark the learners' work and provide the relevant feedback.

Possible Responses

1. Natural features: Mountain/ highland, valley, rocks/boulders, vegetation/ trees and grass.
Human features: Houses/ settlements, railway line, gardens, quarry, post/pole.
2. Settlements and the railway line are found in the low lying valley; they avoid the highlands.
The quarry is found on steep slopes.
Gardens are found on relatively gentle slopes; they avoid steep slopes.
3. Cultivating steep slopes may expose the highlands to soil erosion when heavy rains come.
Quarrying on the slopes of highlands may lead to destruction of vegetation as all plant cover is removed in order to remove the rocks/boulders.
Burning the vegetation in the highlands is likely to lead to loss of wild animals as their habitat is destroyed.

Hint: Emphasise that the learners get all the responses from evidence presented in the photograph.

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. Those taken while the photographer is standing on the ground 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 connected to the ground in any way. These are called **aerial** photographs.



(b)

Figure 4.1: The Rift Valley in Uganda



(a)

(b)

Figure 4.2: Kampala City

Activity 4.7: Types of photographs

Look at Figures 4.1 and 4.2 above 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 the observer is looking at features vertically from the air, i.e. at an angle of 90° , are called **vertical aerial** photographs. These show only the top views on the ground, with all features appearing as flat objects. The 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.

Resources to use: Photographs are already presented in the Learner's Book

Skills: Observation, interpreting photographs, analysing, communication

Teacher Instruction

1. Ask learners to do Activity 4.7 in the Learner's Book.
2. Observe learners as they do the activity and assist them where they get challenges.
3. Ensure that every learner participates in the activity and comes up with an individual write-up.

Hint: Emphasise to learners that they should get all responses from the photos provided. Background knowledge should only be used as explanation.

Possible Responses

1. In Figures 4.3 and Figure 4.4(a) the buildings appear as real houses with the side and top views visible. The vegetation is also visible as real trees and grass with visible stems and tops. In figure 4.4 (b) the buildings and vegetation appear as flat objects on the ground. They do not have visible vertical views. Only their top views are visible.
2. Photos in Figure 4.3 and 4.4 (a) all show actual objects in three-dimensions while figure 4.4(b) shows features as abstract objects with one dimension/ top views only. Photos in Figure 4.3 and 4.4(a) show objects in the fore ground bigger than those in the background (bring out perspective) while in Figure 4.4(b) the size of features does not decrease with distance from the reader.
3. Photos 4.3 (a), (b) and Photo 4.4(a) are (air) aerial oblique photographs; because they show more than one profile of the objects in the areas where they were taken. This suggests that they were taken from air but with the camera tilted at an oblique angle.
4. Photo 4.4(b), vertical (air) aerial photograph; because it shows only the top views of the objects in the area it represents. This suggests that the person who took it was looking at the objects vertically from above (bird's eye view)

Describing Where Things are on a Photograph

In Chapter Three, the learners learnt the different ways in which they can find things on maps of different scale. 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. Ask the learners to suggest why this is so?

Background

Middle ground

Foreground

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 edged 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.

Resources to use: Photographs as presented in the Learner's Textbook, a straight edge (preferably a foot ruler)

Skills: Observation, interpreting photographs, analysing information, communication

Teacher Instruction

1. Guide the learners to read the text before they begin the task.
2. Ask the learners to do Activity 4.8 in the Learner's Textbook.

3. Ensure that every learner has the tools needed for the activity.
4. Observe learners as they do the activity and assist them where they get challenges.
5. Note how accurately the learners use the tools.
6. In a discussion, ask the learners to justify the names they have suggested for each region.
7. Wrap up the activity by giving the learners the right name for each division on the photo.

Hint: Emphasise to learners that they should get all responses from the photo provided.

Possible Responses

1. A drawn landscape sketch of the photograph divided into six regions.

Left Background	Right Background
Left Middle ground	Right Middle ground
Left Foreground	Right Foreground

Features

- i) Left foreground – boulders/rocks, gentle slope, short grass vegetation, river with cataracts, river valley/flood plain, a tree
- ii) Right foreground – river, boulders/rocks, scattered grass, gentle slope
- iii) Left middle ground - thick tree vegetation/forest, boulders/rocks, river valley/flood plain, river
- iv) Right middle ground – river valley/flood plain, gentle slope, boulders, scattered trees, short grass
- v) Left background – steep slope/hills, short grass vegetation, isolated trees, depressions/gullies
- vi) Right background – steep slopes, hills, depressions/gullies, settlement/house/building

2. A drawn landscape sketch of the photograph divided into nine regions.

Left Background	Middle/Centre Background	Right Background
Left Middle ground	Centre Middle ground	Right Middle ground
Left Foreground	Middle/Centre Foreground	Right Foreground

When you look at photograph (b) in Figure 4.2, 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: Describing the area on photographs

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

Resources to use: Photograph as presented in the Learner's Textbook

Skills: Observation, interpreting photographs, analysing information, communication

Teacher Instruction

1. Guide the learners to read the text before they begin the task in order to understand the words they are going to use in the task.
2. Ask the learners to do Activity 4.9 in the Learner's Textbook.
3. Observe learners as they do the activity and assist them where they get challenges.
4. Wrap up the activity by giving the learners the right name for each division on the photo.

Hint: Emphasise to learners that they should get all responses from the photo provided.

Possible Responses

1. The bottom left hand corner of the photograph has greater concentration of trees than other parts of the photograph.
2. The left hand side and the middle part of the photograph have smaller buildings than top and middle right hand sides.
3. The top part of the photograph has a smaller concentration of roads than other parts.
4. There is an open green leisure/recreation park in the centre of the photograph.

Activity 4.10: Drawing a sketch from a photograph

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.

Resources to use: Photograph as provided in the Learner's Textbook, straight edge (preferably a foot ruler), lead pencil, coloured pencils.

Skills: Drawing a sketch of a photograph, observation, interpreting photographs

Teacher Instruction

1. Ask learners to do Activity 4.10 in the Learner's Textbook.
2. Observe learners as they do the activity and assist them where they get challenges.
3. Ensure that every learner participates in the activity so as to develop the skills listed above.
4. Ask the learners to justify the divisions they have created on the photograph.
5. Select some learners and ask them to present their description of the area shown in the photograph. Ask the whole class to comment on the presentations.

Hint: Emphasise to the learners that all the responses should be based on the photograph provided.

Possible Responses

1. A hand-drawn sketch of the photograph showing the natural/physical and human features in the area.
2. Divisions – left foreground, middle foreground, right foreground, left middle ground, centre middle ground, right middle ground, left background, centre background, right background; and possibly the horizon.
3. Gentle slope in the foreground, road in the left middle ground, electric poles/power line in the right middle ground, hills with deep valleys in the background, settlements, trees, gardens/farms, wood lot/planted trees, grass vegetation, banana crop.
4. There is a gentle slope rising from the valley in the right fore and middle grounds towards the left. There is a deep valley in the middle ground.
 The background is characterized by hills whose slopes have been heavily eroded to create deep valleys. The hill slopes in the background are covered by short grass vegetation with trees scattered here and there. The settlements are concentrated on the lower slopes of the hills (foot hills) possibly because they are easy to cultivate and reach using road transport. The area seems to be experiencing a wet climate because of the presence of green vegetation, wood lots and the banana crop all of which grow in wet areas.

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.

Resources to use: Textbooks /ICT, magazines, newspapers, departmental reports, research reports, journals

Skills: Searching for information, analysing information, reporting findings, communication, critical thinking

Teacher Instruction

1. Guide the learners individually to do the research task in the Learner's Textbook.
2. Ensure that every learner has access to the library or ICT in order to be able to do the task.
3. Guide the learners in a whole class discussion to share their reports.
4. During the discussion, observe the learners and note how well they communicate their findings, defend their opinions and respect each other's' views.
5. Mark the learners' research reports and give immediate feedback.

Possible Response

1. A written research report about the sources of geographical information which may include: textbooks, magazines, newspaper articles, diaries, departmental reports, the Internet, photographs, maps, the local environment/field, statistical data tables, graphs, charts, cartoons, billboards, postage stamps, television programs, radio broadcasts.
2. This will vary depending on the learner's opinion and the ability to defend it.

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.

Tools to use: No specific tools

Skills: Critical thinking, creative thinking, problem solving and effective communication.

This activity is aimed at assessing the extent to which the learner has understood the different sources of geographical information and the methods one can use to find out the information. Encourage learners to elicit original ideas reflecting understanding and application of the knowledge they have acquired in the topic.

Teacher Instruction

1. Ask learners to do the activity at the end of Chapter Four in the Learner's Textbook individually. Give a timeframe to ensure timely application of the knowledge learnt and skills acquired.
2. Ensure that every learner produces written responses to the task.
3. Mark learners' work and give timely feedback and guidance where needed.

Possible responses

How Abu Said can get the information:

- i) The advice note should point out the following: Reading books, magazines and newspaper articles about Tanzania; reading maps showing different aspects of Tanzania; studying and interpreting photographs taken in Tanzania; visiting the country to observe and ask the people of Tanzania about the physical environment and human activities.
- ii) The most effective method/methods will vary depending on the learner's ability to evaluate the possible methods against the costs involved while using them.

Note: The learner will be considered to have achieved the competence if s/he attains 2/3 of the total scores available (or of the assessment criteria).

Chapter Five: The Earth and its Movements

Overview

In this topic, help the learners to understand the shape and movements of the earth, and how these movements affect people's lives, including their own lives. Use a range of interactive methods to enable learners to develop the skills listed under each activity.

In this topic, guide learners to:

- understand the relationship between the earth and the sun and how this affects temperatures and seasons.
- draw diagrams to show the relationship between the earth and the sun rays and the causes of temperature variations and use these to show why the earth can be divided into tropical, temperate and polar regions.
- understand how the earth's rotation causes day and night.
- calculate time using longitude.
- 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.

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, i.e. it is neither too cold nor too hot.

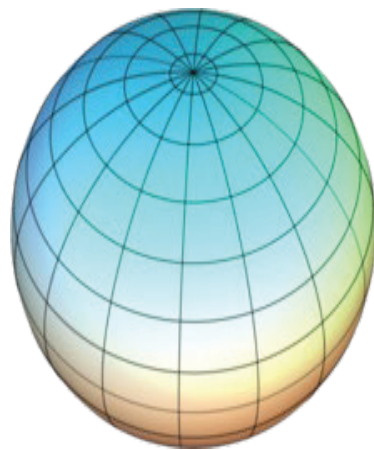


Figure 5.1: A model showing the shape of the earth

Activity 5.1: A model showing the shape of the earth

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

- Identify the positions of the poles, and the equator.
- Describe what the earth looks like at the poles and at the equator.
- Describe the shape of the earth.
- Through discussion, share what you have written with the class.

Resources to use: A model showing the shape of the earth as presented in the Learner's Book

Skills: Collaboration, observation, critical thinking

Teacher Instruction

1. Organise learners into pairs and ask them to do Activity 5.1 in the Learner's Book.
2. Observe learners as they do the activity and assist them where they get challenges.
3. Ensure that every learner participates in the activity and that each pair comes up with a write-up.
4. Guide learners in a whole class discussion to share their views. Correct the mistakes made and clear doubts, if any.

Hint: Emphasise to learners that they should get all responses from the model provided.

Possible responses

1. The poles are at the extreme ends; the North Pole at the upper end; the South Pole at the lower end.
2. The earth is nearly flat/flattened at the poles and bulges out at the equator. It is wider at the equator and narrows as one moves towards the poles.
3. It is round/spherical/oblate/oblate spheroid.

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 the solar system it is called so and how many planets make up the system.

Resources to use: Computer/textbooks

Skills: Learning to learn, organising and interpreting information, critical thinking

Teacher Instruction

1. Ask learners individually to do Activity 5.2 in the Learner's Book.
2. Observe the learners as they do the activity.
3. Discuss with the learners and ask them to explain why they have drawn and labeled the diagram as they have done.
4. Mark the learners' research about the solar system and provide feedback.

Possible Responses

1. Diagram of the earth with the major lines of latitude and longitude marked and named.
 - Latitudes: Equator, Tropic of Cancer, Tropic of Capricorn.
 - Longitude: Prime Meridian/Greenwich Meridian.

2. Report containing information about the solar system, with labeled diagrams to illustrate the system. The report should point out the planets in the solar system, the position of planet earth, movements of planets around the sun, and how the natural bodies in the system affect life on planet Earth
3. It is called the solar system because it is centred on the sun; and all the nine planets move around the sun in their orbits.

The Rotation of the Earth

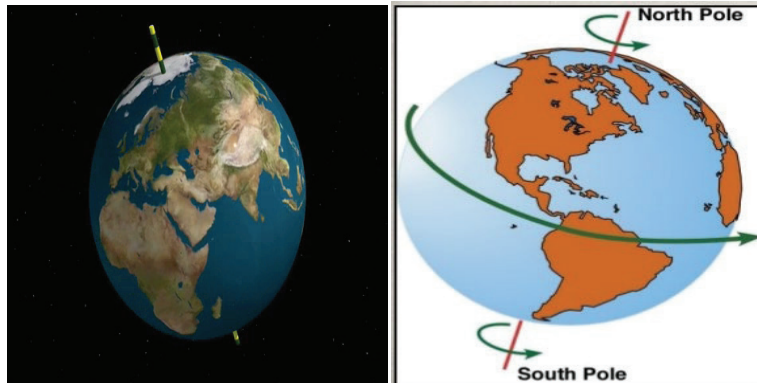


Figure 5.2: The earth rotates on its axis

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 day time and night time on earth.

Resources to use: Globe/football, torch /source of light, marker/ bold ink

Skills: Collaboration, observation, recording information

Teacher Instruction

1. Organise the learners into pairs and guide them to do Activity 5.3 in the Learner's Book.
2. Call upon several pairs to carry out the demonstration and observe them as they do the activity.
3. Discuss with the learners and ask them to explain why they have put an X-mark on the globe/ball.
4. Ensure that every pair comes up with a write-up of the observations made.
5. Mark the learners' work and provide immediate feedback.

Possible Responses

1. The side of the ball upon which light is flashed is bright while the one on the opposite side is dark. As the globe/ball spins, the X-mark gets turned away from light until it eventually goes to the dark side. The side which has been in darkness gets exposed to light and becomes bright.
2. We get daytime when the earth rotates on its axis and exposes the part of the earth where we live to light from the sun. We get nighttime when the earth rotates and turns that part of it where we live away from the sun.

Why Places on Earth Have Different Times

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

The sun reaches the highest position in the sky at 12 noon. At that time the Greenwich Meridian lies directly under the sun. This is called 12 noon local time along the Prime Meridian. Local time at the Greenwich Meridian 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.

Activity 5.4

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

Resources to use: No special resources needed

Skills: Finding out information, estimating time using longitude

Teacher Instruction

1. Ask learners individually to do Activity 5.4 in the Learner's Book.
2. Observe the learners as they do the activity.
3. Discuss with the learners and ask which formula they are using to get the time and why.
4. Ensure that every learner participates actively.
5. Mark the learners' work and provide immediate feedback.

Possible Responses

1.
 - (i) 2 hours
 - (ii) 30° east of the Prime Meridian
2.
 - (i) 12:00 noon
 - (ii) 2:00 a.m.

Revolution of the Earth

The earth takes one year or $365\frac{1}{4}$ 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 $66\frac{1}{2}^{\circ}$ to the earth's path.

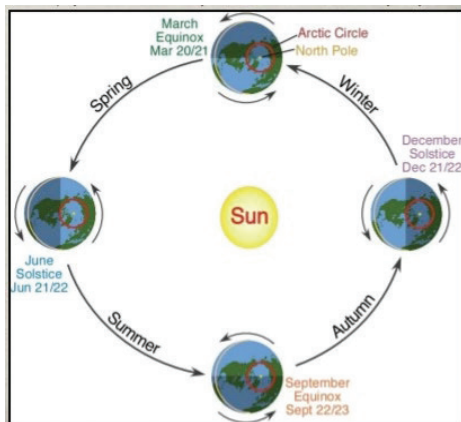


Figure 5.4: Revolution of the earth

The movement of the earth around the sun leads to changes in the position of the latitudes in relation to the sun. On 21st and 23rd September, the sun is overhead at the equator. This is called the **equinox**. 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.

Resources to use: A diagram is already presented in the Learner's Book

Skills: Observation, interpreting diagrams, analysing, finding out information/ICT skills, communicating research findings

Teacher Instruction

1. Ask the learners to read the text before they can do this Activity.
2. Guide the learners to do Activity 5.5 in the Learner's Book.
3. Observe learners as they do the activity and assist them where they get challenges.
4. Discuss with the learners and ask them to explain the months and seasons they suggest.
5. Ensure that every learner participates in the activity and comes up with an individual write-up.

Hint: Emphasise to the learners that they should get all responses from the diagram provided.

Possible Responses

1. March and September
2. June – September
3. April – May
4. December – March
5. The research report should point out how each of the four seasons influence people’s activities and ways of life. The activities may include farming, tourism, forest exploitation, fishing, work in industries, crafts making and cottage manufacture and recreation. Ways of life may include dressing styles, house designs and types, staple foods, settlement patterns, size of communities, etc.

Why is the Earth Divided into Zones with Different Temperatures?

Activity 5.6

Conduct internet or library research about world climate zones and in your notebook:

1. Draw the earth, mark and name the equator, the tropic lines, and the Arctic and Antarctic Circles.
2. Mark out the tropical, temperate and polar zones.
3. Describe the characteristics of each of these zones.
4. Explain the other factors that cause temperature differences in an area.
5. Share your report with the class through discussion

Resources to use: Computer (ICT)/textbooks, magazines/journals

Skills: Learning to learn/searching for information, drawing diagram to summarise information, critical thinking

Teacher Instruction

1. Ask learners individually to do Activity 5.6 in the Learner’s Book.
2. Ensure that each learner has access to the sources of information needed for the task.
3. Discuss with the learners and ask them to explain why they have drawn and labeled the diagram as they have done.
4. Guide the learners in a whole class discussion as they share their findings.
5. In a discussion, ask the learners to explain further the characteristics of each climatic zone to find out how much they understand their research findings.
6. Again, challenge the learners to explain in detail other factors influencing temperature differences.
7. Mark the learners’ research report and provide immediate feedback.

Possible Responses

1. Diagram of the earth with the Equator, Tropic of Cancer, Tropic of Capricorn, Arctic and Antarctic Circles marked and named.
2. On the same diagram, the tropical, temperate and polar zones marked/shaded and named.
3. **Tropical climate zone**
Lies close to the equator between the Tropics of Cancer and Capricorn (23.5°North and 23.5°

South of the Equator). The region receives direct sunlight all year round so the average temperature stays greater than 20°C. This makes areas in this region hot throughout the year. Mornings are usually cool but quickly become warm and hot in early afternoon up to around 3:00 pm. There are bigger daily changes in temperature than annual changes. Experiences high evaporation especially in places close to large lakes and seas. Rainfall is heavy in most areas and this leads to the growth of dense forests and Savannah grasses.

Temperate climate zone

It lies between the tropics and Polar Regions (35° and 50° north and south of the Equator)

The temperatures are moderate, they are neither too hot nor too cold. The zone has four clear seasons namely summer, the warmest; autumn, the season between summer and winter; winter, the colder season, and spring, the transiting season between summer and winter. Temperature ranges throughout the year are large i.e. the difference between the hottest and coolest months is big.

Polar climate zone

It is found around the North Pole and South Pole of the Earth. It is very cold and dry throughout the year. The summers are cool while winters are very cold. Precipitation comes in form of small ice crystals or snow. This brings about permanent ice sheets. Also experiences strong winds. These conditions are not favourable for permanent human settlement. So there are no people living permanently in the polar region.

4.

Altitude

- This is the height of a place. Places which lie at or near sea level are hotter than those at great height above sea level. This is because heat from the sun heats the air around the Earth from the ground surface upwards. This makes temperature to decrease with increasing height above sea level. For example, on a mountain the lower slopes are hotter than the peak.

Distance from the sea or large water

- The sun's heat the earth water and land absorb the heat differently. Because of this places near large water bodies tend to be cooler than those far inland. When the sea is cooler than land, it lowers the temperature of coastal areas.

Humidity

- This is the amount of water vapour present in air. Water vapour absorbs heat escaping from the earth back into the atmosphere. Therefore, the higher the humidity the higher the amount of heat absorbed and kept in the air and hence the hotter the atmosphere becomes.

Aspect

- The side of a mountain or hill directly facing the sun gets heated up before the opposite sides.

Vegetation cover

- Areas with dense vegetation such as forests always have lower temperature than areas with open ground. This is because the crowns of trees in the forest prevent heat from the sun from reaching the ground directly. So the ground remains cool.

Nature of soil

- Light soils such absorb less heat than darker soils. This may bring about a small difference in temperature even within the same region. Again, dry soils like sand heat up faster when struck by the sun's rays than wet soils such as clay, which keep much moisture and warm up more slowly.

Ocean currents

- These are large streams of water flowing in the oceans. They influence temperature in nearby coastal areas. Currents flowing from the Polar Regions towards tropical areas bring cold temperature conditions which lower temperature. Those flowing from tropical areas towards Polar Regions carry warm conditions even during winter.

Activity of Integration

Imagine your family has migrated to another planet which does not experience day and night, and the seasons experienced in your former home area. Write a composition of not more than two pages explaining how your way of life might change while on the new planet.

Tools to use: No specific tools

Skills: Critical thinking, creative thinking, problem solving

This task is aimed at assessing the extent to which the learner has understood the concept of relationship between the earth and the sun; and also appreciated how this relationship affects time, climate seasons and human life.

Teacher Instruction

1. Ask learners to do the task at the end of Chapter Five in the Learner's Textbook individually.
2. Ensure that every learner produces written responses to the task.
3. Mark their work and give immediate feedback and guidance where needed.

Possible responses

If the earth stops rotating on its axis:

1. There will be no day and night in all parts of the world. Places exposed to the sun will have only day time while those on the opposite side of the earth will remain in darkness all the time.
2. There will be no time difference between places lying at different lines of longitude.
3. Winds will be able to move straight from one pole to the other.

If the earth stops moving around the sun:

1. There will be no season's i.e. winter and summer.
2. There will be no rainfall, humidity, and wind movement on the side of the earth which will not be exposed to the sun.
3. Only the side of the earth exposed to the sun shall be receiving rainfall. The opposite side will remain dry. It will always be a high pressure zone

How people's ways of life might change

- To depend on the changes in climate and weather suggested above.

Chapter Six: Weather and Climate

Overview

In this topic, help learners to understand the main elements of weather and how they are recorded; the difference between weather and climate; how to plot weather on maps; how to describe weather and climate from maps; and to appreciate the importance of recording weather.

Use a number of interactive methods to enable learners to develop the skills listed under each activity.

In this topic, the learner should be able to:

- understand the main elements of weather and climate and the difference between weather and climate.
- understand how to record the main elements of weather.
- know how to plot weather on maps and the terms used for plotting.
- make some simple instruments for measuring and recording weather.
- read or use maps and graphs to describe weather and climate.
- know the names and characteristics of the main types of clouds and rainfall.
- appreciate that weather affects your day-to-day life and activities.
- appreciate the importance of recording weather for farmers and others.

Weather and How it is Measured

Activity 6.1: Understanding weather

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

Resources to use: The local environment outside the classroom

Skills: Observation, analysing, effective communication, and critical thinking

Teacher Instruction

- Guide the learners to do Activity 6.1 in the Learner's Book.
- Observe learners as they do the activity and assist them where they get challenges.
- In a discussion, probe learners to describe the weather around the school using a combination of elements.
- Listen to the learners' description of the weather of the local area for yesterday or the past three days. Note how well they contrast it with the current weather.
- Write learners' definitions of weather and assess how well they understand the concept. Ask the class to comment on each other's definition and make the necessary amendments.
- Guide the learners to agree the correct definition of weather by pooling their own ideas.
- Wrap up the activity by pointing out that at any time, weather cannot comprise one element; the weather of a place is a combination of two or more conditions in the air.

Hint: Emphasise that the weather of a place is what the atmosphere is like for a very short time. Also emphasise that weather cannot be the same even for a day.

Possible Responses

You are expected to encourage learners to give their different views in support of their ideas as a way of developing skills, e.g. observing, analyzing, communication, and critical thinking.

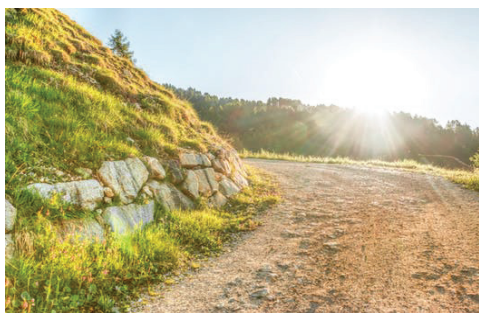
1. Will depend on the locality and the local weather e.g. sunny, warm and calm; rainy, cool and windy; sunny, hot and windy; cool, misty and humid
2. Will depend on the locality
3. Will depend on the locality and season
4. Weather is what the atmosphere looks like at any given time; the conditions of the atmosphere at any one time; the state of the atmosphere for a short time, etc.

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

Resources to use: Pictures are already presented in the Learner's Textbook

Skills: Photographic interpretation, analysing, critical thinking

Teacher Instruction

1. Organise learners in pairs and ask them to study the pictures in Figure 6.1 in the Learner's Book.
2. Move around, observe pairs as they do the activity, and assist them where they may get challenges.
3. Ensure that everybody engages actively with the pictures. Randomly, select a few pairs and ask them to present what they have written to the whole class. Ask the rest to comment on each presentation.
4. In a discussion, probe learners to explain their points further and to support them with evidence from the pictures provided.
5. Wrap up the activity by pointing out that since photos represent the real world, then what they have written about each picture is the true geography of the area represented by the photograph.

Possible Responses

1. Photo (a): Sunny, possibly warm, clear atmospheric visibility, calm
Photo (b): Windy, cloudy, with patches of clear blue sky
Photo (c): Misty, humid and cold
Photo (d): Cloudy, rainy with low atmospheric visibility

2. Photo (a):

It is sunny weather as seen from the sunshine. It is possibly warm because it is still early morning and the rising sun has just started heating up the air. Atmospheric visibility is clear since one can see even the features in the back ground of the photograph. The weather is calm because the tall tree in the back ground is not bent in any direction. This shows that there is no moving wind in the area.

Photo (b):

It is windy as indicated by the branches of the palm which are bent towards the direction of wind movement. It is also cloudy with patches of clear blue sky seen in some places.

Photo (c):

It is misty weather as indicated by the white fumes in the back ground. This implies that humidity is also high. It is sunny as indicated by the sunshine especially in the fore and middle grounds. The weather is probably cool since mist can form only at cool and cold temperature.

Photo (d):

Cloudy as indicated by the thick cloud cover. It is also rainy with low atmospheric visibility. It is probably cool since it is rainy.

What are Elements of Weather?

Activity 6.3: Understanding the 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.

Resources to use: Knowledge got from the local environment and photographs used in Activity 6.2 in the Learner's Book.

Skills: Observation, analysing, collaboration/ interactive skills, critical thinking and communication.

Teacher Instruction

1. Organise learners into pairs and guide them to do Activity 6.3, in the Learner's Book.
2. Observe learners as they do the activity and observe how well they collaborate and communicate with each other.
3. In a discussion, ask learners to explain their ideas.
4. Ensure that each group comes up with a written list of the elements of weather.
5. Observe learners as they discuss in pairs and as a whole class to ensure that interactive skills, critical thinking and communication skills are developed.
6. Ask learners which name can be given to all the conditions they have listed.
7. Wrap up the activity by pointing out that they are called elements of weather because they tell us the weather of a place.

Possible Answers

1. These will partly depend on the local weather. Together with those identified in the photos they may include: sunshine, rainfall, temperature, clouds, mist, humidity, and atmospheric visibility.
2. Elements of weather, weather conditions.

Hint: Point out atmospheric or air pressure as another element of weather and explain that we cannot see it since it is just the weight of air.

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.

Resources to use: No special tools needed; knowledge of the weather pattern in the local area

Skills: Collaboration, summarising information, communication, opinion formation

Teacher Instruction

1. Organise learners into groups and ask them to do Activity 6.4 in the Learner's Book.
2. Observe learners as they do the activity; note how well they collaborate; share responsibilities communicate with one another and respect each other's views.
3. In a discussion, ask learners to describe the pattern of weather pointing out seasonal changes.
4. Guide learners in a whole class discussion and note how well they use the key elements of weather to describe the local weather pattern.
5. In a discussion, ask groups to defend the name they suggest for the local annual weather pattern.
6. Wrap up the activity by pointing out that the pattern of weather a place has over a long period of time is called its climate. The two most important elements used to describe climate are precipitation and temperature.

Possible Responses

1. The description of the weather pattern will vary depending on the region and local area in which the learners live. It should point out the times of the year when the area receives low, moderate and heavy rainfall; cool, warm, or hot temperature; calm, light, or strong winds.
2. The name given to the weather pattern described is climate/local climate.

What is Precipitation?

Activity 6.5: Understanding precipitation

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

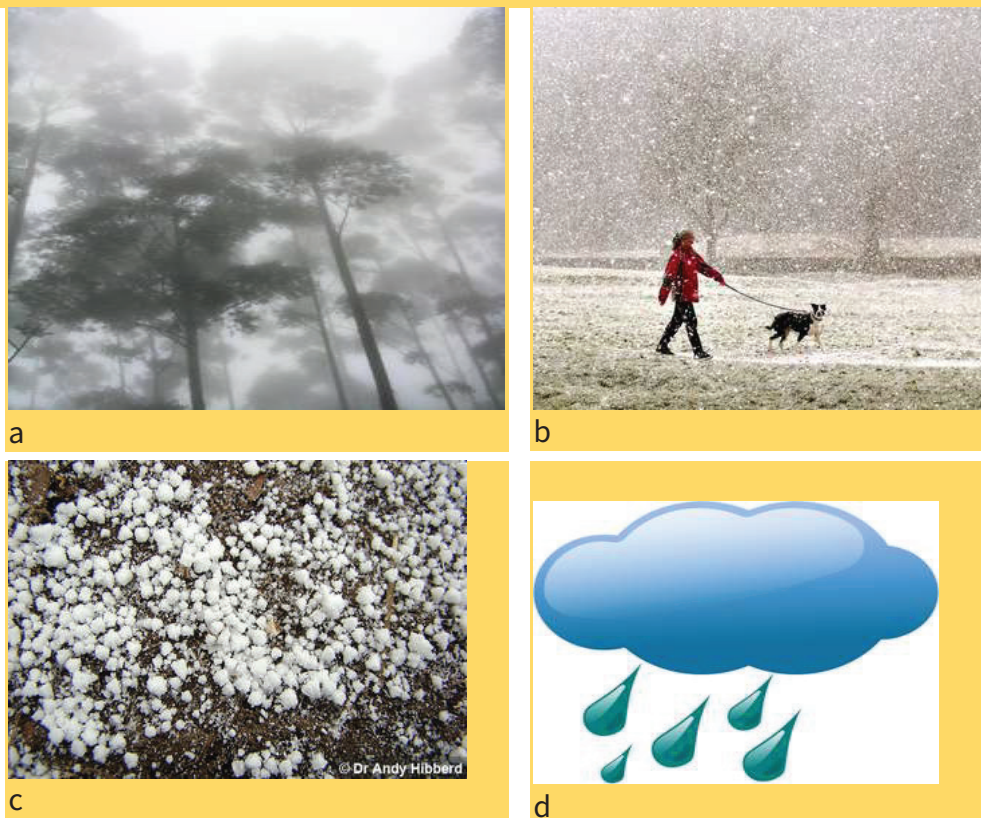


Figure 6.2: Types of precipitation

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.

Resources to use: Pictures are already presented in the Learner's Book.

Skills: Observation, photographic interpretation, critical thinking

Teacher Instruction

1. Organise learners into groups and guide them to do Activity 6.5 in the Learner's Book.
2. Observe learners as they do the activity and assist where they get challenges.
3. In a discussion, ask learners to explain why they have named each type of precipitation the way they have done.
4. Ensure that every group comes up with a written definition of precipitation.
5. Mark the learners' written work and give immediate feedback.
6. Wrap up the activity by pointing out that precipitation refers to all forms of moisture falling on to the surface of the earth from the atmosphere. It may come as rainfall, snow, hail, sleet or mist.

Possible Responses

1. Type of precipitation
 - Picture (a) Mist/ fog
 - Picture (b) Snow/ snow fall
 - Picture (c) Hail stones
 - Picture (d) Rainfall/ rain
2. Response will depend on the locality of the home or school. May include one or more of the following: mist/fog, hail stones, rainfall.
3. Definition should point out any form of moisture falling on to the surface of the earth from the atmosphere. It may be rainfall, snow, hail, sleet or mist.

Measuring and Recording Elements of Weather

Activity 6.6: Measuring weather



Figure 6.3: Some weather measuring instruments

Study Figure 6.3 above and do the following:

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

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

- 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 recording instruments are kept and used?

Resources to use: Pictures are already presented in the Learner's Book.

Skills: Observation, analysing, critical thinking

Teacher Instruction

1. Guide the learners to do Activity 6.6 in the Learner's Book.
2. Observe learners as they do the activity and assist them where they get challenges.
3. During the whole class presentation, ask learners to explain logically how each instrument is used to measure and record weather.
4. Ensure that every group comes up with a written definition of precipitation.
5. Mark the learners' written work and give immediate feedback.
6. Wrap up the activity by emphasising that every element of weather is measured and recorded using a special instrument. These instruments are kept in a special place called a weather station. At a weather station, delicate weather recording instruments are kept in a raised wooden box called a Stevenson Screen.

Possible Responses

1.

Picture	Name of weather instrument	Element of weather it measures
a)	Wind vane	Wind speed
b)	Sunshine recorder	Sunshine
c)	Windsock	Wind strength
d)	Rain gauge	Rainfall amount
e)	Mercury barometer	Air pressure/atmospheric pressure
f)	Anemometer	Wind speed

How they are used:

a) Wind vane

- i) The wind vane records wind direction.
- ii) As wind blows the arm of the wind vane rotates until its pointer faces the direction from which the wind is coming while the tail points in the direction the wind is going.
- iii) The person observing weather reads the pointer and records the directions.

b) Sunshine recorder

- i) This instrument records the number of hours and minutes of sunshine a place receives each day.
- ii) When the sun shines, the glass ball (sphere) on the recorder collects and directs the sun's rays to a heat-sensitive card found on one side of the metal frame surrounding it (the glass ball).
- iii) The heat-sensitive card has a scale marked in hours and minutes. As the position of the sun changes, its rays burn a line (trace) across the scale.
- iv) At the end of the day, the card is taken out and the length of the burnt line is interpreted in hours and minutes to get the total amount of sunshine received on that day.

c) Windsock

- i) It measures and records the strength of wind blowing in an area. The sock itself is a bag made from light cloth. It is kept with both ends open to allow wind to pass through.
- ii) When the weather is calm i.e. with no wind blowing, the sock falls against the post/pole and points to the ground. When wind blows through the sock, it stretches out.
- iii) The amount of stretching will depend on the strength of wind. When wind is very strong, the sock becomes horizontal and parallel to the ground.

d) Rain gauge

- i) This instrument records the amount of rainfall received in a day.
- ii) Inside the cylindrical container is a can containing a glass or transparent plastic jar for collecting rain water. At the top of the can there is a funnel which directs rain water into the jar.
- iii) Every 24 hours the rain gauge is opened and the water that has collected in the jar is poured into a measuring cylinder. The amount received is read off the scale marked on the measuring cylinder, usually in millimeters, and recorded.
- iv) The rain gauge is usually sunk into the ground to prevent the collected rain water from evaporating.

e) Mercury barometer

- i) This instrument is used to measure atmospheric pressure or the weight of air over a given part of the earth's surface.
- ii) When the glass tube containing mercury is placed in the bowl or trough of mercury, the mercury inside the tube falls and creates a vacuum at the top until its pressure balances with the pressure of air outside the tube. At sea level the column of mercury inside the tube rises to about 760mm.
- iii) When the pressure of air outside the tube is high, it presses down the surface of mercury in the bowl and forces it to rise into the glass tube. This causes a rise in the pressure reading.
- iv) When the air pressure is low, the mercury in the glass tube flows out into the bowl causing a fall in the pressure reading.

f) Anemometer

- i) This instrument is used to measure and record the speed of wind in a given area.
- ii) The cups on it are semi-circular in shape so that they can trap wind. All cups are fixed on metal rods which are connected to a spindle. The spindle is in turn connected to a meter which records the number of revolutions made by the cups as wind blows.
- iii) The faster the wind blows, the faster the cups move. These movements are used to interpret the speed of wind.

3. The place where all weather recording instruments are kept and used is called a **weather station**.

Activity 6.7 (a, b and c): Weather recording project**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 $\frac{1}{2}$ cm apart upwards with the permanent marker. For more accurate readings, tape a ruler to the side of the bottle. Each $\frac{1}{2}$ 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.

Resources to use: A notebook, calendar, thermometer, 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

Skills: Observation, recording data, analysing data, critical thinking

Teacher Instruction

1. Organise learners into groups and guide them to do Activity 6.7 in the Learner's Book.
2. Observe learners as they do the activity and assist them where they get challenges.
3. Ask learners to explain logically how each instrument is used to measure and record weather.
4. Ensure that every group comes up with a complete set of temperature and rainfall data for the three months of the project.
5. Mark the learners' project report and give immediate feedback.

6. Wrap up the activity by emphasizing that we do not always need expensive instruments in order to measure and record local weather. Also point out how learners can use the information they have collected to describe the climate of a local area and to create climate graphs and maps.

Hint: Ensure that every learner takes an active part in the project; and that the weather recording instruments they produce are as accurate as possible. Every group should work out daily and monthly averages for each element of weather in order to come up with the idea of the local climate.

Possible Responses

1. The product will vary with localities.
2. The product should be a weather report consisting of temperature and rainfall statistics. The statistics may also be accompanied with descriptions of wind, cloud cover and other elements of weather in the area over the project period.

Atmospheric or Air Pressure

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.

Resources to use: A computer or any other ICT device connected to the internet, textbooks, notebook

Skills: Collecting information/ICT skills, recording information, analysing information, interpreting information

Teacher Instruction

1. Guide learners to individually do Activity 6.8 in the Learner's Textbook.
2. Observe learners as they do the activity and assist them where they get challenges.
3. Ensure that every learner comes up with a written report about the task.
4. Mark the learners' reports and give immediate feedback.

Possible Responses

1. An aneroid barometer is an instrument for measuring air pressure.
2. It consists of a small flexible metal box from which air has been removed. This box is called an aneroid cell (capsule).
3. Inside the box are levers which move a needle or pointer as the air pressure squeezes the metal box.
4. When the air pressure rises, the air in the atmosphere compresses the sides of the metal box and this makes the box to bend inwards.
5. When this happens the levers move the needle/ pointer which in turn records the air pressure. Pressure is recorded on a round scale (dial) which looks like the face of a clock.
6. This tells you the air pressure and weather forecast. This process is repeated whenever there is a change in air pressure.

Atmospheric Humidity or Air Humidity

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.

Resources to use: Mirror/glass, notebook

Skills: Investigation, recording information, analysing information, interpreting information, communication

Teacher Instruction

1. Guide learners to individually do Activity 6.9 in the Learner's Book.
2. Ensure that every learner gets access to a mirror or glass in order to do the activity.
3. Observe learners as they do the activity and assist them to overcome challenges if any.
4. In a discussion, ask learners to explain their observations in relation to condensation and evaporation of water; note how well they can express themselves orally.
5. Guide the whole class discussion and challenge learners to ask each other questions so as to clarify their ideas. Note how well learners respect views at variance.
6. Assess the learners' write ups and presentation and give immediate feedback.
7. Wrap up the activity by pointing out that air in the atmosphere contains water in form of a gas. This is called water vapour. The amount of water vapour present in air is called **humidity**. It is this water which condenses to form clouds, mist, rainfall and other forms of precipitation.
8. Guide learners to read the text to understand how humidity is measured and recorded; and the importance of relative humidity in weather and climate.

Possible Responses

Mist forms on the surface of the mirror/glass. The mirror/glass becomes hazy.

1. This is subjective. It will depend on temperature in the classroom. If it is a cool day, a white cloud will be seen coming out of the mouth. On a hot day, nothing will be seen coming out of the mouth because the air breathed out cannot condense to form mist.
2. When the glass is left to stay for some time, the white mist turns into very tiny droplets of water or a thin film of water. Later, the water evaporates and the surface of the mirror /glass becomes dry.

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.

Resources to use: No special resources needed

Skills: Critical thinking, communication

Teacher Instruction

1. Guide learners to individually do Activity 6.10 in the Learner's Book.
2. Ensure that every learner comes up with written response to the task.
3. Observe learners as they do the activity and assist them to overcome challenges if any.
4. In a discussion, ask learners to explain their views in detail. Note how well they relate sunshine to their own lives and life in the local community.
5. Assess the learners' newspaper article and give immediate feedback. Check for relevance, creativity, originality, and logical flow of ideas. Note the learners' ability to illustrate their ideas with relevant examples.
6. Guide learners to read the text to understand how sunshine is recorded on climatic maps.
7. Wrap up the activity by emphasizing the importance of sunshine to human beings and life styles.

Possible Responses

1. Will depend on the locality where the individual learner lives. The benefits may include drying harvested crops, fish, fire wood, raw materials for making crafts, or finished crafts; drying clothes, drying of hides/skins, or fish; conducive for outdoor games and sports; gives the light that enables people to move around and do work; keeps the air warm and conducive for living; improves people's health through sun bathing; supporting the growth of crops/ grazing animals.
2. To point out how the people in Uganda will not be able to get the benefits related to sunshine (as explained above) for the whole period of three months.

Clouds

Activity 6.11: Finding out about clouds

In groups, go out of the classroom, observe the sky and:

1. Describe the appearance of the clouds.
2. Describe the cloud cover using the key provided in Figure 6.7 of the Learner's Textbook.
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.

Resources to use: No special resources needed. A key for describing cloud cover is already provided in the Learner's Book.

Skills: Observation, recording data, analysing data, critical thinking, collaboration, report writing.

Teacher Instruction

1. Organise learners into groups. Lead them outside the classroom and guide them to do Activity 6.11 in the Learner's Book.

2. Observe learners as they do the activity; note how well they collaborate, exchange ideas, and respect each other's views. Assist them where they get challenges.
3. In a discussion, ask learners to justify their description and classification of clouds. Note how well they relate their ideas to the key provided and the known cloud types.
4. Challenge learners to clarify their views as they explain the value of clouds to human beings.
5. Ensure that every group comes up with a written field work report about cloud cover in the area around the school.
6. Mark group reports and give learners immediate feedback.

Possible Responses

1. Will depend on the locality and the types of clouds present on the sky.
2. Cloud cover to depend on the locality, season of the year, relief and distribution of sources of water vapour.
3. Types of clouds should include cirrus, nimbus, cumulus, stratus, cumulonimbus.
4. The importance of clouds to human beings may include:
 - i) They influence the formation of rainfall and other types of precipitation which control most of the human activities.
 - ii) They influence temperature conditions which in turn determine what we dress and how we dress.
 - iii) They provide a guide to weather forecasting and preparation for expected weather events, e.g. when we see stratus clouds, they are a sure sign of rain especially if it is warm.
5. The report will depend on the locality but should spell out the types, characteristics of clouds, and the proportion of the sky covered by clouds e.g. clear skies, scattered clouds (about 25% of the sky covered), partly cloudy (about half of the sky covered), overcast (sky fully covered by clouds).

Types of Clouds

Activity 6.12: Types of clouds

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**.

Resources to use: Textbooks, E-resources, table summarizing clouds already provided in the Learner's Book

Skills: Observation, summarising information, analysing information, critical thinking, collaboration, communication

Teacher Instruction

1. Organise learners into pairs and guide them to do Activity 6.12 in the Learner's Book.
2. Observe pairs as they do the activity; note how well learners collaborate and share responsibilities. Assist them to overcome challenges if any.
3. In a discussion, ask learners to justify their description and classification of clouds. Note how well they relate their ideas to the known cloud types.
4. Ensure that every pair comes up with a fully filled table.
5. Mark pair work and give learners timely feedback.
6. Guide learners to read further in order to understand how cloud cover is recorded on weather charts and maps.
7. Wrap up the activity by emphasising the basis for classifying clouds into the major types especially their shape, colour and location in the sky.

Possible Responses

Name	Height	Appearance
Cirrus	High in the atmosphere	<ul style="list-style-type: none"> ○ White in colour ○ The look wispy or feathery. ○ They are thin with lots of blue sky visible. ○ They look as if someone took a cloud, stretched it, pulling pieces off.
Nimbus	High level clouds	<ul style="list-style-type: none"> ○ They are dark and seen during a thunderstorm along with thunder and lightning. ○ They have great vertical height
Stratus	Low clouds	<ul style="list-style-type: none"> ○ They are gray or white in colour ○ They look like a very large thick blanket covering all or most of the sky.
Cumulonimbus	Low clouds	<ul style="list-style-type: none"> ○ They are pale to dark gray in colour ○ They appear to be dense and usually form towers which make them to appear like a mountain

Effects of Weather on Your Life and that of Your Community

The learners have already learnt how the different elements of weather affect people's ways of life. A number of the activities they do and those of other people in their 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: Benefits and effects of different weather conditions

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

Weather condition	Benefits	Negative effects
Rainfall		
Sunshine		
Temperature		

Resources to use: Table already provided in the Learner's Book

Skills: Summarising information, critical thinking, communication

Teacher Instruction

1. Guide learners individually to do Activity 6.13 in the Learner's Book.
2. Observe learners as they do the activity and assist them to overcome challenges if any.
3. In a discussion, ask learners to explain their ideas and note how they relate weather conditions to their own life.
4. Ensure that every learner comes up with a fully filled table.
5. Mark learners' work and give them timely feedback.
 Wrap up the activity by emphasising the relationship between weather on one hand, and the things we do and how we live, on the other hand. Also emphasize the need to study weather in the areas where we live.

Possible Responses

Weather condition	Benefits	Negative effects
Rainfall	<ul style="list-style-type: none"> ○ Supports the growth of crops. ○ Lowers air temperature thereby creating cool conditions which are good for us. ○ Supports the growth of pasture on which people feed their animals. 	<ul style="list-style-type: none"> ○ Leads to flooding of roads and homes causing death and loss of property. ○ Rain storms destroy farmland ○ Too much rain leads to poor crop harvests.
Sunshine	<ul style="list-style-type: none"> ○ Creates warm conditions which are conducive for life. ○ Enables farmers to preserve their crop harvest through drying. ○ Provides light which makes our movement easy. 	<ul style="list-style-type: none"> ○ Too much sunshine leads to drying of pasture and loss of animals. ○ Strong sunshine spoils crops leading to poor harvest.
Temperature	<ul style="list-style-type: none"> ○ Cool and warm temperature enables human beings to carry out activities like games, sports and farming. 	<ul style="list-style-type: none"> ○ Very cold temperature makes people uncomfortable and to stay indoors

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.

Tools to use: No special tools needed

Skills: Critical thinking, creative thinking, problem solving, communication

This task is aimed at assessing the extent to which the learner has grasped the concept of geography and the relevance of studying it to his/her own life and community. Encourage learners to come up with original views based on their own locality and imagination.

Teacher Instruction

1. Ask learners to do the Activity of Integration at the end of Chapter Six in the Learner's Book individually. Give a time frame to ensure timely application of the acquired knowledge.
2. Ensure that every learner produces written responses to the task.
3. Mark their work and give feedback and guidance where needed.

Possible Responses

Personal ideas based on the understanding of climate and how it affects farming.

Chapter Seven: Location, Size and Relief Regions of East Africa

Overview

In this topic, guide learners to understand the main types of rocks and landform of East Africa and how they are formed. You are advised to use a number of interactive methods to enable learners to develop the skills listed under each activity. Ensure that all learners participate in class and group discussions. ICT has been integrated, and where possible, make use of it to make the learning process interactive and interesting.

In this topic, the learner should be able to:

- use maps, statistics, graphs and diagrams to analyse population.
- appreciate that East African countries vary greatly in area and population.
- know the East African countries, their approximate population and area.
- use contours to show physical features and draw cross-sections from simple contour maps.

What is East Africa?

Introduction

From primary school the learners have always heard their teachers and other people say that our country, Uganda, is found in East Africa. Again, if they have ever travelled to places far away from their home area they could have noted that the physical features are somewhat different from those around their home. This is because although East Africa is one region, its relief is not uniform everywhere. In this chapter guide them 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.

Activity 7.1: Understanding East Africa

In groups, study the atlas and,

- identify the countries making up East Africa and list them.
- draw a sketch map to show the location of East Africa.
- 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.

Tools to use: Atlas, lead pencil

Skills: Drawing a sketch map, collaboration, critical thinking, problem solving

Teacher Instruction

- Organise learners into groups and guide them to do Activity 7.1 in the Learner's Book.
- Ensure that every learner has access to the atlas.
- Observe groups as they do the activity; note how well learners collaborate and use the atlas. Assist them where they get challenges if any.
- Observe learners as they discuss in groups and note how they exercise democracy, leadership, and respect for each other's views.

5. Guide the learners as they share group ideas in a whole class discussion. Ask the class to comment on the views raised by each group.
6. Wrap up the activity by pointing out the difference between East Africa and the East African Community.

Possible Responses

1. Uganda, Kenya, and Tanzania. Some may include Rwanda, South Sudan
2. A sketch map showing the three countries of East Africa and their neighbours in all directions. May also include lines of latitudes and longitude between which East Africa lies.
3. A geographical region found on the eastern half of the African continent comprising three counties; 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.

Resources to use: Textbooks, E-resources, atlas

Skills: Searching information, summarising information, analysing information, critical thinking, communication

Teacher Instruction

1. Guide the learners to do Activity 7.2 in the Learner's Book.
2. Observe the learners as they describe the position of East Africa using earlier knowledge of locating places on a map. Assist them to overcome challenges if any.
3. Ensure that every learner produces a map with lines of latitude and longitude numbered and/named; and with the countries bordering East Africa named.
4. Mark their work and give timely feedback.

Possible Responses

1. East Africa is bordered by South Sudan and Ethiopia to the north, Somalia to the north east, Mozambique to the south, Malawi and Zambia to the south west, Burundi, Rwanda and the Democratic republic of Congo to the west. In the east, the region is washed by the Indian Ocean.
2. East Africa lies astride the i.e. it is crossed by the equator with one part lying in the Northern hemisphere and the other in the Southern hemisphere. It lies between latitude 4.5°N and 12.5°S of the Equator, and between longitudes 29°E and 41°E of the Prime Meridian.
3. A sketch map of East Africa showing the latitudinal and longitudinal extent as well as the relative position of the region. Lines of latitude and longitude should be marked and labelled. All neighbouring countries named.

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.

Resources to use: Textbooks, E-resources, Departmental reports, News Letters, newspaper articles, atlas, graph paper

Skills: Searching information, analysing statistical data, critical thinking, drawing diagrams to represent information

Teacher Instruction

1. Organise the learners into pairs and guide them to do Activity 7.3 in the Learner's Book.
2. Observe the pairs as they do the activity. Note how well the learners collaborate and use the drawing tools to come up with the graph or pie-chart. Assist them to overcome challenges if any.
3. Ask learners to explain why there are some slight variations in the figures they have got.
4. Ensure that each pair produces a diagram representing the data got.
5. Guide the learners to share their ideas and drawings through a whole class discussion. Challenge the learners to critic pair presentations and to suggest corrections where applicable.
6. Assess their work for accuracy and effectiveness of the diagram drawn in representing the data. Give timely feedback.
7. Wrap up the activity by pointing out that the small differences in the data got are brought about by whether the area covered by water bodies is considered when calculating area or not.

Possible Responses

1. Size of the East African countries

Country	Area/ Size in square Kilometres
Uganda	241,037
Kenya	580,367
Tanzania	945,087
Total	1,766,481

2. A pie chart or bar graph showing the relative size of each East African country
 - Tanzania
 - Uganda

- Tanzania is about 4 times larger than Uganda. This is because Tanzania is 945,087 km² in size while Uganda is 241,037 km². This means that to get the size of Tanzania one adds the area of Uganda 3.9 times.

Activity 7.4:

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

Resources to use: Textbooks, E-resources, atlas, newspaper articles, departmental reports, journals

Skills: Searching information, summarising information, analysing information, critical thinking, communication

Teacher Instruction

- Guide the learners to do Activity 7.4 in the Learner's Book.
- Observe the learners as they do the activity and not how well they use mathematical instruments to draw the chart. Ask them to use ICT to draw the chart if available.
- Ensure that every learner comes up with accurate and well labeled chart.
- Ask the learners to justify their response about the country with the largest and smallest population.
- Assess their work for accuracy and give timely feedback.

Possible Responses

- The population of East Africa. Figures to vary depending on the source used.

Country	Population in millions
Uganda	45.74
Kenya	53.77
Tanzania	59.73
Total	159.24

- A well labelled pie chart showing the population of East African countries. The sectors spell out the relative population size of each country.
- Tanzania
Uganda

The Relief Regions of East Africa

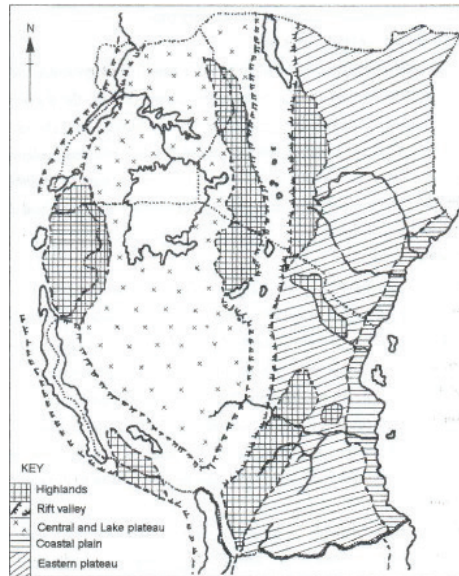


Figure 7.1: Map showing the relief regions of East Africa

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.

Resources to use: Map as provided in the Learner's Book, lead pencil, coloured pencil

Skills: Drawing a map, using a map to find out information, critical thinking, and problem solving

Teacher Instruction

1. Organise the learners into groups and guide them to do Activity 7.1 in the Learner's Book.
2. Ensure that every learner has the necessary tools.
3. Observe the learners as they do the activity, note how well they collaborate in their groups and assist them to overcome challenges if any.
4. Emphasise to the learners that everyone has to come up with a fully drawn and labeled map.
5. Assess the learners' work for accuracy, neatness, and correctness of facts. Give them timely feedback.
6. Ask the learners to justify their response for the region which covers the largest part of East Africa, and the region in which their home area is found to see how well they can defend their opinions.
7. Wrap up the activity by emphasising to the learners the relative sizes of relief regions and how they can use the atlas to look up the relief region in which their home area is found.

Hint: Ensure that every learner takes an active part in the activity in order to develop the skills listed above.

Possible Responses

1. Uganda, Kenya, and Tanzania, respectively.
2. From the coast inland: Coastal Plain, Eastern Plateau/Nyika Plateau, Highland region, Rift Valley region, Central or interior Plateau
3. Mountains will vary depending on individual groups. They may include Ruwenzori, Mufumbiro, Moroto, Elgon, Kenya, Abadare, Mathew Ranges Kilimanjaro, Usambara, Meru, Rungwe.
4. The Plateau region.
5. Subjective. To depend on individual learners or groups and their home areas.

In the above activity, the learners 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. Guide them 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.

Resources to use: Local environment, lead pencil, coloured pencil, camera

Skills: Collecting information, drawing a map, using a map to find out information, critical thinking, collaboration and reporting field findings

Teacher Instruction

1. Organise the learners into groups and guide them to do Activity 7.6 in the Learner's Book.
2. Ensure that every group has the necessary tools.
3. Observe the learners as they do the activity, note how well they collaborate in their groups, apply the methods of data collection, and assist them to overcome challenges if any.
4. Ask the groups to justify their choice of data collection methods and note how well they can defend it basing on the type of information sought.
5. Probe the learners to explain their views about the influence of the feature or features and assess their application of knowledge got in Chapter 6.
6. Ensure that every group draws the field sketches and also comes up with a field work report about the feature/features studied.
7. Assess the learners' work for accuracy, neatness, and correctness, and coherence of facts and opinions. Give them timely feedback.
8. Wrap up the activity by emphasising to the learners the influence of relief on local climate and people's ways of life.

Hint: Ensure that every learner takes an active part in the activity in order to develop the skills listed above.

Possible Responses

1. Observation, interviewing, field sketching, map reading, administering a questionnaire, photography
2. This is subjective. To depend on the relief feature chosen and the locality where the school is found.
3. To depend on the relief feature chosen and the locality where the school is found.
4. To depend on the locality. It should have the qualities of a good map, both physical and human features represented using symbols

The area which the learners 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**.



(a)



(b)



(c)



(d)



(e)

Figure 7.3: Natural hazards

Activity 7.7

In the same groups you used in Activity 7.2:

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.

Resources to use: Photographs as presented in the Learner's Book

Skills: Interpreting photographs, critical thinking, collaboration, problem solving

Teacher Instruction

1. Organise the learners into groups and guide them to do Activity 7.7 in the Learner's Book.
2. Ensure that every learner participates actively so as to develop the skills listed above.
3. Observe the learners as they do the activity, note how well they collaborate in their groups and assist them where they might get challenges.
4. Assess the learners' work for accuracy, neatness, and correctness of facts. Give them timely feedback.
5. Ask the learners to explain further the nature of harm that suggested hazards might cause. Note how critically they think and how well they defend their opinions.
6. Assess their responses for correctness of facts and originality of ideas.

Possible Responses

1. To depend on the locality. The identified hazards should be marked on the map.
2. To depend on the locality and the type of hazards experienced.
3. To depend on the type of hazards identified.

Chapter Eight: Formation of Major Landforms and Drainage in East Africa

Overview

In this topic, guide learners to understand the main types of rocks, landforms and drainage in East Africa, how they were formed and how their own lives and life in their communities are affected by physical features. Encourage learners to visit the local area to get firsthand information about the environment and how the lives of people are affected by the physical features.

You are advised to use a number of interactive methods to enable learners to develop the skills listed under each activity.

In this topic, the learner should be able to:

- a) locate the major landforms on the map of East Africa.
- b) understand how the main types of rocks are formed.
- c) understand that the main types of landforms were formed by rocks themselves or by rocks being worn away or eroded.
- d) understand the main concept of plate tectonics and how this has led to the formation of the main physical features of East Africa.
- e) draw diagrams to show the formation of important physical features.
- f) understand the characteristics of the main physical features in East Africa.
- g) understand the relationship between drainage and landforms.
- h) recognise landforms on photographs.
- i) understand how their own life and that of their community are affected by physical features.
- j) appreciate that the landforms, rocks and drainage all affect the way people live.

Rocks and Landforms

Activity 8.1 Finding out about rock and landforms

In groups, choose **one** of these landforms, i.e. a volcanic mountain or rift valley, and:

1. Explain how it was formed.
2. Describe the nature of rocks making up the landform.
3. Explain how the landform may affect drainage, climate, soils and human activities in the area.
4. Share what you have written down with the rest of the class.

Resources to use: No special resources needed; may use previous knowledge, textbooks or the Internet

Skills: Finding out information, problem-solving, analysing information, report writing, drawing diagrams, communication

Teacher Instruction

1. Organise the learners into groups and guide them to do Activity 8.1 in the Learner's Book.
2. Observe the learners as they do the activity and note how well they cooperate, share tasks and respect each other's contribution; assist them where they get challenges.

3. In a discussion, ask learners to explain how they have got information about the landform chosen and why they have used that source.
4. Encourage the learners to use diagrams to illustrate the formation of the landform.
5. Guide the whole class discussion; probe learners to clarify their ideas as they relate landform to drainage, climate, soils and human activities. Note how well learners express themselves, and also defend their opinions.
6. Mark the learners' work and assess the extent to which their diagrams and descriptions bring out the formation of the landform, nature of rocks, and the relationship between physical features themselves as well as physical features and human activities. Then provide the relevant feedback.

Hint: Ensure that every learner participates actively in the activity so as to develop the skills listed above.

Possible Responses

1. Will depend on the landform chosen. Should be relevant to the landform chosen and logically spell out the stages and processes involved in its formation. **Note:** These landforms are structural in nature and their formation should be related to the nature of the rock.
2. Will depend on the landform chosen.
E.g. for the volcanic mountain;
 - i) Black/gray rock which formed as a result of molten rock cooling outside the earth's crust.
 - ii) They are called volcanic rocks.
 - iii) They are younger than the local rocks surrounding the mountain.
 - iv) Some parts of the volcanic rock are unconsolidated i.e. they are in form of ash.
 - v) The rocks of a volcano may have layers showing the different phases or times of eruption.

For the Rift Valley:

- i) Hard rocks which are very old.
 - ii) They may be sedimentary or metamorphic.
 - iii) The rocks are brittle i.e. can break up easily.
 - iv) Some rocks exist in layers
3. Effects on drainage will depend on the landform chosen. Should point out how the landform affects the flow of streams and rivers, lakes and underground water.

E.g., for the volcanic mountain;

- i) May become a source of streams and rivers which flow in all directions i.e. radial drainage.
- ii) May block the flow of a river to form a lake or pond.
- iii) May have a depression at the top in which water collects to form a summit crater lake.

Effects on climate:

- i) May form a barrier to moving winds, force them to rise.
- ii) May condense and form relief rainfall on the slopes facing the winds i.e. windward side.
- iii) May create dry conditions on the slope opposite the windward side as winds reach the slope when they are dry i.e. rain shadow effect.

Effects on soils:

- i) When old volcanic rocks break up or decay, they form fertile volcanic soils.
- ii) Young volcanoes do not produce fertile soils.
- iii) May produce porous soils which do not keep enough ground/soil water to support plant growth.

Effects on human activities:

- i) The fertile volcanic soils are good for crop farming and this attracts large numbers of farmers on the slopes of the mountain. Because of the fertile soils, volcanic mountains have high population densities.
- ii) Volcanoes contain some valuable minerals which are mined and sold for money. Some are exported. Volcanoes may have quarries or mining sites.
- iii) The mountain may be a source of rocks used by the local people as grinding stones or construction aggregates.
- iv) The volcano may affect human activities by attracting both local and foreign tourists who bring income to the local people.

Note: Learners should elicit closely similar responses for the rift valley.

In Activity 8.1, the learners realised that the chosen landform is made up of rock material. All landforms of the earth are made up of rocks. Rocks are of different types and sizes. In terms of size, they may range from very tiny particles, such as sand grains, through small stones to very large boulders. Every rock is made up of several minerals and if you break it up and examine it scientifically, you can identify each mineral. Some of the minerals found in the rocks are useful to people. Learners will learn more about this in their chemistry lessons in Term Three.

Activity 8.2

As a whole class, conduct a debate on the motion: “*There are more problems than benefits in living on a volcanic mountain*”.

Resources to use: No special resources needed. The motion for the debate is already provided in the learner’s book

Skills: Critical thinking, problem solving, communication

Teacher Instruction

1. For Activity 8.2 in the Learner’s Book, guide learners to form two lead sides: Proposers and Opposers of the motion; and to elect their leaders for the debate.
2. Observe the learners as they debate and guide them to avoid heated arguments. Assess well how they exercise leadership skills, respect views at variance; and assist them where they get challenges.
3. In a discussion, ask learners to clarify their points of view and note how well they can defend and stand by their opinions.
4. In their submissions, note how well learners express themselves, and the extent to which their ideas relate to the benefits and problems associated with living on volcanoes.

Hint: Ensure that every learner takes an active part in the debate in order to develop the skills listed above. Assess the extent to which learners relate their ideas to real life situations in the local areas, Uganda, East Africa and the rest of the world with the view to find out their knowledge of the world around them.

Possible Responses

The responses are subjective as they will depend on personal opinions. They should reflect the benefits and problems associated with volcanoes.

Activity 8.3

In pairs:

1. Copy the table below in your notebooks, study it and fill in the missing information in the right hand column.

Mineral	Uses
Iron	E.g. Making iron sheets and hoes
Gold	
Copper	
Aluminum	
Silver	
Calcium	

2. Swap the filled table with another pair, comment on each other's work and make the necessary corrections.
3. Think of how life in your community would be if there were no minerals on earth.

Resources to use: Table as provide in the Learner's Book.

Skills: Critical thinking, collaboration, summarising information

Teacher Instruction

1. Organise the learners in pairs and guide them to do Activity 8.3 in the Learner's Book.
2. Observe the pairs as they do the activity and not how they share responsibilities, respect each other's views; and assist them where they get challenges.
3. In a discussion, ask learners to clarify their points of view and note how well they can defend and stand by their opinions.
4. In their submissions, note how well learners express themselves, and the extent to which their ideas relate to the benefits associated with mineral.

Possible Responses

1.

Mineral	Uses
Gold	i) It is used for making jewellery like bangles, necklaces, ear rings and pins, armlets ii) Making decorations such as flower vases, statues, and winning medals. iii) In glass making it is used as pigment or coating to give glass a beautiful colour iv) In dentistry and medicine, gold is used for filling tooth cavities and damaged crowns.
Copper	i) Making electric wires, decorations, metallic plates ii) Making shutters like house doors and windows
Aluminum	i) Making cooking utensils like sauce pans ii) Making aluminum sheets used to manufacture air crafts iii) In building and construction, it is used for making shutters like doors and windows iv) It is used on power lines for transporting energy across long distance. This is because

- it is light and durable.
- v) In medicine Aluminum hydroxide is used to treat heartburn, upset stomach, and acid indigestion.
- Silver
- i) Plating metals to prevent rusting
 - ii) Making coin money in many countries including Uganda.
 - iii) Making jewellery and decorations.
 - iv) Used for making mirrors because it is the best reflector of visible light.
In medicine it is used as Silver Nitrate for treating wounds like bone ulcers and burns.
- Calcium
- i) Manufacturing tooth paste, animal feeds, and construction cement.
 - ii) Making medicine for treating bone conditions like weak bones and rickets
 - iii) Calcium carbonate is used in construction as a binding material

2. This is subjective as it will depend on how one appreciates the importance of minerals in our lives. It may include all the possible negative effects of not having minerals.

Types of Rocks

All rocks are not similar in colour, hardness, texture and ability to hold water. This is because they were formed by different processes and under different conditions. In Geography, we divide rocks into three main types depending on how they were formed.

Activity 8.4

1. Carry out a library or internet search about the formation of igneous rocks, their types and examples.
2. Draw diagrams to illustrate how each type is formed.
3. Construct a table to summarise examples of each type of igneous rock.
4. Suggest ways in which igneous rocks may benefit people living in areas where they are found and your country.

Resources to use: ICT, textbooks, journals

Skills: Investigation, recording information, analysing information, interpreting information, communication, critical thinking

Teacher Instruction

1. Guide the learners to read the text as a stimulant for doing this activity.
2. Ask the learners to individually do Activity 8.4 in the Learner's Book.
3. Ensure that every learner gets access to the necessary resources in order to do the activity.
4. Observe learners as they do the activity and assist them to overcome challenges if any.
5. In a discussion, ask the learners to explain their views about the benefit people may get from igneous rocks, note how well they can express themselves orally and also defend their opinions.
6. Assess the learners' write ups and diagrams for correctness and accuracy of facts, and then give immediate feedback.
7. Wrap up the activity by pointing out other benefits of igneous rocks which have not been identified by the learners.

Possible Responses

1.
 - Diagram showing how extrusive igneous rocks are formed
 - Diagram showing how intrusive igneous rocks are formed
 - These should be well labeled in order to spell out processes their formation.

2. Table showing examples of igneous rocks

Extrusive Igneous rocks	Intrusive Igneous rocks
• Pumice Basalt	• Granite
• Dolerite	• Gabbro
• Obsidian (volcanic glass)	• Diorite
• Andesite	• Peridotite
• Rhyolite	• Syenite

3.
 - i) Provision of fertile soils which support cultivation of crops
 - ii) Provision of valuable minerals
 - iii) Provision of construction materials such as gravel and hard core
 - iv) Attracting tourists and fetching income for the local people and country
 - v) Provision of grinding stones for local food processing

Activity 8.5

1. Carry out a library or internet search for diagrams showing the formation of different types of sedimentary rocks.
2. Draw the diagrams in your notebook and make a brief description of how each type is formed.

Resources to use: ICT, text books, journals

Skills: Investigation, recording information, analysing information, interpreting information, communication, critical thinking

Teacher Instruction

1. Ask the learners to individually do Activity 8.5 in the Learner's Book.
2. Ensure that every learner gets access to the necessary resources in order to do the activity.
3. Observe learners as they do the activity and assist them to overcome challenges if any.
4. Assess the learners' write ups and diagrams for correctness and accuracy of facts, and then give immediate feedback.

Possible Responses

1.
 - Diagram showing how mechanically-formed sedimentary rocks are formed
 - Diagram showing how chemically-formed sedimentary rocks are formed
 - Diagram showing how organically-formed sedimentary rocks are formed
2. **Mechanically-formed:** Formed when small particles of igneous, metamorphic or old sedimentary rocks are removed by running water. The water transports them from one place and drops (deposits) them in a low lying depression or valley. As more materials are deposited, the layers at

the bottom get compressed under pressure from the new materials, become hard and eventually form rock layers.

Chemically-formed sedimentary rocks: Formed in areas with hot temperatures which experience high evaporation. Naturally, when water comes into contact with rocks, it dissolves some of the rock minerals. In hot areas when water evaporates, the minerals dissolved in it does not change to gas; instead it forms small crystals. When these crystals accumulate, they harden and form rock layers. An example of this rock type is rock-salt.

Organically-formed sedimentary rocks: Formed from the remains of dead plants and animals. Some animals live in communities or colonies. When such animals die in large numbers, their remains decay, harden and form a rock. Some rocks such as coral limestone along the East African coast were formed from the skeletons of snail-like animals called polyps.

Activity 8.6

In groups:

1. Discuss and suggest areas in East Africa where each type of sedimentary rock is likely to be found. Give reasons to support the areas you have suggested in each case.
2. Explain how each type of sedimentary rock may affect human activities in the area where it occurs.

Resources to use: No special resources needed

Skills: Collaboration, analysing information, communication, critical thinking

Teacher Instruction

1. Organise the learners into groups and guide them to read the text. This should form the basis for discussing sedimentary rocks.
2. Ask the learners to do Activity 8.6 in the Learner's Book.
3. Observe learners as they do the activity, assess how well they collaborate, communicate orally, respect each other's views, and assist them where they get challenges.
4. Probe the learners to explain the reasons given to justify the suggested areas where each type of sedimentary rock is likely to be found. Assess their ability to think critically and to defend their opinions.
5. Assess the learners' written work for correctness and accuracy of facts, and then give immediate feedback.
6. Wrap up the activity by emphasising to the learners the conditions under which each type of sedimentary rock is formed and how these rocks affect human activities both positively and negatively.

Possible Responses

1. **Mechanically-formed sedimentary rocks:** Valleys between hills, foot hills of mountains, depressions, river valleys, along lake shores
Reason: areas where rock sediments and silt are deposited and accumulate.

Chemically-formed sedimentary rocks: In the hot and dry areas like Chalubi desert in Kenya, Turkana land, Karamoja, Albert rift valley

Reason: areas experiencing hot temperature and high rates of evaporation

Organically-formed sedimentary rocks: Rift valley region, Indian Ocean coastline, Southern Tanzania

Reason: Areas where the remains of dead plants and animals have collected over a long period of time to form rocks.

2.

Mechanically-formed sedimentary rocks:

- i) May be used as construction material e.g. lacustrine deposits (lake sand)
- ii) Source of minerals such gold/ mining sites

Chemically-formed sedimentary rocks:

- o Source of chemicals used in industries e.g. salts like gypsum and common salt, and calcium

Organically-formed sedimentary rocks:

- i) Source of fossil fuels such as Mineral oil and coal
- ii) Industrial raw materials

Each type of rock influences the formation of landforms in a different way. This is because each type has different characteristics, such as hardness and the ability to absorb water.

Activity 8.7

1. Copy the map in Figure 7.1 into your notebook and on it shade the type of rock likely to be found in each relief region. Give reasons to explain the distribution of rocks you have shown on the map.
2. Suggest which type of rock is:
 - hardest
 - softest
3. How might the landforms in each region have been influenced by the type of rock present?

Resources to use: Map as provide in the Learner's

Skills: Drawing a map, analysing information, critical thinking

Teacher Instruction

1. Organise the learners into groups and guide the learners to read the text. This should form the basis for discussing sedimentary rocks.
2. Ask the learners to do Activity 8.7 in the Learner's Book.
3. Observe learners as they do the activity, assess how well they collaborate, communicate orally, respect each other's views, and assist them where they get challenges.
4. Probe the learners to explain further the reasons given to justify the suggested areas where each type of rock is found. Assess their ability to think critically and to defend their opinions.
5. In a discussion, ask the learners to give reasons for the hardest and softest rocks they have suggested.
Assess their ability to relate rock hardness to the mode of formation and type, and how well they can defend their views.

6. Assess the learners' written work for correctness and accuracy of facts, and then give immediate feedback.
7. Wrap up the activity by emphasising to the learners the conditions under which each type of sedimentary rock is formed and how these rocks affect human activities both positively and negatively.

Possible Responses

1. A sketch map of East Africa showing the distribution of major types of rocks. The map should have the following regions and their respective rock types;
 - Coastal Plain: Sedimentary rocks
Reason: It is an area where sediments from the interior and deposits brought by sea waves collect.
 - Eastern Plateau/Nyika Plateau: Metamorphic rocks
Reason: It is a region where the original rocks of rocks are found.
 - Central or interior Plateau: Metamorphic rocks/Sedimentary rocks
Reason: A region of original rocks/ a region with numerous valleys and depressions where eroded sediments are deposited.
 - Rift valley region: Sedimentary rocks
Reason: A depression in which eroded sediments are deposited.
 - High land region: To depend on the type of highlands; metamorphic rocks in areas with block mountains, Igneous rocks in areas with volcanic highlands.
2.
 - Hardest - Metamorphic rocks
 - Softest – Sedimentary rocks
3. The presence of soft young sedimentary rocks on the coastal plain leads to the existence of generally flat landscape. These sediments cannot form highlands if they are not modified by other processes.

The metamorphic rocks on the interior plateau have led to the existence of relatively flat plains with residual hills made up of hard rocks which are not easily eroded.

The presence of extrusive igneous rocks in the highland region has led to the formation of volcanic highlands/ mountains. Most of the mountains have weak rocks which are easily eroded to form deep gullies on mountain slopes.

Formation of Landforms in East Africa

The landforms of the earth are of two major types. The first type is that formed by the rocks themselves. These are called structural landforms. The second type is made up of landforms formed when some processes such as erosion work upon rocks and change them into new landforms.

Activity 8.8

Using your knowledge about the relief regions of East Africa, in groups, do the following tasks:

1. Discuss how the rift valley and highlands of East Africa were formed.
2. Suggest where the forces that led to the formation of those landforms originated.
3. What could have caused those forces?
4. Write a report of what you have discussed and share it with other groups through a class discussion.

Resources to use: No special resources needed

Skills: Collaboration, critical thinking, problem solving, drawing diagrams to illustrate relief features, writing a report, communication

Teacher Instruction

1. Organise the learners into groups and guide the learners to read the text.
2. Through questioning, guide the learners to recall knowledge about the relief regions of East Africa.
3. Ask the learners to do Activity 8.8 in the Learner's Book.
4. Observe the groups as they do the activity, assess how well they collaborate, exercise leadership skills, communicate orally, respect each other's views, and assist them where they get challenges.
5. Ask the learners to give reasons to justify the forces they suggest and what could have caused such forces. Assess their ability to think critically and to defend their opinions.
6. Assess the learners' written work for correctness and accuracy of facts and diagrams, and then give immediate feedback.
7. Wrap up the activity by clarifying the processes that led to the formation of the rift valley and the forces responsible for those processes.

Possible Responses

1. A written report pointing out the forces that led to the formation of the rift valley and highlands of East Africa, and causes of those forces.
2. Forces: Compressional and tensional forces; followed by fracturing (cracking) and upward, downward, or horizontal displacement of land blocks.
3. The forces were caused by intense heat and pressure in the interior of the Earth, circulation of convection currents and molten rock, movement of the plates which make up the world.

The learners have probably suggested that the rift valley and some highlands were formed as a result of faulting while other highlands were formed as a result of volcanic eruptions. Also they could have suggested that both faulting and volcanic eruptions were caused by forces which originated in the interior of the earth. What is not very easy to understand is what caused those forces.

Guide them to understand why earthquakes, faulting, volcanic eruptions and folding take place. You need to learn about the nature of the earth.

Activity 8.9

In pairs or individually, use Figure 8.4 to do the following:

1. Count the plates shown on the map.
2. Make a list of all the tectonic plates.
3. What do the arrows at the boundaries of tectonic plates indicate?

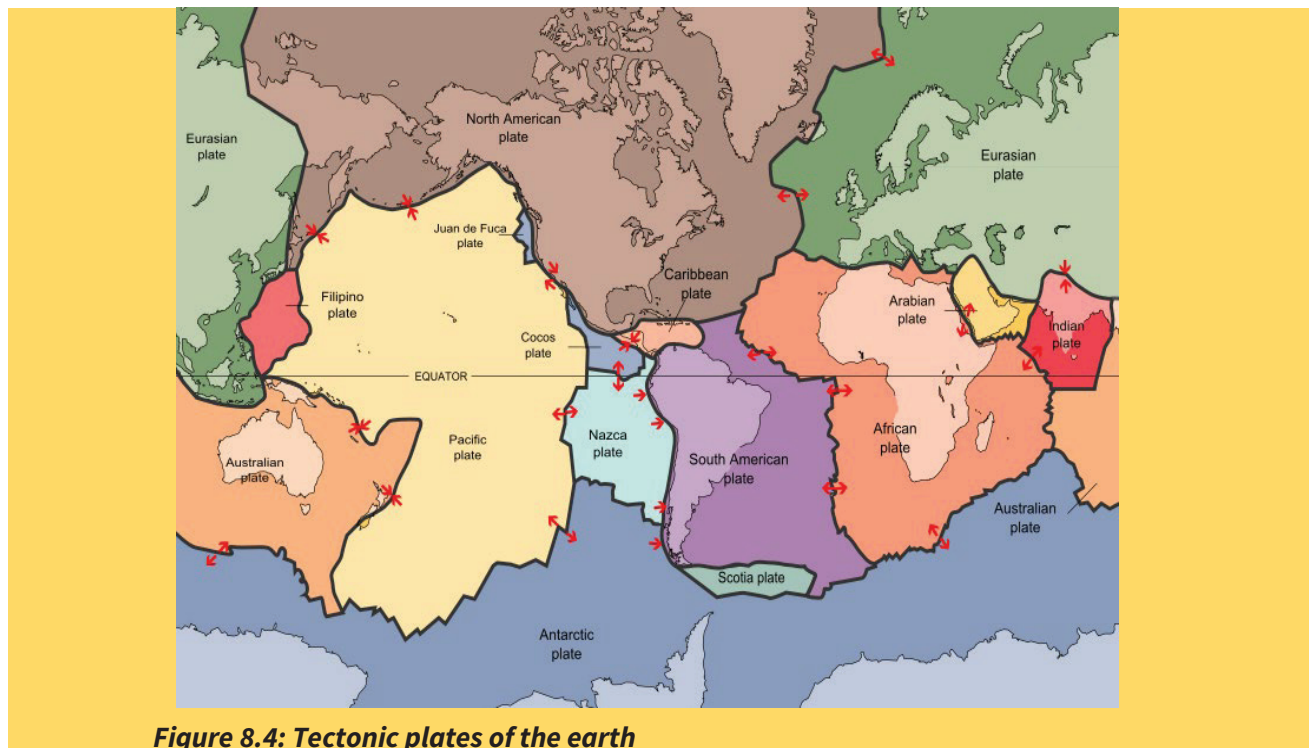


Figure 8.4: Tectonic plates of the earth

Resources to use: Map as provided in the Learner's Textbook

Skills: Collaboration, reading and using a map, critical thinking, problem solving

Teacher Instruction

1. Organise the learners into groups and guide the learners to read the text.
2. Ask the learners to do Activity 8.9 in the Learner's Book.
3. Observe the learners as they do the activity; assess how well they interpret a map. Assist them where they get challenges.
4. Ask the learners to justify the number of plates they have suggested. Assess their ability to think critically and to defend their opinions.
5. Assess the learners' written work for correctness and accuracy of facts, and then give timely feedback.
6. Through questioning and demonstration, guide the learners to understand how tectonic plates are moving, the speed at which they are moving, why the earth does not expand as plates move, why no "gaps" occur even when plates move apart, and how the movement of plates influences the formation of landforms.
7. Wrap up the activity by clarifying the actual number of tectonic plates and why they appear to be more than that number on the map; the spherical Earth is stretched out to appear flat thereby splitting up some plates like Eurasian, Australian, and Antarctic.

Possible Responses

1. 14 plates
2. Eurasian plate, North American pate, Australian plate, Filipino plate, Pacific plate, Juan de Fuca plate, Cocos plate, Caribbean plate, Nezca plate, South American plate, Scotia plate, African plate, Arabian plate, Indian plate
3. The arrows indicate the directions in which the plates are moving.

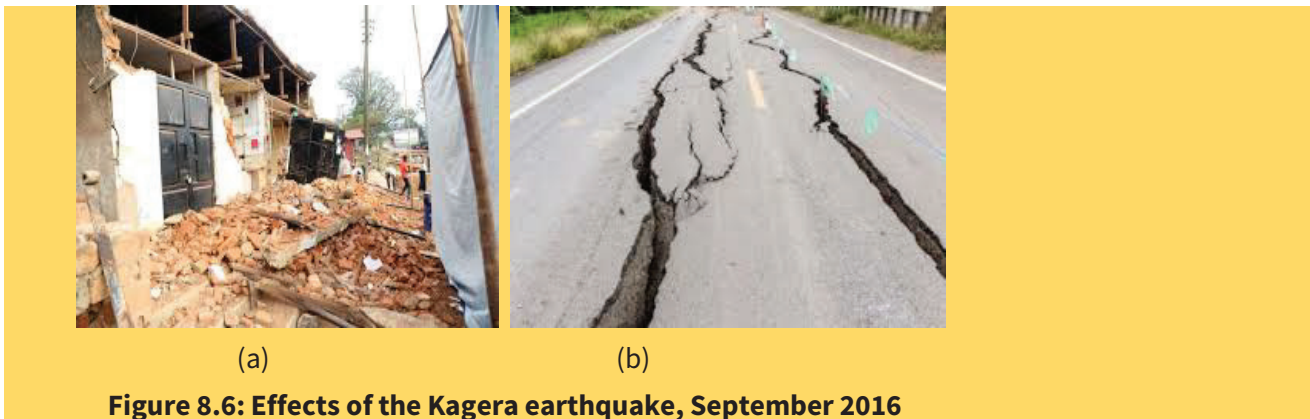
We cannot get information about the interior of the earth by drilling or mining. The deepest mine in the world is 4.0 km below the surface, and from the surface to the center of the earth it is more than 6000km. By studying earthquakes **geologists** come up with information about the interior of the earth.

Geologists believe that the solid outer layer of the earth, which is about 100 km, rests over a thicker layer of semi-molten rock.

Earthquakes and Landforms Formed by Faulting

Activity 8.10

1. Using your knowledge of the relief regions of East Africa:
2. Suggest areas in East Africa where earthquakes are most likely to occur.
3. Explain why you think the areas which you have suggested are likely to experience earthquakes.
4. Look at Figure 8.6 and explain how earthquakes affect people and their property.
- 5.



Resources to use: Photographs as provided in the Learner's Book

Skills: Reading and interpreting photographs, critical thinking, problem solving

Teacher Instruction

Guide the learners individually to read the text before beginning this activity.

1. Ask the learners to do Activity 8.10 in the Learner's Book.
2. In a discussion, ask the learners to explain further the reasons they have given for the areas that are most likely to experience earth quakes. Note how well they articulate their ideas relating them to relief regions, earth movements and disasters.
3. Observe the learners as they do the activity; assess how well they interpret the photographs. Assist them where they get challenges.
4. Emphasise to the learners that all responses to how earthquakes affect people and their property must be got from evidence in the photographs.
5. In a discussion, ask the learners to suggest other possible effects of earth quakes apart from those got from the photographs. Assess their ability to think critically and to defend their points of view.
6. Assess the learners' written work for correctness and accuracy of facts, and then give timely feedback.

Possible Responses

1. Faulted zones like in the Eastern arm of the rift valley in Kenya and Tanzania, the Albert rift Valley in western Uganda, Nile-Aswa flats, Lake Victoria basin like in the Kavirondo (Winamu) gulf, and Kagera region.
2. These areas have experienced earth movements especially faulting which is highly associated with earth tremors. The Kagera region has recently experienced an earth quake (in 2016) so it is most likely to experience other earth quakes.
3. Destruction of settlements/houses as walls and foundations get shaken and crack as tremors pass. Displacement of communities when their homes get destroyed
Loss of property such as house hold items which get damaged by falling walls, are buried by rubbles.
They lead to destruction of infrastructure such as tarmac roads, power lines and bridges.

The energy released into the rocks of the earth can lead to large scale cracking or fracturing up to the surface of the earth. When this happens we say that faulting has taken place. For example, in Figure 8.5 (b), two fault lines have developed in the road. What do you think is likely to happen in the area if the ground is pulled apart along the fault lines?

In the same way, when the rocks of the earth experience faulting, there is movement and displacement of land blocks along the fault lines. This leads to the formation of rift valleys and Block Mountains or horsts.

Activity 8.11

In pairs or groups, study Figure 8.7 and do the following:

1. Copy the diagrams into your notebooks and give them labels 1-3 to identify the stages
2. in the formation of faulted landforms.
3. Explain the process going on at each stage and how it affects the land block.
4. On the diagram in stage 3, show the rift valley and Block mountains.
5. Suggest how the rift valley and Block Mountains may affect the lives of people in areas where they are found.

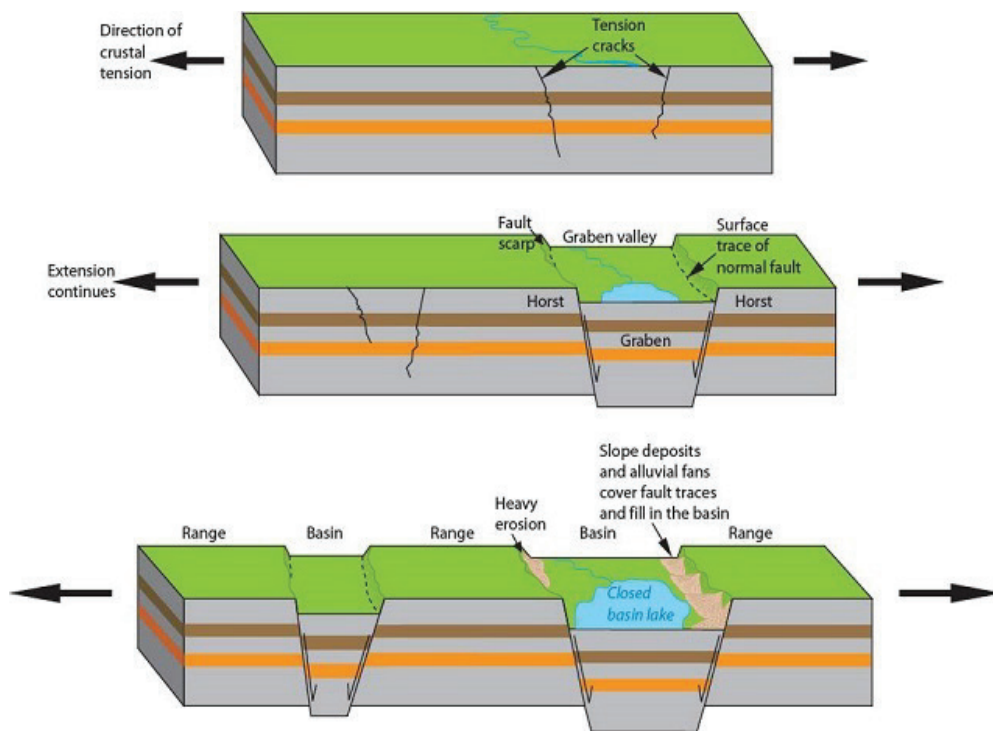


Figure 8.7: Formation of landforms by faulting

Resources to use: Pictures as provided in the Learner's Book

Skills: Drawing diagrams to illustrate processes, interpreting pictures, critical thinking, collaboration and problem solving

Teacher Instruction

1. Organise the learners in groups or pairs and guide them to do Activity 8.11 in the Learner's Book.
2. Observe the learners as they do the activity; assess how well they interpret the pictures by attaching stages to processes. Assist them to overcome challenge if any.
3. In a discussion, ask the learners to explain further the processes shown in the diagrams and note how their ideas logically lead to the final landform.
4. Observe the learners as they draw the diagrams, assess their accuracy and guide them to develop the skill.
5. Emphasise to the learners that all responses to the tasks in this activity should be based on the diagrams provided. Encourage them to use background knowledge as examples to back up their views.
6. Assess the learners' written work for correctness and accuracy of facts, and then give timely feedback.
7. Guide the learners to read the text and to use other sources including the Internet so as to find out other features formed by faulting and their effects on human activities.

Possible Responses

- Stage 1:
Tectonic movements in the interior of the earth produce tension forces. The tensional forces act upon the land block by pulling it into opposite directions. Due to continued pulling, the land block develops parallel cracks or fractures.
- Stage 2:

When tensional forces continue pulling the land block, the land gets divided into three blocks along the cracks or fractures which now cut across the land block. These cracks are called normal faults. As the three blocks continue being pulled apart, the middle block starts sinking. The two side blocks remain standing at a higher level than the sinking block. The sinking block forms a deep depression with steep walls. The depression is called a graben valley or rift valley while the side blocks are called horsts.

○ Stage 3:

When tensional forces continue pulling the land blocks apart, middle block sinks deeper. This makes the graben valley deeper. Heavy erosion acts on the steep walls on both sides of the depression thereby widening the graben. The eroded material is deposited on the floor of the graben valley.

The depression on the floor of the graben/rift valley gets filled by water from the surrounding higher land to form a lake.

The processes which the learners have described in the previous activity are similar to those that led to the formation of the East African Rift Valley and the Ruwenzori Mountains. The steep walls on both sides of the rift valley are called **fault scarps** or escarpments.

Within the rift valley, another phase of faulting can take place. This is called **secondary faulting** and it may lead to the formation of a secondary depression. When the secondary depression gets filled with water, it becomes a **rift valley lake**. See Figure 8.8.

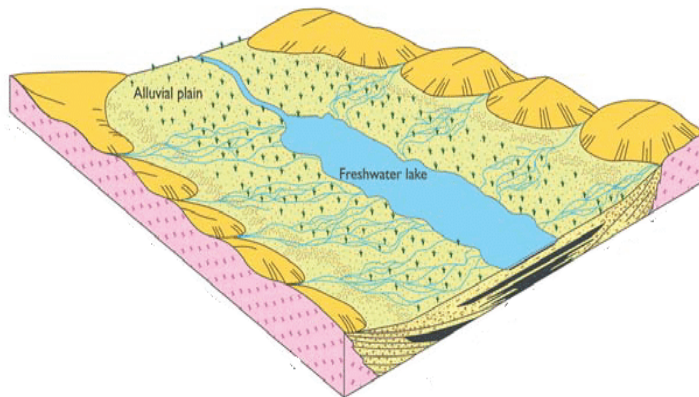


Figure 8.8: A lake in a small graben

Lake Albert in western Uganda and Lake Tanganyika are examples of such lakes. Think of other examples of rift valley lakes in East Africa.

Vulcanicity

Activity 8.12

In groups,

1. Think of the volcanic features you know in Uganda, East Africa, and other parts of the world.
2. Make a list those features.
3. Swap your list with another group and see the features you have in common.
4. Discuss and agree on what is meant by vulcanicity and volcanicity.

Resources to use: No special tools needed

Skills: Critical thinking, collaboration and problem solving

Teacher Instruction

1. Organise the learners in groups and guide them to do Activity 8.12 in the Learner's Book.
2. Observe the groups as they do the activity; assess how well the learners collaborate, exercise leadership roles, share ideas and respect each other's views. Assist them to overcome challenge if any.
3. In a discussion, ask the learners to explain the difference and similarity between vulcanicity and volcanicity. Note how well they relate their ideas to the formation of igneous rocks earlier studied.
4. After swapping their lists, ask group to comment on each other's work and to suggest corrections where necessary.
5. Assess the learners' written work for correctness and accuracy of facts, and then give them feedback.
6. Guide the learners to read the text and to use other sources so as to find out other features formed by vulcanicity and how they affect human activities and life styles.

Hint: Emphasise difference between vulcanicity and volcanicity and how each process affects relief and landscape.

Possible Responses

1. This will vary depending on the learners' earlier knowledge. The list may include Mountains like Elgon, Mufumbira (Mgahinga, Muhavura, Sabinyo), Moroto, Kadam, Napak, Kenya, Kirimanjaro, Rungwe, Suswa, Longonot, Oldoinyo Lengai, Nyragongo and Nyamulagira (D.R. Congo), Dabbahu (Ethiopia); lava plateaus like Lakipia; Explosion craters like Lakes Katwe, Nyungu, Kyamwiga, Nyamunuka, Rutoto, Saaka, Kigere, Ngorongoro, etc.
2. Vulcanicity refers to the movement of molten rock material from the interior of the Earth into the rock layers making up the earth or onto the surface of the Earth. It involved pushing (intrusion) of molten rock into the local rocks and pushing (extrusion) molten rock outside the local rocks.

Features of a volcano

Activity 8.13

In pairs,

1. Carry out a library or internet search about the features of a volcano.
2. Copy Figure 8.9 (b) from the Learner's Textbook into your notebooks and using the information you have got from the search, name the features labelled 1-6.

When volcanic eruptions occur, they do not lead to the formation of volcanic mountains only but also create other landforms. Volcanic eruptions also lead to the formation of lakes.

Resources to use: Pictures as provided in the Learner's Book

Skills: Searching for information, ICT skills, critical thinking, collaboration and problem solving

Teacher Instruction

1. Organise the learners in groups and guide them to do Activity 8.12 in the Learner's Book.
2. Observe the pairs as they do the activity; assess how well the learners collaborate, exercise leadership roles, share ideas and respect each other's views. Assist them to overcome challenge if any.

3. In a discussion, ask the learners to explain the difference and similarity between vulcanicity and volcanicity. Note how well they relate their ideas to the formation of igneous rocks earlier
4. Assess the learners' written work for correctness and accuracy, and then give them feedback.
5. Guide the learners to read the text and to use other sources so as to further their understanding of volcanoes.

Possible Responses

1 - Ash cloud, 2 - Central vent, 3 - Falling ash, 4 - Layers of Lava and Ash, 5 - Layers of local rock/strata, 6 - Magma chamber

Activity 8.14

In groups,

1. Carry out a library or internet search on landforms resulting from volcanic eruptions.
2. Make a list of the major landforms and draw diagrams to explain how each landform is formed.
3. Find out the types of lakes formed due to volcanic eruption; and draw diagrams to explain how each type is formed.
4. Suggest how the volcanic landforms and drainage features might be useful to people.
5. Suggest the disadvantages associated with volcanic landforms and lakes.

Tools to use: ICT, textbooks, journals, lead pencil, coloured pencil

Skills: Searching for information, ICT skills, critical thinking, collaboration, drawing diagrams to illustrate features, communication

Teacher Instruction

1. Organise learners in groups and ask them to do the Activity 8.14 Learner's Book.
2. Ensure that every learner has access to the tools and resources needed for the task.
3. Observe the learners as they do the activity; note how well they collaborate in their groups, share responsibilities, and respect each other's contribution.
4. Observe learners as they draw the diagrams of volcanic features and assess them for accuracy and effectiveness in representing the real landforms.
5. Ensure that every learner comes up with a reasonable range of landforms, with a simple explanation of how each landform was formed illustrated with relevant diagrams in order to develop the skills listed above.
6. In a discussion, probe the learners to explain their suggestions in detail in order to foster understanding.
7. Mark their work and give feedback and guidance where needed.

Possible Responses

1. Landforms resulting from volcanic eruptions:
 - i) Volcanic mountains, lava plateaus, explosion craters, volcanic plugs and calderas
2. Lakes formed by volcanic eruption: lava-dammed lakes, explosion craters lakes, summit crater lakes and caldera lakes
The formation of each feature should point out the processes and diagrams.

3. These will vary as they are personal opinions. They may include:
 - ii) Old volcanoes when weathered for fertile soils which may support crop cultivation and attract a large population.
 - iii) Volcanic features may lead to development of tourism and fetch income.
 - iv) They may be rich in minerals, so they may become important mining sites and employ many people.
 - v) Volcanic highlands modify local climate. They can create heavy rainfall on the windward sides and attract dense settlement.
 - vi) Volcanic lakes may become important fishing grounds. This can provide people with food and income.
 - vii) Volcanic lakes can be used for recreation such as swimming, boat racing, bungy jump and others.
 - viii) The lakes may also become sources of water for the local community if they are not salty. Such water can be used for many domestic purposes and also in industry.
4. Disadvantages
 - i) Volcanic landforms may not be secure for settlement if they are still active or dormant. Any time they may erupt and lead to death and loss of property.
 - ii) Volcanic mountains can lead to aridity in areas which are not facing the direction of rain fall bearing winds. This can affect agriculture, settlement and forestry.
 - iii) Volcanic ranges may hinder communication by road since they form barriers to construction works.
 - iv) It is not secure to live on the slopes of an old volcano since the weak slopes can easily be affected by landslides.
 - v) Young volcanoes may hinder farming since they have hard rocks and poor soils with very few weatherable minerals which can support crop growth.

Warping

In Chapter Seven, you learnt that much of East Africa is a plateau. What do you understand by a plateau? The East African plateau has been affected by many processes which have created depressions and hills. Some of the large depressions have been filled with water to form lakes.

Activity 8.15

In groups,

1. Choose two people to hold a sheet of newspaper or a piece of cloth by its corners.
2. Let them slowly lift the extreme ends of the paper or cloth as the rest of you observe and note down what happens.
3. Write down what you have observed and draw a diagram to illustrate your observation.
4. Share what you have written and the diagram you have drawn with other groups through a whole class discussion.

Tools to use: A large sheet of paper, preferably a sheet of a flip chart/ a large piece of cloth of about 1 square metre.

Skills: Drawing diagrams to illustrate features, collaboration creative thinking, and communication

Teacher Instruction

1. Organise learners into groups and ask them to do Activity 8.15 in the Learner's Book. Ensure that every learner produces written responses to the task.

2. Observe the learners as they do the activity and assist them where they get challenges.
3. Ask the learners to explain what they observe and assess how well they relate it to down warping and the resultant landform.
4. Emphasise to the learners that everyone has to participate actively so as to develop the target skills.
5. Assess their written work for accuracy of facts, logical flow of explanation and accuracy of the diagram and then give immediate feedback.
6. Guide the learners to read the text to crosscheck their observation and description.

Possible Responses

1. As the ends were lifted up, the central part sagged and formed a depression. The more the sides were lifted the deeper the depression became. In the same way if a region experiences uplifting on the opposite sides of the land block, the middle blocks sags in to form a depression or basin. This process is called down warping. Personal ideas
2. A diagram showing how down warping occurs with forces and directions of movement of land blocks marked and labelled.

What the learners have observed is called sagging. In the same way, when certain parts of the East African plateau were acted upon by forces which originated in the interior several million years ago and pushed the eastern and western sides of the plateau upwards, the central part sagged in. That process is called **down warping**. It led to the formation of very large depressions. These depressions are now occupied by lakes.

Activity 8.16

In pairs,

1. Open the atlas and look at the map of East Africa showing physical features.
2. Suggest lakes in East Africa which were formed as a result of down warping. Give reasons to support your suggestion.
3. Draw a sketch map of East Africa showing the down warped lakes and other drainage features connected to them.

Tools to use: Atlas, lead pencil, and coloured pencil

Skills: Reading and using a map, drawing diagrams to illustrate features, critical thinking, searching for information

Teacher Instruction

1. Organise the learners in pairs and ask them to do Activity 8.16 in the Learner's Book individually. Give a time frame to ensure timely application of the acquired knowledge.
2. Ensure that every learner has access to the tools needed for the activity.
3. Observe the pairs as they do the activity assess their skill of using the atlas to get information.
4. Ask the learners to justify their suggestions for the down warped lakes and note how well they relate their ideas to the relief regions earlier studied.
5. Wrap up the activity by guiding pointing out the down warped lakes and give throw more light on how and when they were formed.
6. Mark learners' written work and diagrams and give feedback and guidance where needed.

Hint: Guide the learners to use ICT or Library search and other sources to find out information about the erosional processes which are responsible for the formation of the relief and landforms of East Africa, including the work of rivers, lakes and ice glaciers.

Possible Responses

1. Lake Victoria, Lake Kyoga, Lake Mburo, Lake Wamala, Lake Kachira and Lake Kijanabarora
2. A sketch map of East Africa Showing the down warped lakes and some rivers, streams and swamps connected to the lakes. It should bear the qualities of a good and effective map.

Activity of Integration

Imagine strong earth movements have occurred in Butinnindi village, in central Uganda. Using diagrams to illustrate your ideas, explain any two effects these earth movements might have on the landscape in the area. Suggest how those effects on landscape might affect the way people in Butinnindi live; and the problems which might arise from the change in the landscape.

Tools to use: No special tools needed

Skills: Critical thinking, creative thinking, problem solving, communication

This task is aimed at assessing the extent to which the learner has grasped the concept of geography and the relevance of studying it to his/her own life and community. Encourage learners to come up with original views based on their own locality and imagination.

Teacher Instruction

1. Ask learners to do the Activity of Integration at the end of Chapter Eight in the Learner's Book individually. Give a fixed duration to ensure timely application of the acquired knowledge and skills.
2. Ensure that every learner produces written responses to the task.
3. Mark their work and give feedback and guidance where needed.

Possible Responses

Personal ideas based on the understanding of tectonic movements and how they may affect landscape and the lives of people.

Chapter Nine: Climate and Natural Vegetation of East Africa

Overview

Climate is a quiet familiar concept to the learners. In this topic, help the learners to understand the main types of climate in East Africa and how the climate influences the vegetation and to appreciate this as a natural resource which can benefit both the present and future generations.

You are advised to use a number of interactive methods to enable learners to develop the skills listed under each activity.

In this topic, guide learners to:

- a) understand the characteristics of the climates of Uganda and the rest of East Africa and the factors influencing them.
- b) understand through fieldwork the characteristics of the vegetation and how vegetation is affected by the climates.
- c) draw graphs to show the different climates.
- d) draw a map showing the climates and vegetation of East Africa.
- e) recognise and describe a climate from a graph.
- f) recognise and describe types of vegetation from photographs.
- g) understand through case studies how selected climates and types of vegetation affect the way of life of the people in those areas.

Activity 9.1

1. Explain what you understand by climate.
2. List any five climates you know.
3. Describe two of the climates listed above.

You have probably used words like hot, wet and dry to describe the two climates. Describing climate means pointing out its main **characteristics**. It is these characteristics that differentiate one climate from another. You are going to learn about the characteristics of the main climates in East Africa.

Resources to use: No special tools needed

Skills: Critical thinking, communication, problem solving

Teacher Instruction

1. Ask the learners to do Activity 9.1 in the Learner's Textbook.
2. Observe learners as they do the activity and assess how well they can provide solutions to problems
3. Ask the learners to describe the climates orally and note how effectively they can communicate and express themselves.

4. Ensure that each learner comes up with written work to which can form summarized notes.
5. Assess their written work for correctness and logical flow of ideas and then give them feedback.

Possible Responses

1. The pattern of weather experienced in a place for over a long period of time.
It is the typical weather of a place for a reasonably long period of time.
2. Equatorial climate, Savanna climate, Semi-desert climate, temperate climate, Tundra climate.
3. The description of each climate should point out the location, temperature conditions, precipitation/rainfall, and possibly humidity.

Characteristics of the Main Types of Climate

Learning about the characteristics of climates will help the learner to understand why each climate is different from other climates. This will enable them to understand why there are many types of climate in East Africa.

Equatorial climate

This climate is found in areas that lie between 5°N and 5°S of the equator. In East Africa, the equatorial climate is experienced around the Lake Victoria basin, including the islands within the lake. To understand this better, do Activity 9.2.

Activity 9.2

In pairs or individually, study Figure 9.1 and do the following tasks:

1. Write down the months in which the highest amount of rainfall is received at Entebbe.
2. How many seasons of highest rainfall does Entebbe experience? Why do you think the area experiences that number of seasons?
3. Is the relative humidity at Entebbe high or low? Give reasons to support your answer.
4. Calculate the annual range of temperature for Entebbe. Is the range high or low?
5. Calculate the total annual rainfall for Entebbe. Is the rainfall low, moderate, or heavy?

Resources to use: A graph as provided in the Learner's Book.

Skills: Critical thinking, reading and using graphs to analyse data, problem solving, mathematical computation

Teacher Instruction

1. Guide the learners to read the text before they begin this activity.
2. Organise the learners in pairs and guide them to do Activity 9.2 in the Learner's Book.
3. Observe learners as they do the activity and assess how well they collaborate, share responsibilities and respect each other's views.
4. Challenge the learners to justify every suggestion they make in order to assess their understanding and ability to defend their opinions.
5. Assess their written work for correctness and logical flow of ideas and then give them feedback.

Hint: Ensure that each pair comes up with written work in order to develop the skills listed for this activity.

Possible Responses

1. April
2. Two seasons: March – May, October – December
3. It is high, probably above 70%. The relative humidity is high because Entebbe receives heavy rainfall and hot temperature the whole year. This leads to high evaporation and high amounts of water vapour in the air.
4. Annual range of temperature = 2°C
5. Total annual rainfall = 1432mm
6. It is heavy rainfall.

The climate of Entebbe is similar to that of other areas within the Lake Victoria region of East Africa. You have realised that areas with an equatorial climate receive two peaks of heavy rainfall. This is called **double maxima** rainfall distribution. The climate of the Lake Victoria region is called **modified equatorial** climate. That is to say, this region receives heavier rainfall than other equatorial lands and does not have any month without rainfall.

Mountain or Montane Climate

This type of climate is mainly found in the highlands, especially in the mountains. Think of areas in East Africa which are likely to be having this type of climate. In these areas temperatures are generally low and air pressure decreases with altitude. Areas with the montane climate receive mainly relief rainfall, which is heavier on the windward side. The leeward side receives very little rainfall. Why do you think this is so? The condition the learners have explained is called the **rain shadow** effect.

Activity 9.3

Study Figure 9.2 and do the following tasks:

1. Which months have the highest rainfall?
2. Which months have the lowest rainfall?
3. Describe rainfall distribution in Nairobi.
4. Which are the hottest months?
5. Which months have the lowest temperatures?
6. Calculate the total rainfall for Nairobi.
7. Copy the graph into your notebook.

Resources to use: A graph as provided in the Learner's Book.

Skills: Critical thinking, reading and using graphs to analyse data, problem solving

Teacher Instruction

1. Guide the learners to read the text before they begin this activity.

2. Guide the learners to do Activity 9.3 in the Learner's Book.
3. Observe the learners as they do the activity and assess how well they interpret the graph to come up with the characteristics of montane climate. Assist them where they may get challenges.
4. Challenge the learners to justify every suggestion they make in order to assess their understanding and ability to defend their opinions.
5. Assess their written work for correctness and logical flow of ideas and then give them feedback.

Hint: Ensure that each learner comes up with written work in order to develop the skills listed for this activity.

Possible Responses

1. April
2. July
3. Nairobi receives rainfall all the year round. The place experiences two rain fall peaks; In April and November. The first rains come in October and reaches the peak in November. From December to February, rainfall decreases while from March to May Nairobi experiences the second rain season. June to October are dry months.
4. Hottest month – February
5. Lowest temperature – July
6. 871 mm
7. A well-drawn and labelled graph showing the climate of Nairobi

Semi-Arid and Arid Climate

Activity 9.4

In groups, study Figure 9.3 and do the following:

1. Copy the figure into your notebooks.
2. Find out the months with the heaviest rainfall.
3. Which months have the lowest rainfall?
4. Describe the characteristics of the climate of the area represented by Figure 9.3.
5. Suggest the likely economic activities carried out by the people living in the area represented by the graph. Give reasons for each activity you suggest.

Resources to use: A graph as provided in the Learner's Book.

Skills: Critical thinking, drawing a graph to represent information, reading and using graphs to analyse data, problem solving

Teacher Instruction

1. Organise the learners in pairs and guide them to do Activity 9.4 in the Learner's Book.
2. Observe learners as they do the activity and assess how well they collaborate, share responsibilities and respect each other's views.
3. Challenge the learners to explain the likely economic activities carried out in Wajir in order to assess their understanding of the influence of climate on peoples' economic activities and life styles, and ability to defend their opinions.
4. Assess their written work for correctness and logical flow of ideas and then give them feedback.

Hint: Ensure that each learner comes up with written work in order to develop the skills listed for this activity. Emphasise to the learners that they have to read about other types of climate in East Africa.

Possible Responses

1. April
2. June, July and August
3. Wajir receives little rainfall. Rainfall comes almost throughout the year with two peaks occurring in April and November. January, February, June, July and August are almost dry months. Total annual rainfall is only 221mm. The area experiences hot temperature throughout the year ranging between 26°C and 30°C. The annual range of temperature is low, only 4°C
4.
 - i) Growing of annual crops such as sorghum, maize, beans and other legumes.
 - ii) Pastoral farming since animals can survive even in within semi-arid areas. Again the hot and dry climate can support grazing as animals can be moved to areas with fresh pasture.
 - iii) Wild life conservation and tourism can be carried out. The semi-arid climate can support a wide range of animals which can attract tourists.

This type of climate is found in northern and north-eastern Kenya, e.g. the Chalabi Desert, Karamoja in north-eastern Uganda, Nyiri desert in southern Kenya, in central Tanzania and in north-eastern parts of Tanzania, e.g. the Masai **steppe**. It is also experienced in the Ankole-Masaka corridor in Uganda. Areas in the Western Rift Valley region around Lake George and Lake Edward also experience a semi-desert climate.

Tropical or Savannah Climate

This type of climate covers the greatest part of East Africa. It is found next to the equatorial region, both north and south of the equator. It may not differ much from the equatorial climate. Generally, savannah lands receive less rainfall than places in the equatorial climate region. Also, they have well marked rainy and dry seasons. You can understand the other characteristics of the savannah climate by studying Figure 9.4.

The Coastal Tropical Climate

This type of climate is experienced in the coastal region of East Africa in places like Malindi, Mombasa, Tanga and Dar es Salaam. The climate is modified by the Southeast Trade Winds and the sea. The rainfall is heavy and well distributed throughout the year and ranges between 1,000 mm and 1,800 mm. The area experiences high temperatures throughout the year. Why do think temperatures are hot in this region? Figure 9.5 is a climate graph of Mombasa, an area with a coastal tropical climate.

Factors that influence Climate in East Africa

In Chapter Five you learnt about the revolution of the earth while in Chapter Seven you learnt about the relief of East Africa. Now you are going to learn how these and other factors affect the climate of East Africa, including that of your home area.

Activity 9.5

In pairs or groups, use your knowledge of the movements of the earth to do the following tasks:

1. When is the sun overhead at the equator?
2. Explain what happens in the region close to the equator when the sun is overhead at the equator.
3. Why does the region close to the equator receive two peaks of rainfall?
4. When is the sun overhead at the Tropic of Cancer?
5. When do areas close to the Tropic of Cancer receive rain and why?
6. When is the sun overhead at the Tropic of Capricorn?
7. When do areas close to the Tropic of Capricorn receive rainfall and why?
8. Share what you have written through a whole class discussion.

Resources to use: No special tools needed

Skills: Critical thinking, problem solving

Teacher Instruction

1. Organise the learners in pairs or groups and guide them to do Activity 9.5 in the Learner's Book.
2. Guide them to recall what they know about earth movements.
3. Observe learners as they do the activity and assess how well they collaborate, share responsibilities and respect each other's views.
4. Challenge the learners to explain their views in order to assess their understanding of the effects of earth movements on weather pattern and climate.
5. During the whole class discussion ensure that each group presents ideas agreed upon by the group, then ask groups to critic each other and suggest amendments where possible.
6. Assess their written work for correctness and logical flow of ideas and then give them feedback.

Possible Responses

1. It is overhead at the equator on 21st March and 23rd September every year.
2. The region close to the equator experiences hot temperatures. As a result of too much heating of the ground, air rises and gets replaced by moist winds from the Southern and Northern Hemispheres. When the winds meet, they rise, form heavy clouds and give off rainfall.
3. Because it is crossed by the overhead sun twice a year. This causes the low pressure belt to cross this region twice hence the seasons of heavy rainfall.
4. It is overhead at the Tropic of Cancer on 21st June.
5. They receive rainfall in July to September. This is the time when the low pressure trough is in that region. The north east and south east trade winds meet in the low pressure trough and give off rainfall.
6. On 22nd December
7. From January to March. This is the time when the low pressure trough is around the Tropic of Capricorn. The north east and south east trade winds meet in the low pressure trough and give off rainfall.

The Inter Tropical Convergence Zone (ITCZ)

The overhead sun causes much heating of the ground. This in turn causes a low pressure zone which attracts winds from high pressure zones. The low pressure zone within the tropics in which the winds from the northern and southern hemispheres meet is called the **Inter Tropical Convergence Zone (ITCZ)**. The ITCZ keeps on moving following the position of the overhead sun. Warm air rises, which leads to conventional rainfall. The conventional rains in most cases are stormy, so this region is referred to as the **thunderstorm zone**. The seasonal rainfall pattern in most parts of East Africa is caused by the ITCZ.

Height

Another important factor influencing the climate of East Africa is height of land above sea level. It is also called **altitude**. Imagine you are flying in a balloon with a thermometer in your hand. The thermometer reading will drop as you rise higher. This is illustrated in Figure 9.6.

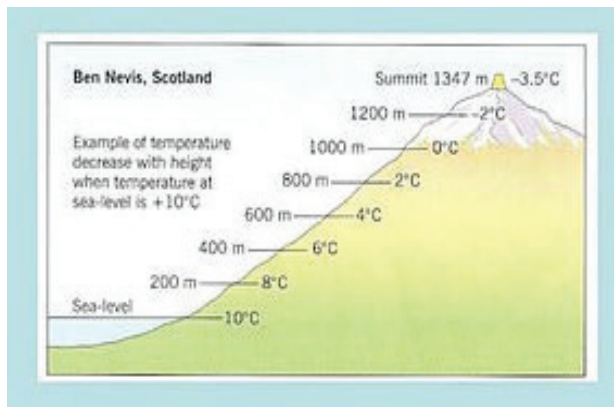


Figure 9.6: How altitude affects temperature

This means that temperature decreases with a rise in height. This is because air is thin, dry and dust free at high altitudes. Such air cannot absorb and keep much heat. This implies that altitude influences temperature and climate.

Latitude

The areas within the tropics, $23\frac{1}{2}^{\circ}$ N and S of the equator receive the most heat because the sun overhead in these areas all year round. East Africa lies astride the equator 4° N to 12° S. The region experiences a tropical-equatorial climate with constant heat and conventional rainfall. Figure 9.6 shows the influence of latitude on the climate of East Africa.

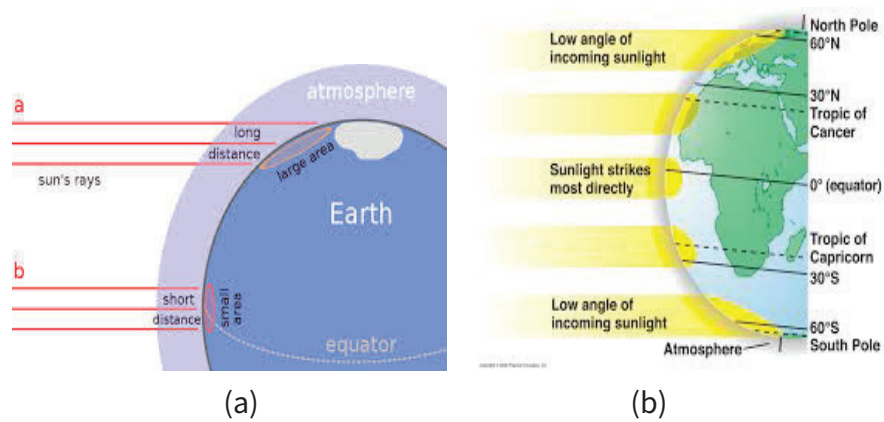


Figure.9.6: Influence of latitude on climate in East Africa

Activity 9.6

1. Copy the figure into your exercise book.
2. Explain what is taking place in the diagrams above.

Resources to use: Diagram as provide in the Learner's Book.

Skills: Critical thinking, drawing diagrams to represent features, problem solving

Teacher Instruction

1. Ask the learners to do Activity 9.6 in the Learner's Book.
2. Observe learners as they do the activity and assess how well they draw the diagram. Assist them where they may get challenges.
3. In a discussion, ask the learners to explain their views in order to assess their understanding of the effects of latitude on temperature.
4. Assess their written work for correctness and logical flow of ideas and then give them timely feedback.
5. Guide the learners to read the text so as to understand the factors influencing climate in great detail.

Possible Responses

1. Places on the surface of the Earth get the same amount of heat from the sun as shown by the sun's rays, a and b. Around the equator heat from the sun reaches the ground after travelling through a shorter distance than that received in the polar region. Again, around the equator the heat concentrates over a smaller area.
2. This means that there is more heating and so the atmosphere is hotter than in the Polar Regions. This explains why the tropical region is hotter than the Polar region.

Relief

Relief influences the formation and distribution of rainfall in East Africa. Rain is formed when warm, moist air blows over a mountain. The warm, moist air condenses, and forms clouds and rainfall. The side of the mountain from which the prevailing winds blow receives heavy rainfall. This is called the **windward side**. The side to which the winds move after dropping rainfall receives little or no rainfall. This is called the

leeward side. The leeward side is said to be in the **rain shadow**. Figure.9.8 below shows how relief influences rainfall.

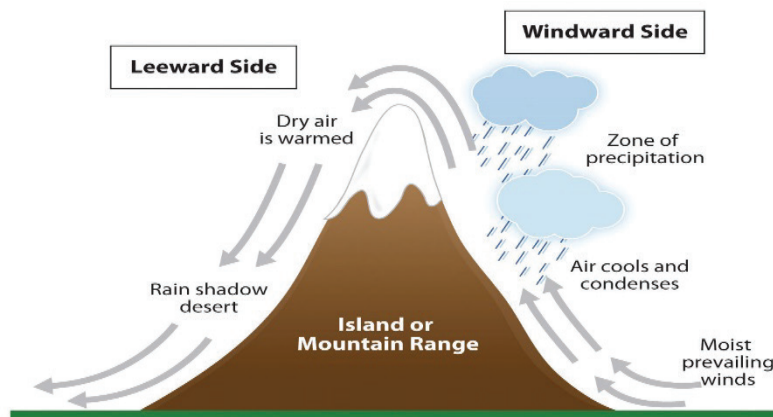


Figure 9.7: Influence of relief on rainfall

Activity 9.7

In your exercise book:

1. Make notes on how the highland regions in East Africa influence rainfall formation and distribution.
2. Copy the figure above.

Resources to use: Diagram as provide in the Learner's Book.

Skills: Critical thinking, drawing diagrams to represent features, problem solving

Teacher Instruction

1. Ask the learners individually to do Activity 9.7 in the Learner's Book.
2. Guide the learners to read the text in order to get the ideas which can assist them to think about east Africa.
3. Observe learners as they do the activity and assess how well they draw the diagram. Assist them where they may get challenges.
4. In a discussion, ask the learners to explain their views in relation to actual highland areas in East Africa. Assess how well they can transfer and apply knowledge to new situations.
5. Assess their written work for correctness and logical flow of ideas and then give them timely feedback. Note the use of technical terms.
6. Wrap up the activity by drawing the attention of the learners to areas like Karamoja whose climate is, in a large measure, influenced by the surrounding highlands.

Possible Responses

This will depend on the highlands chosen by the learner. Notes should specify the highlands, places affected, the amount of rainfall received and temperature conditions experienced.

Activity 9.8

In your notebook:

1. Copy the figure above.
2. On the map, mark the Southeast and the Northwest Trade Winds.
3. Explain why the coastal areas of East Africa receive little rainfall.
4. Read the summary below and copy it.

Resources to use: Map as provide in the Learner's Book, text books, atlas, ICT.

Skills: Critical thinking, drawing diagrams to represent features, problem solving

Teacher Instruction

1. Ask the learners individually to do Activity 9.8 in the Learner's Book.
2. Guide the learners to search relevant sources for the information they can use to do this activity.
3. Observe learners as they do the activity and assess how well they draw the map and relate climate to the alignment of land. Assist them to overcome challenges if any.
4. In a discussion, challenge the learners to explain why the coastal areas of East Africa receive little rainfall yet they lie along a large water body. Assess how well they can think critically and also express themselves orally.
5. Guide the learners to read the text summary and to copy key points in their note books.
6. Assess their written work for correctness and logical flow of ideas and then give them timely feedback. Note the use of technical terms.

Possible Responses

1. Map with the South east and North east trade winds marked using arrows and labeled.
2. Ideas and explanation may vary. However, learners should point out the nature of the East African coast and its alignment to the direction of the North east and south east trade winds.
3. A summarised text.

Activity 9.9

In groups, do the following:

1. Move around the local area.
2. Observe the type of vegetation in the area.
3. List the types of vegetation observed.
4. Write down the characteristics of the different types of vegetation.
5. Identify the climate in the local area.
6. Discuss how climate affects each type of vegetation.
7. Write a group report with diagrams of the type of vegetation observed and present it to the class.
8. Discuss the dangers of overuse of vegetation.
9. Copy the table below and fill it.

Resources to use: The local environment, Table provided in the Learner's Book, Text books, ICT

Skills: Collaboration, collecting information, writing a report, critical thinking, drawing diagrams to represent features, problem solving

Teacher Instruction

1. Organise the learners into groups and guide them to do Activity 9.9 in the Learner's Book.
2. Observe learners as they do the activity and assess how well they apply field work techniques to collect information. Assist them where they may get challenges.
3. Assess the field reports for correctness and logical flow of ideas, and accuracy of the diagrams.
4. In a discussion, probe the learners to explain the likely dangers of overuse of resources in the area studied. Note how well they relate their arguments to the local environment and also defend their opinions.
5. Guide the learners to search relevant sources for information which can assist them to fill in the table.

Possible Responses

1. The responses are subjective. To depend on the locality in which the school is found.
2. A filled table showing the major types of vegetation in East Africa and their characteristics.

How Climate and Vegetation Types Affect People's Ways of Life

Activity 9.10

In pairs or individually, read the extract below and do the tasks that follow:

The climate of Kalangala district is generally moist and humid all year round. The area has small seasonal variations of temperature, humidity and wind throughout the year. The dry season is experienced between December and March, and again in June–July. The two periods have frequent thunderstorms.

The climate is characterised by high annual rainfall amounts that are well distributed. The mean annual rainfall received ranges from 1,125 to 2,250 mm.

The annual rainfall is highest over the open lake and there is a marked gradient drop of 50 mm per 1.6 km landward. The windward shores of the lake shores exposed to the moist air are wetter than the lee shores, which are sheltered from the moist winds. The rainfall maxima are associated with the onset of the southeast (SE) or northeast (NE) monsoon winds.

The vegetation in Kalangala district is predominantly characterised by medium altitude moist evergreen forests. This vegetation occurs at altitudes ranging from 600 to 1,550 m. It forms closed stands rising 30 to 45 metres high, with abundant lianas. Grasses are generally absent or are broad-leaved and fire-sensitive.



TROPICAL RAIN FORESTS

These forests grow in areas where rainfall is more than 200 Cms.

They include the tropical semi-evergreen forests and Tropical evergreen Forests.

The trees do not have any particular season to cast off their leaves.

The forests are also known the archetypal rain forests.

Figure 9.11: Tropical rainforest

The lakeside consists of dense and impenetrable forests with numerous shrubs on the ground. There are also small to medium sized evergreen tree species with roots extending to as high as 3.6 m up the main stem.

The district is richly endowed with tropical high forest resources covering 221.5 km². The predominant forest cover in the district comprises tropical high forest species. Most of the forest is filled with primates such as monkeys and other species of wildlife, including the sitatunga antelopes and exotic bird species. The Ssesse islands are truly a bird watchers' paradise.

There are a variety of fruits on the island. These include mangoes, bananas, papaya, watermelons, pineapples and jackfruit. Timber and fuel constitute the major commercial benefits of forests for the residents. As a result of these two commercial uses, the forest resources are heavily exploited.

Agriculture is the second major economic activity in the district. There are two main farming activities in Kalangala district, i.e. livestock rearing and food and cash crop production. Robusta is the main cash crop grown. The food crops comprise mainly bananas, sweet potatoes, beans and a variety of vegetables. The bananas are generally stunted and produce under-sized bunches. Robusta coffee trees grow well around homesteads. The yield of the coffee trees is not as high as on the mainland.

(Adapted from: Kalangala District, State of the Environment Report, 2005)

1. In about three sentences, summarise the climate of Kalangala district.
2. Explain why the windward side of the lake shore gets more rainfall than the leeward side.
3. List the economic activities carried out in Kalangala district.
4. Describe the characteristics of the forests in Kalangala district.
5. Basing on the natural resources mentioned in the extract, suggest other likely economic activities carried out in Kalangala that are not mentioned in the extract.
6. If you were living in this area, what types of clothes would you wear and why?

Resources to use: Extract as provided in the Learner's Book

Skills: Collaboration, searching for information, summarizing a text, critical thinking

Teacher Instruction

1. Organise the learners into pairs and guide them to do Activity 9.10 in the Learner's Book.
2. Observe the pairs as they do the activity and assess how well they collaborate and respect each other's contribution. Assist them where they may get challenges.
3. In a discussion, challenge the learners to justify the economic activities and type of clothes they suggest. Assess how well they relate activities and life styles to local climate and vegetation.
4. Ask pairs to swap their work so that they comment on each other's ideas, and suggest amendments where necessary.

Hint: Emphasize to the learners that all responses for the activity must be based on the extract provided in order to develop the relevant skills.

Possible Responses

1. It is moist and humid throughout the year with average rainfall ranging from 1,125 mm to 2,250mm a year. Experiences two periods of maximum rain fall separated by relatively dry seasons. The rainfall is highest over the open lake and it decreases as one moves landward.
2. The windward side of the lake shores are exposed to the moist air which brings the rainfall while the leeward side is sheltered from the moist winds so it remains dry.
3.
 - i) Forestry/extraction of timber and wood fuel
 - ii) Tourism especially bird watching
 - iii) Farming: livestock rearing and growing of crops
4. They are evergreen medium altitude forests. Trees exist in closed stands rising 30 to 40 m high. Besides the trees, the forests have numerous lianas and shrubs. Close to the lake shore, the forests are dense and impenetrable. They have small to medium size trees with roots extending as high as 3.6m up the main stem. The forests are home for numerous animals and birds.
5.
 - i) Making of crafts such as mats, baskets, and wood curving
 - ii) Commercial and subsistence hunting of the numerous wild animals such as antelopes
 - iii) Extraction of medicinal plants/ processing herbal medicine
6. Light clothes during the dry season due to hot temperatures
 Rain wears during the rain seasons e.g. overcoats, sweaters, and rain coats

Drawing a Climate Graph

Climate figures are always shown in a table, as you can see in Figure 9.12. This information can also be shown on a bar graph. When you look at the graph, you are able to understand the information more easily than when it is in a table. From the graph we can describe the climate of an area. You are going to draw a climate graph using the information in Figure 9.12.

Activity 9.11

Study the table in Figure 9.12 and do the activity that follows.

	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^o C)	21	21	21	22	22	21	21	21	21	21	21	21
Rainfall (mm)	155	176	243	357	288	80	49	69	99	165	211	209

Figure 9.11: Climatic statistics for Bukoba, Tanzania

1. Copy the table into your exercise book.
2. Draw a graph to represent the climate of Bukoba.
3. Which is the hottest month in the year?
4. Which is the wettest month at Bukoba?
5. Calculate the total annual rainfall for Bukoba.
6. Describe the rainfall distribution at Bukoba.
7. Explain the relationship between temperature and rainfall distribution at Bukoba.

Resources to use: Data table as provided in the Learner's Book, graph paper, mathematical instruments

Skills: Drawing a graph to summarise information, using graphs to analyse information, mathematical computation

Teacher Instruction

1. Guide the learners individually to do Activity 9.11 in the Learner's Book.
2. Observe the pairs as they do the activity and assess how well they use scale and tools to draw the graph. Assist them where they may get challenges.
3. Observe the learners and assess their use of the knowledge of mathematics to compute total rainfall.
4. In a discussion, challenge the learners to justify their suggestions for the hottest and wettest months at Bukoba. Note how well they relate their reasons to the graph they have drawn and the data table provided.
5. Mark their work and provide feedback.

Hint: Emphasize to the learners that all responses for the activity must be based on the data table provided in order to develop the skills listed above.

Possible Responses

1. A climate graph for Bukoba. It should have a suitable vertical scale; represented using bars while temperature is represented using a curving line. The values should be accurately plotted.
2. Hottest month – April/ May
3. Wettest month – April
4. Total annual rainfall = 2,101mm

5. Rainfall is received all year round and it is well distributed across the months. There is no marked dry. From June to September rain fall is relatively low. The region has two rainfall peaks; in April and December. Annual rainfall is heavy, rising slightly above 2000mm.
6. Generally, the two rainy seasons coincide with high temperature while the months with temperature falling below 22°C have comparatively lower rainfall. The heaviest rainfall is received in the hottest months.

Activity 9.12

1. Using the internet or other sources, make notes on the different vegetation types of East Africa.
2. Draw a map of East Africa showing the vegetation types.
3. Explain the ways of life of people living in each vegetation zone.

Resources to use: ICT tools, text books, photographs, journals, newspaper articles, research reports

Skills: ICT skills, searching for information, summarising a text, critical thinking, writing a report

Teacher Instruction

1. Ask the learners to do Activity 9.12 in the Learner's Book.
2. Ensure that every learner has access to the appropriate sources of information for.
3. Observe the learners as they do the activity and assess how well they make use of the sources to get information. Assist them where they may get challenges.
4. Observe the learners as they draw the map and assess how well they bring out the relative sizes of the countries and use appropriate symbols to represent the different types of vegetation in East Africa.
5. In a discussion, task the learners to justify the economic activities and type of clothes they suggest. Assess how well they relate activities and life styles to local climate and vegetation.
6. Assess the learners' research report for accuracy of facts and the map, logical explanations, and illustration of life styles in each vegetation zone. Provide timely feedback.

Possible Responses

1. A map showing the distribution of the main vegetation types in east Africa. It should have the qualities of a good map.
2. Written explanation of life styles of people living in each vegetation zone. Responses to depend on the vegetation zones identified by the learner e.g. Savannah, Tropical forest zone, Montane vegetation, Wet savannah zone, Grassland savannah, wooded grassland, Bush and thicket etc.

What are the Factors that Affect the Climates of East Africa?

The differences in the climatic patterns you have given above are due to a number of factors. These factors are mainly physical in nature. In some regions human activities are increasingly playing a role. These factors include relief/altitude, water bodies, the Inter Tropical Convergence Zone (ITCZ), latitudes, the location of the earth, coastal alignment, vegetation cover, and the distance from the sea, wind masses and human activities.

Activity 9.13

In pairs or groups:

1. Conduct library research and make notes about factors influencing the climate of East Africa.
2. Present your report to the class through discussion.

Resources to use: Text books, ICT tools, atlas

Skills: Searching for information, summarising information/ communication, critical thinking, writing a report

Teacher Instruction

1. Ask the learners to do Activity 9.13 in the Learner's Book.
2. Ensure that every learner has access to the appropriate sources of information for.
3. Observe the learners as they do the activity and assess how well they make use of the sources to get information. Assist them where they may get challenges.
4. Guide the learners to share their findings in a whole class discussion.
5. In a discussion, task the learners to justify their sources and assess how well they relate their explanation to the sources of geographical information earlier studied.
6. Assess the learners' research report for accuracy of facts, logical explanations and illustration of factors using sketches. Provide timely feedback with suggested amendments where necessary.

Possible Responses

A research report about general factors influencing the climate of east Africa. The factors may include:

- i) Latitude and the apparent movement of the overhead sun within the tropics
- ii) Altitude/ height above mean sea level
- iii) The movement of trade winds
- iv) Distribution of water bodies/distance from the sea
- v) Relief
- vi) Vegetation cover

Activity of Integration

Climatic statistics for station Y

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	8	25	76	132	175	150	178	180	140	112	145	36
Temperature (°C)	26	27	26	26	24	24	23	23	24	24	25	24

Study the table above and do the following tasks:

- Calculate:
 - the total annual rainfall for station Y.
 - the mean annual temperature for station Y.
- Draw a suitable graph to represent the climate of station Y.
- Using the graph you have drawn, describe the climate of station Y.
- Suggest the type of vegetation found in the region where station Y is located. Give reasons to support your suggestion.
- Draw a map of East Africa and on it shade the likely regions where station Y is located.
- If you were given a chance to settle in the area where station Y is found, what kind of economic activities would you carry out? Give reasons to support the choice of each activity you have suggested.

Tools to use: No special tools needed

Skills: Critical thinking, creative thinking, problem solving, communication

This task is aimed at assessing the extent to which the learner has grasped the concept of geography and the relevance of studying it to his/her own life and community. Encourage learners to come up with original views based on their own locality and imagination.

Teacher Instruction

- Ask learners to do the Activity of Integration at the end of Chapter Six in the Learner's Book individually. Give a time frame to ensure timely application of the acquired knowledge.
- Ensure that every learner produces written responses to the task.
- Mark their work and give feedback and guidance where needed.

Possible Responses

- Total annual rainfall=1357mm
 - Mean annual temperature=24.6°C/24.7°C/25°C
- A climate graph for Station Y. It should have a suitable vertical scale; rainfall represented using bars while temperature is represented using a curving line. The values should be accurately plotted.
- Characteristics:



The region is hot throughout the year as it experiences high temperatures between 23 and 27°C. The station receives rainfall all the year round with no practically dry month. Has one long rain season stretching from April to November followed by a short dry season from December to March. The highest rainfall is received in August while the least rainfall is received in January. The rainfall received at the station is moderate, 1357mm annually. The annual range of temperature is small, only 4°C.

4. Savanna vegetation; because the moderate rainfall and hot temperatures can support savanna woodland and grassland vegetation. During the dry season (December - March) the trees in the region can shed off their leaves while the grasses can dry and come back to life when rains come.
5. Personal ideas based on the understanding of climate and how it affects human activities and life style.



National Curriculum
Development Centre,
P.O. Box 7002, Kampala.
www.ncdc.go.ug