GEOGRAPHY

TEACHER'S GUIDE
Grade 11

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FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
MINISTRY OF EDUCATION

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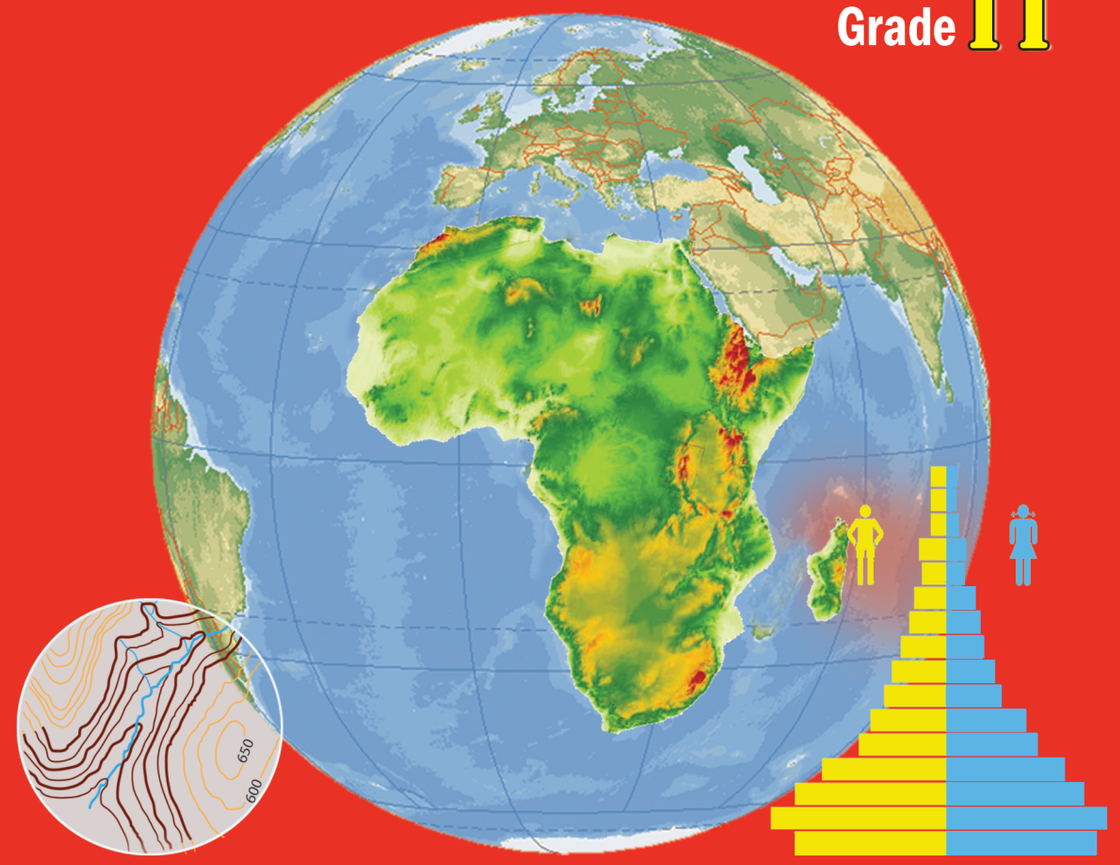

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GRADE 11

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Table of Contents

INTRODUCTION

Geography is the science of the earth's surface. It consists of a systematic description and interpretation of the spatial distribution of phenomena on the earth's surface.

The Grade 11 geography textbook has been designed to provide textual material covering the whole of African geography in a manner particularly suited to classroom discussion for beginning courses in preparatory geography.

Geography at this grade level has these objectives

- describe and depict the major elements of human and physical geography
- enable the students to acquire a background for interpreting the significance of these elements' areal association

The textbook gives your students a foundation for studies in the regional geography of Africa, including physical and human geography. The subjects that relate to physical geography include map reading, the Geographical Information system (GIS), geological and relief structures, climate, drainage, natural vegetation and wildlife

The subjects that relate to human geography include considerations of population and the economic and natural resources of Africa.

One of your tasks as the teacher is to create a conducive environment for the teaching-learning activity and to encourage your students to work as hard as possible. Be sure students know the practical applications of each lesson topic in their daily life to bring socio-economic and cultural development.

In this grade level, the students are expected to gain basic skills and knowledge of the fundamental theories and their practical applications, rules and procedures of geography. It is also expected that the students using the knowledge and skills they gained will be in a position to solve socio-economic problems that he or she encounters in the nation.

Moreover, the specific objectives of geography at this cycle will enable them to:

- gain fundamental knowledge of geography
- appreciate the dynamic nature of geography
- to bring socio-economic progress
- understand the horizontal relationship of geography with natural and social science disciplines

Since geography studies the spatial distribution and variation of phenomena, its scope is wide and the components it comprises are complex and dynamic. These peculiar

characteristics of geography demand special attention, especially in the teaching-learning activity. The teaching-learning methodology should be transformed from its earlier archaic nature to its modern type. Thus, the traditional teaching-learning activity has been replaced by an active and student-centered teaching-learning activity. In this type of teaching-learning activity, the position of the teacher is to act as a facilitator to enable students to do things independently and develop self confidence and personal qualities.

The teacher should encourage students to express their ideas in front of their classmates. Give special attention to slow learners and female students. Try to appreciate their trials whenever they do class work or in answering and asking questions. Do not ridicule students even if they do not participate in any activity since they might be confronted by different problems. Therefore, it would be advisable to investigate their problems before you take action. Advise those fast-learner students to share their experience with slow-learner students.

Help students to create favorable conditions to organize their own groups. This helps students to exchange ideas, experiences and develop teamwork.

The teacher's guide provides you with general ideas on how to budget your time when you conduct classes. Budgeting your time has paramount importance for the active and student-centered teaching learning process. Divide the period in accordance with your lesson plan so that you can accomplish your lesson topic on time. See how the following hypothetical time table is constructed:

Task	**Time allotted (in minutes)**	**To be performed by**
Brainstorming Questions	3	Teacher
Introduction	4	Teacher & students
Motivation	3	Teacher
Group discussion	10	Students (group members)
Presentation	10	Students in each group
Brief explanation Summary and evaluation	10 4	Teacher & students Teacher

In due course, inspect and follow critically each student's work, participation and behavioral change regarding his or her academic performance in line with the learning

competencies listed in the teachers' guide. Examine the balance between the standard and minimum learning competencies. Be aware that the minimum requirement level is not the standard level – rather it is the threshold (marginal) level.

We can say that students have achieved the standard level set by the Ministry of Education if they have fulfilled all of their grade level's competencies successfully. When you come across students who have achieved learning competencies below the standard level, consult their parents and other stakeholders to study their problems and find solutions.

Give orientation or guide students in how to use the recommended supplementary (reference) materials in the library. Those who have access to the internet will be able to get extra resources if they if they contact Yahoo and Google. Although this teacher's guide provides you with a general view of the teaching-learning activity, it is advisable to formulate your own teaching-learning methods that you think convenient and appropriate. But this does not mean that you are authorized to formulate your own teaching methodology unless it is contextual, up-to-date and beyond what the curriculum demands. Be energetic in using your full capacity, skills, and experience in a way you expect will be appropriate and helpful for achieving the expected goal.

The new textbook has been designed in line with the student-centered teaching-leaning methodology. Such a participatory approach enables students to grasp most of their concepts through their own efforts and through some from the teacher. The new textbook includes a lot of activities to be done by the students themselves. As has been mentioned previously, the role of the teacher is to give direction, harmonize concepts when the students face conflicting ideas, provide the students with the necessary materials, and manage the classroom when class is conducted. The teacher also gives hints to help the students discover facts, realize concepts, and develop skills in solving problems. Do not forget to create situations that promote active learning. The following instructions will help you and give you general guidelines on how to get ready before and during the entire teaching-learning process.

1. Organizing Groups

You have to organize different groups in each section you are currently teaching. The number of students in each group should not be more than six. You may organize the groups in any way you like that you think convenient for the teaching-learning activity. However, it is advisable and fair if you organize the group by mixing fast learners with medium learners and slow learners. After organizing the groups, let the students name their respective groups-for example, Black Lion, Red Fox, Nyala, etc. Each group must have a group leader and a secretary. The group leader manages the group discussion while the secretary writes minutes and records the opinions of the students. You can reward the best

group. For example, consul the school administration and ask them to provide you with books or the materials as prizes.

2. Discussion

In almost all units, there are activities especially prepared for discussion. The activities include challenging and argumentative questions so that students can learn more from the discussion and understand ideas and concepts easily. While the students discuss topics, the teacher should:

- ☞ Assess whether every member in each group is participating or not
- ☞ Assist the groups when necessary
- ☞ Check whether all students get equal chances or not in the discussion
- ☞ Give them hints if the point of discussion is not clear or is difficult to understand

3. Presentation

Students are expected to present:

a) the most important ideas and concepts they gained in the discussion

b) their understanding and analysis of each point of discussion

Be sure that

- each and every member of the group presents its opinions turn by in turn
- there is fair distribution of topics. It would be better if students present topics of their own choice.
- first priority should be given to female students

4. Demonstration

Demonstration is suggested for all units. All demonstrations should be conducted by both the students and the teacher. In doing so, the teacher is required to perform the following tasks:

a) guide students while they do their demonstrations

b) give brief explanations after and before the demonstrations

c) provide materials from the pedagogical center

d) assist the students whenever they need your help

e) follow up the see whether each member of the group is carrying out his task or not.

Explain the topic briefly and ask questions about it to find out whether students have understood or not. If students do not raise their hands to answer questions, please go on explaining the topic until they understand the main idea of the lesson. Do not forget to give special attention to slow-learner students.

The discussion should be supported by teaching aids and examples that are appropriate for and contextual to the lesson topic.

5. Field work:

Field work through observations and interview: Field observation enables students to associate what they have learnt theoretically in the class with the actual physical features in the field. The field observation should be pre-planed and purposeful. Students should be oriented on how to collect, organize, analyze and interpret data. Each group is expected to present its findings to the class.

6. Continuous assessment:

Continuous assessment is the process of collecting, interpreting and analyzing information to aid in decision making. Continuous assessment does not mean testing. Rather, it means communicating with the students to find out whether they are truly learning or not.

Most of the time different students in the class come from different economic, social and cultural backgrounds. Such conditions have great impact on the teaching-learning process. In this regard the teacher must be in a position to stimulate and encourage the students' interests in accordance with their interests, beliefs and values. Therefore, the teacher should follow each student's day-to-day activities and identify those students that have problems in their academic performance. After having investigated such a student's problems, the teacher has to use varieties of techniques to make decisions about:

- how to teach
- what to teach
- how well students have learned

A teacher should follow the following steps to apply continuous assessment:

Before instruction: Gather information about what the students already know-for example, about contour lines-and identify what misconceptions they may have. Use this information to help plan the instruction and teaching activities for the unit. After that, use the information to consider changes that should be made in the learning plans.

During instruction: gather information about how well the students are learning. Use this information to decide which students are performing well and which ones are not doing well. Use the information to consider what changes should be made in the lesson plans.

After instruction: Collect information about how well each students has learned the lesson that was taught. Use the information to record grades or re-teach students who are lagging behind.

In the past, it was a traditional to evaluate the students' performance by recording their grades on quizzes, tests, and mid and final examination results. Even though these evaluation methods are useful to assess the students' achievements, they may not give us clear pictures of each student's academic performance. Therefore students academic performance should also be evaluated by their day-to-day activities throughout the topics they are taught. Hence, you need to have a record of every student's work and activity. You can manage a record of each student's achievement on the basis of the following points:

- participation in group and individual discussions
- participation in presentations after discussion
- participation in answering and explaining questions
- The part played by students during classroom demonstration
- reporting field observations
- Other miscellaneous assessment techniques are:
    - Class work
    - Homework
    - Group work
    - Quizzes
    - Tests
    - Mid-semester and semester exams

7. Additional questions:

Review questions are given at the end of each unit in the textbook. The answers for each review question are given in this teacher's guide in each section. Give questions indicated by asterisks (*) for students performing below the minimum learning competencies. Those fast learner students are supposed to do all questions. If fast-learner students complete their class work earlier than the slow-learner students, please give them some challenging questions so that they do not remain idle and get frustrated.

8. Giving Notes

Teachers are not expected to give notes on the blackboard. However, the teacher may give summary notes which give general views about the topic that has been taught at the end of each unit or sub-unit. Otherwise, the teacher is not obliged to write every detail that is depicted in the textbook. The teacher should teach the students to how to take notes from their textbook and other reference materials.

9. Answers for review questions

Answers to review questions are given at the end of the teacher's guide.

10. Suggested teaching methodologies

Since geography is a dynamic subject, the teaching-learning activity demands the implementation of the active and student centered teaching methodology. In the active learning methodology, more time is devoted to student discussions (either in groups or individually) on ideas, issues and contents of the topic treated. In this teaching methodology, the role of the teacher is just to guide students on how to handle issues in the course of discussion. Therefore, the teacher is there to act as facilitator instead of dominating the class by talking the whole period without giving the students chances to talk.

Active learning enables students to:

- develop their critical thinking skills
- develop positive attitude towards others
- develop self confidence that they can solve any problem by themselves
- develop responsibility
- bring behavioral change and continuous progress in their academic achievements

Active learning can be implemented by employing the following techniques:

a) **Entertaining brainstorming questions:** enable the teacher to assess students' abilities and their prior knowledge about the topic that is treated in the class. It also helps the teacher how to approach and present the unit to the students.

b) **Group discussion:** This is the most important teaching methodology for the teacher to use to apply active learning. Group discussion can be conducted by dividing the class into several groups of about 4 to 6 students in which they are to work together throughout the year. Group discussion helps teachers to assess the

students' thinking power and the knowledge they acquired from their previous classes.

c) **Brief explanation:** give brief explanations of the lesson topic after students have finished their presentations. Give class work as per your timetable or else give them assignments to be done at home. Do not forget to give a summary at the end of each period.

d) **Demonstration:** this is a method in which the teacher shows the students how something is done-for example, the drawing of contour lines by interpolation.

e) **Inquiry method:** The teacher asks questions during lectures just to keep students alert and attentive.

f) **Visual based active learning:** the teacher should bring real objects, models, pictures, maps, etc. to class. For example you can use a globe when you teach the rotation and revolution of the earth. You can use the following web sites to get more information about active-learning methodology.

11. Motivation:

Motivation is a technique for stimulating the students' interest in using their fill potential in their learning activities. Students should be encouraged, appreciated and recognized by their teacher when they try to answer questions and participate in discussions.

It is assumed that the following questions are common to all students regardless of their differences in attitude, knowledge and skill.

Therefore, the teacher is required to organize the class on the basis of the efficiency of students. The questions should be addressed in terms of the aggregate ability of the students in the group formed for fast, average and slow learners.

You can also refer to the assessment at the end of each unit in the syllabus and needs to stress on it while you are dealing with any activities.

Grade level learning outcomes of Geography for Grade 11

1. To develop understanding and acquire knowledge of:

- The meaning and scope of geography
- The concept of determinism and possibilism in geography and environmental problems and the role of geography in bridging various fields of study.
- Regional division, geological history, major relief structure, climate, climatic regions, rivers and water bodies, and natural vegetation and wild animals of Africa.

- Types of contour lines, representing various landforms using contour lines and inter visibility over landforms.
- Catchment areas, drainage patterns, stages of river valley development and river capture.
- Representing settlement patterns on maps, shape and types of settlements on maps and factors influencing the siting of settlements.
- Transport net work, representation, factors affecting development of transport network and shortest length of route for various land transport meanses on rugged landforms.
- Relative and absolute location, size and shape of Africa.
- Size, growth and distribution of population in Africa and thereby characteristics of population and migration of population in Africa including its urbanization.
- Socio-economic development of Africa.
- Major resources and utilization of Africa and conflict management around utilization of resources in the continent.

2. To develop skills and abilities of:

- Drawing contour lines and constructing relief cross-section from contour maps.
- Designing patterns of land transport routes on a given contour maps.
- Demonstrate the relative and absolute location of Africa using world map.

3. To develop the habits and attitudes of:

- Justifying the merits/demerits of approaches used in geography to study physical and human environment.
- Appreciating the significance of quantitative revolution in geography.
- Relating elements of geographical study with other fields of study.
- Reflecting settlement related aspects on contour maps.
- Appreciating the techniques of contour lines in representing various forms of land.
- Demonstrating transport net work on contour maps.
- Appreciating the unique land feature of Africa.
- Realizing the economic use of African rivers and lakes.
- Admiring natural vegetation and wild animals of Africa.
- Realizing characteristics of African population and African economy.
- Reflecting the paradox between the potential and the actual resource exploitation of Africa.
- Defending the advantage of peaceful conflict management around resource utilization against aggressive mechanisms in Africa.

Unit 1

THE SCIENCE OF GEOGRAPHY

Total Periods Allotted: 8

1. Unit Introduction

In this unit, the students are going to learn about the science of geography. They are going to get introduced with the meaning and scope of geography. The unit is also intended to get the students familiar with the approaches of geographical studies and the major schools of thought in geography. Furthermore, the relationships that geography has with the various disciplines of the social sciences are also another area of focus of the unit.

2. Unit Outcomes

At the end of this unit, your students will be able to:

- *Understand the meaning and basic concepts of geography*
- *Realize the scope of geography and its relationship with other disciplines*
- *Discuss different approaches of geographic studies*
- *Recognize major schools of thought in geography*

3. Main Contents

1.1. **THE MEANING OF GEOGRAPHY**

1.2. **THE SCOPE OF GEOGRAPHY**

1.3. **APPROACHES IN GEOGRAPHY**

1.4. **MAJOR SCHOOLS OF THOUGHT IN GEOGRAPHY**

1.5. **THE RELATIONSHIP BETWEEN GEOGRAPHY AND OTHER DISCIPLINES**

1.1 THE MEANING OF GEOGRAPHY

Period Allotted: 1

1. Competencies

At the end of this lesson, students will be able to:

- *State the meaning of geography*

2. Contents

- Meaning of geography

3. Overview

In this lesson, students are going to learn about the meaning of geography. First they will learn the general definition of geography. Then there will be discussion about the term geography and how it was coined by the famous Greek philosopher known as Eratosthenes. During that time, geography was defined as the field of study which deals with "the description of the earth". But today the scope of geography is beyond this definition. Different scholars have tried to define geography differently at different times. This variation might be attributed due to:

- The wider nature of the scope of geography
- The dynamic nature of much of its content

Although geography has been defined in different ways by different scholars, geographers have adopted one single definition.

> Geography is the study of the spatial variation of phenomena on the earth's surface, on the one hand, and the two-way relationship existing between humankind and the environment, on the other hand.

4. Teaching-Learning Process

4.1 Suggested Teaching Aids

- Ancient maps to show the location of Greece
- Pictures of Eratosthenes
- Diagrams

4.2 Suggested Teaching Methods

- Brainstorming questions
- Questioning
- Introduction and explanation
- Group discussion
- Presentation

Note: the selected teaching methods that are included in the lesson are prescribed in the general information for the teacher given on the first page of this guide.

4.3 Pre-Lesson Preparation

Before you begin teaching the lesson obtain ancient and modern maps of the world, photographs, diagrams, and other teaching materials.

The school pedagogical center officer could provide such maps.

4.4 Presentation of the Lesson

a) Introduction to the lesson

You might use your own method of presenting the lesson in a way you see fit for that particular topic. However, the simplest way of introducing a topic is by raising relevant questions. Questions by themselves are motivating factors which make students curious and draw their attention to the lesson. Therefore, you may begin the lesson by asking questions such as:

- What is geography?
- Who defined the term geography for the first time in history?
- Why did different scholars define geography in different ways?
    - Introduce the lesson by giving the ancient and modern definitions of geography.
    - Be sure the students understand the objectives of the lesson.
    - You may ask questions such as: what reasons do you suggest for the fact that geography has different definitions?

b) Body of the lesson

- Following the responses of your students, try to give a general definition of geography.
- Explain why it is difficult to have a single and simple definition of geography.

c) Stabilization

Give a short summary of the following points

- The meaning of geography given by different scholars
- The definition of geography especially the most convenient and scientific definition of geography

4.5 Evaluation and Follow-Up

a) Evaluation

At the end of the lesson, make sure that your students have understood the essential concepts of the lesson by asking them questions and giving them tasks like the following

- Who introduced the term geography first in history?
- Define geography.
- Explain the relationship between man and nature.

b) Follow up

Check the students' understanding of the lesson by giving them an exercise to do independently.

- Write the modern and ancient definitions of geography.
- Explain and report on the two-way relationship between man and the physical environment.
- What do we mean by spatial variation of phenomena?

Make sure that you are always grading and rating the students' activities, levels of participation and quiz results.

c) Additional Questions

There exists a general agreement by most geographers that, geography is the study of the spatial variation of phenomena on the earth's surface, on one hand and the two way relationship existing between humankind and the environment, on the other hand.

Questions are set from this definition of geography as follows:

1. What do we mean by spatial variation of phenomena? Explain briefly by giving examples.
2. How do you understand the two-way relationship between human-kind and the environment?
3. Compare and contrast the modern and ancient definitions of geography.

4.6 Answer for Activities

Activity 1.1

Answers to the where questions are naturally descriptive as they try to show where things or phenomena are found.

Example: Where do we find the pygmy people?

The pygmy people are found in the equatorial rainforest region of Africa or in the Congo Basin.

In which continent do we find Kangaroo: Kangaroo are found in Australia.

- In the same manner answers to the why there questions need logical explanations as to what factors determine (influence) the location of things or phenomena in the place where they are found.

Example:

- Why do pastoral nomads practice animal rearing than crop production in lowland regions in Africa? People in the lowland regions do not practice crop production for the following factors:
  - ✓ Lack of adequate amount of rainfall
  - ✓ infertile soil
- Ethiopia is a country which is well-endowed with natural resources but is facing ecological crises of grave proportions. What factors undermined its capacity to implement sustainable policies and strategies of development.
- Fast rates of population growth
- Serious depletion of the natural resource base (soil erosion, deforestation, etc) and severe environmental degradation and socio – economic stagnation.
- The “how they are arranged” questions also need analytical and visual explanations of how the studied phenomena are spatially distributed:

Example:

Why do we find sparse and dense population distribution in lowland and highland regions respectively?

In lowland regions we find sparse population distribution for the following reasons:

1. The climate is hostile, which is not suitable for settlement.
2. Lowlands are infested by tropical diseases.
3. Absence of adequate rainfall.

On the other hand, highlands are densely populated for the following reasons:

- Presence of adequate rainfall
- Absence of tropical diseases – like malaria
- Fertile soil
- Ideal environment for settlement

Answer key for additional questions

1. The physical and human phenomena are not distributed evenly over the earth's surface nor are thy characterized homogeneously. For E.g. altitude temperature, population rainfall, economic activity etc. are unevenly distributed over the earth's surface.
2. People obtain their basic necessities form their surroundings. For example they get their Food, Cloth and Shelter out of the products of nature. In this regard man affects his environment when he performs his daily activities. Environment, on the other hand, influences the activities of humans' activities in a number of ways e.g, drought, flood, wild fire, volcanic eruption, hostile climate, etc.
3. In the ancient times geography was defined as the field of study which deals with the description of the earth. But the modern definition of geography is different form the aforementioned definition.

   "Geography is the study of the spatial variation of phenomena on the earth's surface on one hand and the two way relationship existing between human king and the environment on the other hand.

1.2 THE SCOPE OF GEOGRAPHY

Period Allotted: 1

1. Competencies

At the end of the lesson, the students will be able to:

- *determine the scope of geography*

2. Contents

- The scope of geography

3. Overview

Geography is a discipline which has a wide scope. It generally places special emphasis on the following four major issues: location, spatial relationships, regional characteristics and the forces that change the earth. Hence, the scope of geography emerges from these broader themes.

The geographer's major interest is to explain the spatial variation and distribution of different phenomena over space.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

To make your lesson lively and appropriate, use the following teaching aids:

- Physical map of the world
- Pictures/photographs that show relationships between man and nature – e.g., different economic activities, settlements, etc.

4.2 Suggested Teaching Methods

Commence your lesson by using the following methods:

- Brainstorming questions
- Questioning
- Group discussion
- Explanation
- Presentation

4.3 Pre-lesson Preparation

- Get ready the teaching aids and teaching material. If none are available in your school, try to prepare your own maps, pictures and photographs with your students in the pedagogical center.
- Read related literature in the school's library or elsewhere.
- Prepare notes and activities.

4.4 Presentation of the Lesson

a) Introduction to the lesson

- Introduce students to what they are going to learn (The Scope of Geography).
- Be sure that the students are clear about the objectives of the lesson.
- Ask students to brainstorm about the scope of geography

so you can assess whether they have background information.

- What is scope? How wide is the scope of geography?
- What makes geography have a wider scope than any other subject.

b) Body of the lesson

- Taking students' background understanding into consideration, commence your presentation by explaining what "scope" means.
- Explain the scope of geography, including its areas of interest.
- Have the students describe geography's areas of interest.
- Explain geography's emphasis on the causes of spatial variation of the distribution of things over the earth's surface.
- Have the students discuss in groups the basis of the philosophy of geography and how/why it developed. Students should present their opinions before the class.
- Explain the four principal types of questions which deal with location, spatial relation, regional characteristics and the forces that change the earth.
- Explain how the scope of geography emerged.

c) Stabilization

Give a brief summary of the following points

- The main reasons why the physical and human-made features are not evenly distributed
- How wide is the scope of geography?
- Its great concern about location, spatial relation, regional characteristics, the forces that change the earth.

4.5 Evaluation and Follow up

a) Evaluation

To know the level of understanding of the students and whether the expected competencies are achieved, ask the students questions about the topic you taught.

You can ask the students questions like the following:

- Explain the term scope.
- Explain how the scope of geography emerged.
- Explain geography's emphasis on the causes of spatial variation of the distribution of things over the earth's surface.

b) Follow up

To help your students get more knowledge on the lesson you have taught, you can give them assignments.

Assign each group the task of making a library study on the following issues:

- The physical and human-made phenomena are not uniformly distributed over the earth's surface. Explain.
- Discuss the scope of geography.

Evaluate the students' assignments and grade their achievements. Give special attention to slow-learner students.

Although the scope of geography is wide it does not mean that its scope is limitless. Its scope is limited in space and time.

The major areas that geography focuses on are:

- The position of the earth in the universe and its movements
- The different physical features that constitute the earth's surface
- The forces that cause their spatial variations and their changes over time
- The two-way relationship between humans and their natural environment
- The condition of the lower part of the atmosphere and the subsequent weather and climatic conditions, together with their spatial distribution and variation
- The materials that make up the earth and its diverse landforms
- The major economic activities of humans and the impact on the environment.

c) Additional Questions

1. State the major focuses of geography and explain how the scope of geography is wide.
2. Mention the major issues that constitute the scope of geography.
3. What are the four principal questions that geography considers?
4. Explain the difference between human and physical geography.

4.6 Answer for Activities

Activity 1.2

1. Although the scope of geography is wide it does not mean that its scope is limitless. Its scope is limited in space and time.

2. The major areas that geography focuses on are:

- The position of the earth in the universe and its movements
- The differences that cause their spatial variations and their changes over time.
- The two-way relationship between humans and their natural environment
- The condition of the lower parts of the atmosphere and the subsequent weather and climatic conditions, together with their spatial distribution and variation.
- The materials that make up the earth and its diverse landforms
- The major economic activities of humans and the impact of the environment.

Answer key additional questions

1. Location and explanation are the major focuses of geography. Geography considers four principal types of questions which deal with location, spatial, relations, regional characteristics and the forces that change the earth therefore the scope of geography emerges form this following central issues: In this regard geography is concerned with both natural and human made phenomena that are found in the geo-sphere. These natural and human made phenomena mat are studied by geography are found in the following sub-divisions of the geographers. These are: Lithosphere, Biosphere, hydrosphere anthropasphere and troposphere
2. The major issues that geography focuses on are:
   - The different physical features that constitute the earth's surface, the forces that cause them, their variations from place to place and their changes overtime.
   - The different relationships between human-beings and their natural environment.
   - The conditions of the lower part of the atmosphere and the subsequent weather and climatic conditions together with their spatial distribution and variation.
   - The materials that make up the earth and its diverse landforms
   - The major economic activities of humans and their impacts on environment.
   - The earth's position and movements in the universe.
3. i. Where are things located?
   ii. Why are they located where they are?

iii. How are they arranged?

iv. What makes them to be there?

4. Physical geography studies natural features such as Climate, landform, vegetation wild life sail etc Human geography deals with man made features like. Population (density, distribution patterns), economic activities, agriculture, industry, forestry, fishery etc).

1.3 APPROACHES IN GEOGRAPHY

Period Allotted: 1

1. Competencies

At the end of this lesson, students will be able to:

- *Explain the merit and demerits of approaches used to study physical and human environments.*

2. Content

- Approaches in Geography

3. Overview

Various geographical approaches apply either of the following two approaches:

- The systematic approach, which deals with the topical study of things
- The regional approach, which aims at making a complete geographical study of a particular region.

4. Suggested Teaching-learning Process

4.1 Suggested Teaching Aids

Use the following aids when you conduct the lesson topic

- Ancient maps
- Photographs
- Films
- Diagrams

4.2 Suggested Teaching Methods

For further information about how to use the suggested methods refer to the general information for the teacher in the Introduction to this guide.

- Brainstorming
- Explanation
- Group discussion
- Presentation

4.3 Pre-lesson Preparation

- Get ready in advance with the teaching aids and teaching materials, such as an ancient map of the world.
- Design the most appropriate teaching method.
- Read relevant literature to provide students full information.
- Prepare notes, activities and exercises.

4.4 Presentation of the Lesson

a) Introduction to the lesson

- Introduce the topic briefly with the help of brainstorming. Be sure the students are clear about the objectives of the lesson
- Conduct a brainstorming session with the students so you can understand their background knowledge about approaches in geography.
  - What are the approaches of geography?
  - What is the difference between the regional approach and the systematic approach?

b) Body of the lesson

- Following the response of your students, try to give the definition of the regional approach and the systematic approach.
- Give sufficient explanation about the regional approach and systematic approach.

c) Stabilization

Brief your students on the following points

- How geography approaches the physical and human-made phenomena
- The various methods used to study the natural and human-made features such as
  - Systematic and
  - Regional approach

4.5 Evaluation and Follow up

a) Evaluation

- Check the students' understanding of the lesson by giving them activities to do individually such as:
  - How does regional geography differ from systematic geography?

- How does geography define the term region?
- Explain the term "approach" from the point of view of different disciplines.

b) Follow up

- To broaden students' knowledge, give the following library assignments to each group.

  - The differences and similarities of regional and topical (systematic approach) approaches.
  - Categorize the following fields of study either under regional or topical approach

    - Medical geography
    - Soil geography
    - Population geography
    - Geography of Africa
    - Urban geography
    - Population geography

Make sure that you are always recording the students' results right after you evaluate their activities whither they have been performed orally or in written form.

1. A. Systematic or topical approach studies the distribution of a thing or a phenomenon by picking one topic and treating its worldwide character, organization, etc. E.g., population distribution, the geography of diseases, plantation agriculture, etc.

   b. Regional approach, unlike the topical approach emphasizes various geographical topics or aspects of a defined region or locality.

e.g., The geography of Africa

The geography of Ethiopia

The geography of North America

c) Additional Questions

1. Explain the difference between systematic approach and regional approach.
2. Take a geographical topic related to your locality and tell which approach would be suited to explain why it is so.
3. Which approach would best suit a study of the distribution of rice cultivation in Ethiopia.
4. Define the term region.

4.6 Answer for Activities

Activity 1.3

1. a. Systematic or topical approach studies the distribution of a thing or a phenomenon by picking one topic and treating its worldwide character, organization, etc, E.g., population distribution, the geography of diseases, plantation agriculture etc.

   b. Regional approach, unlike the topical approach, emphasizes various geographical topics or aspects of a defined region or locality.

   e.g., The geography of Africa.

   The geography of Ethiopia.

   The geography of North America.

Answer key for additional question

1. Systematic approach deals with specific geographical element or phenomenon over a defined geographical unit.

   e.g. Climate, landforms or culture and treats the distribution of selected element over a country, continent or the world.

   Regional approach – deals with a region – a defined geographic unit or locality. With in the region the study examines a varieties of geographic feature. The region studied could be a continent, subcontinent or a number of counties that share a common geographic factor E.g. The geography of Africa, Asia or Europe, sub-Sahara, Ethiopia, etc. The similarity could be, either physical (i.e., climate, landform, etc) or cultural (i.e religion, language, economic, activity, etc)

2. If you want to study the rainfall distribution in your home area, the most suitable approach should be topical approach. This is because your focus of study is only one specific topic. But if your like to study climate, natural vegetation agriculture, the best approach should be regional approach. This is because you are going to study a variety of geographic features as stated above.
3. Topical approach
4. A region is an area of spatial unit consisting of similar or homogeneous geographical features.

1.4 MAJOR SCHOOLS OF THOUGHT IN GEOGRAPHY

Periods Allotted: 4

1. Competencies

At the end of this lesson, students will be able to:

- *compare and contrast the concept of determinism with possibilism.*

2. Content

- possibilism
- determinism
- quantitative revolution
- The emergence of applied geography

3. Overview

Radical changes took place in the 1930s. These were the emergence of deterministic and possibilistic schools of thought. These schools of thoughts were dedicated to studying the human-environment relationships. The dedicated possibilistic and deterministic approaches prevailed up to the Second World War in one way or another.

- The deterministic approach: the deterministic approach advocates that the natural environment controls human beings and it is the decisive factor for any socio-economic changes.
- The possibilistic approach: Unlike the deterministic approach, the core idea of the possibilistic is the possibility of two-way relationships between people and their environment.

Although the influence of environment is unavoidable, human beings can modify (influence) their environment with the help of their skill, knowledge and experience.

The other significant development in modern geography is the promotion of the subject to a level of an applied science. This was possible largely because of the positive effects of the tremendous changes it showed earlier, particularly by way of the quantitative revolution.

- The introduction of scientific research accompanied by quantitative techniques have led to geography being applied to solve societal problems.
- In this regard, both the human and physical branches of geography presently contribute much to human progress in all spheres.

4. Teaching-learning Processes

4.1 Suggested Teaching Aids

- Pictures and photographs that show different human and natural environments of different countries (e.g., developed and developing countries)
- Films to show the influence of the physical environment
- Charts

4.2 Suggested Teaching Methods

You are asked to conduct your class by using the suggested teaching methods

- Brainstorming
- Introducing the lesson
- Explanation
- Questioning
- Group discussion
- Presentation

4.3 Pre-lesson Preparation

Get ready the teaching aids and teaching materials.

Inform students of the lesson to be discussed and encourage them to present ideas and concepts.

4.4 Presentation of the Lesson

a) Introduction to the lesson

- Introduce students to the lesson and give emphasis to the given topics, such as major school of thought in geography.
- Make students clear about the objectives of the lesson.
- Brainstorm to know students' past experience regarding the lesson topic.
- You can begin the lesson by asking probing questions like
  - What are the two major schools of thought in geography?
  - What is determinism?
  - What is possibilism?
  - Mention some developments that took place during the 1930's.

Notice that these questions are samples and you can reproduce and use them based on the lesson given.

b) Body of the lesson

- Start your discussion by describing briefly geography's development after the 1930's.
- Discuss the basis of such radical developments in geography and those prominent schools who contributed to this development.
- Explain the major development of:
  - The emergence of determinism versus possibilism
  - The quantitative revolution and its intensive application
  - The emergence of applied geography
  - Discuss the two-way relationship between humans and nature, including how they influence each other.
  - Discuss the difference between deterministic and possibilistic approaches.
  - Mention those scholars who advocated possibilistic and deterministic approaches
  - Explain the impact of the quantitative revolution upon human progress.
  - Explain that the emergence of the quantitative revolution is the cornerstone for the coming into being of applied geography.
  - Finally let students discuss determinism and possibilism in their groups.

c) Stabilization

Summarize the following points

- The development of geography
- Different schools of thought and their concepts and difference.

Such as

- School of determinism and possibilisim
- Turning points of geography
- The major radical changes and developments in geographical thought
- The emergence of applied geography
- The quantitative revolution and its applications

4.5 Evaluation and Follow up

a) Evaluation

Check whether or not the students have understood the lesson by giving them quizzes. Encourage them to answer the following questions in their groups or independently.

- Define the new geography and describe its features.
- Mention the three leading developments in geography during and after the 1930's.
- Compare and contrast the philosophies of determinism and possibilism.
- How do you perceive the influence of the physical environment on the lifestyles of people in your locality?
- What's meant by applied geography? Give examples.

b) Follow up

Inform the students about and guide them in discussing the following issues. Check their findings. After evaluating the class work, grade their achievements.

Let students take two hypothetical countries which differ in their economic development. Country "A" is developed, whereas country "B" is developing. But both of them are found in the same latitude, experiencing almost the same climate conditions and uniform landscape. Answer the following questions on the basis of the information given above.

1. Why are these two countries in different stages of economic development? Answer the question in line with the following philosophies of possibilism and determinism.

   The physical environment does not decide how people live. However the physical environment influences humans' activities. Human society cannot fully tame nature and is always influenced by nature. These physical factors of the environment do not govern human beings.

   The influence of environment on humans' activity is unavoidable. But people can change (modify) their environment with the help of technologic developments. The advancement of technological enables human beings to create conducive environments so that they can exploit natural resource in a way they seek.

2. Environment means the totality of all resources whether in their natural state or as modified or changed by man. Environmental conservation means to safeguard the environment from all sorts of agents that degrade the environment. E.g., air pollution, water pollution, soil degradations, deforestation, etc. Therefore, it means to secure the continuity of the human race on this fragile earth.

3. Environmental determinism was a school of thought in geography that propounded the dominance of the physical environment over man's activities. According to this thought human beings are subordinate to the natural environment. This idea developed criticisms: the natural environment does not decide the existence of men. Human beings using technology can tame the hardships of natural environments to achieve more conducive and favorable conditions.

   As it has been discussed in the above activities, human beings can modify their environment in ways they wish with the help of technological developments and scientific research, e.g., it is possible to use desert lands for crop production by using modern irrigation schemes.

c) Additional Questions

1. Is it possible to think of development without having natural resources? Why? Why not?
2. Explain the difference between environmental determinism and possibilism.
3. Describe the major developments in geographical thought after the 1960's.
4. What is the major concern of applied geography?

4.6 Answer for Activities

Activity 1.4

1. The physical environment does not decide how people live. However the physical environment influences human activities. Human society cannot fully tame nature and is always influenced by nature. These physical factors of the environment do not govern human beings.
2. The influence of environment on human activity is unavoidable. But people can change (modify) their environment with the help of technological developments and advancements. The advancement of technology enables human beings to created conducive environments so that they can exploit natural resources in ways they seek.

Activity 1.5

1. Environment means the totality of all resources whether in their natural state or as modified or changed by man. Environmental conservation means to safeguard the environment from all sorts of agents that degrade the environment. E.g., air pollution, water pollution, soil degradations, deforestation, etc. Therefore, it means to save and secure the continuality of the human race on this fragile earth

2. Environmental determinism was a school of thought in geography that propounded the dominance of the physical environment over man's activities. According to this thought, human beings are subordinate to the natural environment. This idea was criticized by possibilists saying that the natural environment does not decide the existence of men. Human beings using technology can tame the hardships of natural environments to achieve more conducive and favorable conditions.

Activity 1.6

1. As discussed in the above activities, human beings can modify their environment in ways they wish with the help of technological developments and scientific research, e.g., it is possible to use desert lands for crop production by using modern irrigation schemes.

    - The constriction of transport networks by adjusting difficult terrain.
    - Constriction of tunnels in mountainous.

Answer key for additional question

1. Development cannot be achieved with out natural resources such as land, soil, minerals, vegetation, water, etc.
2. Environmental determinism is a school of thought in geography which believes in that the elements of the physical environment such as climate, relief soil etc determine people mode of life.

   The possiblism school of thought believes that human society cannot fully tame nature

   The main theme of passibilism is the possibility of two way relationship between humankind and natural. Of course the influence of environment on the activities of people is un avoidable. But people can change their environment in a way they wish with the help of their knowledge and skills to regulate the effect of the environment. To sum-up possibilists argue that it is impossible to explain the difference in human-society and the history of that society with reference to the influence of environment alone.

3. A more abstract, theoretical approach to geographical research has emerged, and the analytical method of inquiry evolved. This movement in geography is known as quantitative revolution.
4. Applied geography is the application of geographical knowledge and skills to the solution of economic and social problems and in the learns of planning.

1.5 THE RELATIONSHIP BETWEEN GEOGRAPHY AND OTHER DISCIPLINES

Period Allotted: 1

1. Competencies

At the end of this lesson, students will be able to:

- *Relate elements of geographical study with other fields of studies;*
- *Explain the role of geography in connecting (bridging) various field of studies.*

2. Contents

- The Relationship between Geography and other Sciences

3. Overview

- Geography is a discipline that shares facts, concepts, ideas and theories with various disciplines.
- Geography is an interdisciplinary subject that has strong links with the different disciplines of the social and natural sciences. Most of the contents of physical geography are related to the natural sciences, while the contents of human geography are linked with the social sciences.
- Geography and natural sciences: Every natural science considers geographic issues in human economic activities. Branches of natural sciences which are related to geographic issues include:

Astronomy, botany, forestry, engineering, geology, physics, etc

- In the same way the following selected fields of study of the social sciences include:

  Economics, archaeology, political science, etc.

4. Teaching-learning Processes

4.1 Suggested Teaching Aids

- Charts that show the relationship between geography and other disciplines
- diagrams
- slides to show how geography and other fields of study are interrelated
- photographs
- pictures

4.2 Suggested Teaching Methods

You can conduct your class by using the suggested teaching methods

- Brainstorming
- Introducing the lesson
- Explanation
- Group discussion
- Presentation

4.3 Pre-lesson Preparation

- Get ready the teaching aids and teaching materials
- Inform students of the lesson to be discussed and encourage them to present ideas and concepts.
- Collect as much information on the above topics as possible from additional references.

4.4 Presentation of the Lesson

a) Introduction of the lesson

You may start the lesson by asking questions like the following:

- Is geography an independent subject or an interrelated one? Why?
- What are some of the disciplines that are related to geography? How do they relate?

b) Body of the lesson

- Give a brief description of the relationship between geography and the other sciences.
- Mention the disciplines that are related to geography from both the social and natural sciences.
- Demonstrate how geography and natural and social sciences are related.

c) Stabilization

Give a brief summary on the following point:

- The relationship between geography and other disciplines such as geography hydrology, biology, economics, political science, history, sociology, etc.

4.5 Evaluation and Follow up

a) Evaluation

Check whether or not students have understood the lesson by giving them quizzes.

Encourage them to answer the following questions in groups:

- Explain the relationship between geography and biology.
- Explain the relationship between geography and economics.

After evaluating the class work, grade their achievements

b) Follow up

Ask your students to discuss in groups the following:

- The disciplines that are related with geography.

Finally, help them present their group findings.

i. Geology – tectonic tone, volcanic activity, uplifting, earthquake, etc.
ii. Demography – population distribution, characteristics, density, dependency ration, life expectancy, population change (dynamics)
iii. Economics – spatial distribution of resources, GDP, precipitate income, dependency ratio.
iv. Political science: border disputes between countries and regional organizations.

c) Additional Questions

1. In what ways does geography relate with natural sciences?
2. Geography has wide relationships with both natural sciences and social sciences? Explain.
3. Explain how geography and biology approaches the study of animals and plants.
4. Let us assume that there is an urban riot in a given urban area. How do geography and economics treat this social unrest?

4.6 Answer for Activities

Activity 1.7

- Geography, in almost all its branches, shares a number of contents with other fields of studies (disciplines), both human and physical in nature. You may ask specifically: What is it about the earth's surface that the geographer studies? Essentially it is the two classes of interrelated features:
  a. Those which are provided by nature (among them, climate, surface configuration, soils, economic minerals, surface and underground water, native plant and animal life) and
  b. those which are added through living on the earth and using its resources (population, settlements, communications, farms, factories, etc.

  Hence the physical parts of geography have strong relationships with the natural sciences, while those in human geography are related to the social sciences.

Activity 1.8

i. Geology – tectonic force, volcanic activity, uplifting, earthquake etc,
ii. Demography – population distribution, characteristics, density, dependency ratio, life expectancy, population change (dynamics)
iii. Economics – spatial distribution of resources, GDP, per-capita income, dependency ratio
iv. Political science – border disputer between countries and regional organizations
v. Boundary demarcation.

Answer key for additional questions

1. Physical geography is related with natural sciences.
   E.g Geography is related with biology when it studies the spatial distribution of animals and plants.
   Meteorology: is the scientific study of the earth's atmosphere especially its patterns climate and weather. Hence, it is related to the sub-field of geography called climatology.
2. Geography is closely linked to the social and natural science. Geography shares facts with them and explain certain aspects of those sciences.
3. Biology: is a science that deals with all forms of life, including their classification, physiology, chemistry, and interactions. As biogeography is the study of plant and animal distribution, it is linked with biology.
4. Geography approaches the urban riot from the point of view of the areal extent of this social unrest while economics tries to relate this problem with unequal distribution of resources.

Answer Key for Review Questions

Part I

1. True 2. False 3. True 4. False 5. True

Part II

6. I 7. B 8. A 9. H 10. E 11. D

12. F 13. G

Part III

14. B 15. B 6 C 17. A 18. B

Part IV

19. Alexander Von Hamboldt
20. Biogeography
21. Anthroposhere
22. Eratosthenes
23. Political geography

Part V

a. The rigid part of the earth's crust, extending to a depth of about 65km below the surface, and comprising the sial, (aluminum silicate) the sima (Magnesium silicate) and the upper mantle, Beneath it is the softer, weaker layer known as the asthenosphere.

b. The lower layers of the atmosphere, i.e,. Those below the stratosphere from which it is separated by the tropopause extending from a height of about 11km to the earth's surface in the temperate zone.

c. All the water of the earth as distinct from the atmosphere and the lithosphere.

d. A term sometimes applied to that portion of the earth occupied by the various forms of life, being additional, for purposes of classification, to the three main physical zones, the lithosphere, the hydrosphere and the atmosphere.

e. The cultural landscape of the earth

Part VI

24. Geography is the study of the environment of the earth's surface and the relationship of humans to this environment, which includes both physical and cultural geographic features.

25. A systematic approach applies a specific geographical element or phenomenon over a defined geographical unit. It takes a phenomenon such as climate, landforms or culture and treats the distribution of the selected element over a country, continent or the world.

    Unlike the systematic (topical) approach, the regional approach focuses on a region, a defined geographic unit or locality. Within the region, the study examines a variety of geographic features. The region studied could be a sub-continent, continent or a number of countries that share a common geographic factor.

26. Environmental determinism is a school of thought that bases its view on the idea that the natural environment is an influencing factor on human modes of living. It believes that human activities are controlled by the environment.

    Environmental possibilism: states that the environment can potentially affect people's activities but people can influence the environment to enhance their ways of life.

27. Applied geography: This new development in geography occurred in the latter part of the 20^{th} century. This development has become a science that we can use to solve socio–economic and political problems.

28. Geography is an interdisciplinary subject which has strong relationships with various disciplines in both the natural and the social sciences.

29. The quantitative revolution led to an increased use of statistical techniques. It emphasized multivariate analysis and the use of computers in geographical research.

    The methods adopted included various mathematical techniques that were more precise than the descriptive methods of regional geography.

30. Part of the land surface of the earth

31. While investigating the spatial variation and distribution of things, geographers employ three questions about the phenomena they study. These are

    - Where are things located?
    - Why are they located where they are?
    - How are they arranged?

32. Geography is not only a study of place names, lengths of rivers, heights of mountains, areas of water bodies, capital cities of countries. Geography is a discipline which deals with more than this.

    Geography tries to provide explanations about our world and the ways in which we live, work and carry on socio–economic, political, and cultural activities. To sum up, geography is a science that investigates our cultural and natural environments, how human beings affect them, and how they affect us.

Check List

Check the student's performance according to the given competencies referring the questions under the check list for every unit. Put a tick (✓) mark against each task weather they are able to perform in the competencies of each unit. The students are expected to respond saying Yes or No. then, you can make your own evaluation whether the competencies are met or not.

Can you:

	Yes	No
1. State the meaning of geography?----------		
2. Determine the scope of geography? ----------		
3. Justify the merit and demerit of approaches used to study physical and human environments? ----------		
4. Compare and contrast the concept of determinism with posibilism? -----		
5. Show appreciation for the significance of quantitative slides? ----------		
6. Relate elements of geographical study with other fields of studies? -------		
7. Explain the role of geography in connection with various field of study?		

Unit Assessment

Students' performance has to be assessed continuously over the whole unit. The assessment will be made by comparing students' performance with the specified level of competencies. Besides, the teacher has to recognize the level of performance of each student and provide assistance accordingly, Thus:

Students at the minimum requirement level

- A student at a minimum requirement level will be able to state the meaning of geography, determine the scope of geography, justify the merit and demerit of approaches used to study physical and human environments, compare and contrast the concept of determinism with possibilism, show appreciation for the significance of quantitative studies, verify the importance of applied geography in solving social and environmental problems, relate elements of geographical study with other fields of studies, explain the role of geography in connecting various fields of study.
- In addition, a student working above the minimum requirement level and considered as a higher achiever should be able to: compare and contrast the varied meaning of geography and show the strength and weakness of varied definition of geography, explain the boundaries shared between geography and other fields of natural and social science, differentiate the approaches used in writing varied articles or textbooks, argue for/against how major schools of thoughts in geography affect human life, prove/disprove the argument of determinism/possibilism, differentiate cases in which it is more appropriate to use the qualitative method rather than the quantitative method, give a brief explanation how applied geography has brought significant changes in human life, write a short essay that shows how a given element is treated in geography and other fields of studies.

Students below the minimum requirement level

- Students working below a minimum requirement level will require extra help if they are to catch up with the rest of the class.
- Students who not only reach the minimum requirement level but also achieve a little bit more should be supported so that they attain the higher achiever competencies. Students who fulfill the higher-achiever competencies also need special support to contribute and achieve more.

Unit 2 MAP READING AND INTERPRETATION

Total Periods Allotted: 37

1. Introduction

You should bear in mind that students have past experience, i.e., in grades nine and ten they have learned some basic concepts, principles and procedures of map study and analysis. Thus some of the major lessons included: map enlargement and reduction, measurement of distance and area, location and bearings. This gives you some sort of clue about students' past experience about map reading. In this grade level students are going to learn much more about intermediate map reading. It is a course which basically deals with the representation of different landforms on maps with the help of contour lines, also known as isohyets. Students are also going to learn the techniques of drawing contour lines from spot heights by interpolation. In addition to this, students are expected to learn how to interpret different land features on contour maps by constructing cross-sections (profile). The unit also includes landforms associated with drainage, settlement patterns and communication features.

The ultimate objective of this unit is to enable students to draw contour lines on topographic maps, and to construct cross-sections. Finally, this unit will enable students to have basic skills in and knowledge of making, reading, analyzing and interpreting topographic maps.

2. Unit Outcomes

At the end of this unit, the students will be able to:

- *Review the definition and properties of contour;*
- *Realize how contour lines are used to represent relief features on maps and types of contours;*
- *Acquire the skills of drawing contour lines, cross sections and of determining intervisibility;*

- ➲ *Assess the differences among watershed, catchment area drainage patterns and river capture, using contour maps;*
- ➲ *Discriminate settlements and communication features from contour maps.*

3. Main Contents

2.1 Relief representation on contour maps

2.2 Drainage on maps

2.3 Study of human-made features on maps

2.4 Geographical Information System

2.1 RELIEF REPRESENTATION ON CONTOUR MAPS

Period Allotted 15

1. Competencies

At the end of this lesson, the students will be able to:

- *Draw contour lines from spot heights using interpolation*

2.1.1 Drawing contour lines from heights

2. Contents

- Methods of depicting relief on contour maps.

3. Overview

The surface of the earth has a variety of different altitudes. This results in the pattern that constitutes relief. One of the major problems that map-makers encounter is how to show these ups and downs on a flat sheet of paper. The map maker should consider these ups and downs of the earth's surface, so the map should accurately show the relief of an area.

One major method which is used to show relief features on maps is by means of contour lines, and the other methods are by spot heights and trigonometric points.

- Contour: is a line on the map joining places of the same height above sea level.
- Spot height: is a point on the land (and map) whose height has been accurately identified.
- Trigonometric station (Trig. Point): is a point on the land identified very accurately in position and height during a survey.

Other methods which are not nowadays in use include: physiographic diagrams, hachure, and hill shading.

4. Teaching-learning Processes

4.1 Suggested Teaching Aids

- Topographic map with spot heights
- Topographic map with contour lines
- School Atlas

4.2 Suggested Teaching Methods

- Use the following teaching methods as suggested in the general introduction and presentation of the lesson:
- Brainstorming questions
- Questioning
- Introduction and explanation
- Group discussion
- Presentation

Forward planning: read the contents on drawing contour lines from spot heights from the student textbook and other related resources and make the necessary preparation. Prepare your plan especially to monitor students when they deal with the start-up activity.

The start-up activity is designed to illustrate the drawing of contour lines by the technique of interpolation.

4.3 Pre-lesson Preparation

Get the teaching aids and teaching materials ready.

4.4 Presentation of the Lesson

a) Introduction of the lesson

You can start the lesson by posing questions like the following:

- What are the methods used to show relief on maps?
- What are spot heights and trigonometric stations?
- What is interpolation?
- Why do we draw contour lines on maps?

b) Body of the lesson

After testing your students' understanding about contour lines, commence your presentation by explaining the meaning of interpolation, spot height and vertical interval (V.I.).

- Discuss primarily how the various spot heights which enable us to draw contour lines are obtained. Do not forget to note that the surveyor first marks a number of points in the field through horizontal measurements. The altitude of each one of these points is then found and marked (see Figure 2.7).
- Explain that the altitude of each one of these points is marked in the map in accordance with its proper position according to scale with the altitude attached.
- Therefore, most of them fall between the contours. Hereafter your major task is to find exactly where the contour lines run relative to the spot heights.
- Follow the whole procedure given in the student textbook to draw contour lines.

c) Stabilization

Give a brief summary for the following topics.

- The various methods used to show relief on maps.
- Peculiar characteristics of contour lines.
- The drawing of contours by interpolation.
- Procedures to be followed when drawing contour lines.

4.5 Evaluation and Follow-up

a) Evaluation

Arrange as many hypothetical spot heights as possible to be done by students either in their groups or individually.

1. Draw the 250 m contour line
2. Describe properties of contour lines
3. Write the types of slope or landforms represented by the following contour patterns.

Contour lines:

1. That run together for part of their course _____
2. Are drawn very close together _____
3. Bend down and upwards _____
4. Are drawn farther apart _____
5. Bend down and upwards_____

b) Follow up

Make the students copy Figure 2.5 and perform the following activities:

1. What are the heights of the lowest and the highest points on the map?
2. Locate the following landforms on the map:

   a. peak b. steep slope c. spur d. steep-sided valley

c) Additional Questions

1. Contour lines are known as imaginary lines. Explain.
2. Describe three characteristics of contour lines.
3. Explain the difference between contour line and spot height.
4. Describe those methods used to show relief on maps.

4.6 Answer for Activities

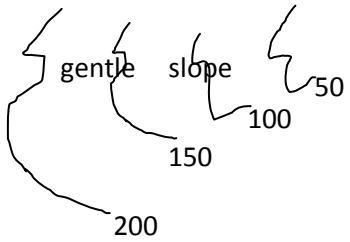
Activity 2.1

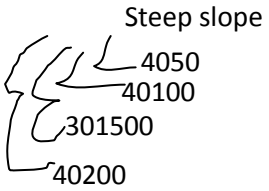
1. a. Relief – the difference in elevation of parts of the earth's surface.

   b. Contour – line drawn on a map to join all places at the same height above mean sea level.

   c. Isobath – A line on a map joining points on the seabed which have equal depth. Such lines show the relief of the seabed just as contours show the relief of the land by joining places of equal altitude.

2. Gentle slopes are shown on maps by contour lines that are drawn relatively farther apart, while steep slopes are shown by contour lines which are drawn very close together.





3. i. The scale of the map is defined in such a way that the smaller the scale is, the bigger the vertical interval becomes.

   ii. Relief: A map showing a very flat (plane) area uses a small vertical interval, where as mountain areas have bigger vertical intervals.

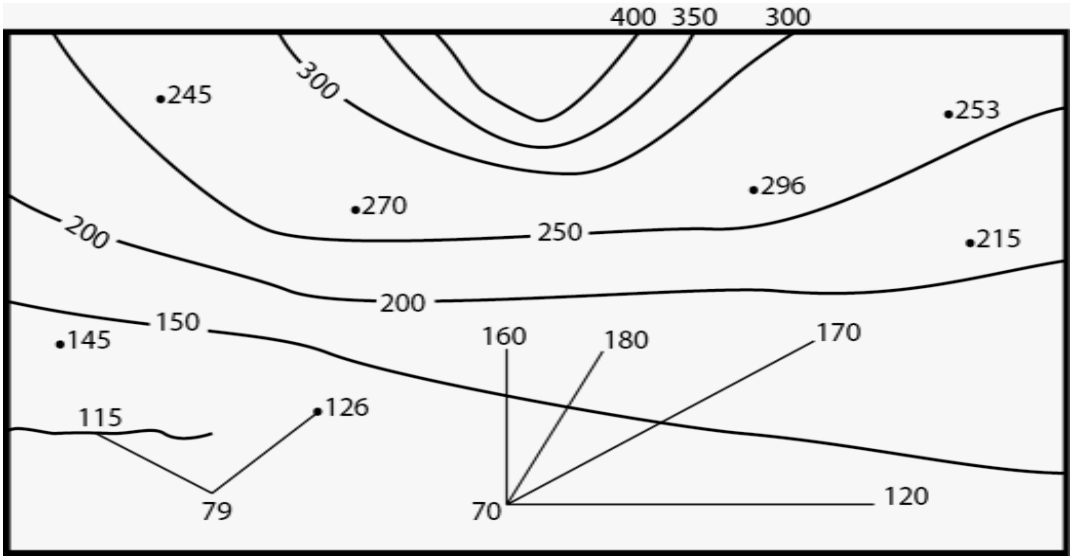
4. a. Even slope b. plain c. cliff d. over hanging cliff

Activity 2.2

1. Show where each contour line with a 100m contour interval passes, by using the interpolation method accompanied by mathematical calculations.
2. Cartographers obtain spot heights (altitudes of individual places) for their mapping by ground survey using altimeters and aerial photographs and, satellite imagery.

4.6 Answer key for Activities

Activity 2.3



Interpolation principles

- When we draw contour lines, they do not pass through the points but between them.
- We use the principle of interpolation to find out where exactly the contour lines should pass.

Now let us draw the 100m contour on the above map (Figure 2.7) as an example. To draw the contour line follow the following procedure.

1. Look at the distribution of spot heights and sort out the pairs of spot heights that allow you to draw the 100m contour line.

   e.g 70 – 120

   70 – 170

   70 – 180

   70 – 160 etc.

2. To continue our drawing, find two spot heights in between which 100m is an altitude. Two points that enable us to pass the 100m contour line are 70 and 120.

3. Choose a suitable contour interval such as 10,20,100,150 etc. In the given figure the chosen interval is 50m.

4. Decide to draw the contour line. Start with the 100m above sea level contour line. Therefore, this contour line should pass below spot heights of 120,170,160 and 180 etc. We can interpolate contour lines using the following formula.

$$\frac{\text{vertical distance between spot heights and that contour line}}{\text{vertical distance between two adjacent spot heights}} \times \text{map distance between the concerned spot heights}$$

5. Join points 70 and 120 with a straight line and measure the length of it (=40 mm or 4.0cm)

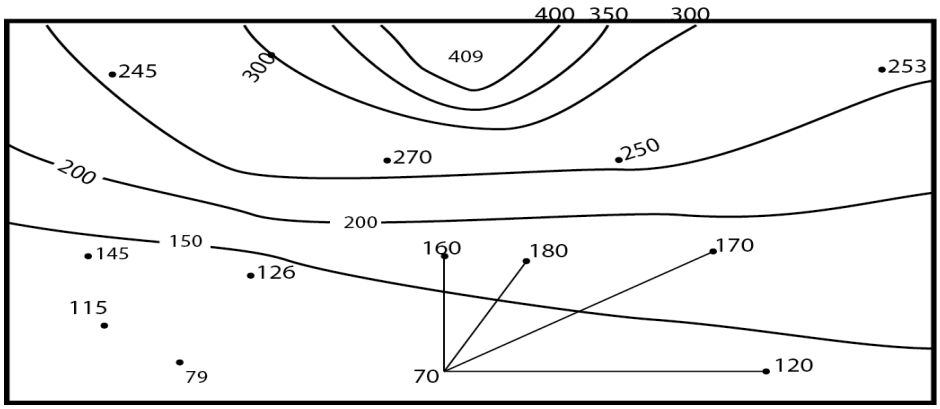
6. The vertical interval (V.I.) between the two spot heights is 120-80 = 40m.

   - Vertical distance between the lowest spot height and the required contour line 100 – 70 = 30m.
   - Vertical distance between the upper spot height and the required contour line = 120 – 100 = 20m.

$$\frac{30\times 40}{50} = 24mm$$

$$\frac{20\times 40}{50} = 16mm$$

- Now find, through measurement, the point on the line segment 120-70 = which is 16mm from 120 and 24mm from 70



Answer key for additional questions

1. This is because contour lines are only drawn on maps. They are not actually drawn on the surface of the earth.
2. Contours that widely spaced at the top of a hill and close together at the bottom indicate a convex slope
    - Contours that merge at appoint indicate a cliff
    - Crossing contours indicate an over handling cliff;
    - Closed contours with more or less circular shapes, with values increasing towards the center with the top being indicated by a spot height represent mountains or hills;
3. Spot height is the height (altitude) of a paint on the earth's surface where as contour line is a line on a map which connects all paints with the same, known altitude above a specific datum loosely termed sea level.
4. Relief is shown on maps by using layer tinting, form line, shaded relief, hachures and contours.

2.1.2 Drawing Relief Cross-Section (Profile)

Periods Allotted: 4

1. Competencies

At the end of this lesson, the students will be able to:

- *Construct relief cross sections to visualize features of landscapes.*

2. Content

- The drawing of cross section (profile)

3. Overview

- A crosssection is a most useful way of visualizing the shape and slopes of the ground.
- We draw cross-sections to show graphically the proportions between horizontal and vertical distances. In order to easily visualize the landscape, we always exaggerate the vertical scale over the horizontal scale.
- Remember that vertical exaggeration is a function of the horizontal and vertical scales of the map. The relationship of the vertical scale to the horizontal scale is known as vertical exaggeration. The degree to which we exaggerate the vertical scale depends on the scale of the map and the terrain of the area.
- We can use the drawing of a section of a given area to learn whether two places are intervisible or not. Whether two points are intervisible or not depends on;
    - ✓ The type of slope between the two points
    - ✓ The nature of the terrain between the two points
    - ✓ The vegetation cover of the area.

4. Teaching-learning Processes

4.1 Suggested Teaching Aids

- Contour map
- Block diagrams and physical models
- Teaching materials such as instrument boxes, eraser, ruler and pencils.

4.2 Suggested Teaching Methods

The teaching methodology employed to teach the contents in this lesson topic are brief explanation, group discussion, student-centred teaching learning activity, supplemented by short notes, gapped lecture and inquiry.

Begin the unit with the start-up activity.

- The start-up activity is designed to illustrate the drawing of cross sections. You have to give ample time for the students to discuss the activity in groups. Then have the students do the activity individually.

  Check and grade students' activities. After that select the best ones and present them to the class so that other students who have not done the activity properly could try to do it again.

Demonstrations: let the students demonstrate the drawing of cross section by constructing model block diagrams.

4.3 Pre-lesson Preparation

- Get the teaching aids and teaching materials suggested above ready.
- Forward planning: read the contents on drowning cross–sections from contour lines and make the necessary preparation.

4.4 Presentation of the Lesson

a) Introduction of the lesson

You can start the lesson by posing questions like the following:

- What is a cross section?
- Why do we draw cross sections?
- What are the procedures to be followed to draw cross sections?
- What is vertical exaggeration?
- Why do we exaggerate the vertical scale?

b) Body of the lesson

You should not use the same scale for both vertical and horizontal distances. If you do, the cross section you finally obtain will not be easy to read or interpret.

- Explain the relationship between the vertical scale over the horizontal scale briefly.
- Discuss also the degree to which you exaggerate the vertical scale that you use.
- You may enhance students' understanding by using sample section diagrams to show the relationships.

Using students' previous understanding as input, start your presentation by explaining the meaning of cross section (profile), vertical exaggeration, vertical scale, horizontal scale and amplitude.

In the drawing of cross sections and profiles you have to show graphically the proportion between horizontal and vertical distances. If sections have to be drawn from maps to show the relief of a certain piece of land, you should remember that the variations in altitude are very small when compared with the horizontal distance involved.

c) Stabilization

Summarize the most important concepts as follows:

- The merit of drawing cross sections
- Procedures that are employed for drawing cross sections
- The relationship between contours and the land feature they represent
- The importance of contour maps in general and the construction of cross–sections in particular for engineers, road (highway) planners

4.5 Evaluation and Follow up

a) Evaluation

Arrange several topographic maps which are used to construct cross sections in groups.

- Draw the cross section and label the different landforms that are shown by the cross sections.
- Associate the contour lines and the relief they represent.

b) Follow up

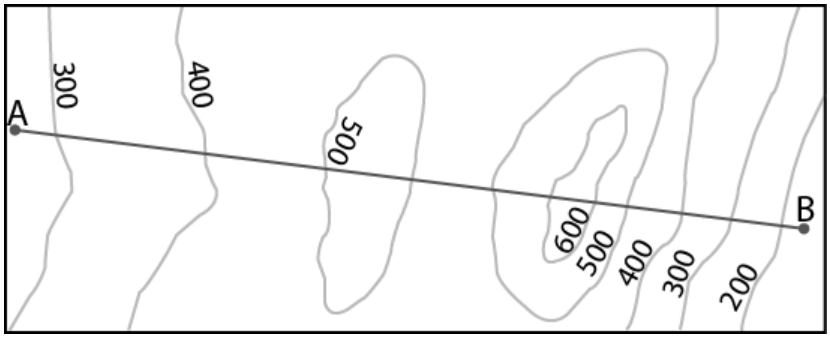
Get the students to copy Figure 2.14 and answer the following questions.

- Which contourlines represent the highest peak?

- There is lower ground between the two peaks; mention the contour lines that represent this lower ground.
- Draw contour lines (ideal contour lines) that represent concave and convex slopes and explain briefly their difference in relation to the patterns of the contour lines that represent these slopes.

c) Additional Questions

1. What is cross section?
2. What is the difference between vertical scale and horizontal scale?
3. What is vertical exaggeration?
4. Construct the cross section of the following contour map.



4.6 Answer for Activities

Activity2.4

In order to visualize the shape of the ground shown on the map in Figure 2.15, we first decide what section line across the map will show up the shape of the ground best for our purpose. Then,

1. Take a strip of paper and lay it along A-B.
2. On the strip of paper mark a mark opposite A and B, and also opposite the points where line AB cuts a contour line; write down the height of each contour. The strip will now look like Figure 2.15 (b).
3. Next construct a scaled grid of parallel lines marked off according to the vertical interval as in Figure 2.13 (c).
4. Place the strip of paper along the bottom of the grid as in Figure 2.15(d) and mark off A and B, the ends of the section.
5. From each point on the strip, draw vertical lines up to the appropriate parallel line on the grid.

6. Then draw a line to join up the tops of the vertical lines on the grid, taking care to round the tops of the hills and the floors of the valleys. This line gives the section along A-B.

Before you begin drawing the section, find the proper vertical exaggeration to use for your section. This is decided on the basis of the scale of the map and the amplitude of the relief that you will find along your section. The scale is 1:250,000, and the amplitude V.E. is 8 in this case. This means that the vertical scale should be exaggerated 8 times over the horizontal scale.

According to definition: $V.E. = \frac{horizontal\ scale}{vertical\ scale}$

Therefore

$$8 = \frac{250,000}{x} \; or \; x = \frac{250,000}{8} = 31,250$$

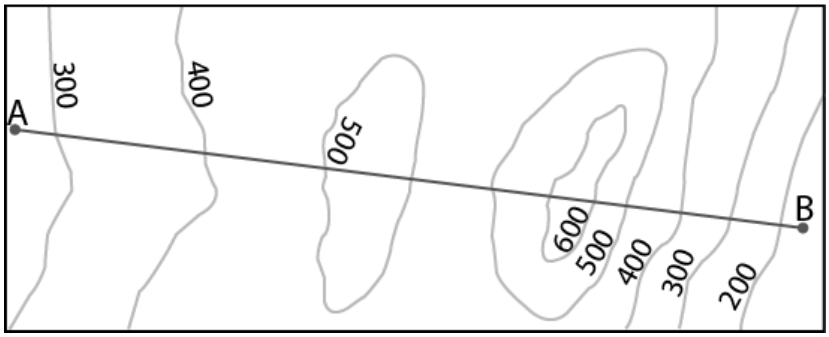
$$= \frac{100 \times 100}{31,250} = 0.32cm.$$

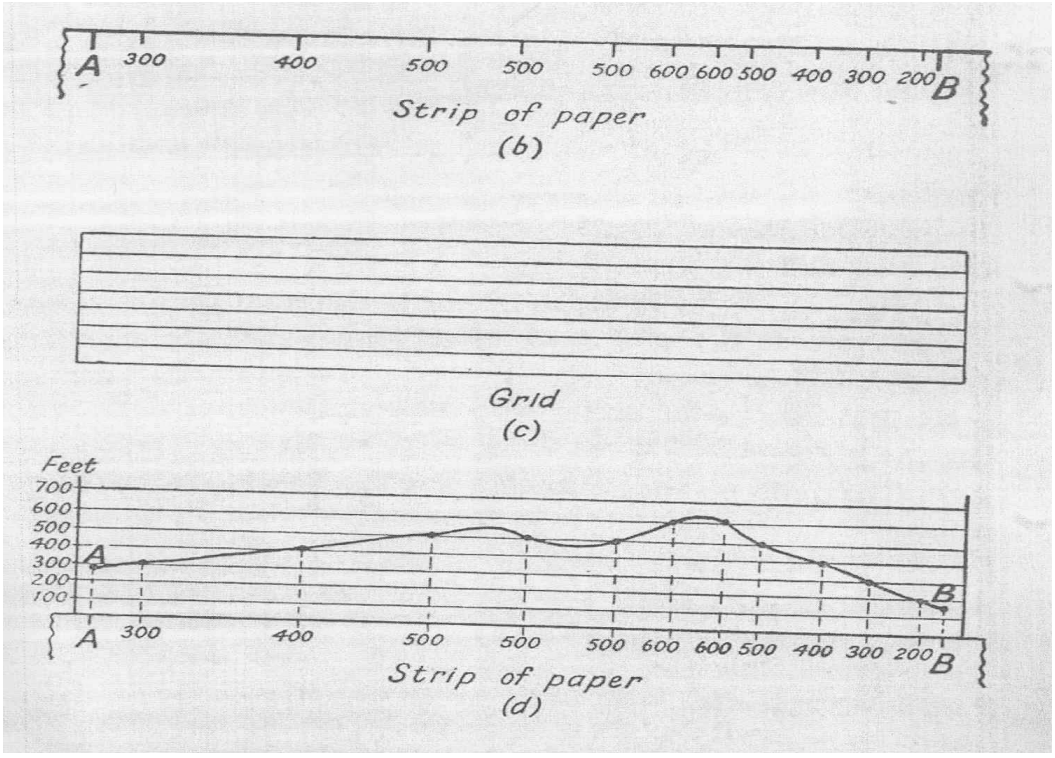
Therefore, a vertical distance on the vertical axis of represents 100 meters.

Answer key for additional questions

1. Cross section is a line which shows the rise and fall of the surface of the ground along a chosen line on a map. It is draw to get a clear idea of the nature of relief along a line.
2. Vertical exaggeration is a deliberate increase in the vertical scale of a section or profile in comparison with the horizontal scale in order to make the section clearly perceptible.

3. Construct the cross section





2.1.3 Intervisibility

Periods Allotted: 1

1. Competencies

At the end of the lesson, students will be able to:

- *Determine the intervisibility of land features by section drawing or contour maps.*

2. Contents

Intervisibility

3. Overview

Intervisibility is simply defined as the visibility of places to each other. If an observer standing at a certain point can see another observer standing at another point, then the two places are said to be intervisible.

Any land that is not visible from a certain point or place is known as dead ground.

Intervisibility is important for

- Planning military operations;
- To understand the distribution of dead and visible ground with respect to a proposed plan of infrastructure;
- Intervisibility provides information for the evaluations of proposed sites for forest fire lookouts;

  Intervisibility is affected by several factors amongst which the most important ones are the following:

  i. The type of slope between the two points;
  ii. The general relief between the two points; and
  iii. The amount of vegetation that covers that area.
- We can use the drawing of sections of a given area to learn whether two places are intervisible or not.

4. Teaching-learning Processes

4.1 Suggested Teaching Aids

- A topographic map with contour lines
- Photograph of the area which is represented by the topographic map
- Block diagram of the topographic map.

4.2 Suggested Teaching Methods

- The methods employed to teach the contents in this lesson topic are brief explanation, group discussion, student-centered teaching learning activity, gapped lecture and inquiry supplemented by short notes.

4.3 Pre-lesson Preparation

Before you begin teaching the lesson, collect the aforementioned teaching aids and materials.

Forward planning: Read the contents on intervisibility from the students' textbook and other supplementary materials and make the necessary preparations.

4.4 Presentation of the Lesson

a) Introduction to the lesson

You can start the lesson by posing questions like the following:

- How do we know whether two places are intervisible or not?
- What are the factors that affect intervisibility?
- For what purposes do we study intervisibility?

b) Body of the lesson

Based on the descriptive and illustrative information given in the students' text book:

- Define the term intervisibility.
- Explain factors that affect intervisibility.
- Demonstrate whether two points are intervisible or not and reveal the extent of dead ground between them by drawing a cross-section from a given contour map.
- Inorder to illustrate the meaning of the term dead ground, take the same map that you had in Figure 2.16 and now draw the complete section from A to B. In this case, do not forget to use a very large vertical exaggeration (V.E.).

c) Stabilization

Give a short summary about

- The concept of intervisibility
- The uses of intervisibility
- Factors that affect invervisbility

4.5 Evaluation and Follow up

a) Evaluation

Ask the students to

- Take Figure 2.15, and determine whether intervisbility is possible or not among and between several points on the contour map.
- Give their reasons

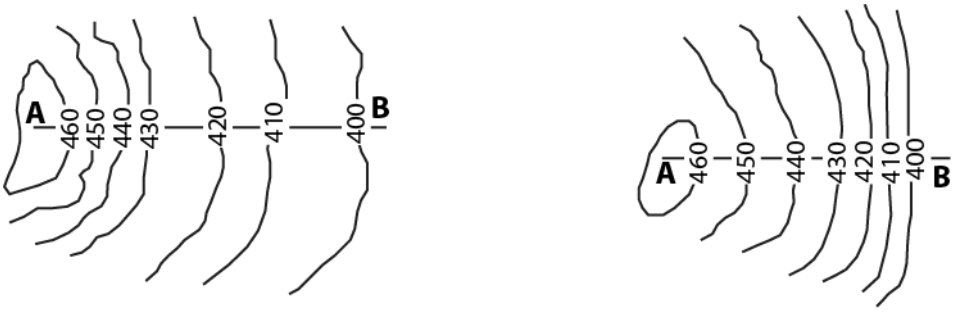
b) Follow up

Ask students to

- Take Figure 2.25 and check whether intervisibility is possible or not between points Z and P.
- Give their reasons

c) Additional Questions

1. Describe those factors that affect intervisibility.
2. When do you think two points on the ground will be mutually intervisible.
3. In which of the following contour maps is intervisibility possible?
   a. b.



4. What are the uses of studying intervisibility?

4.6 Answer for Activities

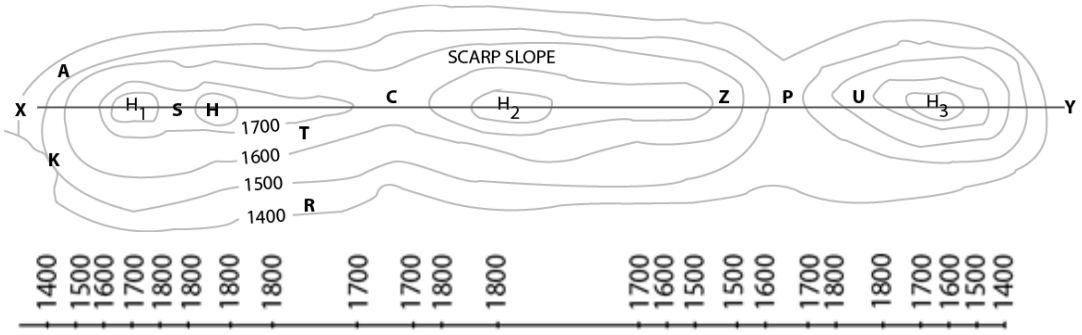
Activity 2.5

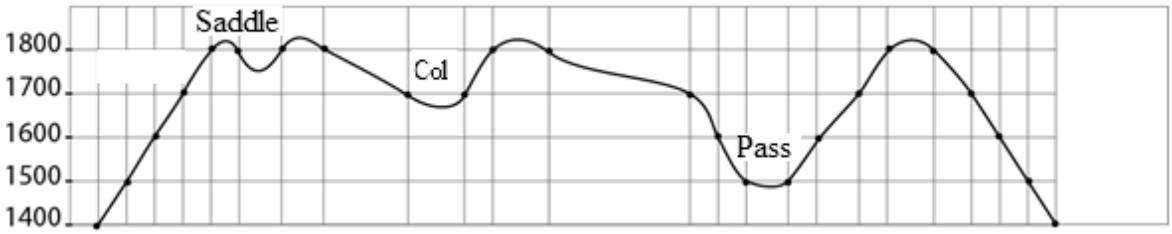
a. In the case of 'a', the landform is a cliff. A is situated on top of the cliff, whereas B is standing at the bottom of the cliff. Their intervisibility depends on the distance between the two individuals. If A is located at the edge of the cliff, we can say they are intervisible.
   But if A is far away from the edge of the cliff, and B is exactly at the foot of the cliff, there would be no intervisibility between the two points. Therefore, intervisibility in this regard is affected by distance.

b. In the case of 'b', both A and B are located in the same altitude – each of them is located at 700 m. altitude. If two people are standing on the same altitude, we can say that the two people are intervisible, as long as there is no higher ground between the two points which obscures intervisiblility. But we should bear in mind that two persons located in the same altitude might not see each other if there is a dense vegetation growth between the two points.

Activity 2.6

Part I





1. Point C and P are not intervisible for there is a higher ground represented by the letter H_2.
2. Point C and S are intervisible since there is no a higher elevation between them. Both of them are situated at 1700m.
3. Point Z's elevation is 1700m and that of P is less than 1600m. Their intervisibility depends on the distance between the two points. If the two points are located further apart they may not be mutually seen. In addition to this, the slope between the two points is roughly convex slope. Therefore we can conclude that the two points are not intervisible.

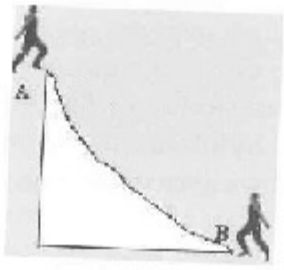
Part II

1. Pass
2. From X – H then from H_1 –C .
3. i. Downhill ii. Uphill
4. Letter A
5. Letter C
6. Saddle
7. Cliff

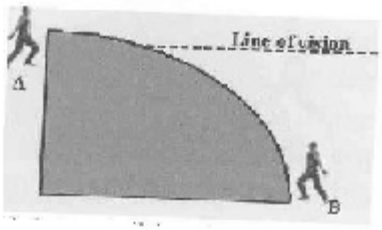
Answer key for additional questions

1. Intervisibility is affected by
   a. The type of slope between two points
   b. The general relief between two points
   c. The amount of vegetation that covers the area
2. A. When the ground is perfectly flat.
   b. When one point is located at the bottom and the other at the top of a concave slope.
3. Points A and B are intervisible in the case of the first figure (concave slope)
   Reason: this is because the slope between A and B is concave.

a)



b)



4. - Intervisibility is important for planning military operations;
   - To provide information for the evolution of proposed sites for forest-fire lookouts;
   - It plays a significant role in planning of logging;
   - It is important for selecting appropriate sites for the development of recreation and refreshment centers

2.1.4 Landforms on Contour Map

Periods Allotted: 3

1. Competencies

At the end of the lesson, the students will be able to:

- *Differentiate different landforms on contour maps;*
- *Identify types of contour lines.*

2. Contents

- Different landforms on contour maps: hill, saddle, valley, ridge, depression, re-intrant, spur, cliff, cut, fill.

3. Overview

Contour maps show different land features by using contour lines with different shapes and spacing. Their patterns (arrangement) enable map readers to identify the types of terrain features depicted.

Mountains and plateaus are shown by contour liens with different shapes.

A wide variety of landforms can be shown on contour maps by means of contour lines along with spot heights and hachures. For further information, make yourself familiar with how various landforms would look on maps included in the student textbook.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Contour/topographic maps showing several landforms (relief)
- Block diagrams
- Scenery films and photographs, if possible.

4.2 Suggested Teaching Methods

Use the following teaching methods as suggested in the introduction and in the presentation of the lesson:

- Brainstorming questions
- Questioning
- Introduction and explanation
- Group discussion
- Presentation

4.3 Pre-lesson Preparation

- Get the suggested teaching aids and teaching materials ready.
- Read reference materials that could help you to present your lesson well.

4.4 Presentation of the Lesson

a) Introduction of the lesson

You can start the lesson by posing questions like the following:

- What are the methods used to show relief on maps?
- Mention the various methods of showing relief on maps.
- How do we differentiate different landforms on contour maps?

b) Body of the lesson

Based on the descriptive and illustrative information given in the student text book:

- Discuss the various patterns of contour lines.
- Show how sketches of the landscape are drawn from contour maps (figures, block diagrams and cross – sections, and describe and demonstrate the major landforms found in:
  - Highlands
  - Lowlands
  - Valleys and spurs
  - Plateaus and depressions

c) Stabilization

Give a short summary on

- How to show different landforms on contour maps
- How patterns help map readers to easily identify the kinds of terrain feature represented

4.5 Evaluation and Follow up

a) Evaluation

Arrange contour maps that represent different land features and make the students name each relief feature represented by contour lines such as:

a. uniformly spaced contour lines _____

b. A land feature found between two summits _____

c. Contour lines forming concentric circles _____

d. Closed contour lines with thick marks pointing downward to lower ground ___

e. Contours that point toward the lower ground with ‘U’ or ‘V’ shapes___

b) Follow up

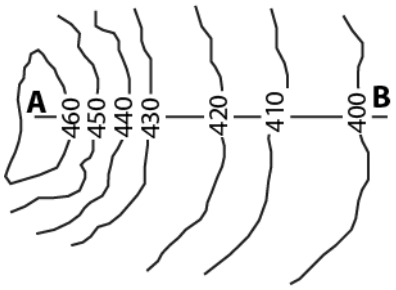
Help (guide) students to:

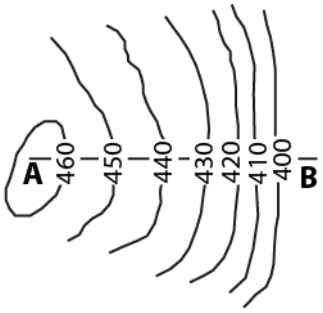
1. Do the practical activities given in the student textbook.
2. Take Figure 2.27 and construct its cross section to show

a. mountain peaks	d. saddle
b. plateau	e. pass
c. col	f. cliff

c) Additional Questions

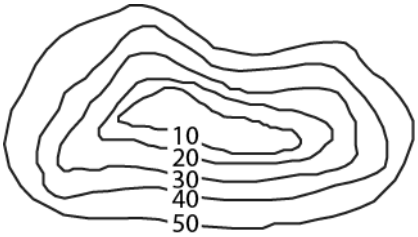
1. What types of landform do the following contour maps represent?





i) a. Represents _____
ii) b. Represents _____

2. Tell the type of landform represented by the following contour map.



3. What is the difference between a normal cliff and overhanging cliff?
4. Explain the difference between cut and fill.

4.6 Answer for Activities

Activity 2.7

1. Various terrains on contour map appear with their own distinct shapes and spacing.
2. A conic hill
3. Depression

4. A valley is a long low-lying area of land, often with a river or a stream running through it that is surrounded by higher ground. It is as tretched-out channel in the land, usually formed by streams. Contour lines forming a valley are either U shaped or V shaped.

   If for example the terrain has a steep slope, the contour lines are drawn very close together, but they are farther apart when they show a gentle (dip) slope. The space between successive contour lines is wider when the terrain is flat (plane). Therefore the shape of contour lines varies due to variation of the shapes of the landforms they represent.

5. A re-intrant is a leas developed stream course that is smaller than a valley.

Activity 2.8

1. Concave slope – The steep gradient is close to the top the slope and then smoothens out near the foot hill. This is indicated on the contour map by the spacing of the contours. The contours are depicted close together near the top and farther apart near the foot of the slope.
2. Convex slope – it is indicated by contours that are close together at the lower levels, and widely spaced at the higher levels.
3. Confluence – a point where two streams meet.
4. The type of slope shown from A – B is cliff. The three contour lines (a00m, 200m and 300m contour lines) are running together for the length of the cliff then separating.
5. Spur is formed by two roughly parallel streams that cut draws along the side of a rig.
6. Even (uniform) slope – the space between successive contour lines is uniform.
7. The point K would not be visible from H, as it is obscured by the brow of the hill.
8. You would rise from gentle slope to steep slope. This is because the contour lines from 100m – 400m altitude are drawn farther apart, where as the slope from 400m – 800m becomes steep because the contour lines are drawn closer together.
9. River valley.

Answer key for additional question

1. a. concave slope
   c. convex slope
2. depression
3. A cliff is a vertical mountain wall. It is indicated on a country map when two or several contour lines are running together for part of their course.
   Over hanging cliff is a vertical mountain wall where the top part of it is outwardly projected. Over hanging cliff on a contour map involves the crossing of contours.

4. Cut is a human made feature which occurs from cutting through raised ground. Fill is also a human made feature which results from filling a low area usually to form a level land for a road or rail road track.

2.2 DRAINAGE ON MAPS

Periods Allotted: 2

1. Competency

At the end of this lesson students will be able to:

- *determine catchment areas from watersheds on contour map.*

2.2.1 Watersheds and Catchment Areas

2. Contents

- Watersheds and catchment areas

3. Overview

- Adjacent river systems are separated from one another by watersheds.
- A watershed (water parting) or divide is the elevated boundary separating the headstreams, which are tributary to different river systems or basins. It often has an irregular course and does not necessarily follow the ridge of a range of hills or mountains.

Use the following guidelines to interpret and describe watersheds on maps.

i. A watershed (divide) is not drawn parallel between streams; rather the streams flow away from the watershed in opposite directions (see Figure 2.39).
ii. Look at the streams' direction of flow carefully. A watershed may wind but it never crosses the channel of a river,
iii. A watershed usually passes through the highest points between adjacent river basins.
iv. A watershed runs in the middle of two contour lines of different altitude in the case of a river capture. However, a river can cross its watershed.

- How do you identify minor and major watersheds on maps? Does a watershed cross contour lines?

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- A contour map with drainage basins, a diagram that illustrates a watershed.

- Pictures, photographs and films that show different landforms associated with river basins.

4.2 Suggested Teaching Methods

- Brainstorming: this helps you to understand students' background knowledge about the topic discussed.
- Introduction: introduce the objective of the lesson you are teaching and explain what will be expected from the students at the end of the lesson.
- Explanation: explain the topic briefly so that the students will be clear about the subject you actually teach.
- Demonstration: harmonize the students' impressions with the real concept of the lesson topic.

4.3 Pre-lesson Preparation

- Get the aforementioned teaching materials ready. If none are available in the school's pedagogical center, organize the students to have them work with you to prepare the teaching aids.
- Collect equipment to simulate the appearance of a watershed between streams.
- Give group assignments in advance to make your presentation interesting.

4.4 Presentation of the Lesson

a) Introduction to the lesson

You can start the lesson by posing the following questions.

- How do you differentiate minor watersheds from major watersheds?
- Describe the difference between watersheds and interfluves.

b) Body of the lesson

- Define the term watershed.
- Demonstrate drainage basins and watersheds as shown in Figures 2.38 and 2.39.

c) Stabilization

Give a short summary of the following points:

- The pattern the watershed follows on contour maps.
- The pattern of contour lines and watersheds.
- How the watershed is affected by river capture.

4.5Evaluation and Follow up

a) Evaluation

- In order to check whether the students have understood the lesson, ask them to perform the following task.
- Draw sketch contour maps to show
  - Watersheds and interfluves
  - Describe the patterns of watersheds and contour lines

b) Follow up

1. Let them collect drainage maps and block diagrams to distinguish minor and major watersheds.
2. Take the drainage map of Africa and describe it interms of watersheds.

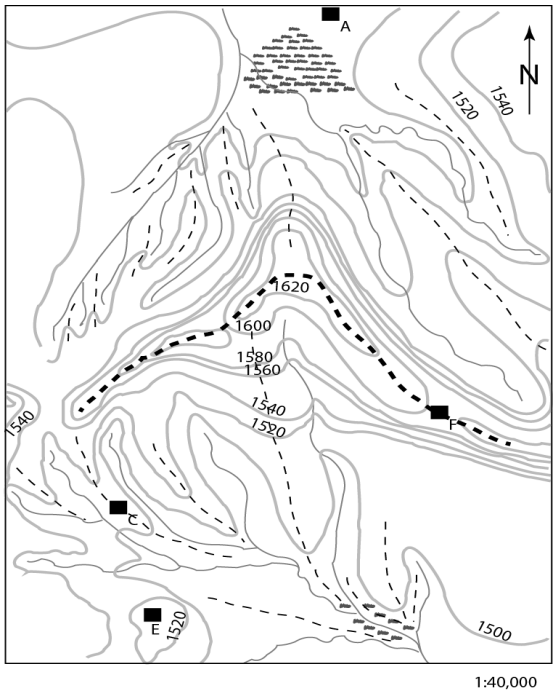
c) Additional Questions

1. Describe steps that help us to identify a drainage basin and its divide on a contour map.
2. What is confluence?
3. What is catchment area?

4.6 Answer for Activities

Activity 2.9

1. Two drainage basins



Legend

…….. minor watershade

------- mjaor watershade

Answer key for additional questions

1. a. A watershed (divide) is not drawn parallel between streams; rather the streams flow away from the watershed in opposite directions

   b. Look at the streams' direction of flow carefully. A watershed may wind but it never crosses the channel of a river,

   c. A watershed usually passes through the highest points between adjacent river basins.

   d. A watershed runs in the middle of two contour lines of different altitude ,

2. It is the point at which two rivers meet to flow together.
3. Catchment area is the entire geological space that is drained by the major river and its tributaries.

2.2.2 Drainage patterns

Periods Allotted: 2

1. Competency

At the end of this lesson the students will be able to:

- *Distinguish different drainage patterns.*

2. Content

- Drainage pattern

3. Overview

- Rivers are the most important agents that shape different landforms.
- Drainage is the discharge of water from the surrounding area through definite channels.
- A river system usually develops a pattern which is related to the general structure of its basin. The drainage of a certain place comprises the different water resources that drain into the sea.
- Drainage basin refers to the area that is drained by the main river and its tributaries.
- How rivers drain a certain area, including their patterns, can be depicted by using contour maps. Catchment areas are also shown on topo–maps.
- What is a catchment area? A catchment area is the region which drains all the rainwater that falls on it into a river or stream, which then carries the water to the sea or to a lake.

- Each drainage has its own patterns. A pattern of drainage is determined by the relief of the area over which it flows and the climate of the area.
- How do we identify river basins and those landforms which are associated with them?
    - Use the following guidelines to interpret and describe drainage features on maps.
        - Does the map show different water features such as rivers, lakes, seas, swamps?
        - How many drainage systems are shown on the map?
        - Can you find landforms associated with the work of rivers?
        - Can you identify the main features in the upper course of a river? The main features in the upper course of a river are as follows:
            - "V" shaped valleys
            - Interlocking spurs
            - Waterfalls
            - Rapids
            - Cataracts
- How do you identify aV-shaped valley?
- Can you say something about the patterns of contour lines that show "V"- shaped valleys?
- Why do contour lines cross one another? What type of landform is represented by these contour lines?
- How do you differentiate an overhanging cliff from a normal cliff? Where do we find these landforms? Why?
- Contour lines are drawn farther apart from one another in the lower courses of rivers. How do you describe the arrangement of contour lines in this regard?

4. Teaching-learning Processes

4.1 Suggested Teaching Aids

- A contour map with drainage basins, a diagram that illustrates drainage patterns.
- Pictures, photographs and films that show different landforms associated with river basins.

4.2 Suggested Teaching Methods

- Brainstorming: to bring the students' attention to the lesson. Encourage students to try to answer questions.
- Introduction: introduce the lesson topic, including its objectives.
- Explanation: explain the topic briefly and give the students opportunities to give their own opinions or to ask questions. Your explanation should be assisted with the appropriate teaching aids.
- Harmonizing: harmonize the students' previous impressions about the topic with the real essence of the topic.
- Demonstration: demonstrate how to interpret different landforms that are associated with the work of rivers.

1. Field visit: you can take your students out in the field to see the real land features which are associated with river basins. Students should write reports about what they have observed in the field and present the reports.
2. Group discussion: each group is expected to discuss elected issues regarding drainage basins. They have to present their ideas through one of the group members.
3. Guest speaker: you can invite an expert on water resources or cartographers to enable your students to get additional information about drainage basins and some issues related to water resources.
4. Give projects to be done in their groups.

4.3 Pre-lesson Preparation

- Get the aforementioned teaching materials ready. If none is available in the school's pedagogical center, organize the students to work with you to prepare the teaching aids.
- Collect equipment to simulate the work of rivers in the class.
- Give group assignments in advance to make your presentation interesting.
- Invite a cartographer, if possible, to demonstrate how river basins and river features are represented on maps.

4.4 Presentation of the Lesson

a) Introduction to the lesson

You can start the lesson by posing the following questions.

- How do you differentiate a river on a contour map?
- What sort of color is used by map makers to show water features?

- How do you read and understand landforms which are associated with river basins?
- How do you differentiate minor watersheds from major watersheds?
- Can you describe the characteristic features and stages of rivers?
- Describe the difference between watersheds and interfluves.
- What is river capture?
- Explain the whole process of river capture.

b) Body of the lesson

- Define key terms that appear frequently in the lesson topic.
- Demonstrate the work of rivers in their various stages.
- Have the students differentiate between contour lines and streams on topographic maps.
- Explain the geological formation of drainage patterns in relation to the type of climate that prevails in each drainage pattern.
- Have the students try to categorize Ethiopian rivers into appropriate types of patterns.

c) Stabilization

Give a short summary on the following important points as follows:

- How do rivers modify their channels and the surrounding area?
- How does a river system develop patterns which are related to the general structure of its basin?
- How are drainage basins and the landforms they create depicted on maps? E.g., U-shaped valleys, V-shaped valleys, waterfalls, cliffs, interfluves, interlocking spurs, etc.
- What does catchment area mean and how are they identified on contour maps?
- How do you identify river basins and those landforms that are associated with them?

4.5 Evaluation and Follow up

a) Evaluation

- Take a contour map of Africa or Ethiopia which includes river basins and have the students categorize these rivers into appropriate types of drainage basins.

- Describe landforms that are formed in the upper, middle and lower courses.
- Have the students identify rivers that are vulnerable to capture by another river.
- Describe the main characteristics of contour maps which are show a young valley, middle valley and lower valley.
- Draw cross-sections of three major Ethiopian rivers and describe the types of landforms they represent.

b) Follow up

Ask your students to do the following things:

1. Have them collect drainage maps, photographs, and block diagrams to understand in depth the various drainage features discussed so far.
2. Find drainage maps of Africa and/or Ethiopia and describe them carefully interms of:
   a. Drainage
   b. Watersheds
   c. Drainage patterns
   d. Age of river valley
3. Using contour lines and conventional colors, make relief and drainage maps of your locality.

Finally grade their achievements in your grading list.

You can also give them a short quiz or test. If there are students who received low grades, please try to understand their problems and arrange special classes to upgrade those student.

Do not bypass those activities that are found in the student textbook.

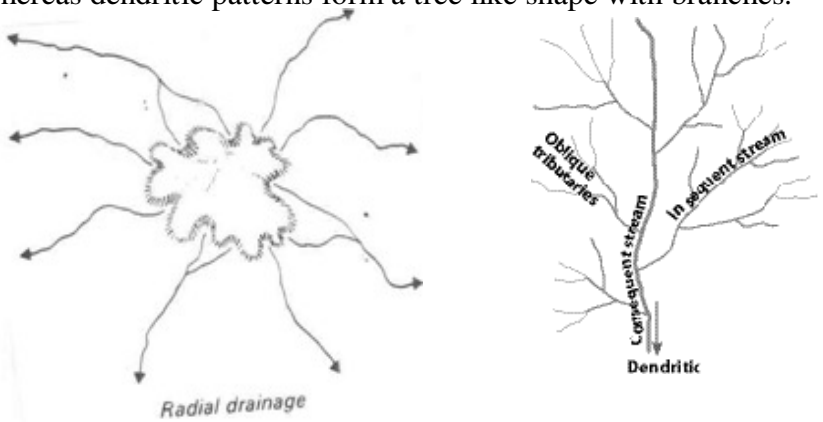
c) Additional Questions

1. Explain the reasons why drainage basins have different patterns.
2. How are dendritic drainage basins formed?
3. Which drainage pattern is associated with granite rocks?
4. Give an example of centripetal drainage pattern in Ethiopia.

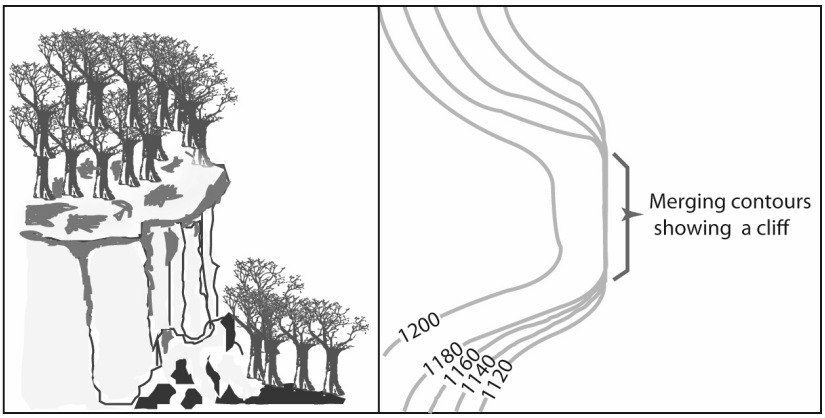
4.6 Answer Key for Activities

Activity 2.10

i. Radial drainage patterns occur where rivers flow in all directions away from a raised feature, whereas dendritic patterns form a tree like shape with branches.



ii. Water formed when a stream flows over a vertical slope and the edge of a plateau. It is represented by contours which merge into each other.



Rapid – A river which flows very fast because it is steep and perhaps narrow.

Answer key for additional questions

1. Geological structure of the rocks on which they flow and variation in topography make rivers to have different drainage patterns.
2. They are formed in areas of homogeneous rocks which comprises horizontal strata rock makes.
3. Rectangular drainage patter.
4. Rivers that empty into Lake Tana (e.g. R. Rib. Gumara)
   Rivers that drain into L. Langano (e.g. R. Baku, R. Teggi)

2.2.3 River capture and stage of river valley development

Periods Allotted: 2

1. Competencies

At the end of this lesson students will be able to:

- *Demonstrate river capture*
- *Demonstrate stages of river-valley development, using contour lines.*

2. Contents

A. River capture

B. Stages of river valley development

3. Overview

River capture can be shown and recognized from maps. Inorder to describe and interpret river capture on a map there must be a river joining another river down slope from a watershed that separates their two basins. The river that flows over the basin of the other river is called the pirate stream. The other stream is known as the victim stream.

The following conditions should be fulfilled for the occurrence of river capture:

- The rocks on the side of the victim river must be softer.
- Heavy rainfall should fall on the pirateriver's side of the watershed.
- The pirate stream should have a steeper course and erode its course.
- The watershed must comprise very low ground and become indefinite.

Inorder to describe and interpret river capture and stages of river valley development in a given area shown on a map, the following guidelines must be taken into consideration:

- Is there any evidence of river capture? How do we know? Is there a water gap? Can you identify the 'pirate' and 'victim' rivers?
- Does the map show all of the three river courses–upper, middle and lower valleys?
- What are the major landforms made by drainage?
- Are the river valleys narrow, broad or steep-sided?
- How do the valley shapes affect the rivers or streams which flow through them?
- Are there mountains and plateaus dissected by rivers?
- Are the rivers fast or slow flowing?
- Are there cliffs, lagoons, headlands, estuaries or deltas?

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Map showing drainage basins (topographic maps)
- School atlas
- Models which show river capture and stages of river valley development
- Photographs and films that show drainage basins.

4.2 Suggested Teaching Methods

- Brainstorming: encourage students to present their opinions about the lesson topic.
- Explanation: give a brief explanation with the help of the appropriate teaching aids.
- Harmonizing: harmonize the student's previous impressions about the topic with the real essence of the topic.
- Demonstration: explain the topic, with the help of demonstration when necessary: how to interpret river capture, stages of river valley development and the work of rivers in modifying, destroying and shaping different landforms.
- Group discussion: let students discuss in their groups so that they will be able to share ideas about the topic. Assist and encourage students to discuss before the class.
- Field observation: since "seeing is believing", the teacher should arrange a field trip so that students will gain more knowledge about the work of rivers, including the patterns they form in accordance with the nature of the terrain over which they flow.
- Group work: give group work to your students and present the results in the class.

4.3Pre-lesson Preparation

- Collect the aforementioned teaching materials and aids.
- Refer to materials that are relevant to the topic you are teaching.

4.4Pre-lesson Preparation

a) Introduction of the lesson

- You may start the lesson by posing questions like:

  - What is river capture?
  - Describe stages of river valley development.
  - Mention those landforms formed by rivers in their different stages.
  - Can you explain how river capture takes place?
  - What is the difference between pirate and victim streams?
  - How do you identify the various river courses on maps?

b) Body of the lesson

Define key terms such as river capture, misfit stream, pirate and victim rivers.

- Demonstrate the work of rivers in their respective stages.
- Explain the relationship between a drainage pattern and the geological make up of a given region (area).
- Explain briefly pirate river, elbow of capture, wind gap, misfit river.

c) Stabilization

Give a brief summary of the following points:

- The process of river capture
- Major features of a completed river capture such as
  - ✓ Pirate river
  - ✓ Elbow of capture
  - ✓ Wind gap
  - ✓ Misfit stream
  - ✓ Captured stream
- Summarize the stages of river valley development by asking questions such as
  - ✓ Explain the three stages of rivers.
  - ✓ Explain (describe) landforms associated with the work of rivers, etc.

4.5 Evaluation and Follow up

a) Evaluation

- Take a topographic map of Africa which includes river basins and have the students examine it and decide whether there is river capture or not.
- Describe landforms that are associated (formed) with the upper, middle and lower courses of a river.
- Have the students identify rivers that are vulnerable to capture by another river.
- Analyze and interpret contour maps which show: upper middle and lower courses of streams (rivers).

b) Follow up

- Inorder to check whether the students have understood the lesson, tell them to perform the following tasks:
  1. Draw your own sketch contour maps to show
     a. Stages of river valley development
     b. River capture
     c. Landforms formed by streams indifferent stages

2. Describe the main characteristics of contour maps which represent:
   a. Young valley (upper course of a river)
   b. Middle valley (middle course of a river)
   c. Lower valley (last stage of a river)
3. Using contour lines and conventional colours, make a relief and drainage map of your locality.

Finally grade their achievements in your grading list.

c) Additional questions

1. Describe the characteristics of a middle course river.
2. Describe the types of landforms formed in each stage of river valleys.
3. Explain the difference between misfit and pirate streams.
4. Describe the difference between arcuate and bird foot deltas.

Answer Key for Additional question

1. a. the river flows over a relatively gentle gradient as compared to its upper course, and the river flows slowly as a result;
   b. the river's volume increases gradually as it is joined by the tributaries that feed water to the river;
   c. the river's valley gets wider and deeper. The slope along the valley's sides gentler, altering the valley's shape from a V-shape nearly to a U-shape
2. Upper course: - narrow gorge, waterfall deep narrow velley the development of interlocking spurs
   Middle course - wide valley floor
   - a line of bluffs on each of the valley floor
   Lower course – Meander swamp
   - Ox bow lake
3. Misfit stream – is a stream which is deprived of its head waters and becomes too small for the valley it belongs to Pirate stream is a stream that flows over the basins of the other river
4. A. Arcuate delta – this kind of delta is formed when the river empties into the sea. It is composed
   ofsediments like gravel and sand and has a convex outward margin.
   b. Bird foot delta – Projects irregularly in to the sea the stream channel divides into a few distributaries.

2.3 THE STUDY OF HUMAN-MADE FEATURES ON MAPS

Periods Allotted: 4

2.3.1 Representation of settlement on maps

1. Competencies

At the end of this lesson students will be able to:

- *Distinguish various patterns of settlement on maps;*
- *Interpret the shape of settlements;*
- *Estimate factors influencing the setting of a settlement;*
- *Reflecton the function of settlement.*

2. Contents

- Signs and symbols
- The shapes of settlements
- Types of settlements
- Factors influencing the setting of a settlement
- The function of settlements

3. Overview

Settlement geographers study the historical, economic and spatial aspects of settlements. They are interested in knowing how a community constituting a settlement utilizes the available resources.

- A settlement is any place which is inhabited by human beings. It includes houses, buildings, villages, towns and cities.
- Every settlement has its own site or location in relation to other places. The site, situation, shape, size, distribution and function of human settlements can be shown on maps.
- A settlement might be situated on a particular landform and gradient such as a spur, the foot of an escarpment, mountain and alluvial fan, dry-point area, river terraces.
- Water is the most important factor for settlement in rural Africa.
- Places that are far away from water points are not preferred for settlement.

Students should be in a position to analyze the reasons why settlement sites were chosen by human beings.

Some helpful points to guide you in the description and interpretation of settlements are given below:

- Identify the sites and situations of various villages, towns and cities. Most of the time, settlement sites are located on plateaus, plains, spurs, deep slopes of ridges, gaps or river terraces.
- Healthier and defendable areas and transportation lines also are focuses of settlements. On the other hand, flood plains, cold or very dry areas are not ideal for settlement. Therefore, you should closely observe human settlements shown on the map to understand why some sites were chosen by people for settlement.
- From the available map evidence, state whether the settlements are hamlets, villages or towns. Are they rural or urban settlements? According to their distribution patterns, human settlements may be classified into dispersed, nucleated and linear. Which settlement pattern is more dominant on the given map? According to their shape or layout, urban settlements can also be identified as compact, linear, star–shaped, radial and grid square types.

The function of a settlement can be deduced from maps based on:

- Site situation/location of settlements;
- Settlement names and sizes;
- Map symbols/names of some economic activities;
- What are the main occupations of the inhabitants shown on the map?

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Topographic maps which show settlement, communications and railways.
- School atlases
- Sketch maps that show different settlements and transport networks
- Models which show the plan of your hometown
- Photographs and films to show different settlements and communication features.

4.2 Suggested Teaching Methods

- Brainstorming: Encourage students to try to answer questions.
- Introduction: introduce the lesson topic, including its objectives.
- Explanation: Explain the topic briefly and give the students opportunities to give their own opinions or to ask questions. Your explanation should be assisted with the appropriate teaching aids.
- Harmonizing: harmonize the students' previous impression about the topic with the real essence of the topic.
- Demonstration: demonstrate how to interpret settlements and communication features on maps.
- Group discussion: have the students discuss individually and in groups. Help and encourage students to discuss in front of the class. Encourage students to present their ideas to the class.
- Field visit: Help the students to go out of their school compound and observe the real situation. Have the students associate what they have learned theoretically in the class with the real situation in the field. Finally have the students present their observations to the class.
- Guest speaker: you may invite an expert on town planning or on transportation networks so that students can get some ideas about settlements and communications.
- Group work: You must give group work to your students. Each member of each group should participate in the group work.

4.3 Pre-lesson Preparation

- Collect and get ready the appropriate teaching materials
- Have the students read related reference materials.
- Invite guests from different government or nongovernment offices who have special training in urban planning, civil engineering, and geographic communication.
- Interpret and analyze to po maps showing human settlement.

4.4 Presentation of the Lesson

a) Introduction of the lesson

Introduce the lesson by asking questions such as:

- What is a settlement?

b) Body of the lesson

- Start your discussion by describing and explaining human-made features on maps.
- Define the term settlement.
- Discuss the site, situation, shape, size, pattern and function of any settlement show on a topographic map.
- Describe the types of signs and symbols used to show settlements on maps.
- How to read, understand and interpret settlements on contour maps. This includes settlements established alonga line of springs, at the foot of a mountain, at the base of rolling interfluves and gaps, etc.
- Explain shapes of settlements including their meanings.
- Discuss types of settlements:
  1. Wet-point settlement
  2. Dry-paint settlement
- Explain factors affecting the sitting of settlements like
  - Availability of fresh water
  - Defense
  - Dry healthy site
  - Line of communication and economic area

Discuss functions of settlements.

c) Stabilization

Give a short summary on the following important points:

- Human and physical factors that influence people's choices of sites for settlement.
- Selecting suitable sites on maps.
- Describing the major types and distribution patterns of human settlements on maps.
- Identifying the main functions from maps.

4.5 Evaluation and Follow up

a) Evaluation

Have the students perform the following activities and answer the following questions.

1. Demonstrate the site and situation of a settlement on topographic maps (settlement map).
2. Describe some hypothetical sites for human settlements and describe the reasons.
3. Invent a large – scale hypothetical site for human settlements and describe the reasons.
   a. Compact shape c. Star shape
   d. Radial shape b. Linear shape
4. Identify the shape of the following urban settlements and give your reasons for why those urban areas retain their shape:
   a. Awasa d. Nazareth
   b. Addis Ababa e. Bahir Dar
   c. Harar f. Gondar

Give a short quiz and or test and grade their achievements.

b) Follow up

1. Take a topographic map of Ethiopia and describe and analyze the major types of sites and situations, and also the distribution and function of human settlements on this map.
2. Draw an ideal road network on a contour map and connect two places by a road network:
   a. Calculate the gradient of the road in percent and ratio.
   b. Describe the types of vehicles which can be served by this road network.
3. Discuss the uses of transport and communication as shown on the map.

c) Additional Questions

1. A kind of settlement established by one family or a few family residences scattered about in isolated places is called.
2. Are sign and symbols drawn proportional to scale on topo-maps.
3. Put the following settlements in their descending order-metropolis, large town, megalopolis, city?
4. To which type of settlement do most of the Ethiopian towns belong?

Activity 2.11

1. Most of the time people establish their settlements in areas where there are alluvial soils. Alluvial soils are soils transported by running water and deposited along river banks. These soils are rich in plant nutrients and are ideal for crop production– e.g., the Nile valley in Egypt is the most densely populated area for its fertile soil.
2. Wet-point settlements are established near adequate and pure drinking water, fishing, cultivation, irrigation, power (HEP) generation and communication features.
   Dry-point settlements differ from wet-point settlements in that dry-point settlements are established far away from water courses and flooding. People usually tend to avoid poorly drained areas because they produce illnesses due to the proliferation of tropical diseases, e.g., malaria.
3. Towns which were founded primarily for defense purposes (garrison towns) are: Assela, Chencha, Yirgalem, Nekemt etc.
4. Wet-point site
5. Some towns become ghost towns if there are other towns that attract people away from them for reasons: such as job opportunity, variety of services like transportation, education, developed health facilities, sustainable security etc.

Answer key for additional question

1. Dispersed settlement.
2. Signs and symbols are not sometimes drawn proportional to scale. Sometimes signs and symbols are drawn larger or smaller without keeping their proportionality to the scale of the map they belong.
3. Megalopolis, metropolis, city, large town.
4. Linear (elongated) settlement

2.3.2 The study of communications on maps

Periods Allotted: 6

1. Competencies

At the end of this lesson, students will be able to:

- *Demonstrate transport networks;*
- *Examine factors affecting development of transport networks;*
- *Design different patterns of land transport routes on given contour maps;*
- *Identify various airfields on maps.*

2. Contents

- Transport network
- Factors affecting development of transport networks
- Different patterns of transport network
- Air transport.

3. Overview

Transportation and communication features are shown on maps by using conventional signs and symbols.

When students read these maps, attention should be given to the following important points:

- The modes and nature of transportation and communication
- The major factors that hinder or enhance transport and communication development

The impact of gradient (slope) on transport (road) networks

- Hill-climbing capacity of different vehicles
- The advantages and disadvantages of all modes of transport (railways, roads, waterways and airways).

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Topographic maps which show settlement, communications and gradients of roads and railways
- School atlases
- Sketch maps that show different settlement and transport networks
- Models which show the plan of your hometown
- Photographs and films to show different settlements and communication features

4.2 Suggested Teaching Methods

- Brainstorming: Encourage students to try to answer questions.
- Explanation: Explain the topic briefly and give the students opportunities to give their own opinions or to ask questions. Your explanation should be assisted with the appropriate teaching aids.

- Harmonizing: harmonize the students' previous impressions about the topic with the real essence of the topic.
- Demonstration: demonstrate how to interpret settlement and communication features on maps.
- Group discussion: have the students discuss individually and in groups. Help and encourage students to discuss topics in front of the class. Encourage students to present their ideas to the class.
- Field visit: have the students leave their school compound and observe the real situation. Have the students associate what they have learned theoretically in the class with the real situation in the field. Finally have the students present their observations to the class.
- Guest speaker: you may invite an expert on town planning or on transportation networks so that students can get some ideas about settlements and communications.
- Group work: You must give group work to your students. Each member of each group should participate in the group work.

4.3 Pre-lesson Preparation

- Collect and get ready the appropriate teaching aids and materials.
- Have the students read related reference materials.
- Invite guests from different government or nongovernment offices who have special training in urban planning, civil engineering, and geographic communication.
- Interpret and analyze topo-maps showing communication and transport networks.

4.4 Presentation of the lesson

a) Introduction of the lesson

Introduce the lesson by asking questions such as:

- What is a settlement?
- How are settlements established?
- What factors determine the establishment of settlements?
- How do we show settlements on maps?
- What is a transport network?

b) Body of the lesson

- Have the students interpret and analyze sites and situations on maps.
- Have the students distinguish between rural and urban settlements on maps.
- Briefly discuss and demonstrate how the main economic activities of a settlement can be shown and recognized from maps. Make students familiar with the helpful hints suggested in the student textbook.

c) Stabilization

- Communication features are shown on maps by using different signs and symbols.
- Marginal information on maps is the most important tool for helping map readers to analyze and understand communication features on topographical maps. These include foot paths, roads, railways, air fields and waterways.
- Other means of communication that can be show on maps by using symbols such as radio /TV stations and microwave and tower stations the development of transport net work is affected by natural and human factors.
- Transport facilities have paramount importance for two purposes:
- To serve economic activities
- To make strategic control of a country possible

4.5 Evaluation and Follow up

a) Evaluation

Ask the students the following questions:

- Depict roads, railways, airfields by using conventional map symbols or signs.
- How do you identify/understand and distinguish different transport and communication features?

b) Follow up

1. Get a map of Ethiopia which shows a road transport network and find the gradient of the road from:
   a. From the Millennium Bridge of the River Abay to theTown of Dejen
   b. From Bahir Dar to Gondar
   c. From TarmaBer to Dessie

2. Prepare a sketch map of your woreda to show transport and communication features and answer the following questions:

   a. Are the roads suitable for all seasons or are they only used in the dry season?

   b. Which types of communications are available in the woreda

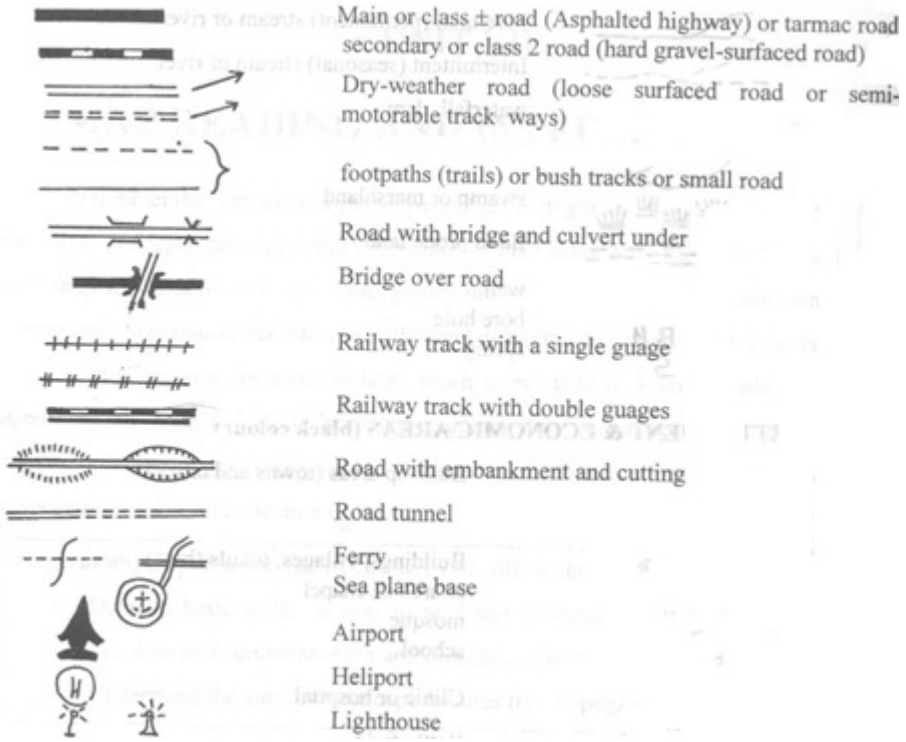
   c. What factors influence the nature and development of communications in your area?

c) Additional Questions

1. How do we show communication features on top maps?
2. Describe the advantages of railways over roads.
3. How do we recognize canals on maps?
4. What are the two important elements to be considered byroad planners?

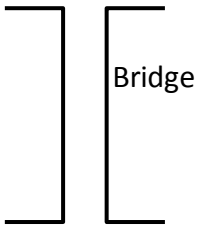
Answer key for additional question

1. Communication features are shown by the following signs and symbols.



2. Railways avoid congestion, causes less pollution cheaper and quicker, cover long distance, safer and more comfortable.

3. The type of symbol used to show bridge.



4. Relief (terrain) and natural water courses.

2.3.3 Climbing capacity of vehicles

Period Allotted: 2

1. Competencies

At the end of this lesson, the students will be able to:

- *Compute the shortest route for different vehicles and railways, using the climbing capacity of each, on contour maps.*

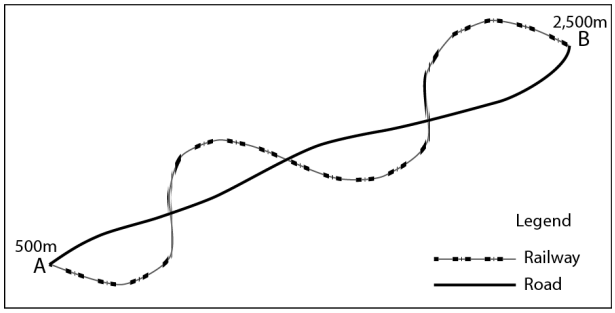
2. Contents

- Hill climbing capacities of vehicles

3. Overview

- When we consider the steepness of a slope we commonly use the gradient of the slope. The gradient expresses the rate of change in altitude of a slope.
- The gradient can be expressed in three different ways:
  1. As a simple ratio
  2. In percent
  3. In degree
- In order to find the gradient of a road, a river, a railway, etc. in the aforementioned formats, we need some sort of measurements on the map accompanied by minor calculations.
- The gradient (the rate of change in altitude of a slope) depends on the distance travelled in the horizontal and vertical planes simultaneously.

- Take the following example for your information.



- The above two towns, A and B, are connected by a road.
- As shown in the figure, the road has a winding pattern. When we have to build roads along steep-sided hills, we do not build them in a straight line up the slope, like the one joining point x with point y shown on the same figure. This is in order to decrease the steepness of the road.
- This reduction of gradient is necessary because different vehicles have different hill climbing capacities.

Look at the following means of transport and their different hill climbing capacities:

Means of Transport Maximum gradients

Trains ---------- 20%

Ordinary bicycles ---------- 10%

Ordinary cars ---------- 25%

4-whal drive cars ---------- 30%

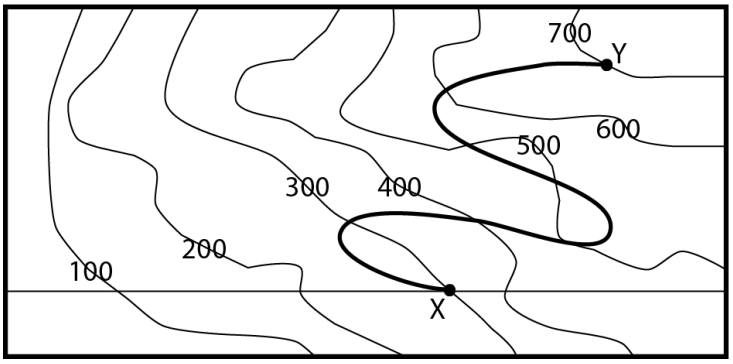
Walking upright without support of hands ---------- 45%

Example:

What is the average gradient of the slope between points x and y?

- Follow the following procedure to find the average gradient of the road from x to y.
  1. Join points x and y with a straight line
  2. Find the map distance of the road from x – y (by measurement = 8 cm).

Note



3. Find the ground distance x – y in km, by measurement and scale
   - map distance = 8cm
   - scale of the map = 1:40,000

$$\text{Distance of the road in km} = \frac{8\text{cm} \times 40{,}000}{100{,}000} = 4\text{km}$$

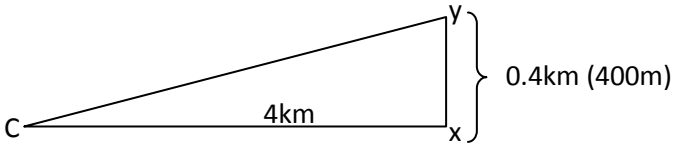
4. The difference in altitude x – y = 500m – 100m = 400m or 0.4km
5. The gradient expressed in simple ratio is

$$\text{Gradient in ratio} = \frac{\text{difference in altitude}}{\text{road distance on the map}}$$

$$\frac{0.4\text{km}}{4\text{km}} = 0.4 \text{ in } 4 \text{ or } 40 \text{ in } 400$$

Or 1 in 10

6. The gradient expressed in percent = $\frac{0.4 \times 100}{4} = 10\%$
7. The gradient expressed in degrees depends on this trigonometric. Formula:



The height and the base values are given. Therefore inorder to get the gradient we have to apply tan:

$$\text{Tan} = \frac{\text{opposite}}{\text{adjacent}} = \frac{0.4}{4} = 0.1$$

The tan value of 0.1 from trigonometrical tables = $5^{o}43'$

4. Teaching-learning Process

4.1Suggested Teaching Aids

- Topographic maps that show transport networks
- Sketch map for calculating gradients
- Topographic map of Ethiopia that shows road transport networks

4.2 Suggested Teaching Methods

- The teaching methodology used in this lesson topic are:
  - ✓ Explanation
  - ✓ Group discussion and presentation
  - ✓ Student-centered teaching learning activity supplemented by short notes, gapped lecture and inquiry.
- The start-up activities
  - ✓ Are meant to illustrate how to calculate gradients of various road networks.
  - ✓ Give class group activity. Then have the students do the activity individually.
  - ✓ Check and grade students' activities. After that select the best ones and present them to the class so that other students who have not done the activity properly can try to do it again.

4.3Pre-lesson Preparation

- Get the teaching aids and appropriate teaching materials suggested above ready.
- Forward planning: read the content on gradient and make the necessary preparations.
- Plan the number of activities to be done in the class by the students.

4.4Presentation of the Lesson

a) Introduction of the lesson

To begin the lesson, ask questions like the following:

- What is gradient?
- How is gradient expressed?
- What is the use of studying the gradient of a given railway or road network?
- How do we minimize the gradient of a given road?
- What sort of relationship do you observe between altitude and the slope of a given terrain?

b) Body of the lesson

- Discuss what gradient means.
- Explain the relationship between slope and altitude.

- Explain basic guidelines for calculating the gradients of roads, rivers, railway lines, etc.
- Explain why some roads have a winding pattern in relation to the geomorphology of a given area.

c) Stabilization

- The surface of the earth is not uniform. In a given area there are a number of ups and downs. The ups and downs are expressed interms of slope and gradient.
- This affects hill climbing capacity of vehicles.
- Different vehicles have different hill climbing capacities.
- Railways are affected by relief much more than are roads because of their hill climbing capacity.
- Railways require much smaller gradients than the roads.
- The maximum gradient for railways is 2 %.
- When a railway and a road have to travel the same ascent, the railway uses a different and much longer route than the road.

Ask your students questions in order to find out whether the students have understood the lesson or not.

After getting feedback from the students you can give brief summary on topics that are not clear.

4.5 Evaluation and Follow up

a) Evaluation

Ask the students the following questions:

- Draw a sketch map having contour lines like the one drawn in the teacher's guide.
- Draw a sketch map having contour lines like the one drawn in the teacher's guide. Take two towns, A and B, located in different areas and connect them with a road network. The altitudes of towns A and B are 700 and 50 metres above mean sea level, respectively.
  The scale of the map is 1:50,000.
- The map distance from A to B is 10cm.
  1. Calculate the gradient of the road:
     a. In ratio
     b. In percent
     c. In degree
  2. List the types of vehicles that are served by this road.

b) Follow up

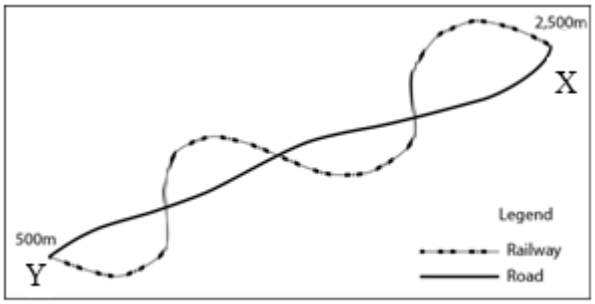
- Invite the students to do the following:
  1. Find a topographic map of your home area and then analyze the gradient of the roads from your home town to other towns by just applying the method and guidelines for calculating gradients.
  2. Take a road map of Ethiopia and find the highest gradient in the country.
  3. Assume that two towns are connected by two road networks. The distance of one of the road networks is 100kms,whereas the other one is 60kms. Compare and contrast the advantages and disadvantages of these roads with the help of a diagram.

c) Additional Questions

1. What is gradient?
2. What are the two factors that determine gradient?

The following questions should be answered on the bases of the following diagram.

3. Two towns, X located at an altitude of 2500m, and Y located at 500m, are to be joined with a road and a railway



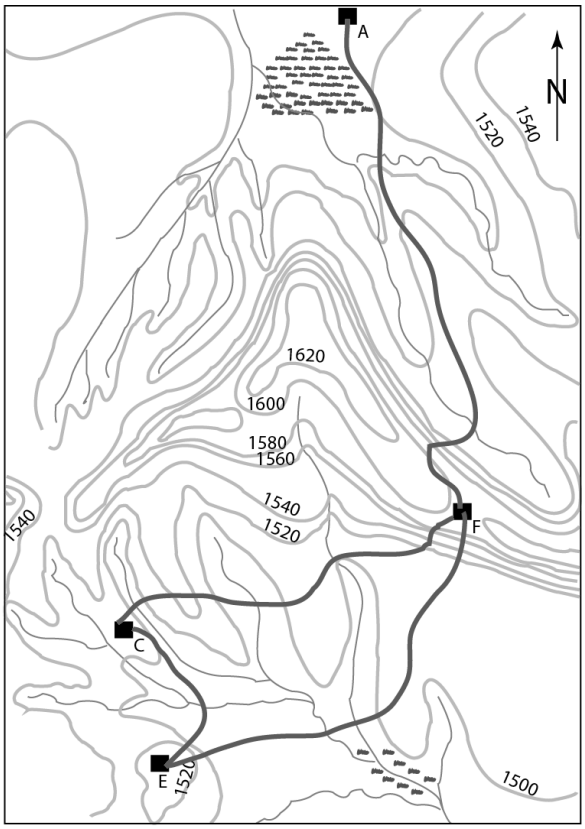
i. What is the length of the road?

ii. What is the length of the railway?

Answer Key for Activity 2.12

1. When you construct a road network from one town to another, you must be careful to keep your road as short as possible since every meter of road costs a lot of money to build. You have to avoid unnecessary bends in the road. Check to be sure that your suggested route satisfies this point.

   Do not forget to follow the watershed of the two drainage basins and the lower possible gradient. In addition to this you should be careful not to cross numerous streams because the construction of bridges is very expensive.



a. The road from A to F is constructed on the map
b. The road from E to C is also constructed on the map
c. The road from C to F is also constructed on the same map

2. The gradient from town A to F =

a. $\text{Gradient} = \dfrac{\text{altitutde difference} \times 100}{\text{ground distance from F to town A}}$

To get the ground distance in kilometer, use the following formula.

$\text{Map distance in km} = \dfrac{\text{groud distance in cm} \times \text{scale}}{100,\ 000}$

Given

Distance on the map in cm = 5.5cm

Scale of the map = 1:40,000

1km = 100,000cm

$\therefore \text{Ground distance} = \dfrac{5.5\text{cm} \times 40,\ 000}{100,\ 000} = 2.2\text{km}$

The road distance from town A – F = 2.2km.

Gradient of the road from town a to town F =

$$\frac{\text{Alt.of town F} - \text{Alt.of town A}}{\text{Ground distance (road distance)}}$$

$\therefore$ Alt. of town F = 1600

Alt of town A = 1500

$$\therefore \frac{1600\text{m} - 1500\text{m}}{1000} = \frac{100}{1000} = \frac{0.1\text{km} \times 100}{2.2} = \mathbf{4.5\%}$$

The gradient of the road from town A to town F = **4.5%**

b. The Gradient from town E to town C

$$\text{Gradient} = \frac{\text{altitude difference}}{\text{Ground distance (Road distance in km)}} \times 100$$

First find the road distance in km with the help of the scale.

Given

Distance on the map = 2cm (by measurement)

Scale = 1:40,000

Road distance from town E to town C = $\frac{2\text{cm} \times 40,000}{100,000} = \mathbf{0.8km}$

Gradient of the road from town E to C =

1530 (E) - 1490 (C) = 40m

Change 40m into km

$\frac{40}{1000} = 0.04\text{km}$

$\therefore$ Gradient of the road = $\frac{0.04\text{km}}{0.8\text{km}} \times 100 = \mathbf{5\%}$

c. The gradient from town C to F =

$$\text{Gradient} = \frac{\text{altitude difference}}{\text{Ground distance of the road}} \times 100$$

Given

Distance on the map = 4.5cm

Scale = 1.40,000

Road distance = $\frac{4.5\text{cm} \times 40,000}{100,000} = 1.8\text{km}$

Alt difference between town C and F = $\frac{1600\text{m} - 1490\text{m}}{1000}$ = **0.11km**

Gradient = $\frac{0.11\text{km} \times 100}{1.8\text{km}}$ = **6.1%**

The road constructed from C to F comprises the highest gradient. Therefore, The one with the highest gradient requires much more construction cost.

Answer key for Additional question

1. Gradient is the rate of change in altitude of a slope.
2. The vertical distance of two points and the horizontal distance (run) between them.
3. Using the formula for calculating gradients we get
   Altitude difference between the two towns = 2500m – 500m
   a. $25 = \frac{2\times100}{x}$ or $x = \frac{2\times100}{25} = 8\text{km}$ (the length of the road)
   b. $2 = \frac{2\times100}{x}$ or $x = \frac{2\times100}{2} = 100\text{km}$ (the length of the railway.
   This shows that railways are rare and costly (expensive) to construct in rugged terrains. As a result of this the two towns follow different routs and you can imagine how the railway line is much longer in this small scale map.

2.4 GEOGRAPHIC INFORMATION SYSTEM (GIS)

Period Allotted: 4

1. Competencies

At the end of this lesson, students will be able to:

- *discuss what Geographical Information System (GIS) means;*
- *explain turning points in the development of GIS;*
- *state the uses of GIS;*
- *show appreciation for the uses of GIS.*

2. Contents

2.4.1 What is Geographical Information System?

2.4.2 Turning points in the development of GIS (brief history)

2.4.3 Uses of Geographical Information System

3. Overview

Geographic Information System is a new science which is increasingly used to produce unique products and analyses of interest to map users.

Geographical Information System (GIS) is defined as a system of hardware, software and procedures designed to support the capture, management, manipulation, analysis, modeling and display of spatially referenced data for solving complex spatial problems.

- In order to geta better understanding about how the system works, it is important for you to understand data, information and systems.
- Data is a collection of facts representing places, things, people, events and concepts in the form of numbers, text, figures, symbols and signals.
- Information is data transformed through processing such as structuring, formatting conversion and modeling.
- The word system can be used in different contexts. It can be used to describe physical entities. Physical entities include: solar system, ecosystem, drainage system, immune system, etc. Conceptual entities include: political system, democratic system, computer system, economic system, etc.
- The most common components of GIS: are data, technology, the application and people.
- Geographic data are characterized by two crucial properties. They are referenced to geographic space, which means the data are registered to an accepted geographical coordinate of the earth's surface.
- All digital geographic data are represented by three basic forms such as vector, raster and surface. Geographic data are the main inputs of GIS for the analysis of spatial phenomena.
- Geographic data can be categorized into three parts:
    - Geodetic control network
    - Graphical overlays
    - Topographic base
- GIS has technology components explained as hardware and software.
- The application components of GIS can be explained from three perspectives.
    - Area of applications
    - Approaches of implementation
    - Nature of application
- According to their information needs and the way they interact with the system, GIS users can be classified as viewers, general users and specialists.
- in order to organize a GIS system, each component of GIS must be well- structured so that the system can be easily built.

- There are different types of data which can be utilized by a GIS system. Each data type has its own unique properties and potential for contributing to the overall quality and functionality of the GIS database.
- There are different data-entering methods for the computer system.
- The global positioning system (GPS) is a satellite-based navigation system. It captures positional data (latitude, longitude and altitude).
- The system is made up of a network of 24 satellites placed into orbit by the US Department of Defense.
- GIS is used for different purposes. It is used for:
  - Urban planning, traffic control, emergency management, education, scientific research, social programs, public health, business planning, resource management, wildlife management, military base management, agriculture, etc.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- remote sensor/camera
- aerial photograph
- map of the world or of any continent or country
- computer with data plane
- GPS (Global Positioning System) to show the position of an object in reference to latitudes, longitudes and altitude.

4.2 Suggested Teaching Methods

- Brainstorming- Ask the students questions that are relevant to the topic before you introduce the lesson topic. Their answers will help you to understand their background knowledge about GIS and GPS.
- Demonstration – demonstrate the application of GIS and GPS by using hardware and software.
- Group discussion – let students discuss in their groups and present their findings.

4.3 Lesson Preparation

- Get ready the aforementioned teaching aids and materials.
- Take aerial photographs of anyplace in your locality in order to collect information. Then put it into the system of GIS.

- Read relevant materials including the text book.
- Let students define key terms that appear frequently in the lesson topic.

4.4 Presentation of the Lesson

a) Introduction of the lesson

Introduce the lesson by raising questions such as:

What is GIS? For what purpose do we learn about GIS? Then define what GIS means.

- Try to explain the objective of the lesson topic.
- Demonstrate to the class how GIS processes data.
- Demonstrate how a Global Positioning System shows the exact position of an individual, place or any object on the earth's surface.
- Let students discuss the application of GIS and present their ideas before the class. Have students ask questions when each group present its findings.
- Do not forget to give special attention to slow-learner students. Ask them questions and try to assess whether they have understood or not.

b) Body of the lesson

- Based on the descriptive and illustrative information given in the student text book,
- Discuss antecedents of GIS.
- Explain the applications of GIS.
- Describe GIS components.

c) Stabilization

Give a brief summary of:

- The concept of Geographical Information System
- The historical development of GIS
- The uses of Geographical Information System
- The application of GIS
- Classification of geographical data

4.5 Evaluation and Follow up

a) Evaluation

To check how far your students have grasped the lesson you taught them, ask them some questions from the lesson. Note that your questions should be based on the stated specific objectives of the lesson. You can ask the students questions like the following:

- Explain the historical development of GIS.
- Discuss the applications of GIS.
- Your group discuss the uses of GIS.
- Explain turning points in the development of GIS.

b) Follow up

- To help the students develop a better understanding of the lesson topic, give them additional activities and record their achievements.
- Let the students discuss in their groups the following issue about GIS.As they discuss, follow critically the students' opinions so that you can understand the extent to which your students have understood the concept of GIS.

"Many types of information systems are used today. They deal with concerns such as payroll, financial information, and library holdings. A GIS, however has another primary characteristics that distinguishes it from the bulk of such information systems. Explain.

c) Additional Questions

1. Explain the uses of GPS (Geographical Positioning System).
2. What are the three categories of GIS on the basis of their use?
3. What does the GIS hardware consists of?
4. Describe the different ways of entering data into the computer system.

4.6 Answer for Activities

Activity 2.13

1. The most important application of GIS in urban planning is the development of master plans. In addition to this, information about vegetation classes, water quality zones, slope categories, unique landforms and soon can be put into a planning database.
2. GIS data can also be used in neighborhood planning applications. For example in one city it was used to evaluate neighborhoods requesting funding to help increase owner occupancy of housing.
3. GIS is used to monitor and control traffic flows on streets. Information is fed into a typical system from video monitors, vehicle detectors and other sources. When traffic congestion develops, this information is used as background data for decisions about changes in message signs, lane signals and other traffic controls.

4. GIS used before, during and after disasters of natural or human origin earth quakes, floods and wildfire, etc. Inorder to prepare to cornbat these disasters, background information about utilities, highways, terrain, population area have already been stored in a GIS system. This information can be rapidly accessed to provide a framework for emergency management.
5. Airport noise can be controlled by data regarding airport configuration, combined with aircraft noise-generation monitoring. Such programs seek to reduce noise impacts near the airport by following up on noise incidents and by planning future land uses and airports.
6. GIS relates unemployment rate with population growth rate for the following reasons.
    - Population growth rate is affected by the three dynamics of population, namely fertility (birth) mortality (death) and migration.
    - Among these factors of population change, fertility and mortality play significant roles in most countries of the world. If fertility is high but mortality is relatively low, the population growth rate will be undoubtedly high. If population growth rate outruns economic development, there will be lack of schools, lack of health facilities, low standards of living, shortages of housing and lack of employment opportunities.

Answer key for Additional question

1. GPS (the Global positioning system) is a satellite based navigation system. It captures positional data (latitude, longitude and altitude).
2. a. Geodetic control network
   b. Topographic base
   c. Graphical overlays
3. The hardware GIS consists of a configuration of core and peripheral equipment that is made for the acquisition, storage, analysis and display of geographic information.
4. a. keyboard entry for non-spatial attributes and, occasionally for location data
   b. Manual locating devices (for example, digitizers and computer mouse)
   c. Automated devices (e.g., scanning)
   d. Conversion directly from other digital sources such as Global positioning system, (GPS)

Answer Key for Review Questions

Part I

1. False 2. False 3. False 4. True 5. True

Part II

6. B 7. D 8. C 9. E 10. A

Part III

11. C 12. Plain 13. B 14. C 15. D 16. A

Part IV

17. Re-intrant 18. Terraced (stepped slope) 19. Concave slope 20. Gradient

21. Gradient

Part V

22.

Urban settlement	Rural settlement
- Has groups of buildings on vast built-up areas. - Has planned streets and defined shapes of settlement	- Has houses made out of simple materials (wood and mud) - Has no planned streets - Has irregular un planned roads - Has no defined shape - Covers a small area

23. Watershed is a higher ground which serves as a source region for streams and rivers that flow in different directions within distant basins.

24. GIS is a physical entity designed to achieve the specific objective of collecting, storing, analyzing and presenting information in systematic ways.

25. The three components of GIS are:
    a. Area of application
    b. Natural of application
    c. Approaches of implementation

26. In its upper (young) stage.

Check List

Check the student's performance according to the given competencies referring the questions under the check list for every unit. Put a tick (✓) mark against each task weather they are able to perform in the competencies of each unit. The students are expected to respond saying Yes or No. then, you can make your own evaluation whether the competencies are met or not.

Can you:

	Yes	No
1. Draw contour lines from spot-heights using interpolation?----------		
2. Construct relief cross section to visualize features of the landscape? ------		
3. Determine the intervisibility of land features by section – drawing or contour maps? --- ----------		
4. Differentiate different landforms on contour maps? ----------		
5. Identify types of contour line? ----------		
6. Determine catchment areas from watershed on contour map? ----------		
7. Distinguish different drainage patterns? ----------		
8. Demonstrate river capture? ----------		
9. Demonstrate stages of river valley development using contour lines? ----		
10. Distinguish various patterns of settlement on maps? ----------		
11. Interpret the types of settlement? ----------		
12. Explain the types of settlements? ----------		
13. Estimate factors influencing the sitting of settlements? ----------		
14. Reflect the function of settlement? ----------		
15. Demonstrate transport network? ----------		
16. Examine factors affecting development of transport network? ----------		
17. Design different pattern of land transport route on given contour map? -		
18. Compute the shortest length route for different vehicles and railways using their climbing capacity of each on contour map? ----------		
19. Discuss what geographical information system (GIS) means? ----------		
20. Explain turning points in the development of GIS? ----------		
21. State the uses of GIS? ----------		
22. Show appreciation for the use of GIS? ----------		

Unit Assessment

Student above the minimum requirement level

Students' performance has to be assessed continuously over the whole unit. The assessment will be made by comparing students' performance with the specified level of competencies. Besides, the teacher has to recognize the level of performance of each student and provide assistance accordingly, Thus:

- A student at the minimum requirement level will be able to draw contour lines from spot heights using interpolation, construct relief cross sections to visualize features of the landscape, determine the intervisibility of land features by contour maps, identify types of contour lines, determine catchments areas from watersheds on countour map, distinguish different drainage patterns, demonstrate river capture, demonstrate stages of river valley development using contour lines, distinguish various patterns of settlement on maps, interpret the shape of settlements, explain the types of settlement, estimate factors influencing the siting of settlements, reflect the function of settlement, demonstrate transport networks, examine factors affecting development of transport networks, design different patterns of land transport routes on a given contour map, identify various airfields on maps, compute the shortest route length for different vehicles and the railways, the using the climbing capacity of each on a contour map, discuss what GIS means and turning points in the development of GIS, and state the uses of GIS.

- In addition, a student working above the minimum requirement level and considered as higher achiever should be able to: differentiate different sources that show the heights of varied places, identify the origin of the place where elevation is measured as a datum, compute the altitude differences of varied landforms from a given map, justify why a cartographer uses different types of contour lines, differentiate factors that shape and govern drainage patterns, discuss the activity of a river at every course and its resultant land features, justify why settlement patterns varied in different environments. Use one of the GIS software to search for geographic information.

Students below the minimum requirement level

- Students working below the minimum requirement level will require extra help if they are to catch up with the rest of the class.
- Students who not only reach the minimum requirement level but also achieve a little bit more should be supported so that attain the higher achiever competencies students who fulfill the higher achiever competencies also need special support to contribute and achieve more.

Unit 3

AN OVERVIEW OF PHYSICAL GEOGRAPHY OF AFRICA

Total Periods Allotted: 56

1. Unit Introduction

This unit deals with the physical geography of Africa. It is designed in a way that enables learners develop basic understanding of the overall physical environment of the continent. The unit covers diverse topics. These include the position, size, shape and regional divisions of Africa, the geological history and relief structure of Africa, the climate of the continent, the drainage systems of Africa, the natural vegetation and wild animals of Africa and the soil of the continent.

2. Unit Outcomes

At the end of this unit, your students will be able to:

- *Understand the locational and geological aspects of Africa;*
- *Recognize the climate of Africa – that is climatic elements, controls, regions and drought in Africa;*
- *Know and appreciate the characteristics of drainage patterns, lakes, swamps and their importance;*
- *Appreciate the natural vegetation and wild animals of Africa; and*
- *Differentiate soils of Africa.*

3. Main Contents

3.1 Position, Size and Shape and Regional Division of Africa

3.2 Geological and Relief Structure of Africa

3.3 Climate of Africa

3.4 Drainage of Africa

3.5 Natural Vegetation and Wild Animals of Africa

3.6 Soils of Africa

3.1 POSITION, SIZE, SHAPE AND REGIONAL DIVISIONS OF AFRICA

Periods Allotted: 4

1. Competencies

At the end of this lesson, the students will be able to:

- *Demonstrate the relative and absolute location of Africa from a map;*
- *Compare the size of Africa with other countries;*
- *Discuss the impacts of the coastal and continental shape of Africa on its development;*
- *Describe the regional division of Africa;*
- *Show the geographical location of each region;*
- *relate the sub-regions in terms of size, access to the sea and major relief features; and*
- *Analyze the socio-economic and geo-political similarities of each region.*

2. Contents

3. Overview

Africa is a continent that occupies a central position in the world. The continent is astronomically located between $37^{o}21'$ N and $34^{o}52'$ S latitude and $17^{o}33'$ W and $51^{o}28'$ E longitude. This makes Africa a tropical continent having almost $2/3^{rd}$ of its area within the tropical latitudes. Africa is also the only continent that is crossed by all of these: the equator, tropic of Cancer and tropic of Capricorn. In terms of its relative location, Africa is a continent that is surrounded by these major bodies of water: the Mediterranean Sea at the north, the Red Sea at the northeast, the Indian Ocean at the east and the Atlantic Ocean to the west. With respect to the major landmasses, Africa is found to the south of Europe, to the southeast of Asia, to the east of the Americas, to the northwest of Australia and to the north of Antarctica. The continent is close to Europe and Asia along the strait of Gibraltar

and the Isthmus of Suez, respectively. It is also close to the Middle East along the strait of Bab-el-Mandab. Africa's relative location gives the continent a higher level of geographical accessibility to almost all of the continents of the world.

Africa is the world's second largest continent. Its total area is about 30.4 million sq. km. This continental area accounts for about 20.2% of the world's total land area. When compared with other continents, Africa's total area is about 2/3rd of that of Asia and 3 times larger than Europe. This condition provides the continent with high resource potentials – for example, in soil, climate, minerals and land for both settlement and agriculture.

The shape of Africa can generally be described as relatively compact. Among the factors that make the continent's shape compact are the facts that its east-west and north-south distances are almost equal, and its coastline is relatively smooth. This situation gives many African countries the benefit of being geographically close to the coast.

The African continent is divided into five major geographical regions, namely, Northern Africa, Southern Africa, Eastern Africa, Western Africa and Central Africa. Each region has its own distinguishing socio-cultural and economic features that make it different from the others.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- World political map
- Political map of Africa

4.2 Suggested Teaching Methods

- Oral presentation/lecture
- Discussion
- Demonstration
- Jigsaw group projects
- Student presentation

4.3 Pre-lesson Preparation

Get ready the political maps of the world and Africa. If none are available in the school, try to prepare your own maps on cardboard. The school's pedagogical-center officer could help you produce such sketch maps. Thorough preparation of the lesson is important. To this end, referring to other reference materials to substantially raise your knowledge about the area is advisable.

4.4 Presentation of the Lesson

a) Introduction of the lesson

Before presenting the lesson to the students, you should assess the students' background so as to identify their areas of weaknesses and strengths and thereby arrange your instruction. This would help you to identify the existing gaps in the students' learning. You can start your lesson by raising such questions as:

- What is location? How is the location of a place described?
- Where is Africa located in the world?
- Can you describe the advantages and limitations of the location of Africa?
- How large is the continent of Africa?
- What impacts does the large area of the continent have on Africa?
- How do you describe the shape of Africa? What are its advantages and limitations?
- What is a region? What are the major regional divisions of Africa?

b) Body of the lesson

- Listen to the students' responses to the above questions and try to identify where your students are in need of your instruction.
- Then, make your own presentation to the class, based on the students' responses to the above questions.
- By displaying the political maps of the world and Africa, have the students identify where the continent is located in the world in terms of the absolute and relative locations of Africa.
- By using the same maps, help students to identify the size and shape of Africa and compare it with the other continents of the world.
- By using the political map of Africa, have the students identify the major regional divisions of Africa. Along with that, motivate them to identify the member countries with their capital cities and the features that make each region different from the others.

c) Stabilization

- Africa, by its very location, is a tropical continent;
- The continent is characterized by almost balanced east-west and north-south extents, and also by tropical climate, because the equator crosses it at almost at its north-south half-way point,
- Africa is the second largest continent next to Asia;
- The presence of large area for settlement, high resource potential, varied climatic conditions, diverse flora and fauna are among the advantages of Africa's large area size;
- Africa's shape can generally be described as relatively compact;
- The mainland of Africa is divided into five major regions, each having its own unique features.

4.5 Evaluation and Follow up

a) Evaluation

To check the level of understanding of your students of the lesson and be sure that the expected levels of competence are achieved, ask the students some questions from your lesson. Note that your questions should be based on the stated specific objectives of the lesson. You can ask the students questions like the following.

- Where is Africa located astronomically?
- Which continents and major bodies of water are found adjacent to Africa?
- What are the advantages and limitations of Africa's location?
- How large is Africa's area?
- In what ways is Africa's large area significant?
- What makes Africa possess a relatively compact shape?
- What are the major regional divisions of Africa?

b) Follow up

To help your students get more knowledge on the topic, you can have them work on topics that are directly related to your lesson. For example, you can give them assignments on following topics.

- The impacts of Africa's tropical location
- Countries of Northern/Southern/Western/Eastern/Central Africa.
- Characteristic features of Northern/Southern/Western/Eastern/Central Africa.
- The shape of Africa

c) Additional Questions

1. How does Africa's absolute location affect the continent's climate?
2. Write some of the advantages of Africa's relative location.
3. What are the factors that make Africa's shape relatively compact?

4.6 Answer for Activities

Activity 3.1

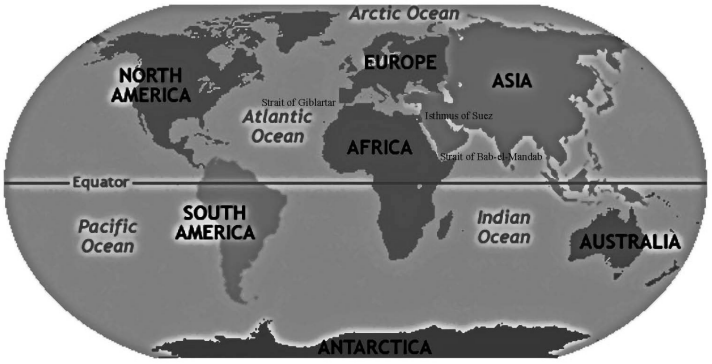
1. It is crossed by the equator, Greenwich meridian, Tropic of Cancer and Tropic of Capricorn.
    - Nearly ¾ th of its total area is found between the two tropics.
    - The equator divides Africa almost into two equal halves.
2. Much of Africa experiences a tropical type of climate
    - The distribution of plants and animals is influenced by the continents' climate, which is the result of its location.
    - Agricultural activities are annunciated with areas of favorable climate.
    - Extremely hot and dry areas are sparsely populated.

Activity 3.2

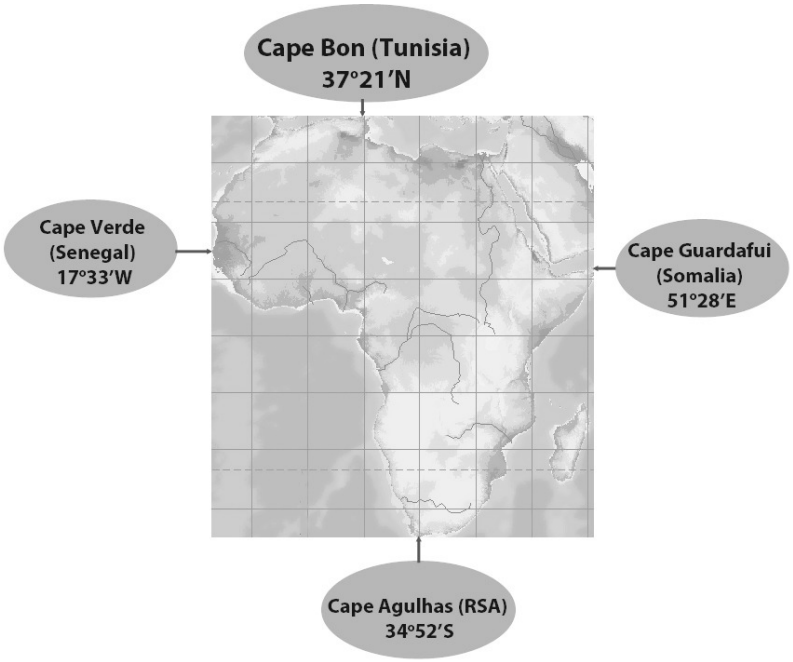
1. Africa is found to the:
    - South of Europe;
    - South of the Mediterranean Sea;
    - Southwest of Asia;
    - West of the Indian Ocean; and
    - East of the Atlantic Ocean.
2. a. Across the strait of Gibraltar
   b. Isthmus of Suez /Suez Canal

Activity 3.3

1.



2. The four extreme points of Africa are shown in the figure below.



Content Check

1. Absolute location
2. Red Sea and Gulf of Aden
3. Relatively compact
4. Eastern Africa
5. Cape Bon and Cape Agulhas

Answer key for additional questions

1. Africa's absolute location influences the continent's climate because it influences the angle of the sun that places receive in different seasons.
2. Among others, the advantages of Africa's relative location include:
    a. The continent's geographical proximity to Europe and Asia;
    b. The comparative geo-political significance of the continent in relation to the Middle East.
3. The presence of smooth coast lines, absence of large bays, in lets, indentations, gulfs and the like are among the factors that make Africa's shape relatively compact.

3.2 GEOLOGICAL HISTORY AND RELIEF STRUCTURE OF AFRICA

Periods Allotted: 8

1. Competencies

At the end of this lesson, the students will be able to:

- *Explain the geological history of Africa;*
- *Identify major relief structures of Africa on a map;*
- *Show appreciation of the unique relief features of Africa; and*
- *Compare the relief of Africa with that of Europe.*

2. Contents

3. Overview

Africa is a continent that once formed part of an old continent that we call Pangaea. The part that contained what is now Africa was the southern part of Pangaea, Gondwanaland. Since, its formation as a continent, Africa has seen several geologic events that have been working on the surface formation of the continent. The continent's geological history is divided into four eras. These are the Precambrian, Palaeozoic, Mesozoic and Cenozoic. Each era is further divided into periods and the periods into epochs. The Precambrian era in Africa was characterized by a series of volcanic activities that roughened the continent's surface. Huge mountains that made Africa's topography rough were formed during this era. During the Palaeozoic era, a series of denudational activity was followed by subsequent peneplanation of the African landmass. In the Mesozoic, the continent was affected by the alternate sinking and rising of the land in the Horn of Africa. That was followed by alternate transgression and regression of water from the nearby sea. This resulted in the accumulation of sediments in many areas of Africa, thereby leaving extensive sedimentary layers behind. The Cenozoic era has been significant in affecting the continent's physical conditions. The internal earth movements, volcanic activities, climatic changes and other geologic events helped the formation of the present topography of Africa. It was during this era that the extensive plateau lands, high volcanic mountains, drainage patterns, the Great East African Rift Valley and many other physical features that characterize Africa were formed.

The relief of Africa is dominated by plateau lands. Much of the continent is made up of highland flat areas. Plateaus account for about 71% of the relief of Africa. This gives the continent the most plateaux of all continents in the world. High volcanic mountains dominate Eastern Africa. In contrast, fold mountains are found at the northern and southern tips of the continent. Eastern Africa is also characterized by the Great East African Rift Valley and many active and dormant volcanoes. Plains are found along the coastal areas of the continent. They are narrow and small in terms of their area coverage, accounting for only about 25% of the continent's relief.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Chart showing the timeline of Africa's geological history
- Physical map of Africa/world
- A sketch of the Great East African Rift Valley
- A cross-section of Africa's relief

4.2 Suggested Teaching Methods

- Lecture
- Small-group discussion
- Demonstration
- Projects
- Field visit
- Students' independent work

4.3 Pre-lesson Preparation

Make the maps, charts and diagram that are proposed for this lesson ready ahead of time. If they are not readily available in the pedagogical centre, do not forget to prepare some of them from locally available materials. Having these ready, make your preparation for the lesson by consulting other locally available reference materials. Prepare yourself especially on areas which you think might be confusing or challenging to the students.

4.4 Presentation of the Lesson

a) Introduction to the lesson

Before you directly proceed to your classroom instruction, check the extent to which your students are familiar with the topic. Relate the lesson with what they have

learned previously in other grade levels and ask them to associate their past experience with the present lesson. To do this, conduct a brainstorming session with the students, asking questions like the following.

- What is geology? What does geological history mean?
- How and when was the present relief structure of Africa formed?
- What were the major geologic events of the Precambrian/Palaeozoic/Mesozoic/Cenozoic eras in Africa?
- How diverse is Africa's relief? Which of these relief features dominate Africa?
- Where do we have the world's largest rift valley? How and when was it formed?

b) Body of the lesson

- After listening to your students' brainstorming responses to the above and some other questions, you can present your lesson based on the information that that you have acquired about their background knowledge.
- By displaying the timeline, the physical maps of Africa and the world, the sketch and the cross-section, have the students identify the major geologic events and the dominant relief features of Africa.
- By using the same teaching aids, help the students to identify the locations of high plateaus, low plateaus, fold and volcanic mountains and the Great East African Rift Valley.
- Repeat the same approach to have the students identify the major landforms of Africa on a regional basis.

c) Stabilization

- Africa is a continent that once formed part of the old continent known as Pangaea, Gondwanaland;
- Africa has seen several geologic events that have been working on the surface formation of the continent;
- Its geologic history is divided into four eras. Each era is characterized by its own geologic events and processes;
- Africa is characterized by a series of volcanic activities that roughened the continent's surface;
- Most of the relief structures of Africa were formed during the Tertiary Period of the Cenozoic Era;

- Much of Africa is plateau. However, mountains and plains are also common relief features in the continent;
- The Great East African Rift Valley forms a spectacular relief feature in Eastern Africa.

4.5 Evaluation and Follow up

a) Evaluation

To assess your students and acquire information about the effectiveness of your instruction and the students' level of understanding, you can ask them some questions that are drawn from your lesson. Your questions may include the following.

- When was the present relief of Africa formed?
- What were the major geologic events of the Mesozoic era in Africa?
- Where do we have most of the fold mountains in Africa?
- Which region of Africa is the most elevated? Why?
- In what ways is Africa's relief significant?

b) Follow up

To further widen the students understanding of Africa's geological history and relief structure have them work on topics like the following, either individually or in small groups.

- The major geologic events of the Cenozoic Era in Africa.
- The Fold Mountains of Africa.
- The Great East African Rift Valley.
- The coastal plains of Africa.
- The significance of Africa's relief.

c) Additional Questions

1. Describe the Ethiopian Rift Valley.
2. Identify the dominant relief features of Eastern Africa.
3. Give a brief Description of Africa's relief.

4.6 Answer for Activities

Activity 3.4

1. a. Mountain-building processes
   b. Formation of the basement complex rock
2. Series of denudation and peen plantation
   - Heavy erosion
   - Coal formation.
3. Alternate sinking and rising of the land in the Horn of Africa.
   - Formation of sedimentary rocks.
   - Volcanic lava flow
   - Flooding of the Sahara desert
   - Formation of the Mediterranean Sea
   - Formation of many of the volcanic mountains of Africa
   - Occurrence of fluvial rains

Activity 3.5

- Presence of steep edges
- Geologic instability
- Presence of active volcanoes
- Presence of many structural lakes

Content Check

1. Copy from the glossary
2. Copy from the text in the student book
3. To the south and southeast of Africa
4. Northern Africa across Morocco, Tunisia and Algeria and South Africa (RSA)
5. The Great East African Rift Valley was formed during the Tertiary Period of the Cenozoic era. It stretches from port Biera of Mozambique to the Dead Sea, Syria. In Africa, it forms four branches. These are the Ethio-Eirtrea-Dijibouti branch, the Eastern Branch, the Western Branch and the Malawi Branch.

Answer key for additional questions

1. The Ethiopian Rift Valley is part of the Great East African Rift Valley. It runs in a general SW-NE alignment and is funnel shaped. The Valley is divided into four parts. These are the Afar Triangle, the Awash Valley, the Lakes region and the Chew Bahir region. Each of these regions of the rift valley has got its own distinct physical features.

2. The relief of Eastern Africa is dominated by very high volcanic mountains, vast volcanic plateaus and the Great East African Rift Valley.
3. Africa's relief is really diverse; however, mountains, plateaus, plains and the Rift Valley are the most dominant ones. Eastern Africa, the Maghreb region of Northern Africa and Southern Africa are dominated by high mountains. Low plateaus dominate western Africa while high plateaus are dominant in parts of southern Africa. Eastern Africa is also known for its Great Rift Valley system.

3.3 CLIMATE OF AFRICA

Period Allotted: 14

1. Competencies

At the end of this lesson, the students will be able to:

- *review the elements of weather and climate;*
- *identify the major climatic controls of Africa;*
- *describe the seasonal temperature conditions of Africa;*
- *discuss the seasonal distribution of rainfall in Africa;*
- *locate the climatic regions of Africa;*
- *compare and contrast the different climatic regions of Africa;*
- *relate climatic data with the different climatic regions of Africa;*
- *discuss the causes and consequences of drought in Africa; and*
- *locate drought prone-areas of Africa.*

2. Contents

3.3.1 Climatic controls

Period Allotted 2

1. Competencies

At the end of this lesson the students will be able to:

- *Review elements of weather and climate;*
- *Identify major climatic controls of Africa.*

2. Contents

- Latitude
- Altitude
- Distance from the sea
- Ocean currents
- Major planetary winds and atmospheric pressure

3. Overview

Climate refers to the average weather condition of a certain place. In other words, it refers to the long-lasting and recurring conditions of the atmosphere. The climate of a place relates to its temperature and rainfall conditions, atmospheric pressure, wind, cloud cover, humidity and other elements, the condition of which is regulated by latitude, altitude, distance from the sea, ocean currents, mountain barriers, and the like. Africa has varied climatic conditions. Temperature and rainfall vary considerably both spatially and seasonally. The variation in the temperature and rainfall conditions that different places in Africa experience varies due to factors that include latitudinal location, altitude, distance from the sea, ocean currents and wind and pressure systems.

Summer is a season of high temperature in many parts of Africa. This is due to the presence of high sun angles that make the amount of incoming solar radiation that places receive high.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Chart, graphs showing temperature and rainfall conditions of the different climatic regions of Africa.
- Climate map of Africa/world.
- Photographs, pictures, diagrams and films

4.2 Suggested Teaching Methods

- Lecture
- Small group discussion
- Case study
- Demonstration
- Individual/group projects
- Field visit to a nearby meteorological station

4.3 Pre-lesson Preparation

- Obtain all or most of the proposed teaching aids for the lesson, as they are vital to achieving the stated learning objectives
- If all or some of them are not readily available in the school, please try to prepare your own aids from the materials that you have around. Then plan how to utilize the teaching aids so as to achieve the expected outcomes.
- Read related materials to have full information about the lesson topic you teach.

4.4 Presentation of the Lesson

a) Introduction of the lesson

Before giving detailed explanations to the students on the lesson, it is better to start the lesson by asking the students some questions about the topic. This would help you identify where your students are with respect to the lesson and its expected outcomes. Questions like the following can help you conduct a brainstorming session with the students.

- What is climate? What are its elements?
- What are the factors that regulate the climatic condition of a place? Which of these factors influence the climate of Africa?
- How are temperature and rainfall spatially distributed in Africa? Which areas are the hottest? What about the coldest?

b) Body of the lesson

- Consider the results of the brainstorming session and your students' background knowledge of the lesson topics. Based on that, make your presentation to the whole class through the method of your preference.
- Display the teaching aids which you have acquired/prepared and have the students identify the areas of high/low temperature and rainfall in Africa. Along with that, help students to describe the seasonal and spatial distribution of temperature and rainfall in Africa.
- By using the same teaching aids, have the students identify the major climatic regions of the continent with their distinguishing features.
- Repeat the same activity to help students develop a better understanding of the climate of Africa.

c) Stabilization

- Africa has diverse climatic conditions that result from a number of factors that influence the continent's climate;
- Altitude, latitude, distance from the sea, ocean currents, wind and atmospheric pressure are among the major factors that control the climate of Africa;
- temperature and rainfall conditions show significant spatial and seasonal variation;
- generally, low altitude areas are characterized by high temperature, and high altitude areas experience the reverse;
- seasons of high angle of the sun are generally characterized by high temperature conditions;

4.5 Evaluation and Follow up

a) Evaluation

Before formally concluding your lesson, conduct a brainstorming session with your students to assess the students' level of understanding, to check the effectiveness of the teaching-learning experience, and to see if the expected levels of competence and behavioural changes have been achieved. You can ask them some questions and direct some activities that relate to your lesson, such as the following.

- What are the factors that control climatic conditions in Africa?

b) Follow up

To further widen the students' understanding of Africa's geological history and relief structure, have them work on topics like the following, either individually or in small groups.

- The factors that control the climate of Africa.
- Temperature distribution over the East African Highlands.
- Major rainfall types.
- The global pressure and wind systems.

c) Additional Questions

1. How does latitude affect the climate of Africa?

2. What are the dominant wind and pressure systems that affect the climate of Africa?

4.6 Answer for Activities

Activity 3.6

1. Climate is the average weather condition of a place. It can also be defined as a long lasting and recurrent condition of the atmosphere.
2. Temperature, precipitation, wind, atmospheric pressure, duration and extent of sun shine.
3. Due to the impacts that the controls of climate impose on the elements.
4. The climate of Africa is characterized by great diversity. The continent has different types of climate over its vast area. Each climatic region has got its own distinct climatic characteristics that include differences in mean monthly temperature and rainfall, annual range of temperature, and types of natural vegetation and wild animals.

Activity 3.7

1.

   a. The ocean current that blow over the coastal areas of Africa influence the continents climate by producing warming and cooling effect as well as wetting and drying effect based on their character.
   b. The global winds that blow over Africa are the trade winds and the waterlines. These winds have wetting and drying effect based on their character.
   c. The ITCZ is a low pressure area where the south east and northeast trade winds converse. It influences Africa's climate by regulating the global winds that blow over the continent.
   d. As altitude increases temperature decreases and rainfall increases. As a result, while higher grounds experience cooler and wetter climate, the low altitude areas experience the reverse.

2.

   a. By regulating temperature and rainfall conditions.
   b. Cannaries, Benguela and Mozambique
   c. The south east trade, north east trade and westerlies.
   d. The distance places have from the sea affects their climate. While places near the sea experience maritime climate, those that are far from the sea experience continental climate.

Answer key for additional questions

1. Latitude affects Africa's climate because it determines the amount of incoming solar radiation that places receive in different seasons.
2. The Southeast and Northeast Trade Winds, the Westerlies and the Guinea Monsoon winds are the dominant wind systems that Affect Africa. Among the pressure systems, the Equatorial low, sub tropical high and sub polar low pressure belts are those that influence Africa's climate.

3.3.2 Temperature conditions

Period Allotted 4

1. Competencies

At the end of this lesson the students will be able to:

- *Describe the seasonal temperature conditions of Africa.*

2. Contents

- Temperature conditions of Africa

3. Overview

The temperature condition of Africa shows great seasonal variation that result from the movement of the overhead sun. Many areas of the continent experience high temperature in their summer season where as winter appears being colder except in the case of the Mediterranean climatic regions where the case is reversed. Spatially, the distribution of temperature is regulated by altitude. As a result, areas of low altitude are very hot, while areas with higher elevation generally experience relatively lower temperature conditions. For example, the high altitude areas in East Africa, the Atlas Mountains Range and the Cape Ranges experience lower temperature conditions due to their great heights.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Chart, graphs showing temperature conditions of the different climatic regions of Africa.
- Temperature map of Africa/world.
- Photographs, pictures, diagrams and films

4.2 Suggested Teaching Methods

- Lecture with demonstration
- discussion
- case study

4.3 Pre-lesson Preparation

Try to acquire the proposed teaching aids for the lesson, as they are important to achieving the stated learning objectives. If all or some of them are not readily available in the school, please try to prepare your own charts and graphs for selected countries of Africa from the materials that you have around. Then, plan how to utilize the materials so as to achieve the expected outcomes. Make necessary preparations for the lesson and get yourself ready to the instruction by consulting various related literatures to the topic. Prepare particularly carefully for issues that you think are challenging to the learners.

4.4 Presentation of the lesson

a) Introduction of the lesson

Before giving detailed explanation to the students on the lesson, it is better to start the lesson by asking the students some questions about the topic. This would help you identify where your students are with respect to the lesson and its expected outcomes. Questions like the following can help you conduct a brainstorming session with the students.

- What is temperature?
- What is the relationship between temperature and rainfall?
- What are the factors that regulate the temperature condition of a place?
- Which of these factors influence the temperature of Africa?
- How is temperature spatially distributed in Africa?
- Which areas are the hottest? What about the coldest?

b) Body of the lesson

- Consider the results of the brainstorming session and your students' background knowledge of the lesson topics. Based on that, make your presentation to the whole class through the method of your preference.
- Display the teaching aids which you have acquired/prepared and have the students identify the areas of high/low temperature and rainfall in Africa. Along with that, help students to describe the seasonal and spatial distribution of temperature and rainfall in Africa.

c) Stabilization

- temperature and rainfall conditions show significant spatial and seasonal variation;
- generally, low altitude areas are characterized by high temperature and high altitude areas experience the reverse;
- seasons of high angle of the sun are generally characterized by high temperature conditions;

4.5 Evaluation and Follow up

a) Evaluation

Before formally concluding your lesson, conduct a brainstorming session with your students to assess the students' level of understanding, to check the effectiveness of the teaching-learning experience, and to see if the expected levels of competence and behavioural changes have been achieved. You can ask them some questions and direct some activities that relate to your lesson, such as the following.

- Describe the spatial distribution of temperature in Africa
- Which parts of Africa have low and high temperatures in:

  a. December b. August
- When does your home area experience high and low temperatures? Why?

b) Follow up

To further widen the students' understanding of Africa's geological history and relief structure, have them work on topics like the following, either individually or in small groups.

- Temperature distribution over the East African Highlands.
- The most extensive area of very high temperature (dry climate)
- The most important controls of temperature distribution in Africa.
- The extreme northern and southern parts of Africa experience the lowest temperature in the continent.

c) Additional Questions

1. What are the factors that affect the seasonal distribution of temperature in Africa?

2. How do you describe the spatial distribution of temperature in Africa?

Answer key for additional questions

1. The position of the overhead sun, the amount of cloud cover and the nature of the winds that blow over regions are among the factors that regulate seasonal distribution of temperature in Africa.
2. The spatial distribution of temperature in Africa can be described as:
    a. Places around the equators are hot all the year round;
    b. Low altitude areas are characterized by high temperature;
    c. High altitude areas get the temperature being influenced by altitude. As a result they are characterized by low temperature.

3.3.3 Rainfall distribution in Africa

Period Allotted: 4

1. Competencies

At the end of this lesson students will be able to:

- *Discuss the seasonal distribution of rainfall in Africa.*

2. Contents

- Rainfall distribution (seasonal and spatial)

3. Overview

- Rainfall is one of the components of climate. The distribution of rainfall in Africa is not uniform. The amount and duration of rainfall is affected by several geographic factors. As a result of this there is spatio – temporal variations of rainfall in Africa.
- Spatial variation is the result of:
    i. The invading strength of the moisture laden winds.
    ii. The presence of barrier that checks the moisture arrival into the area.
- Temporal variation is the result of:
    i. The apparent shift of the overhead sun which results the shift of the Inter tropical convergence zone (ITCZ)
    ii. The nature of the prevailing weather systems following the oscillation of the ITCZ.
- Generally summer is the rainy season in most parts of Africa except in places of the Mediterranean climatic region. In the Mediterranean climatic region rainfalls in the season of winter. Areas in the equatorial region receive heavy rainfall almost all of the year. In contrast, places that are under the influence of dry trade winds are characterized by extreme shortage of rainfall hardly reaches 250mm per year.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Chart/graphs showing rainfall distribution
- Climate map of Africa/world.
- Model rainguage
- Diagram of the global pressure belts and wind systems.

4.2 Suggested Teaching Methods

- Brainstorming – this helps you to understand students background knowledge about the topic discussed.
- Introduction: introduce the objective of the lesson and explain what would be expected from the students at the end of the lesson.
- Explanation: explain the topic briefly by inquiry method.
- Harmonizing: harmonize the students' impressions with the real concept of the lesson topic.

4.3 Pre-lesson Preparation

- Collect the appropriate teaching materials.
- Have the students prepare models and other teaching aids.
- Collect equipments to simulate the formation of rainfall.
- Give either group or individual assignment in advance to make your presentation more attractive.

4.4 Presentation of the Lesson

a) Introduction of the lesson

Introduce the lesson by asking questions such as:

- How is rainfall formed?
- Describe those geographic factors that bring temporal and seasonal variation of rainfall.
- How does the apparent movement of the sun influence rainfall distribution in Africa?

b) Body of the lesson

- Consider the results of the brainstorming session and your students' background knowledge of the lesson topics. Based on this make your presentation to the whole class through the method of your preference.

- Display the teaching aids which you have collected and have the students identify the areas of high/low rainfall in Africa. Along with that, assist students to describe the seasonal and spatial distribution of rainfall in Africa.

c) Stabilization

- Africa has diverse rainfall distribution because of variation in altitude, latitude, distance from the sea, ocean currents, wind and atmospheric pressure.
- Generally high altitude areas are characterized by high amount of rainfall.

4.5 Evaluation and Follow up

a) Evaluation

- Get feedback from your students by asking questions. This will help you to assess the students' level of understanding, to check the effectiveness of the teaching learning experience, and to evaluate whether the expected levels of competence have been achieved or not.
- You can ask some questions and direct some activities that relate to your lesson, such as the following:
  - ✓ What are the factors that control rainfall distribution in Africa?
  - ✓ Describe the seasonal and spatial distribution of rainfall in Africa.
  - ✓ Explain the relationship between the apparent movement of the sun, and rainfall distribution in Africa.

b) Follow up

- For further understanding, have students work on topics like the following:
- Those factors that control rainfall distribution in Africa.
- The relationship between ITCZ and rainfall.
- The influence of weather conditions on rainfall in Africa.

c) Additional questions

1. What factors affect the seasonal distribution of rainfall in Africa?
2. How do you describe the seasonal distribution of rainfall in Africa?

Activity 3.8

a. Places to the south of the equator get their maximum rainfall in January and those of the north in July.
b. Countries like DR of Congo, Zaire, Cameroon, and Nigeria.
c. In July most places that are found the north of equator experience their highest temperature.

d. In Africa, places of high altitude experience lower temperature where as those that are found in areas of lower altitude are very hot. The Shahara, and Kalahari deserts are the hottest contrary to this, the East African highlands, the Cape Ranges and the Atlas Mountains are characterized by cooler temperature.
e. Orographic (relief) and convectional types.
f. In the month of December the sun is over head and located south of the equator so does the ITCZ. The ITCZ pulls the north east trade winds southward over Africa. Since these winds are continental in origin, they carry limited or no moisture. In this season, therefore, remains dry, except for the Maghreb region, where the Mediterranean type of climate dominates.
   Southern Africa, however, gets its maximum rainfall from the south east trades of the Indian Ocean. The Congo Basin gets rainfall from the moist winds of the Atlantic Ocean.
g. Guinea monsoon winds.

Answer key for additional questions

1. The movement of the overhead sun and the winds that blow over the continent are among the factors that regulate the seasonal distribution of rainfall in Africa.
2. Summer is a season of high rainfall in many parts of Africa except the desert regions and the Mediterranean climate. In the Mediterranean climatic region it is winter that appears being rainy.

3.3.4 Climatic Regions in Africa

Period Allotted 2

1. Competencies

At the end of this lesson, the students will be able to:

- *Locate climatic regions of Africa*
- *Compare similarities and differences of climate regions of Africa.*
- *Rate climatic data with respective climatic regions of Africa.*

2. Content

- Equatorial climate
- Tropical continental (Savanna)
- Tropical desert and semi – desert
- Tropical maritime (monsoon)
- Warm temperate continental
- Highland (mountain)
- Mediterranean

3. Overview

- Africa has major climatic regions, each having its own distinguishing characteristics. These regions are:
  - ✓ Equatorial climate
  - ✓ Tropical continental (Savanna) climate
  - ✓ Tropical desert and semi – desert climate
  - ✓ Tropical maritime (monsoon) climate
  - ✓ Highland (mountain) climate
  - ✓ Mediterranean climate
- The parts of Africa that are found around the equator have equatorial climate. The region is located 6^{o} or 7^{o}N and S latitudes. This type of climate is found in Western and central Africa. The region has a high mean annual and mean monthly temperature due to the high angle of the sun. Temperature is high throughout the year.
- Tropical continental Savanna climate is located 5^{o} and 15^{o} N and S latitudes. It is found in many parts of Western and Southern Africa. The region is characterized by:
  - ✓ A well defined dry season of three to eight months;
  - ✓ Its annual rainfall ranges between 500 and 1500mm;
  - ✓ a progressive decline in total annual rainfall; north wards
  - ✓ that part of the Savanna which borders the equatorial rainfall region receives high rainfall;
  - ✓ Slightly higher ranges of temperature than the equatorial climatic zone;
  - ✓ High range of temperature averaging more than 30^{o}C in its northern section throughout the year.
- The tropical desert and semi desert climate is found bordering the tropical Savanna climate regions especially in North central Africa, east central Africa, and Southern Africa. The following characteristics distinguish the tropical desert.
  - ✓ A short rainy season of up to three months. Annual rainfall ranges from 250 to 500mm per year.
  - ✓ Variable, unreliable and inadequate precipitation
  - ✓ High daily average temperature ranging between 25^{o}C and 36^{o}C.
- Tropical maritime (monsoon) climate
  - ✓ This climatic region is located in the southern part of Africa dominating the south east coast of Africa. The region is characterized by the following conditions.
  - ✓ The impact of the warm Mozambique ocean current on temperature and rainfall conditions.

- ✓ High total annual rainfall throughout the year due to the effect of Mozambique current
- ✓ High temperature throughout the year.
- ✓ Law annual range of temperature.

- Warm Temperate continental climate is found in the Sothern part of Africa especially to the high veld of the Republic of South Africa. The region is the smallest of all the climatic zones. It is characterized by:
  - ✓ Cooler temperature and high rainfall
  - ✓ Rainfall is controlled mainly by the onshore winds that come from Indian Ocean.
- Highland climate is typically found in high altitude areas of Africa. It is dominant in the equatorial and tropical highlands of the region. It is characterized by:
  - ✓ Temperate type of climate;
  - ✓ Cool temperature and small annual ranges
  - ✓ Some areas are covered by permanent snow, as on Kilimanjaro and Kenya mountains.
  - ✓ High rainfall (orographic origin)
- Mediterranean climate is found in the northern and southern tips of Africa. The Maghreb regions in the north and the Cape Province of South Africa re the main areas that have this type of climate. The region is characterized by:
  - ✓ A hot, sunny, bright, dry summer and
  - ✓ A mild wet winter season

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Chart/graphs showing temperature and rainfall conditions of the different climatic regions of Arica.
- Climate map of Africa/world
- Photographs/pictures, diagrams, and films that show different climatic regions of Africa.

4.2 Suggested Teaching Methods

- Lecture with demonstration
- Small group discussion
- Jigsaw group projects
- Field visit
- Students independent group work
- presentation

4.3 Pre-lesson Preparation

Before you start this lesson collect the suggested teaching aids for the topic. As some of the teaching aids might not be readily available in the school, prepare some of them yourself from materials that are locally available. Read reference materials to have full information about the topic.

- Update yourself by reading books and journals.

4.4 Presentation of the Lesson

a) Introduction of the lesson

- Before starting the lesson about the climatic regions of Africa, review the previous lesson and try to make a link between the previous lesson and the new one. Then conduct a brainstorming session with the students to try to assess their background knowledge of the topic that you are going to present to the class. Based on the information you gained from the session plan your instructions presentation. During the brainstorming session raise such questions as the following:
    - ✓ What is climate?
    - ✓ Which part of Africa has equatorial type of climate?
    - ✓ What climate characteristics does this type of climate have?
    - ✓ What climate features characterize tropical continental climate?
    - ✓ What characterize the desert and semi – desert climatic regions? etc.

b) Body of the lesson

- Consider the results of brainstorming session and your students' background knowledge of the lesson topics. Based on that make your presentation to the whole class through the method of your preference. Display the teaching aids which you have prepared and have the students identity the location of climatic regions in Africa. Along with that help students to describe the various characteristics of climatic regions of Africa.
- Repeat the same activity to help students develop a better understanding of the climate of Africa.

c) Stabilization

- Africa has diverse climatic conditions that result from a number of factors which influence the continent's climate.
- The continent is generally divided into six major climatic regions each of which has got its own distinct climatic characteristics.

4.5 Evaluation and Follow up

a) Evaluation

- Before formally concluding your lesson, conduct a brainstorming session with your students to assess the students' level of understanding, to check the effectiveness of the teaching learning experience and to see if the expected level of competence has been achieved. You can ask them some questions and direct some activities that relate to your lesson, such as the following:
  - ✓ What are the major climatic regions of Africa?
  - ✓ Which of these regions receive rainfall throughout the year? Why?

b) Follow up

- To have students grasp the most important essence of the lesson give them activities to be done either individually or in small groups.
  - ✓ Characteristics of Africa's climatic regions
  - ✓ The location of each climatic region
  - ✓ The global pressure and wind systems.

c) Additional questions

1. Write the major characteristics of the equatorial climatic region.
2. Describe the north-south distribution of climate in Africa.
3. What are the characteristic features of the Mediterranean climatic region in Africa?
4. Identify the climatic regions that are found only in the southern part of Africa.

Answer key for additional questions

1. The Equatorial climatic region is characterized by:
   a. High angle of the sun through out the year;
   b. High mean monthly and mean annual temperature;
   c. High daily and low annual range of temperature; and
   d. High total annual rainfall.
2. The climate of Africa shows symmetry to the north and south of the equator. As a result, we observe similar and successive climatic zones in the two parts that fall to the north and south of the equator, with little exceptions.
3. The Mediterranean climatic region is characterized by:
   a. Hot, sunny, bright and dry summer season; and
   b. A mild wet winter season.
4. The climatic regions that are found only in the southern part of Africa are the tropical maritime (monsoon) climate and the warm temperate continental climate.

3.3.5 Drought in Africa

Period Allotted 2

1. Competence

At the end of this lesson, the students will be able to:

- *Discuss causes and consequences of drought in Africa;*
- *Locate drought prone areas of Africa.*

2. Content

- Drought
- Drought prone areas of Africa

3. Overview

- Drought, which is generally defined as an extreme shortage of rainfall, is a common problem in many African countries. Many factors that emanate from the continent's natural and human conditions contribute to the problem. The continent's locations in the trade wind belts, its tropical location, environmental degradation, desertification and other related of factors have been facilitating drought in the continent all the areas in Africa, the Sahel region is the most affected by the problem.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Map of Africa showing drought prone areas in Africa.
- Pictures/photographs that show the land feature of drought affected areas in Africa.
- Map showing the Sahel region (which is the most affected area by drought).
- Models/diagrams to show environmental degradation in association with population pressure in Africa.

4.2 Suggested Teaching Methods

- Brainstorming questions
- Group discussion
- Presentation by the group leader
- Field trip to observe environmental degradation caused by:
  - ✓ Over grazing
  - ✓ Deforestation
  - ✓ Soil erosion
  - ✓ Land fragmentation, etc
  - ✓ Population pressure

4.3 Pre-lesson Preparation

- Have the suggested teaching aids ready to use them when conducting classes.
- Plan always your instruction and read reference materials in advance. Guide/couch students to adapt reading at home and in the school library.

4.4 Presentation of the Lesson

a) Introduction of the lesson

- To help you better organize your lesson, it is advisable to check where the students are and how far that they are familiar with the topic. Such brainstorming sessions could help you examine the students' background and thereby you could make adjustments to the organization of your lesson.

You can start your lesson by posing such questions as:

- ✓ What are the major causes of drought in Africa?
- ✓ Which parts of Africa are most affected by drought in Africa?
- ✓ Is there any relationship between desertification and drought? If yes how?
- ✓ Describe the consequences of drought.
- ✓ What sorts of measures do you suggest in order to combat drought?

b) Body of the lesson

- Listen to your students' reflection attentively to the above questions. This could help you examine how far your students are in relation to what you have planned to teach.
- Then, make your own presentation to the students by depending yourself on what has been provided by the students response to the above questions and substantiating their ideas while correcting the wrong impression.
- With the help of the teaching aids which you have arranged to the class, have the students develop the required level of competence.

c) Stabilization

- Drought is one of the most crucial problem in Africa. Many countries are affected by drought in Africa. This is because most of the countries are bounded by the southern fringe of the Sahara desert.
- Drought prone countries in Africa include:
  - ✓ Sub – Saharan region (Sahel) stretching from Senegal and Mauritania in the west to the Horn of Africa.
  - ✓ Eastern African countries, such as Kenya and Tanzania.

i. The main causes of drought in Africa are climate changes, global warming, and lack of rainfall.
ii. Desertification
iii. Population pressure on agricultural land, range lands and natural vegetation, soil degradation, overgrazing and deforestation.

4.5 Evaluation and Follow up

a) Evaluation

Before formally concluding your lesson, conduct a brainstorming session with your students to assess the students' performance, to check the effectiveness of the teaching – learning experience, and to see whether the expected levels of competence have been achieved.

You can ask students some questions such as the following:

What is drought?

Where in Africa is drought a serious problem? Why?

b) Follow up

To further widen the students' understanding of Africa's drought history and its consequences on socio – economic development of African countries.

Have students work on topics like the following either individually or in small group.

- ✓ The relationship between climate change and drought.
- ✓ The history of drought in Africa.
- ✓ Global climate change/global warming

c) Additional Questions

1. What are the major drought prone areas in Africa?

2. Which areas of Ethiopia are frequently affected by drought?

Content Check

Part I

a. Climate is the average weather condition of a place that is characterized by its own recurrent atmospheric conditions that last for a long period of time.
b. Weather is a short lasting condition of the atmosphere that shows the day to day atmospheric conditions of a place.
c. Drought is extreme shortage of rainfall.
d. Elements of climate are those components of the atmosphere that constitute the climate of a place such as temperature, rainfall, and wind where as controls of climate are those factors that regulate the conditions of the elements of weather and climate to produce the different types of climate of places such as altitude, latitude, wind and atmospheric pressure.

Part II

1. Altitude, latitude, ocean currents, distance from the sea, winds and atmospheric pressure.
2. They
   - Are hot and wet all the year round
   - Have low annual range of temperature
   - Have high angle of the sun
   - Have low daily range of temperature

Answer key for additional questions

1. The major drought prone areas in Africa include the Sahel region in the southern fringes of the Sahara, the lowlands of Eastern Africa and the Kalahari Desert region in the south.
2. The most frequently drought affected areas of Ethiopia include the following:

   High drought probability areas

   - Afar region
   - Somali region and the Ghibe lowlands

   Medium drought probability areas

   - Parts of Hararghe
   - Parts of Arsi-Bale zone

3.4 DRAINAGE SYSTEMS OF AFRICA

Periods Allotted: 10

1. Competencies

At the end of this lesson, the students will be able to:

- *Demonstrate the major rivers and drainage systems of Africa;*
- *Discuss the characteristics of major rivers of Africa.*
- *Identify the location of lakes and swamps in Africa;*
- *Realize the economic significance of African rivers and lakes; and*
- *Analyze the hydro-politics of the Nile River.*

2. Contents

3.4.1 The Major Rivers and Drainage Systems of Africa

Period Allotted: 4

1. Competencies

At the end of this lesson the students will be able to:

- Demonstrate major rivers and drainage systems of Africa.

2. Content

- Major rivers and their drainage system
  a. The Atlantic ocean drainage system
  b. The Mediterranean sea drainage system
  c. The Indian ocean drainage system
  d. The closed (Inland) drainage system

3. Overview

- Africa is a continent with enormous water resources.
- Thousands of rivers, many lakes and swamps drain the continent. The major rivers of Africa are generally categorized into four major drainage systems based on their general flow direction. These drainage systems are:
  a. The Mediterranean Sea Drainage system: that includes all the rivers that empty into the Mediterranean Sea, mainly River Nile.
  b. The Indian Ocean Drainage system: that is made up of all the rivers that flow into the Indian Ocean. This system includes the major rivers to Zambezi, Wabishebelle and Ghenale.
  c. The Atlantic ocean drainage system: includes all the major rivers that empty themselves into the Atlantic Ocean. The major rivers of this system include the Niger, Volta, Congo, Gambia, Senegal and Orange.
  d. The Inland/closed Drainage system: is the smallest of all the systems in Africa and is made up of all the rivers and basins that do not have direct access to the sea. They are inland rivers that do not enter into any of the major water bodies that surround Africa. The Awash and Ghibe rivers in Ethiopia, the Okovango swamp in Botswana, the Sud Basin in Sudan, the Danakil Basin in Ethiopia and Eritrea and Lake Chad Basin are among the major inland drainage basins of the continent.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Drainage map of Africa
- A sketch map that shows the location of the major rivers of Africa
- Pictures, diagrams, photographs, films, etc. that show the use of African rivers.

4.2 Suggested Teaching Methods

- Lecture with demonstration
- Small group discussion
- Case study
- Jigsaw group projects
- Field visit
- Students independent/group work

4.3 Pre-lesson Preparation

- Before starting teaching this lesson, acquire the suggested teaching aids for the topic. As some of the teaching aids might not be readily available in the school, try to prepare some of them yourself from materials that are locally available.
- Read about the topic by referring to the textbook and other relevant reference materials. Update yourself on current issues on the socio – economic development of the rivers.

4.4 Presentation of the Lesson

a) Introduction of the lesson

- Before starting the lesson about the drainage of Africa, review the previous lesson and try to make a link between the previous lesson and the new one. Then, conduct a brainstorming session with the students to try to assess their background knowledge of the topic that you are going to present to the class. Based on the information you gain from, the session, plan your instruction, presentation.

  During the brainstorming, raise such questions as the following:

  - ✓ What is a drainage basin?
  - ✓ What is drainage system?
  - ✓ Do you know some of the major rivers of Africa
  - ✓ What are the major types of drainage systems of Africa?
  - ✓ What are the basis of this categorization

b) Body of the lesson

- The responses of the students to the above questions can be used as a basis to begin your presentation. After listening to the students' responses, present your presentation.
  After listening to the students responses, present your lesson to the class by focusing on the most important points of the lesson.
- Your lecture should be supported by the drainage map of Africa and other relevant teaching aids.
- Display the teaching aids to the class and have the students identify the major river basis and drainage systems of Africa.
- Show the students the photographs, posters, pictures or films that comprise some of the features of African rivers and ask the students to locate the major rivers of Africa.

c) Stabilization

- Africa has a number of rivers that drain its surface.
- The rivers are generally categorized into four major drainage systems.
- The major rivers of the continent are not navigable due to their geological and structural formation.

4.5 Evaluation and Follow up

a) Evaluation

- At the end of the lesson, you should gather information on the success/failures of your instruction. This will help you identify the extent to which the expected levels of competence have been achieved. To do so, you can ask your students questions that are drawn from your lesson. The questions should be prepared in such a way that each question is in congruence with the specific objectives of the lesson. You can ask questions like the following:
  - ✓ What is the difference between a drainage basin and a drainage system?
  - ✓ Which drainage system is the largest in terms of its discharge and catchment area in Africa? What about the smallest?

b) Follow up

- To help students acquire more knowledge about the lesson topics, you can provide them with additional activities/tasks that can provide them with additional activities/tasks that can further assist the achievement of the objectives of the lesson. This can also help you in addressing the needs of

students who are fast learners. You can assign tasks related to the following topics, on individual or group bases.

- ✓The major rivers of Africa
- ✓The flow direction of African rivers
- ✓The major river basins of the Mediterranean Sea, Indian Ocean, Atlantic Ocean, and Inland (closed) drainage systems of Africa.

This topic can be addressed by using the jigsaw group – project method.

c) Additional Questions

1. Discuss the socio-economic potential of Africa's water resources.
2. What are the problems that affect the proper utilization of Africa's water resources?
3. Describe the inland drainage system of Africa.

Answer key for additional questions

1. The water resources of Africa have tremendous potential. They can be used to generate hydro electric power; they can be used for irrigation, fishing, and mineral extraction.
2. Among the factors that limit the exploitation of Africa's water resources is lack of capital, skilled human power and lack of technology.
3. The closed drainage system of Africa is made up of all the rivers that don not have direct access to the sea, as a result, the rivers of this system remain with in the continent as they do not have any out let to the sea. The Chad basin is the largest inland basin in Africa. Others include the Okovango basin and the sudd basin. The Awash and Ghibe rivers of Ethiopia are also part of this system.

3.4.2 General Characteristics of African Rivers

Period Allotted 2

1. Competencies

At the end of this lesson, the students will be able to:

- *Discuss the characteristics of major rivers of Africa*

2. Content

- Characteristics of African Rivers

3. Overview

- African rivers have certain common characteristics.
- These characteristic features have impact on the potential of African rivers for socio – economic development.
- The major characteristics include the following:
  - ✓ Presence of steep and long profiles
  - ✓ Presence of rapids and waterfalls
  - ✓ Presence of deltaic mouth and mangrove swamps
  - ✓ Exotic nature of the rivers
- The rivers of Africa have several socio – economic advantages. They have tremendous potential to support the development efforts of the continent. The most significant advantages of the rivers of Africa include:
  - ✓ The tremendous hydro – electric power generation potential.
  - ✓ High potential for the development of irrigation agriculture.
  - ✓ High potential for fishing
  - ✓ They serve as a means of communication along their navigable courses

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Drainage map of Africa
- Pictures, diagrams, photographs, films, etc. that show some of the features of African rivers including their peculiar characteristics.
- Pictures, photographs, diagrams, films that show the use of African rivers for irrigation, tourism, navigation etc.

4.2 Suggested Teaching Methods

- Lecture with demonstration
- Small group discussion with presentation
- Jigsaw group projects
- Field visit
- Case study

4.3 Pre-lesson Preparation

- Get the necessary teaching aids ready.
- Refer to materials that are relevant to the topic you are teaching.

4.4 Presentation of the Lesson

a) Introduction of the lesson

You can start the lesson by presenting the following questions:

- What are the features that characterize the rivers of Africa?
- Mention those exotic rivers of Africa.
- Which African river descends gradually to the sea.
- Explain the advantage and disadvantage of waterfall.

b) Body of the lesson

- The major rivers of the continent are characterized by certain common features such as the presence of rapids and falls, exotic nature, seasonal fluctuation and presence of long and steep profiles.
- African rivers have certain uses that include high HEP potential, high irrigation potential and high potential for fish extraction.

4.5 Evaluation and Follow up

a) Evaluation

At the end of the lesson you should gather information on the successes/failures of your instruction. This will help you identify the extent to which the expected levels of competence have been achieved. In doing so, you can ask students questions that are drawn from your lesson.

The questions should be prepared in such away that each question is in congruence with the specific objectives of the lesson. You can ask questions like the following:

- What are the major characteristics of African rivers?
- In what ways are the rivers of Africa socio – economically significant?

b) Follow up

- To help students grasp more knowledge about the lesson topics, you can provide them with additional activities that can further assist the achievement of the objectives of the lesson.
- You can assign tasks related to the following topics, on individual or group bases.
    - ✓ The uses of African rivers for hydro – electric power generation.
    - ✓ The impacts of the general characteristics of African rivers on their navigability.

c) Additional questions

1. Discuss the major characteristics of Ethiopia Rivers.
2. What advantages do the waterfalls of Africa's rivers have to the continent?

Answer key for additional questions

1. The rivers of Ethiopia are characterized by:
    a. High seasonal fluctuation;
    b. Their international nature;
    c. Their steep and long profile; and
    d. Their water falls and rapids.
2. The water falls of Africa have high tourism and hydro-electric potential.

3.4.3 Lakes and Swamps of Africa

Period Allotted 2

1. Competencies

At the end of this lesson, the students will be able to:

- *Identify the location of lakes and swaps in Africa*

2. Content

- Lakes and swamps

3. Overview

- Africa is rich in lakes and swamps. Most of the lakes of Africa are concentrated within the Great Rift Valley system. The major natural lakes of Africa include lakes Victoria, Chad, Tanganyika, Malawi, Turkana, Albert and Tana. There are also artificial lakes that are formed as a result of the damming of the major rivers of Africa for socio – economic purpose. Such man made lakes include lakes Nasser, Koka kaindji, Volta and kariba. There are also swampy areas in Africa. The major swamps of the continent include the following:
    - ✓ The Sudd and machar along the Nile river basin.
    - ✓ Kamulando swaps in the Congo Basin.
    - ✓ Batorse and Kafue swamps in the Zambezi Basin
    - ✓ Okovango swamps in Botswana
    - ✓ Swamps adjacent to Lake Chad
- The lakes and swaps of Africa have socio – economic advantages. They have tremendous potential to support the development efforts of the continent.
  The most significant advantages of the water resources of Africa include:
    - ✓ High potential for fishing
    - ✓ They serve as means of communication
    - ✓ They serve as source of fresh water.
    - ✓ They serve as tourist attractions and destinations.

4. Teaching-learning Process

4.1 Teaching-learning Process

- Drainage map of Africa
- Map that shows the location of lakes and swamps
- Pictures, diagrams, photographs and films that show the uses of African lakes and swamps.

4.2 Suggested Teaching Methods

- Explanation,
- Group discussion
- Action research presentation on the uses of lakes and swamps

4.3 Pre-lesson Preparation

- Collect the aforementioned teaching aids and materials
- Before starting the lesson, get the suggested teaching aids ready. Read supplementary materials about the topic update yourself on the current issues of the socio – economic development of the lakes of Africa by referring to different sources of information including newspapers, magazines, the radio, television, the internet and the like.

4.4 Presentation of the Lesson

a) Introduction of the lesson

- Review the previous lesson and try to make a link between the previous lesson and the new one. Then conduct a brainstorming session with the students to try to assess their background knowledge of the topic that you are going to present to the class. From this you can plan your instruction presentations. During the brainstorming session, raise questions like the following:
    - ✓ Where in African are the major lakes of the continent concentrated?
    - ✓ What are the major uses of the lakes of Africa?

b) Body of the lesson

- The response of the students to the above questions can help you to begin your presentation. After listening to the students responses, present your lesson to the class by focusing on the most important points of the lesson.
- Your lecture should be supported by the drainage map of Africa and other relevant teaching aids to the class.
- Have the students identify the major lakes and swamps of Africa.

c) Stabilization

- Many lakes and swamps drain Africa. Most of the lakes of the continent are concentrated in the Rift Valley region;

4.5 Evaluation and Follow up

a) Evaluation

- Your lesson should be concluded after making an assessment of your instruction. This would help you to check how far the students have acquired the required information and the achievement of the instructional objectives there by. Questions like the following can help you conduct the assessment.
- How are lakes formed?
- Most of the lakes in Africa comprise fresh water. What advantage does fresh water have?
- What is the difference between fresh water and marine water.

b) Follow up

To help the students develop a better understanding of the lesson, you should support your teaching with additional activities. This could help you the students to have complete knowledge about African lakes and swamps. You can assign tasks like the following on individual or group bases.

- Major lakes and swamps of Africa.
- The difference between anthropogenic and natural lakes.

c) Additional Questions

1. Identify the major rift valley and non rift valley lakes of Ethiopia.
2. What are the significances of the lakes of Africa?

Answer key for additional questions

1. The major rift valley lakes of Ethiopia include lakes Abijata, Shalla, Langano, Ziway, Chamo, Abaya and Abe. The non-rift valley lakes include Lakes Hayk, Ashenge, Wonchi, and Tana.
2. The lakes of Africa have huge socio-economic significance; they are sources of fish for food and sale. They are also important sources of different minerals, mainly of construction materials such as sand and gravel.

3.4.4 The Uses of African Rivers and Lakes

Period Allotted 2

1. Competencies

At the end of this lesson the students will be able to:

- *Realize the economic uses of African rivers and lakes*
- *Analyze the hydro politics of the Nile river.*

2. Content

- The economic use of African rivers and lakes
- The Hydro – politics of the Nile River.

3. Overview

- The rivers, lakes and swaps of Africa have several socio - economic advantages. The most significant advantages of the water resources of Africa include:
  - ✓ Tremendous hydro – electric power generation potential
  - ✓ High potential for the development of irrigation agriculture
  - ✓ High potential for fishing
  - ✓ They serve as a means of communication along their navigable courses.
  - ✓ They serve as tourist attraction and destination
  - ✓ They serve as sources of fresh water
  - ✓ They serve as sources of minerals and construction materials.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Drainage map of Africa
- Pictures, diagrams, photographs, films, etc that show hydro – electric power plants, irrigation schemes, fishing grounds, recreation (resort) areas.

4.2 Suggested Teaching Methods

- Lecture with demonstration
- Small group discussion
- Case study
- Jigsaw group projects
- Filed visit
- Students independent work

4.3 Pre-lesson Preparation

- Collect the appropriate teaching aids and materials
- Refer materials that are relevant to the topic you are teaching.

4.4 Presentation of the Lesson

a) Introduction of the lesson

- Supervise the extent to which your students are familiar with the topic. Relate the topic with the previous lesson and ask them to associate their past experience with the present lesson. This can be conducted with brainstorming session with the students by asking questions like the following:
  - ✓ What uses do rivers and lakes have in Africa?

b) Body of the lesson

- Listen to your students reflection carefully to the above questions. This might help you identify how far your students have grasped the essence of the lesson topic.
- Then, make your presentation contextual by basing yourself on what has been responded by the students to the above questions and substantiating their ideas while correcting the wrong impressions.
- By showing the teaching aids to the students, have the students develop the required level of competence.

c) Stabilization

- African rivers and lakes have certain uses that include high HEP potential, high irrigation potential, high resources potential and high potential for fish extraction.

4.5 Evaluation and Follow up

a) Evaluation

- Compare Africa's lakes with the other continents
- of the regions of Africa which ones have more lakes and rivers?
- Can you mention the major lakes and rivers of Africa?
- Analyze the economic advantages of African lakes and rivers.
- Africa has not fully exploited its water resources – explain why?

b) Follow up

- Motivate your students to raise issues especially about the Nile River and discuss the impacts of disputes among the upper and lower Nile basin countries.
- Give assignment to each group about the current situation of the Nile River.

c) Additional Questions

1. How are rivers used in Ethiopia?
2. What are the most common uses of Africa's lakes?

4.6 Answer for Activities

Activity 3.9

1. Juba, Shebelle, Zambezi and Limpopo
2. Due to the seasonal variation in rainfall
3. The presence of rapids and falls, cataracts, mangrove swamps and deltaic mountain
4. Drainage basin is the entire area from which a river collects its surface water. On the other hand, drainage system is a system that is formed by river basins with common flow directions.
5. Atlantic Ocean is the largest followed by the Indian Ocean, the Inland system and the Mediterranean Sea, respectively.

Activity 3.10

1. To store water for different purposes including HEP generation, irrigation, fishing and recreation.
2. Displacement of people and ecological disturbance

Answer key for additional questions

1. The rivers of Ethiopia are used for different purposes including hydro electric power generation, fishing, in land transportation and mineral extraction.
2. Among the most common uses of Africa's lakes are their uses fro fishing, recreation and extraction of minerals.

3.5 NATURAL VEGETATION AND WILD ANIMALS OF AFRICA

Periods Allotted: 8

1. Competencies

At the end of this lesson, the students will be able to:

- *Relate natural vegetation and wild animals with climatic regions;*
- *Show appreciation to the types and economic uses of wild animals in Africa; and*
- *Show interest to implement natural-vegetation and wild-animal conservation measures.*

2. Contents

3. Overview

The diverse topography and varied climatic characteristics of Africa make the continent rich in terms of biodiversity. The continent is endowed with varied species of plants and animals. The different climatic regions that range from the extremely dry desert climates to the wet all-year-round climatic zones support the development of different vegetation types that require the local climatic conditions of each region. These vegetation zones are habitat for different species of wild animals.

As the kind of vegetation that develops in a certain environment is a reflection of the kind of climate that the place has, the natural vegetation that develops in Africa corresponds with the spatial distribution of the different climatic regions. Accordingly, five major vegetation zones can be identified in Africa. These are:

- Tropical rainforest
- Tropical savannah
- Desert and semi-desert vegetation
- Afro-montane/afro-alpine vegetation
- Mediterranean vegetation

Each of the different vegetation zones of Africa has its own distinguishing features. Each also uses certain mechanisms to exist within local climatic characteristics. These types of vegetation have multi-faceted significance. They have impact on the local climatic conditions of places, and they are used as sources of industrial raw materials, energy sources, food stuffs, medicinal plants and exportable items.

Despite its importance, Africa's natural vegetation faces several problems. Among others, deforestation, forest clearance, wildfire, expansion of settlements, industrial sites, road construction and mining are the most important ones. As a result, the amount of vegetation cover in the continent is gradually declining, forcing many African countries and peoples to face the consequential challenges. To cope with problems, several conservation measures should be taken. These measures could include the following.

- Reforestation
- Afforestation
- Agro-forestry

- Social forestry
- Awareness creation and community participation in forest management

Africa is a home for various species of wild animals. These animals have different characteristics and environmental requirements. As a result, the different climatic and vegetation zones of the continent host different species of animals with their own unique characteristics. The water resources of Africa host different species of amphibians and reptiles. The forests are homes for varied species of arboreal animals and birds. Over the extensive Savannah lands, we have different species of lowland and game animals of the herbivorous, carnivorous and omnivorous families in terms of their feeding habit. The deserts are also rich in terms of wild animals that are compatible with the extreme dry and hot climate. Over the mountainous areas, we have different species of wild animals that are compatible with the rough topography and the cold climate.

These animals are valuable in several ways. They serve as sources of food, industrial raw materials, medicines, and exportable items. They are also important for maintaining the balance of nature. Furthermore, they serve as tourist attractions and sources of foreign currency through tourism.

Though significantly useful, the wild animals of Africa are facing several problems that endanger their sustenance and survival. As a result, some species are already extinct while others are at the verge of extinction. To day, there are very many species of animals that are identified as extinct and endangered. Among the major problems of wild animals in Africa, are the following.

- Illegal hunting/poaching
- Wildfire
- Habitat destruction
- Human encroachment
- Expansion of settlements and industries
- Pollution
- Overgrazing
- Desertification
- Drought

To help the wild animals and get the maximum benefit from them, certain conservation measures should be taken. Otherwise, the future of the continent in terms of wild animal resources could be endangered. Among the possible measures that could be taken to conserve wild animals, are the following.

- Conserving natural vegetation
- Establishing national parks, game reserves and sanctuaries
- Controlling illegal hunting
- Raising peoples' awareness
- Raising the standard of living of the population

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Climate map of Africa
- Vegetation map of Africa
- Maps showing the location of major national parks and other conservation areas of Africa
- Pictures, diagrams, films, posters, etc of the natural vegetation and wild animals of Africa
- Real objects such as leaves, bark, roots, seeds, etc. of different plants

4.2 Suggested Teaching Methods

- Lecture with demonstration
- Small-group discussion
- Case study
- Jigsaw group projects
- Field visit
- Guest speaker
- Panel discussion
- Students' independent/group work

4.3 Pre-lesson Preparation

Obtain and set up the required teaching aids ahead of time. Plan your lesson presentation before you get to class and start the actual teaching. Read about the lesson topics by referring to different documents including brochures, leaflets, magazines, newspapers and other relevant reference materials that could update your knowledge about the natural vegetation and wild animals of Africa. Read also about the legislation some African countries have established to prevent the destruction of natural vegetation and wild animals in Africa. Study about the relationships between the condition of natural vegetation and wild animals in Ethiopia.

4.4 Presentation of the Lesson

a) Introduction to the lesson

Before making your presentation to the class, review the previous lesson and try to make a link between the previous lesson and the new one. Then, conduct a brainstorming session with the students to try to assess their background knowledge of the topic that you are going to present to the class. Based on the information you gain from the session, plan your instruction presentation. During the brainstorming session, raise questions that are relevant to the topic such as the following.

- What is wildlife?
- Why do the types of natural vegetation and wild animals vary from place to place? What factors do you think regulate the distribution of wildlife in the world?
- What type of natural vegetation dominates the African continent?
- Do you think that the type of vegetation that dominates a certain place influences the places wild animal exist? Why?
- What are the major problems of wildlife in Africa?
- What do you think should be done to improve the situation?

b) Body of the lesson

- After considering the students' responses to the brainstorming session, plan the scope of your lesson and its presentation. Your instruction should be supported by the climate and wildlife maps of Africa and other relevant teaching aids. Display the teaching aids to the class and have the students identify the major vegetation zones of Africa. In addition, encourage the students to associate climatic regions of Africa with the major vegetation zones and make inferences on why such associations occur.
- Present the photographs, posters, pictures or films that show some of the vegetation and wild animal features of Africa, and ask the students to identify their characteristics and significance.
- By using the same teaching aids, help the students to identify the location of the major vegetation zones and different national parks as well as dominant animal life.
- Encourage the students to identify the major importance of natural vegetation and wild animals at the local, national and international level. In addition, help them to come up with some ideas as to how to raise the utilization of these resources for the continent's socio-economic development.

c) Stabilization

- The diverse climatic conditions that Africa has make the continent rich in terms of plant and animal life;
- The equatorial rain forests, desert vegetations, the savannah, high altitude vegetation, and the Mediterranean vegetation are the major vegetation zones in Africa;
- The varied vegetation belts of the continent are habitat for different species of wild animals;
- Deforestation, overgrazing, wild fire and expansion of settlements are among the major problems of natural vegetation in Africa;
- Poaching, wild fire, human encroachment, overgrazing, deforestation and associated habitat destruction are among the major problems of wild animals in Africa;
- Afforestation, reforestation, agro-forestry, social forestry and awareness creation are among the conservation strategies of natural vegetation;
- Establishing national parks, game reserves, and sanctuaries, creating awareness among the general public, conserving natural vegetation and the like are among the common wild animals' conservation measures.

4.5 Evaluation and Follow up

a) Evaluation

Before formally concluding your lesson, conduct a brainstorming session with your students to assess the students' level of understanding, to check the effectiveness of the teaching-learning experience, and to see if the expected levels of competence and behavioural changes have been achieved. You can ask them some questions that relate to your lesson, such as the following.

- What are the dominant vegetation zones of Africa?
- Where in Africa do we have dense evergreen forests? Why/
- What are the major problems of natural vegetation and wild animals in Africa? What do you think should be done to conserve them?
- What are the causes of wildlife extinction in Africa?
- What do you think the role of the people should be in the conservation of natural vegetation and wild animals?

b) Follow up

To further initiate learning and make the students part of the solution instead of being part of the problem of wildlife resources, you should give them additional tasks that are linked with the lesson. You can assign tasks like the following on individual or group bases.

- Medicinal plants in Ethiopia.
- Forest products of Africa.
- The importance of wild animals.
- Deforestation in Africa/Eastern Africa/Ethiopia.
- Human encroachment and habitat destruction
- Expansion of settlements as a threat to wildlife conservation
- The major national parks of Ethiopia
- The major natural forests of Ethiopia
- The major vegetation zones of Africa (this can be done by using the jigsaw group-project method).

c) Additional Questions

1. Discuss the direct uses of natural vegetation.

2. Identify the major national parks of Ethiopia.

3. List the major uses of wild animals.

4. Discuss the relationship between the conservation of natural vegetation and wild animals.

4.6 Answer for Activities

Activity 3.11

1. - Deforestation – is the uncontrolled removal of forest vegetation.
   - Overgrazing – is exposing a grazing land to grazing animals beyond its carrying capacity.
   - Wild fire – uncontrolled forest live
2. To use the resources of the areas to fulfill their needs.
3. Deforestation, habitat destruction, climatic change.

4. Raise people's awareness
   - Introducing alternative energy sources
   - Improving agriculture

Activity 3.12

1. Animals face serious problems that emanate from human interference with their habitats. Such problems are related to the demographic pressure on the natural vegetation i.e deforestation, overgrazing, hunting, and frequent drought.
2. Measures to combat and conserve wild life of Africa are:
    a. protection and conservation of natural forests and grasslands
    b. Establishment of conservation areas like national parks.
    c. Controlling illegal hunting and wild life protection through strict legislation.
    d. Public environmental awareness-educating the people about environmental resources conservation and management.
3. Some of the measures to be taken by any local governments are the ones that are stated from "a'' to "d" in the above answer.

Answer key for additional questions

1. The direct uses of natural vegetation in Africa include their uses as a source of fire wood, food stuffs such as fruits, nuts, roots and barks, industrial raw materials such as gums, lumbers and fruits, and construction materials.
2. Among the major national parks of Ethiopia some are the Awash National Park, the Semien Mountains National Park, the Bale Mountains National Park, Yangudi Rasa National Part and the Nech Sar National Park.
3. Wild animals have many uses. Among others, some are the following.
    a. They are important to maintain the balance of nature;
    b. They are used as source pf animal protein;
    c. They are used as sources of industrial raw materials;
    d. They have scientific and educational importance;
4. There exists a strong link between the conservation of natural vegetation and wild animals. This is so because natural vegetation is the habitat and source of food for wild animals. Hence conserving natural vegetation means protecting the habitat of the wild animals and their food supplies.

3.6 SOILS OF AFRICA

Periods Allotted: 12

1. Competencies

At the end of this lesson, the students will be able to:

- *State the major soils of Africa with their specific characteristics;*
- *Relate the soils of Africa with their respective climatic regions; and*
- *Analyze soil problems and measures of conservation in Africa.*

2. Contents

3. Overview

Soil is one of the most precious resources of Africa. As the continent's economy is predominantly agricultural, soil resources have a crucial position in the continent's development. As a result of the presence of varied geologic formations, climatic zones and vegetation regions, the continent of Africa is rich in terms of soils of different quality.

Based on their geographical distribution and their characteristics, the soils of Africa are classified into the following types: ferrasols, nitosols, acrisols, lixisols, plinthosols, luvisols, planosols, vertisols, calcisols, solonchaks, gleysols, fluvisols, arenosols, regosols and leptosols. The geographical location and characteristics of each of these soils is discussed in the student text.

Though significantly important for Africa's development, the soil resources of the continent face several challenges. Among others, deforestation, overgrazing, over cultivation, pollution and traditional farming practices are the major ones. As a result of the multi-faceted impacts of the aforementioned problems, the continent loses huge amounts of soil due to erosion. This makes soil erosion and degradation a major problem of Africa.

Such a high degree of soil erosion and degradation necessitates soil conservation. Soil can be conserved by using different techniques. The following are some of the commonly used conservation strategies in the continent.

Terracing: constructing fence like structures along hillsides or educe the speed at which water flows down slope, thereby reducing erosion.

Agro forestry: is associating agriculture with forest development.

Afforestation: is planting trees in areas which were originally not covered by forests.

Reforestation: is planting seedlings of trees to replace cut forests.

Wind-breaks and **shelter belt** plantations

Large scale irrigation (dam construction)

Strip cultivation: is planting two or more types of crops in stripes on the same farm. This helps to reduce soil erosion as different types of crops have different abilities to holding soil particles tight.

Contour plowing: is plowing the land sideways, following contours. It is commonly used in sloped areas to use the furrows formed by the plow as blocks to reduce the speed of downslope flowing water.

Crop rotation: Planting different crops alternately on a farm.

Green manure: is growing certain plants of nutrient value on a farm and turning them over into the soil when they are grown.

Mulching: is covering the soil with plant residue to let the soil regain some nutrients as the residue decays.

Fallowing: is leaving the farm idle for a while until the soil regains its fertility.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Soil map of Africa
- Climate map of Africa
- Vegetation map of Africa
- Pictures, diagrams, films, posters, etc. that show different soil conservation strategies
- Sample soils of different types

4.2 Suggested Teaching Methods

- Lecture with demonstration
- Small-group discussion
- Case study
- Guest speaker
- Panel discussion
- Students' independent/group work

4.3 Pre-lesson Preparation

Have the required teaching aids at hand ahead of time. Plan your lesson before you get to class. Read up on the lesson's topics by referring to different documents including brochures, leaflets, magazines, newspapers and other relevant reference materials that could supplement your presentation. In particular, read about problems of soil and its conservation in Ethiopia.

4.4 Presentation of the Lesson

a) Introduction to the lesson

Review the previous lessons about the climate, relief, and natural vegetation of Africa and try to create an association between the spatial distribution of the aforementioned conditions and of the soils in Africa. You can ask the students about soil types, their problems and conservation in Africa based on their local experiences. You can use the brainstorming approach and ask the students questions like the following to stimulate their thinking.

- What is soil?
- What are the factors that influence soil formation?
- What are the major soil types that are found in Africa?
- Do you think that climate affects soil? How?
- What are the major problems of soil resources in Africa?
- What measures should be taken to conserve soil resources in Africa?

b) Body of the lesson

- Consider the results of the brainstorming session and your students' background knowledge of the lesson topics. Based on that, give an appropriate presentation to the class. Make your presentation as precise and clear as possible.
- By using the topographic, climate and vegetation and soil maps of Africa, you can guide the students to make associations among these phenomena. Help the students to explore how relief, climate and vegetation influence soil formation and soil type.
- Use the same teaching aids to help the students to identify the location of the major soil types of Africa.
- Motivate the students to identify the major problems of soils in Africa together with their possible conservation strategies.

c) Stabilization

- As a result of the presence of varied geologic formations, climatic zones and vegetation regions, the continent of Africa is rich in terms of soils of different quality.
- Based on their geographical distribution and their characteristics, the soils of Africa are classified into the following types: ferrasols, nitosols, acrisols, lixisols, plinthosols, luvisols, planosols, vertisols, calcisols, solonchaks, gleysols, fluvisols, arenosols, regosols and leptosols.
- The soil resources of the continent face several challenges. Among others, deforestation, overgrazing, over cultivation, pollution and traditional farming practices are the major ones.
- Terracing, contour ploughing, crop rotation, fallowing, green manure, and afforestation are among the major soil conservation measures.

4.5 Evaluation and Follow up

a) Evaluation

Your lesson should be concluded after making an assessment of your instruction. This would help you to check how far the students have acquired the required information and the achievement of the instructional objectives there by. Questions like the following can help you conduct the assessment.

- What is soil? How is it formed?
- What are the factors that affect soil formation in Africa?
- Can you list some of the causes of soil erosion and soil degradation in Africa?
- How can traditional farming practices facilitate soil erosion?
- What measures should be taken to conserve the soil resources of Africa?

b) Follow up

To help the students develop a better understanding of the lesson, you should support your teaching with additional activities. This could help you and the students to have wider views of the soils in Africa. You can assign tasks like the following on individual or group bases.

- Major soils of Ethiopia.
- Soil erosion in Africa/Ethiopia.
- The major soils of Africa.

- Deforestation as a cause for soil erosion.
- Conserving soils of mountainous areas.
- Soil conservation measures in Ethiopia.

c) Additional Questions

1. What are the major problems of soil in Ethiopia?
2. What measures should be taken to conserve soil resources in Ethiopia?

Answer for Activities

Activity 3.13

1. Some of the impacts of soil erosion include:
    a. Loss of soil;
    b. Decline in soil fertility and productivity;
    c. Decline in agricultural output and shortage of food as a result;
    d. Environmental degradation; and
    e. Loss of bio-diversity
2. Some of the measures that people can possibly take to conserve soil include the following.
    a. Crop rotation;
    b. Stripe cropping;
    c. Mulching;
    d. Contour ploughing;
    e. Fallowing;
    f. Terracing; and
    g. Reforestation and Afforestation.

Answer key for additional questions

1. Deforestation, overgrazing, environmental degradation, and soil erosion are among the major problems of soil resources in Ethiopia.
2. Among the possible measures that could be taken to conserve Ethiopia's soil resources some are terracing, contour ploughing, stripe cropping, fallowing, mulching and Afforestation and reforestation activities.

Answer Key for Review Exercise

Part I True or False

1. True	2. True	3. True	4. False	5. False	6. False
7. False	8. True	9. True	10. True		

Part II Multiple Choice

11. C	12. D	13. B	14. B	15. A	16.D
17. E	18. E	19. E	20. D		

Part III Fill in the Blanks

21. Giblartar
22. Isthmus of Suez
23. Relatively Compact
24. Cape Bon
25. Strait of Bab – el – mandab
26. Cape guardafui
27. 20.2%
28. Plateaus
29. Ruwenzori
30. Quatara depression
31. Northern Africa
32. Red Sea and Gulf of Aden
33. Tropical Maritime (Monsoon)
34. Equatorial Climate
35. Between Tropic of Cancer and Equator
36. Mediterranean
37. The warm Mozambique Ocean Current
38. Westerly
39. Altitude
40. Convectional
41. Northern and Southern

Part IV Chronological Order

a. 4	b. 1	c. 2	d. 3	e. 5

Check List

Check the student's performance according to the given competencies referring the questions under the check list for every unit. Put a tick (✓) mark against each task weather they are able to perform in the competencies of each unit. The students are expected to respond saying Yes or No. then, you can make your own evaluation whether the competencies are met or not.

Can you:

	Yes	No
1. Demonstrate the relative and absolute location of Africa using world map?----------		
2. Compare the size of Africa with other continents?----------		
3. Discuss the impact of the coastal and continental shape of Africa on its development? ----------		
4. Describe the regional division of Africa? ----------		
5. Show the geographical location of each region? ----------		
6. Relate the sub regions in terms of size, access to the sea and major relief features?----------		
7. Analyze the socio-economic and geo political similarities of each region?----------		
8. Explain the geological history of Africa? ----------		
9. Identify major relief structures of Africa on a map? ----------		
10. Show appreciation to the unique relief features of Africa and compare it with that of Europe? ----------		
11. Review elements of weather and climate? ----------		
12. Identify major climatic controls of Africa? ----------		
13. Describe the seasonal temperature conditions of Africa? ----------		
14. Discuss the seasonal distribution of rainfall in Africa? ----------		
15. Locate climatic regions of Africa? ----------		
16. Compare similarities and differences of climatic regions of Africa?---		
17. Relate climatic data with respective climatic regions of Africa? --------		
18. Discuss causes and consequences of drought in Africa? ----------		
19. Locate drought prone areas of Africa?		

20. Demonstrate major rivers and drainage systems of Africa? ----------		
21. Discuss the characteristics of major rivers of Africa? ----------		
22. Identify the location of lakes and swamps in Africa? ----------		
23. Realize the economic uses of African rivers and lakes? ----------		
24. Analyze the hydro politics of the Nile River?----------		
25. Relate natural vegetation and wild animals with climatic regions? -----		
26. Show appreciation for economic uses and types of wild animals in Africa? ----------		
27. Show interest to implement conservation measures used for natural vegetation and wild animals? ----------		
28. State the major soils of Africa with their specific characteristics? -------		
29. Relate the African soils with their respective climatic regions? ---------		
30. Analyze soil problems and measures of conservation in Africa? --------		

Unit Assessment

- Students' performance has to be assessed continuously over the whole unit. The assessment will be made by comparing students' performance with the specified level of competencies. Besides, the teacher has to recognize the level of performance of each student and provide assistance accordingly, Thus:
- A student at a minimum requirement level will be able to demonstrate the relative and absolute location of Africa with other continents, discuss the impact of coastal and continental shape of Africa on its development, describe the regional division of Africa, explain the geological history of Africa, identify major relief structures of Africa on a map, show appreciation to the unique relief features of Africa with that of Europe, review elements of weather and climate, identify major climatic controls of Africa, describe the seasonal distribution of rainfall in Africa, locate climatic regions of Africa, compare similarities and differences among climatic regions of Africa, relate climatic data with different climatic regions of Africa, discuss causes and consequences of drought in Africa, locate drought prone areas of Africa, demonstrate major rivers and drainage systems of Africa, discuss the characteristics of major rivers of Africa, identify the location of lakes and swamps in Africa, realize the economic uses of African rivers and lakes, relate natural vegetation and wild animals with climatic region, show appreciation of economic uses and types of wild animals in Africa, discuss soil types and its distribution in Africa, show interest to implement conservation measures used for natural vegetation and soil.

  In addition, a student working above the minimum requirement level and considered as higher achiever should be able to:- explain the advantages and disadvantages of the tropical location of Africa, discuss the difference between compact and elongated shapes of a continent, justify why and how Africa possesses different relief structures, demonstrate how the apparent movement of the sun affects the climate of Africa, give a reason why some pocket areas of Africa, such as NW, SW, SE, the South interior part and the North interior parts, experienced a unique type of climate, discuss how rivers that cross international boundaries are administered by African countries that are touched by these rivers, prepare a short essay that shows how wild animals are endangered in Africa and the measures to be taken.
- Students working below a minimum requirement level will require extra help if they are to catch up with the rest of the class.
- Students reaching at the minimum requirement level but achieved a little bit higher should be supported so that attain the higher achiever competencies. Students who fulfil the higher achiever competencies also need special support to contribute and achieve more.

Unit 4 POPULATION, ECONOMY ANDNATURAL RESOURCES OF AFRICA

Total Periods Allotted: 35

1. Unit Introduction

In the previous grade, your students learned about world population in general. In this grade level, students are going to learn specifically about African population. This unit emphasizes:

- population size, growth and distribution
- determinants of population change
- characteristics of African population
- migration and urbanization

The unit also meant to introduce students with the concepts of economic growth and development, the characteristics of the African economy, the challenges and prospects of economic growth and development in Africa as well as the natural resources of Africa and its politics.

2. Objectives

At the end of this unit the students will be able to:

- ➲ *Describe the size, growth and distribution of the population of Africa;*
- ➲ *Discuss the determinants and characteristics of African population;*
- ➲ *Analyze the extent of migration and level of migration in Africa;*
- ➲ *Explain the concept of economic growth and development and describe the characteristics of African economy;*
- ➲ *Assess the present features of African socio-economic development;*
- ➲ *Distinguish indicators of development and analyse the challenges and prospects of African economic development*;
- ➲ *Recognize major resources, and their level of exploitation and development;*
- ➲ *Appraise resource utilization and conflict management.*

3. Main Contents

4.1 Aspects of Population, Economy and Natural Resources of Africa

4.2 Concepts of Economic Growth and Development

4.3 Natural Resources of Africa and its Politics

4.1 ASPECTS OF POPULATION, ECONOMY AND NATURAL RESOURCES OF AFRICA

Periods Allotted: 13

4.1.1 Population Size Growth and Distribution

Periods Allotted: 4

1. Competencies

At the end of this lesson, students will be able to:

- *Explain population size and growth in Africa;*
- *Demonstrate population distribution of Africa using map;*
- *Show the regional variation of population of Africa.*

2. Contents

- Population size, growth and distribution

3. Overview

There is a general consensus that Africa and other developing regions make up an increasing share of world population. According to the United Nations report, the world population has increased from 2.5 in 1950 to 6.7 billion in 2008. The proportion living in the developing countries of Africa, Asia, Latin America and the Caribbean has increased from 68 to 80 percent.

India and China contribute about 37 percent of the total world population. According to the 2050 world population projection, high population concentration will shift to developing countries.

The highest global population growth rate was recorded in the 1960's in the less developed continents, including Africa. The growth rate of population is vital demographic information that can help us understand the changes in the population of a given society and forecast the future demographic features of an area.

Africa's population growth had been slow and stagnant. The 1000 Ad population rate taken about 700 years before it doubled itself.

The period population doubling has shrunk from 200 to 60 years. The period of doubling has further declined from 60 to 25 years in the 1960's.

Such uncontrolled growth rate has resulted in falling and precipitant income in most African countries.

Furthermore Africa is the only continent whose population is growing faster than the population of any other continent on earth. If this growth rate persists for long, the period of population doubling will shrink to 28 years.

There is no even population distribution in all of the regions of the world. Following this premise, Africa's population distribution is not even.

The crude density for Africa is 32 persons per square mile.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Illustrations
- Political map of Africa
- Charts of population data of Africa.
- School Atlas
- Maps and photographs of Africa's most populous cities.

4.2 Suggested Teaching Methods

- Explanation
- Group discussion
- Action research and presentation on various population related problems.
- Presentation on critical issues related to the subject.

4.3 Pre-lesson Preparation

- Collect the aforementioned teaching materials and aids.
- Refer to materials that are relevant to the topic you are teaching.

4.4 Presentation of the Lesson

a) Introduction of the lesson

You can start the lesson by presenting the following questions. How do you compare Africa with other continents interms of population size through time?

Africa's population growth was very slow around 1,000 A.D. Does it have any relationship with birth rate and deaths rate?

What is the present growth rate of Africa's population?

How does rapid population growth affect the national economy of a given country?

b) Body of the lesson

- Discuss the size of Africa's population in relation to the size of other continents based on table 4.2.
- Explain the causes and consequence of the raid nature of population growth in Africa.
- Discuss the situation of the rapidly growing African population, based on the information given in table 4.3.
- Explain the three components of population change

c) Stabilization

Africa and other developing regions comprise an increasing share of world population;

- Africa is characterized by rapid population growth;
- Population growth rates are the highest in the world;
- Africa population is predominantly young. As a result of this Africa's age dependency ratio is the highest in the world.
- Contrary to all other rates, life expectancy of African population is the lowest in the world. This scenario reflects the low level of living standard of people.
- Africa's population distribution is not even.

4.5 Evaluation and Follow up

a) Evaluation

- What is the estimated size and population size of Africa?
- Describe the growth trend of Africa's population.
- Show the regional variation of the population in Africa.

b) Follow up

i. Have the students prepare a bar graph to show the share of the world population by continent.

ii. Collect data on population growth in Africa from 1000 to 2000 AD. From this have the students: Calculate the population doubling:

- Crude density in each year.

c) Additional Questions

1. Explain the relationship between population growth rate and population doubling time.
2. Take a given settlement in your home area and study why the settlers established their settlements.
3. List down the three most populous countries of Africa.
4. What is rate of natural increase.
5. Describe factors that affect population distribution in Africa.

Answer Key for Activities and Exercises in the Text book

Activity 4.1

1. Africa
2. Uncontrolled population growth rate has resulted in falling precapita income in most Africa countries. As population growth over took rates of economic growth increasing cases of hunger and malnutrition, serious environment degradation with accelerated desertification and ultimate, recurrent drought have become the results.
3. Population growth rate is a function of morfality, fertility and migration. If the population growth rate is high the population doubling period becomes low Growth rate and population doubling period are inversely proportional.
4. Population stagnation occurs when a population zeroes its number. This inturn happens when birth and death rates become equal.
5. Before 1900 the population growth rate was low and the population doubling time was long. But this trend has been changing in the 1960s. Hence, Africa's accelerated population growth has already reached alarming stage. This unbridled growth of population has affected the quality of life of the people.
6. When the population growth rate is high and overtakes rates of economic growth we call it over population.
7. Europe, Oceania, North America and Asia (see table 4.2)

Answer key for additional questions

1. The growth rate of any population determines the time required for population size to double. For example a growth rate of 3% takes 23 years population doubling period. Similarly a growth rate of 2% will double the population every 24 years. This shows that, as the rate of growth increases, the doubling time declines rapidly and vice versa.
2. The settlers in your home area might have used different criteria when they chose their present settlement site. Please try to study how and why people selected their settlement in your home area.
3. The three most populous countries in Africa are: Nigeria, Egypt and Ethiopia.
4. Rate of natural increase is the difference between birth and death rates (Birth –Death) expressed in percentage.
5. Population distribution is affected by:
    i. Physical factors such as climate relief, soil, vegetation, etc.
    ii. Human factors like economic activity, political conditions and other social factors.

4.1.2 Determinants of Population Change in Africa

Periods Allotted: 2

1. Competencies

As the end of the lesson, students will be able to:

- *Describe the fertility and mortality patterns in Africa.*

2. Contents

- Fertility patterns in Africa
- Mortality patterns in Africa
- Migration

3. Overview

The quantitative and qualitative changes of any population are determined by the combined effects of fertility, mortality and migration.

Recent data sources indicate that of all the continents, Africa experiences the highest level of fertility in the world. The average for the whole continent is estimated 32/1000 in Western Africa to 42/1000 in central Africa. It has to be underlined that it is this high fertility level which is responsible for rapid population growth in Africa today.

The following are the major causes of high fertility index in Africa.

- Early marriage
- Religious and other traditional beliefs
- Sex preference (desire for a son is a common feature of many families)
- Low status of education
- Low level of urbanization
- Low status of women
- Poverty and backwardness
- Attitude of people towards large number of children
- Inadequate and ineffective family planning works and so on.

Similarly Africa's mortality rate is the highest in the world. The average for the whole region is 14/1000. Death rate ranges from 7/1000 in Northern Africa to 16/1000 in Southern Africa. Africa's high death rate is attributed to the following major factors:

- Low standard of living
- Low access to health centers
- Poor sanitary practices
- Civil war and political instability

- Wide spread famine caused by recurrent drought
- Poor nutrition and
- High incidence of disease

Even though Africa's current death rate is the highest in the world in comparison with the 1940's period it is fairly lower.

Migration, just like fertility and mortality contributes to the structural changes of African population. In this regard, both internal and international migrations are very important. Internal migration, in many African countries, takes place between relatively poor and relatively rich areas largely for economic motives. This is possible between rural areas and towns. Nowadays, the rural urban migration is becoming more and morehigh in almost all countries in the continent. Such movement of people from rural Arica to urban Africa has a tremendous socio-economic and environmental influence on both rural and urban centers.

International type of migration in Africa has two forms. These are inter-continental and intra-continental migrations.

The inter-continental migrations take place between Africa and other continents. i.e between Africa, Europe and America. This type of migration has brought a number of sociological, political and cultural developments in the continent.

The intra-continental migrations in Africa take place between/among the different countries of the continent. A very important example of this kind of population movement in Africa is labour migration form countries of poorer economic conditions to those which have better employment opportunities.

4. Teaching-learning Processes

4.1 Suggested Teaching Aids

- Charts and diagrams showing indicators of development
- Maps/diagrams and charts showing fertility and mortality trends.
- Tables and figures showing the economy of African countries.

4.2 Suggested Teaching Methods

Do not forget that these methods are applicable and are appropriate when they are applied according to the instructions given in the general introduction.

- Brainstorming
- Group discussion
- Demonstration
- Debate
- Presentation by group members

4.3 Pre-lesson Preparation

Prepare or make ready the required teaching aids to support your instruction plan, your instruction and update yourself with up – to – date information concerning the lesson. Refer to materials that can help you develop better understanding of population-related issues.

4.4 Presentation of the Lesson

a) Introduction the lesson

Before presenting the lesson to the students, you should conduct a brainstorming session with the students so as to identify their areas of weaknesses and strengths and thereby gain information on which to base and plan your instruction. This would help you to identify the existing gaps in the students learning. You can start your lesson by raising such questions as:

- What is fertility? How is it different from other population dynamics?
- Describe the level of fertility and mortality in Africa.
- What is migration and how many types of migration do exist?

b) Body of the lesson

- Continue the discussion by defining the terms fertility, mortality and migration.
- Give reasons for the high level fertility and mortality rates in Africa.
- Discuss the adverse consequences of high fertility level using pictures and diagrams you have collected.
- Show the regional variations of mortality and fertility in Africa with the help of the outline map of Africa.
- Define internal and international migrations and explain their effects on Africa's demographic process.
- Define labour migration and analyze its effect in international, migration in Africa.

c) Stabilization

- The crude density for Africa is 32 persons per square mile.
- The three components that determine population change are birth rate, death rate and migration.
- Africa's birth rate is the highest in the world.
- The average birth rate for Africa is 36/1000.
- Factors that affect population change can be grouped into four categories: demographic, socio – cultural, economic and political.
- Africa's mortality rate is the highest in the world.

- There is disparity in life expectancy between rich and poor countries.
- The current birth and death rates of Africa reflect a very young population of low life expectancy.
- The two major types of population which bring about population change are internal and international migrations.
- The two major causes of migration are push and pull factors.

4.5 Evaluation and Follow up

a) Evaluation

- Compare Africa's fertility level with the other continents.
- Of the regions in Arica which ones indicate contrasting level of fertility?
- Can you mention at least three main reasons which contribute to the high level of fertility in Africa?
- Is Africa's mortality index low or high in the world standard? Why do you think this is so?
- What are inter and intra continental migrations?
- Give examples for both
- Do you think migration can affect social, economic and cultural conditions in Africa?

b) Follow up

- Motivate your students to raise issues and discuss the effects of high fertility rate and very high young population below the age of 15.
- Listen to the students' responses to the above questions and try to identify where your students are prepared for your instruction.
- By providing necessary population data let students calculate the following for both Africa and its five regions:
  i. Crude Birth Rate
  ii. Crude Death Rate
  iii. Infant mortality Rate

c) Additional Questions

1. Describe the components of population change.
2. What is net migration.
3. Africa's fertility rate is the highest in the world. Describe those factors that contribute for this high trend of fertility.
4. Describe those factors that contribute for Arica's high death rate.

Answer Key for Activities and Exercises in the Text book

Activity 4.2

1. a. The population doubling period will shrink

   b. Heavy demand for all types of health services

   c. There will be a growing demand for education i.e raid increase in enrolment relative to teaching facilities.

   d. The demand for housing will increase.

   e. The demand for employment will increase

   f. The demand for water will increase

   g. The carrying capacity of the environment will decline.

2. Old age population is unproductive or economically dependent population. If the old age populations increases beyond its normal condition the dependency ratio will rise and affects the national economy of the country.

Answer key for additional questions

1. The components of population change are: fertility, mortality and migration
2. Net migration is the difference between in migration-out migration
3. - Less access to contraceptives
   - women are of low status
   - people are low educational back ground
   - children are considered as symbol of virility.
4. - low standard of living
   - low access to health facilities
   - civil war and political instability etc.

4.1.3 Characteristics of African Population

Periods Allotted: 2

1. Competencies

At the end of this lesson the students will be able to:

- *Discuss the characteristics of African population.*

2. Contents

- Biological characteristics
  - Age structure
  - Sex structure

3. Overview

The biological characteristics included the age and sex factors of a population. The age composition of the African population shows that Africa is characterized by predominantly young population. About 41 percent of the total population of Africa is under the age of 15. This is the highest in the world. The corresponding average for Europe is 10 percent which is the lowest in the world (See table 4.9) But on the other extreme both the adult (15 – 64 years of age) and the old age (> 64 years) are of the lowest percentage in the world. The low level of the adult population indicates that there exists low level of productive population against the high degree of dependency ratio.

The low index of the low age on the other hand reveals that in Africa life expectancy is low being the effect of high mortality rates.

Studies on sex ratio of Africa's population show that generally there is low sex ratio for almost all countries in sub – Saharan Africa. For various reasons, the populations of Africa is largely composed of female population. There are few exceptions which have excess male population over female population.

The demographic structure of a given country is best illustrated by the use of population pyramids (figure 4.6)

As it is portrayed in figure 4.6 the population pyramid for Sweden is a narrow pyramid indicating equal number in each age group. It reflects a low birth rate and a low death rate reading to a steady and static population growth.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Charts and diagrams that show age composition and percentage share of each age group for major regions of the world.
- Diagrams to show population pyramid

4.2 Suggested Teaching Methods

- Brainstorming questions
- Group discussion
- Debate
- Presentation by group leaders

4.3 Pre-lesson Preparation

- Make the suggested teaching aids ready to use them in the teaching learning process.
- Plan always your instruction and read reference materials in advance. Guide students to adapt reading suggested reference materials.

4.4 Presentation of the Lesson

a) Introduction the lesson

Before presenting the lesson, you should conduct a brainstorming session with the students so that you can be able to identify students weaknesses.

Ask questions such as:

- What are characteristics of population?
- Give example of the biological characteristics of population.

b) Body of the lesson

- Describe the biological characteristics of the African population.
- Using the data from table 4.9, discuss the pattern of the three age groups of African population in relation to other major regions or continents.
- Analyze the impact of age and sex composition in Africa.

c) Stabilization

- The structure of composition of African population falls under two categories classified thus on grounds of biological and cultural characteristics.
- Africa is the only continent which comprises high young population, but very low old age population.
- The demographic picture of a given country is best illustrated by the use of population pyramid.
- Developed countries have less than 30% of young population while developing African countries have greatest than 40%.
- The proportion of the two sexes in the population of a region had impact on other demographic elements such as marriage rate, occupational structure, etc.

4.5 Evaluation and Follow up

a) Evaluation

- Check whether your students have achieved the expected levels of competence or not. In doing so ask your students questions from the lesson you taught. You can ask the students questions like the following:
- Describe the distribution of African population into the young, adult and old age groups.
- Which of the age groups is the biggest by percentage to the total population in Africa?
- What do you say about this large percentage?
  What is the effect of this percentage?
- How do you describe the balance between the female and male populations in Africa?

b) Follow up

- Motivate your students to ask questions or raise critical issues and discuss the following questions:
  - The relation between high fertility rate and dependency ratio.
  - The impact of high and low dependency ratio on economic development.
- Based on current data, assign students to:
  i. Calculate the age dependency ratio of African population and other regions or continents.
  ii. Draw the sex – age pyramid for Africa and Europe and compare the two pyramids.

c) Additional Questions

1. What are the major characteristics of African population?
2. Explain the implication of high median age.
3. How do we illustrate the demographic structure of a given country.
4. Explain the impact of high sex ratio.
5. What are the negative impacts of rapid urbanization?

Answer Key for Activities

Activity 4.3

1. Africa is a continent which comprises light proportion of young population.
2. Europe, north America and Oceania
3. In developing countries like Africa, the level of fertility is very high and so the rate of population growth is high too. This is attributed to their predominantly useful age structure. As high fertility persists, the pressure on scarce resources increases. In addition to this, the demand for food, education health facilities, employment opportunities, housing and other services also increase. To the contrary if the adult population is high the dependency ration becomes low. This means that there is an active participant in the production of national wealth. Governments are not expected to spend much of the national budget to the constriction of schools, health centres than to investment and related tasks.
4. If the young population is high in number the dependency ration also becomes high. This means there high unproductive age group which depends on the productive. But if the adult population (economically active) is high that means there is a great opportunity to bring economic development in a given country.

5. A country with high elderly dependent population means high unproductive but over pensionable age. If the old age population is high it will be burden for the adult (economically active) population. Thus, countries are expected to spend much resource to rehabilitate and protect the old age population.

Activity 4.4

Population pressure means the concentration of too many people in a very limited area beyond holding capacity of that area.

This high population concentration is caused by high fertility rate. Which will eventually lead to a number of problems such as

- Land fragmentation (due to shortage of cultivable land)
- Environmental degradation

This high population concentration is caused by high fertility rate. Taking the above problems that are caused by high fertility rate, discuss in group the way out of this problem (mechanisms to check population pressure in a given area).

Activity 4.5

1. Country Y
2. Country X
3. Fertility
4. High dependency ration means low economic development and vice versa.
5. Country Y

Activity 4.6

1. The development of medical technology, Better sanitary practices
   The discovery of medicines and vaccines.
2. If the young population of a given country is high the dependency ratio is also high. That Means the country will have a large dependent population. Such large dependency level poses continuing challenges both at house hold and national level on the economic development efforts of the country.
3. In developing countries death rate is relatively rising due to:
   - high rate of fertility beyond the holding capacity of the national economy of developing countries and become unable to provide better medical treatments. Another problem is the prevalence of HIV/AIDS especially in sub – Sahara African countries which has increased the deaths fol.
4. Sex ratio refers to the proportion of males to females in the overall population of a given area. It is expressed as the number of males per 100 females.

5. The proportion of the two sexes in a population of a region has impact on other demographic elements such as marriage rate, occupational structure, growth, etc.

Answer key for additional questions

1. - High fertility and mortality rates
   - Generally young population
   - Low life expectancy
   - High population growth rate
2. If the median age of a given population is low it implies that the population is young and vice versa.
3. The population of a given country can be illustrated by the use of population pyramid.
4. High sex ratio is caused by large number of immigrants to a country. This indicates that migration is age and sex selective. High sex ratio means a large population of active population age group will be added to the country.
5. Rapid urbanization causes problems on employment, opportunities, housing conditions, provision of social services like education and health, etc.

4.1.4 Migration and Urbanization

Periods Allotted: 5

1. Competencies

After completing this lesson, students will be able to:

- *Elaborate the concept of migration and its type;*
- *Identify the rate and level of urbanizations in Africa;*
- *Explain the rate of urbanization and associated socio – economic problems in Africa.*

2. Contents

- Urbanization
- Migration

3. Overview

Urban is defined as relating or belonging to town or city. Urban centers are settlements where the majority of the population is engaged in non – agricultural occupation.

Urbanization refers to an increase in the proportion of people living in towns and cities. Urban centers are manifestation of socio – cultural, administrative, economic and geographical processes.

- Urbanization puts its foot print in the early civilizations of the Nile Valley and Delta of Egypt, the Kush land to the south of the delta and valley of Egypt, the highlands of Ethiopia and West African coasts.

  The impact of urban development in Africa has always been of greater significance in political, economic, cultural and social spheres of change. Despite the long history of urbanization in Africa, the degree of urbanization is very low nowadays. In many African countries urbanization is a spontaneous phenomenon. This spontaneous growth of urbanization is justified by shortage of facilities, poor absorption capacities, weak access to the rural population.

  The movement of people to cities began in early 20^{th} century. Since then, many cities have expanded at a rate of 25 percent every ten years. The movement from rural areas to towns is dubbed as rural – urban migration. In most African countries movement to the cities is partly due to rural push and partly due to urban pull factors (see figure 4.8).

  Most cities in Africa are growing very rapidly at the expense of the twin processes of rural-urban migration and the high rate of natural increase in population. Both natural increase and internal migration are more responsible than intercontinental migration for Africa's urban growth. As is estimated by the United Nations, the total number of international migrants in Africa rose from 9 million in 1960 to 16 million in 2000.

  Eastern and Western Africa excel the other regions of the continent in international migration. The sub – Saharan African regions have had different levels of economic development and political stability. Countries, in this region have been affected by international migration.

  Most African countries have significant flows of both immigration and emigration.

  Interms of emigration, much movement is made to countries within the same region; international immigration of this kind may also be made in a form of regional circulation.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Population map of Africa
- Pictures of urban settlements in Africa
- Pictures of migrants

4.2 Suggested Teaching Methods

- Explanation
- Group discussion
- Action research presentation on urban growth and/or migration trends in Africa.
- Presentation on argumentative (critical issues)

4.3 Pre-lesson Preparation

- Collect teaching aids and teaching materials.
- Refer to materials that are relevant to the topic you are teaching.

4.4 Presentation of the Lesson

a) Introduction the lesson

Before you start teaching the topic, supervise the extent to which your students are familiar with the topic. Relate the lesson with the previous topic and ask them to associate their past experience with the present lesson. This can be conducted with brainstorming session with the students asking questions like the following:

- What does the term urban means?
- What is urbanization?
- How do you relate urbanization with migration?

b) Body of the lesson

- Discuss the historical development of urban centers in Africa.
- Explain factors that contribute for urbanization.
- Explain the role of migrations for urbanization in Africa.
- Discuss how migration is accelerated by rural push factors and urban pull factors.
- Explain the gradual effect of urbanization up on the environment.
- Discuss how urbanization in Africa has not contribute significant economies of scale and value added productive chain to the growth in GDP.
- Explain the current urban challenges in Africa by comparing one region from the other.

c) Stabilization

- Urban centres are settlements where majority of the population is engaged in non agricultural occupation.
- Urbanization refers to an increase in the proportion of people living in towns and cities.
- It is also a reflection of socio – cultural, administrative, economic and geographical processes.
- The movement of people to cities in Africa began in the early 20^{th} century.
- Many cities expanded at a rate of 25% every ten years.

- In most African countries movement to the cities is partly due to rural push and partly due to rural push and partly due to urban pull factors.
- The adverse effect of urbanization in Africa are absence of job opportunity, food insecurity, shortage of water, lack of shelter etc.

4.5 Evaluation and Follow up

a) Evaluation

Check students understanding of the lesson by giving them an exercise to be done either in group or individually.

The exercise may comprise questions such as:

- What is urbanization?
- What is urban development?
- How does migration affect urbanization
- What is the difference between emigration and in migration?
- Why is Africa referred to as the least urbanized continent?
- Why is it also called the one with the highest rate of urbanization?
- What do you recommend some ways of solving the problems of urbanization in Africa?

b) Follow up

- Give assignment to each group to be done in their localities.
  The assignment is action research on migrants.
  The living condition of migrants in urban areas (their destination) compared to living conditions in rural areas.

c) Additional Questions

1. Describe the two types of migrations.
2. Describe at least three pushing factors that are related with rural-rural migrations.
3. Explain the advantage of migration
   a. To the losing country
   b. To the receiving country

Answer Key for Activities

Activity 4.7

1. Rural-urban migration
2. Scientists, engineers, researchers, medical doctors, etc move away from their country to abroad (other countries) where the living conditions and salaries are expected to be better.
3. The young and female ones move (migrate) from Ethiopia to the middle East seeking better job opportunity and attractive payment (salary).
4. Internal migration is the movement of people withineach e.g from Amhara to Afar region, from rural areas to urban areas (with in one country). International migration: it is a kind of migration that is concerned with the migrates out of Africa, into Africa and among African countries.
5. The first form of emigration from Africa was accompanied by slave trade to the Americas and the middle East.

Activity 4.8

1. a. Urban – is defined as relating or belonging to town or city.

   b. Urbanization – refers to an increase in the proportion of people living in towns and cities. It is a major aspect of socio-economic change.

2. a. Rural-urban migration

   b. land fragmentation

      Lack of cultivable land

      over population

   c. lack of shelter

      The expansion of slum areas

   The conversion of farm lands and watersheds for residential purposes.

3. Botswana.
4. Western Africa and Eastern Africa
5. Brain drain

Activity 4.9

1. Rural-urban migration due to rural pushing (rural poverty) and urban pulling factors.
2. Yes: much of the urban growth takes place in the absence of industrial expansion due to lack of investment in basic infrastructure.
3. If urban areas engulf (convert) farm lands for residential purposes they may become causes for food insecurity, water supply and the health of the people.
4. Urban poverty with regard to political and socio-economic externalities are much more costly than rural poverty such social evils as compared to rural areas.

   Though rural areas are not free from these problems, they are less affected than the urban areas for the following reasons:

   - They are not as confined as the urban areas.
   - There is no shortage of space.
   - The prevalence of crime is lower in rural areas than in urban areas.
5. Slum is a term designating an urban settlement lacking basic services such as water and sanitation.

Answer key for additional questions

1. International and Internal migration. International migration refers to the movement of people across international boundaries. Whereas internal migration is the movement of people from one place to another with in state.
2. a. natural disaster such as earth quack, volcanic eruption, flood, etc

   b. adverse climatic condition e.g drought

   c. social upheaval

3. a. advantages to the losing country are:
   - reduces pressure on jobs and resources.
   - loses people of child bearing age causing decline in births rate.

   b. Advantages to the receiving country
   - overcomes labour shortage.
   - Prepared to do dirty unskilled jobs
   - cultural assimilation
   - prepared to work long hours for low salaries.

4.2 CONCEPTS OF ECONOMIC GROWTH AND DEVELOPMENT

Period Allotted: 14

1. Competencies

At the end of this lesson, the students will be able to:

- *Describe the concept of economic growth and development;*
- *Describe the condition of utilizing resources in Africa;*
- *Analyze the economic growth and development trend of Africa;*
- *Realize the characteristics of African economy;*
- *Explain how and why most countries of Africa may be judged as less developed;*
- *Discuss the present features of African socio-economic development;*
- *Organize data of socio-economic growth and development and forecast the socio-economic challenges and prospects of Africa; and*
- *Predict the socio-economic challenges and prospects of Africa based on the organized data.*

2. Contents

1.2.1 What is Economic growth and Development?
1.2.2 Economic Growth and Development Trend in Africa
1.2.3 Characteristics of African economy
1.2.4 Present Features of African Socio-economic Development
1.2.5 Challenges and Prospects of Economic Development for Africa
1.2.6 Indicators of development

4.2.1 What is Economic growth and Development?

Periods Allotted: 2

1. Competency

At the end of this lesson, students will be able to:

- *Describe the concept of economic growth and development.*

2. Contents

- Economic Growth
- Economic Development

3. Overview

The concepts of economic growth and development are terms that are used to show the economic conditions of societies. While economic growth refers to the rate at which the economy is growing in quantitative terms, economic development stands for the overall standard of living of the population and its welfare. Economic growth is usually quantitative that is related with the production of more goods and services and thereby generation of more income by the state. On the other hand, economic development refers to growth with structural and technological change. As a result, development is both quantitative and qualitative in that it involves increment in production, service provision and income as well as improvements in the overall living conditions of the population.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Tables and figures showing the economy of African countries
- Pictures/movies showing how people are living in developed and developing regions

4.2 Suggested Teaching Methods

- Questioning and answering
- Oral presentation/lecture
- Discussion
- Demonstration
- Debate
- Students' presentation

4.3 Pre-lesson Preparation

Prepare or make ready the required teaching aids to support your instruction. Plan your instruction and update yourself with up-to-date information concerning the lesson. Refer to materials that can help you develop better understanding on the concept.

4.4 Presentation of the Lesson

a) Introduction to the lesson

Before presenting the lesson to the students, you should brainstorm the students so as to identify their areas of weaknesses and strengths and there by plan your instruction. This would help you to identify the existing gaps in the students learning. You can start your lesson by raising such questions as:

- What is economic growth?

- What about economic development?
- How do you differentiate economic growth from economic development?

b) Body of the lesson

- Listen to the students' responses to the above questions and try to identify where your students are in the due course of your instruction.
- Then, make your own presentation to the class by basing yourself on what has been provided by the students as response to the above questions.
- By displaying the teaching aids which you have arranged earlier to the class, make the students say something about the concept of economic growth and development.

c) Stabilization

- Economic growth and development are terms that are used to show the economic conditions of societies.
- While economic growth refers to the rate at which the economy is growing in quantitative terms, economic development stands for the overall standard of living of the population and its welfare.

4.5 Evaluation and Follow up

a) Evaluation

To check the level of understanding of your students of the lesson and be sure that the expected levels of competence are achieved, ask students some questions from your lesson. Note that your questions should be based on the stated specific objectives of the lesson. You can ask the students questions like the following.

- What is economic growth?
- What is economic development?
- How do you describe the relationship between economic growth and development?
- What are the differences in socio-economic conditions between the developed and developing world?

b) Follow up

To help your students get more knowledge on the topic, you can makes them work on topics that are directly related with your lesson. For example, you can give them tasks on following topics.

- The difference and relationship between economic growth and development.
- The role of economic growth on development.

c) Additional Questions

1. What are the factors that affect economic growth and development?
2. What are the features that characterize a growing economy?
3. What are the characteristics that distinguish a developed economy from the undeveloped ones?
4. Is Africa's economy growing or developing? Why?

Answer key for additional questions

1. Many factors influence economic growth and development of societies. Among others, the most important ones are availability of capital, skilled human power and technology. In addition to this, the extent to which good governance is existent is another important factor.
2. A growing economy is characterized by features like the following.
    a. Diversification of the economy;
    b. Increment in GDP;
    c. Increased division of labour;
    d. Increment in average personal income;
    e. Improvement in the living condition of the population;
3. A developed economy is distinguished from the undeveloped one in that it has:
    a. Highly diversified economy;
    b. High percapita income;
    c. Good access to basic social services such as health and education;
    d. Better standard of living of the population;
    e. Advanced economy and technology.
4. Africa's economy is both growing and developing. However, many African countries are in their stage of economic growth and are struggling to achieve development.

4.2.2 Economic growth and development trend in Africa

Periods Allotted: 4

1. Competencies

At the end of this lesson, students will be able to:

- *Describe the condition of utilizing resources in Africa; and*
- *Analyze economic growth and development trend of Africa.*

2. Contents

- Utilization of natural resources in Africa
- Indicators of development.

3. Overview

The continent of Africa is known for its huge amount of untouched natural resources. The continent resource potential, though not clearly known in quantitative terms, is believed to be of significant importance to promote its development. However, the utilization of these resources stays very far behind their estimated potential. Even in areas were these resources are being tapped, it is being done in a way that is very traditional.

The level of economic development that a society attains is measured in terms of three most important indicators. These are the Gross Domestic Product (GDP) of the country, the per capita income and the standard of living of the population. Accordingly, countries with high GDP, high per capita income and better standard of living are considered as developed. Contrary to this, the economy of the developing regions of the world is characterized by low GDP, low standard of living and low per capita income.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Charts and diagrams showing indicators of development
- Maps/diagrams and charts showing GDP distribution and quality of life
- Tables and figures showing the economy of African countries
- Figures/movies showing resources utilization in Africa.

4.2 Suggested Methods of Teaching

- Questioning and answering
- Oral presentation/lecture
- Discussion (Think – pair – share or Pyramiding)
- Demonstration
- Debate
- Students' presentation

4.3 Pre-lesson Preparation

Arrange the required teaching aids to support your instruction ahead of time. Plan your instruction and update yourself with latest information concerning the lesson. Refer to materials that can help you develop better understanding on natural resources utilization in Africa and indicators of development.

4.4 Presentation of the Lesson

a) Introduction to the lesson

Before making your instruction to the students, you should explore the students' level of understanding and thereby plan your lesson accordingly. This would help you to identify the existing gaps in the students learning. You can start your lesson by raising such questions as:

- How do you describe the degree of natural resources extraction in Africa?
- How can we determine whether a country is developed or not?
- Can you mention some of the indicators of economic development?

b. Body of the lesson

- Listen to the students' responses to the above questions and try to identify where your students are in the due course of your instruction on the issue being treated.
- Then, make your own presentation to the class by basing yourself on the students' response to the above questions. In the mean while, try to indicate the ideas that were to the point and that deviate from the fact.
- By displaying the teaching aids which you have arranged earlier to the class, make the students say something about the utilization of natural resources and indicators of development. This may help them to comprehend their learning.

c) Stabilization

- The degree to which natural resources are utilized in Africa is very low. Most African countries do not have favourable conditions to fully utilize their natural resources. They lack capital, skilled human power, modern technology and the like.
- Gross Domestic Product (GDP), Per capita income and standard of living are generally regarded as indicators of development.

4.5 Evaluation and Follow-up

a) Evaluation

To assess the student on their level of understanding of the lesson and to assure that the expected levels of competence are achieved, ask students some questions from your lesson. You can ask the students questions like the following.

- How do you describe the level of utilization of natural resources in Africa?
- What are the factors that affect the utilization of natural resources in Africa?
- What are the major indicators of Development?
- How do you rate Africa based on these indicators.

b) Follow-up

To help your students get more knowledge on the topic, you can make them work on topics that are related with your lesson. For example, you can give the students tasks on topics like the following.

- Is the economy of Ethiopia growing or developing? Why?
- What are the limiting factors on the utilization of natural resources in Africa?
- Compare and contrast a developed economy with a developing one.

c) Additional Question

1. Mention some conditions that indicate the presence of economic growth in Ethiopia.
2. Most African countries are believed to be rich in terms of natural resources. However, the extent to which these resources are utilized is limited. Explain why.
3. Discuss the role of Africa's international trade on the continent's development.

Answer key for additional questions

1. Among the indicators of economic growth in Ethiopia some are:
    a. Economic diversification; For instance, many Micro and Macro businesses are being developed.
    b. Creation of more and more employment opportunities both by the public and private sectors.
    c. The increases in the GNP of the country;
    d. Increased involvement of women in the national economy;
    e. Increased development of social infrastructure such as roads and other communication facilities.
2. Among the factors that affect the proper utilization of Africa's resource, some are:
    a. Lack of capital;
    b. Lack of skilled human power;
    c. Lack of modern and appropriate technology;
    d. Lack of good governance;
    e. Widely spread corruption;
    f. Socio - economic and political instability
3. Africa is a major supplier of tropical crops and mineral products to the international market. However, the continent's benefit from the international trade is under the influence of the developed nations. As a result, the role of the continent's international trade appears being very limited at present. However, with global understanding, the sector may contribute a lot in the future.

Answer Key for Activities

Activity 4.10

1. We say that an economy is developed when the following conditions are fulfilled:
    a. the utilization of the natural resources increases in order to raise people's standard of living and quality of life.
    b. more goods and services are produced.
    c. the growth in GDP (the total value of all goods and services produced with in a country).
    d. significant changed in the technical and institutional arrangements by means of which output is produced and distributed.

    A given country can be grouped in the category of developing countries if the above basic criteria are not fulfilled.
2. Among the major indicators of development, some are
    a. gross domestic product (GDP)
    b. percapita income
    c. standard of living

Activity 4.11

4. The total value of goods and services produced in a country over a period of time.
5. Income per head. It is also referred as the average amount of money that an individual is expected to earn as a result of a state's GDP
6. Good housing conditions, good access for health and Education services, standardized hygiene.

4.2.3 Characteristics of African Economy

Periods Allotted: 2

1. Competencies

At the end of this lesson, students will be able to:

- *Realize the characteristics of African economy.*

2. Contents

- Characteristics of African Economy

3. Overview

Africa is generally considered as a developing continent. The majority of the African population lives in poverty. The continent's economy is predominantly agricultural and the development of the secondary and tertiary sectors of the economy is at its infancy stage. Social infrastructures are poorly developed and are hardly accessible to the majority

of the population. Education and health services are almost insufficient, houses are substandard, places and regions are poorly interconnected and GDP and per capita income are very low. The continent's economy is dependent on the exportation of agricultural and mineral raw materials and the importation of finished and semi-finished manufactured goods. This puts Africa in the disadvantaged side of the international trade. As a result, the trade balance of many of the countries of the continent appears being negative forcing the states to be immersed in foreign debt.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Photographs
- Drawings
- Graphs and charts

4.2 Suggested Teaching Methods

- Lecture
- Discussion
- Demonstration
- Seminar

4.3 Pre-lesson Preparation

Prepare the required teaching aids that are suggested above ahead of time. Plan your instruction and try to acquire update information on the topic. Refer to materials that can help you develop better insight on the general characteristics of the African economy.

4.4 Presentation of the Lesson

a) Introduction to the lesson

Before presenting your lesson to the class, you should check the students' level of understanding by asking some questions. This would help you to identify the existing gaps in the students learning. You can start your lesson by raising such questions as:

- What are the characteristics of African economy?
- What are the features that most African countries share?

b) Body of the lesson

- Listen to the students' responses to the above questions and try to identify how far that your students are knowledgeable about the characteristics of the African economy.
- Then, make your own presentation to the class by taking the students' responses to the above questions into consideration.

- By displaying the teaching aids which you have arranged earlier to the class, make the students say something about the major features that characterize African economic conditions.

c) Stabilization

- Africa's economy is predominantly agricultural.
- The Secondary and tertiary economic sectors are far from being better developed.
- Poverty, poor standard of living, low GDP growth, low standard of living, wide spread unemployment, poor infrastructure, etc characterize the economic conditions of many African countries.

4.5 Evaluation and Follow-up

a) Evaluation

To check the level of understanding of your students of the lesson and be sure that the expected levels of competence are achieved, ask students some questions from your lesson. You can ask questions like the following.

- What features characterize the economy of Africa?
- What impacts does the amount of GDP have on standard of living?
- Why does the trade balance of many African countries usually appear negative?

b) Follow-up

To help your students get more knowledge on the topic, you can make them work on topics that are related with your lesson. For instance, you can give the students tasks on topics like the following.

- What makes the trade balance of many African countries negative?
- Why do we say that Africa benefits little from the international trade?
- Why is poverty a common problem of many African countries?
- Do you think that rapid population growth and poverty are related? How?

c) Additional Question

1. Describe the general features that characterize Ethiopia's economy.
2. Why do most of the countries of Africa earn little from their exports?
3. What do you think should be done to raise Africa's benefit from the international trade?

Answer key for additional questions

1. Ethiopia's economy is characterized by:
    a. Dominance of the agricultural sector over others;
    b. Low productivity;
    c. Growing manufacturing and service sectors;
    d. Traditional and backward methods of production.
    e. In adequacy of basic social services.

2. Because most of the export items of the countries of Africa are exported without any processing as they are raw. This makes their price very low as compared to the price of manufactured goods that many African countries import.
3. Among the measures that could be taken, some are:
    a. Processing the materials that African countries export to add their value;
    b. Reaching into consensus with other stake holders such as the developed nations to raise Africa's benefits from the global trade;
    c. Promoting regional cooperation and working together to have an influence in the international trade. So that Africa would have a fair share from the international trade.

4.2.4 Present Features of African Socio-economic Development

Periods Allotted: 2

1. Competencies

At the end of this lesson, students will be able to:

- *Explain how and why most countries of Africa may be judged as less developed; and*
- *Discuss the present features of African socio-economic development.*

2. Contents

- Present features of African socio-economic development

3. Overview

Since the earliest history of the continent, Africa's economy has been in a gradual change. Though exposed to the world, the continent's economy remains subsistence to the present. The following points outline the features of economic development in Africa.

- Subsistence economy that is principally based on crop production and animal husbandry dominated the economy of Africa since prehistoric times.
- Long-distance trade networks that promoted the exchange of raw materials and some specialized local goods between a few African states were developed in pre-colonial times.
- As overseas demand for certain African agricultural and mineral products increased due to European colonization, the colonizers began constructing new transportation networks and introducing technological innovations and new crops since the 15th century.
- One-way trade systems in which Africa's wealth of raw materials were exported to enrich foreign assets, with little regard for development within was developed by European colonies in Africa by the mid-20th century.

- As decolonization began in the late 1950s, traditional rural sector supporting the majority and a relatively modern sector that was based in cities and mining and plantation sites began to dominate.
- After independence, African governments began to take development initiative to improve the standard of living of their population. As a result, consumer goods producing industries and other service providing sectors such as education and health care began to grow.
- Rapid population growth in the second half of the 20th century, especially in the 1980s and 1990s retarded the development of many African economies.
- Now, despite all the efforts made by African governments, the different economic sectors, especially the primary and secondary sectors are far from being integrated. Traditional subsistence activities are still dominant. Similarly, despite increasing levels of industrialization in many countries of Africa, the continent's raw materials continued to be produced primarily for export.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Pictures
- Diagrams
- Films
- Statistical diagrams

4.1 Suggested Methods of Teaching

- Lecture
- Questioning and answering
- Group discussion and reflection
- Case study
- Project work

4.2 Pre-lesson Preparation

Before making your instruction, make sure that all the required materials are ready. You should also make yourself ready on the topic by reading on related materials.

4.3 Presentation of the lesson

a) Introduction to the lesson

Instead of starting the lesson directly, try to establish a link between what has been taught during the previous period and what is going to be taught. Along with that, try to acquaint the students with some of the ideas that you are going to teach them. To do so, you can ask questions like the following.

- What did we learn about in our previous period?

- How do you describe the present socio-economic conditions of African countries?
- Describe the primary, secondary and tertiary economic sectors in Africa.

b) Body of the lesson

- Listen to the students' responses to the above questions and try to identify how far that your students are familiar with the present features of Africa's socio-economic conditions.
- Then, make your own instruction to the class by taking the students' responses to the above questions into consideration.
- By displaying the teaching aids which you have arranged earlier to the class, help the students achieve the stated level of competence.

c) Stabilization

- Give a brief summary of the lesson to help your learners stabilize their learning. While doing so, focus on: - The substance nature of the continents economy
- The role of colonization and decolonization.
- The development initiatives of African governments.
- Africa's position in the international trade.

4.4 Evaluation and Follow-up

a) Evaluation

- To check the level to which the minimum levels of competence are achieved, you can ask questions like the following.
    - Why are many African countries judged as developing?
    - Discuss the present socio-economic features of Africa.

b) Follow-up

To further escalate the level of students understanding on the lesson, you can make them work on issues like the following.

- Socio-economic conditions of Eastern African countries.
- Socio-economic conditions of the Horn of Africa.
- Problems of transportation in the urban areas of Africa (you can make it a case study of the nearby urban center in your locality).

c) Additional questions

1. What are the socio-economic conditions that characterize Ethiopia?
2. What are the features that characterize Africa's international trade?

Answer key for additional questions

1. Among the features that characterize Ethiopia's socio-economic conditions, some are:
    a. Inadequate but improving housing;
    b. Inadequate but growing social services provision;
    c. Inadequate but developing transport system;
    d. Inadequate but improving power and water supply; etc.

2. Among others, Africa's international trade in characterized by:
    a. Exportation of agricultural and mineral raw materials;
    b. Importation of semi-finished and finished goods;
    c. High import pays;
    d. Low export earnings;
    e. Mostly negative trade balance.

4.2.5 Challenges and Prospects of Economic Development for Africa

Periods Allotted: 4

1. Competencies

At the end of this lesson, students will be able to:

- *Organize data of socio-economic growth and development to forecast the socio-economic challenges and prospects of Africa;*
- *Predict the socio economic challenges and prospects of Africa based on the organized data.*

2. Contents

- Challenges and Prospects of Economic Development for Africa

3. Overview

There are several challenges that Africa's economy is facing today. Among others the following are the most important ones.

- Lack of capital, skilled human power and modern technology that force many African countries to import all these.
- political instability and civil war that create unfavourable socio – economic and political atmosphere.
- lack of good governance and the resultant widely spread corruption and maladministration that hinder increment in local and foreign investment.
- diseases and infections such as HIV/AIDS that affect Africa's limited skilled human power and capital negatively.
- rapid population growth that cause pressure on scarce resources;
- poor infrastructure and the resultant poor regional interconnectedness;
- poor export performance and declining industrial outputs that make Africa disadvantage from the international trade.
- environmental degradation that result in decline in productivity, drought and famine.
- socio-cultural factors that influence the work habit of the majority of Africans.

Though the current socio-economic conditions of Africa are under extreme pressure as a result of the above mentioned problems, the future of the continent seems somehow promising. This is due to the establishment of so many continental, regional and sub

regional organizations that are meant to facilitate socio-economic development in Africa. These organizations have different purposes. While some are general purpose organizations, others are with specific purpose. These organizations play significant roles in increasing continental interconnectedness, integrity and cooperation to promote over all progress and development in the continental economy.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Statistical figures/tables
- Charts
- Photographs/pictures
- Films and Poster

4.2 Suggested Teaching Methods

- Discussion
- Lecture
- Demonstration
- Questioning and answering
- Debate
- Case study
- Problem solving

4.3 Pre-lesson Preparation

Prepare the required materials for the lesson ahead of time and make yourself ready to make your instruction effective. Refer to relevant references to furnish yourself with up-to-date information on the topic. Try to localize the lesson by taking examples from the factors that influence socio – economic development in your area and the future prospects.

4.4 Presentation of the Lesson

a) Introduction to the lesson

Make a brief introduction on the lesson to establish link between the previous lesson and the new one. You can motivate the students to make active participation in the due course of your instruction by raising questions like the following.

- What are the challenges and opportunities of economic development in Africa?
- What are the major challenges of socio – economic development in your area?
- What roles can continental organizations play in promoting development in Africa?

b) Body of the lesson

Discuss the topic in detail by focusing on issues that relate with the stated competencies. Make sure that you include the responses of the students while making your instruction to help the learners identify what is really correct of their responses.

c) Stabilization

There are many challenges that Africa face in its socio-economic development. These include:

- Lack of capital, skilled man power and modern technology
- political instability and civil war
- lack of good governance and the resultant widely spread corruption and maladministration
- diseases and infections such as HIV/AIDS
- rapid population growth
- poor infrastructure and the resultant poor regional interconnectedness
- poor export performance and declining industrial outputs
- environmental degradation

Though the current socio-economic conditions of Africa are under extreme pressure as a result of the above mentioned problems, the future of the continent seems somehow promising. This is due to the establishment of so many continental, regional and sub regional organizations that are meant to facilitate socio-economic development in Africa.

4.5 Evaluation and Follow-up

a) Evaluation

- Mention at least five factors that hinder Africa's socio-economic development.
- What are the roles that continental and regional organization play in the development of Africa?

b) Follow-up

To make your learners develop better understanding on the lesson, you can make them work on issues like the following.

- The impacts of HIV/AIDS on the development of Africa
- Conflicts, civil war and economic development in Africa.
- Potentials of Africa's economic resources.

c) Additional questions

1. Do you think that Africa has the opportunities for development? Why?
2. Discuss the relationship between good governance and development.
3. Discuss the role of women in the development of Africa.

Answer Key for Activities

Activity 4.12

1. You may know all or some of those regional organizations such as ECOWAS, COMESA, IGAD, AU.
2. These organizations have varied purposes all of which boil down to promoting overall socioeconomic development at regional and continental level. For example, African Union is a general purpose organization where as organizations like COMESA and ECOWAS are of specific purpose.
3. These organizations work hard to:
   - Improve trade and other socio-economic integration among member states;
   - Help member countries achieve better levels of development;
   - Assist development efforts in different ways such as promoting peace, security, and stable socio – economic conditions.
   - Provide financial, technical and technological support to member countries to help them mitigate their problems and faster development.
   - In order to bring an overall socio – economic development in Africa the proposed tasks should be supported by progressive governmental policies and programs. Since socio – economic development is time bounded we do not expect to achieve it with in short period of time.
4. Of course, yes. However, their success will depend on many factors including the commitment of states and their governments as well as the people of the continent.

Answer key for additional questions

1. Yes, Africa has the opportunity for development. This is so because the continent has untouched resources the exploitation of which could foster the continent's development. In addition, the different continental and regional organizations could also play significant roles in the development of the continent.
2. Good governance and development are strongly linked. The presence of good governance means the creation of favourable socio-economic and political atmosphere for the development of a state. Good governance promotes accountability and transparency and there by reduces corruption. These and many other outputs of good governance create conditions that are fertile to promote economic development.
3. As women constitute nearly half of the population of Africa, their role in promoting development is significant. Empowering women means adding more productive force to the economy and maximizing productivity. So, promoting the involvement of women in the economies of African countries can potentially help the states to achieve their dreams of having their economies developed.

4.3 NATURAL RESOURCES OF AFRICA AND ITS POLITICS

Period Allotted: 6

1. Competencies

At the end of this lesson, the students will be able to:

- *Relate major resources of Africa to the exploitation and development of Africa;*
- *State the actual mineral extraction methods of Africa;*
- *Relate the paradox between the potential and actual resources exploitation in Africa; and*
- *Defend the advantages of peaceful mechanisms of conflict management around resource utilization in Africa against aggressive mechanisms.*

2. Contents

4.3.1 Major Resources of Africa

4.3.2 Natural Resources Exploitation and Mineral Extraction Methods in Africa

4.3.3 Resource Utilization and Conflict Management

4.3.1 Major Resources of Africa

Period Allotted: 2

1. Competencies

At the end of this lesson, students will be able to:

- *Relate major resources of Africa to its exploitation and development of Africa;*

2. Contents

- Major resources of Africa

3. Overview

Africa is a rich continent in terms of resource potential. The continent is endowed with varied types of natural resources as well as human resources. It is believed that Africa has tremendous mineral resource potential that is the result of the continent's geology. The continent possesses various types of valuable metallic and non-metallic resources as well as petroleum. Varied types of gemstones such as gold and diamonds are found in large amounts in many areas of Africa. Some countries like the Republic of South Africa, Zaire, Botswana, and Zimbabwe are the major producers and suppliers of gold and diamonds to the world. The varied topography and the resultant climatic diversity make the continent rich in terms of various types of agricultural resources. As a result, Africa is the major producer of tropical crops such as cocoa, coffee, tea, palm oil, sugarcane, rubber, sisal,

ground nuts and the like. The diverse geologic structures have also made Africa possess different soil types with varying degree of quality. This provides the continent with high levels of agricultural potential. The extensive landmass of Africa is also drained by thousands of minor and major rivers making the continent a land of huge water resources. There are many major rivers, lakes and extensive swamps in Africa. Based on their flow direction, the rivers are classified into four major drainage systems. These are the Mediterranean Sea drainage system, the Indian Ocean drainage system, the Atlantic Ocean drainage system and the Inland/Closed drainage system. The rivers and lakes of Africa have many resource potentials. They are habitats for various species of plant and animal resources such as fish. They are also potential sources of minerals and construction materials. Most of the rivers are also significantly important for the production of hydro-electric power. The continent also has the world's second largest population that is characterized by substantial number of labour force. As much of the continent's population is young, it provides the continent with potential labour that is significantly important to the continent's development.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Charts and diagrams showing the major mineral and agricultural products produced in Africa
- Pictures/Posters – Films

4.2 Suggested Teaching Methods

- Oral presentation/lecture
- Discussion
- Case study
- Debate
- Students' presentation

4.3 Pre-lesson Preparation

Before you start teaching the lesson, prepare the materials that are suggested as teaching aids. As most of the things may not be readily available in the school's pedagogical centre, do not forget to prepare them by yourself or acquire the materials from any other source possible, such as from local libraries or mass media. You should also make intensive reading on the topic by referring to relevant books, searching the internet or consulting various published and unpublished documents prepared on the area.

4.4 Presentation of the Lesson

a) Introduction to the lesson

To help you better organize your lesson, it is better to check where the students are and how far that they are familiar with the topic. Such brainstorming sessions could help you assess the students' background and thereby you could make adjustments to the organization of your lesson. You can start your lesson by raising such questions as:

- What are the major resources that Africa is endowed with?
- Can you tell the major mineral resources that Africa is known for globally?

b) Body of the lesson

- Attentively listen to your students' reflection to the above questions. This would help you identify how far your students are in relation to what you have planned to teach.
- Then, make your own presentation to the class by basing yourself on what has been provided by the students as response to the above questions and substantiating their ideas while correcting the wrong respnses.
- By displaying the teaching aids which you have arranged earlier to the class, make the students develop the required level of competence.

c) Stabilization

- Africa is a rich continent in terms of resources potential. The continent is endowed with varied types of natural resources as well as human resource.
- The continent possesses various types of valuable metallic and non-metallic resources as well as petroleum.
- Africa is the major producer of tropical crops such as cocoa, coffee, tea, palm oil, sugar cane, rubber, sisal, ground nuts and the like.
- There are so many major rivers, lakes and extensive swamps in Africa that are rich in various kinds of resources including flora and faura and minerals and construction materials.
- Most of the rivers are also significantly important for the production of hydro-electric power. The continent also has the world's second largest population that is characterized by substantial number of labour force.

4.5 Evaluation and Follow up

a) Evaluation

Your lesson should be concluded by checking how far that your specific objectives have been achieved and that the required changes in the students' behaviour are attained. To do so, you should ask the students questions related with what you

have been teaching. Note that your questions should be based on the stated specific objectives of the lesson. You can ask the students questions like the following.

- What is resource?
- What are the major resources that Africa is known for?
- Can you mention some of the major mineral resources that Africa is a leading producer in the world?
- What are the major agricultural products that Africa offers to the world market?
- How far are Africa's rivers and lakes resourceful?
- Do you think that the resources of Africa could help Africa's future development? Why?

b) Follow up

To further assist your students to develop better understanding on the lesson, you can make them work on topics that are related with your lesson. For instance, you can give them tasks/projects/assignments on the following topics either individually or in small groups.

- Mineral potentials of Africa.
- Major agricultural products of Africa.
- The Hydro electric potentials of Africa's rivers.
- The resource potentials of Africa's rivers and lakes

c) Additional Questions

1. What makes Africa rich in terms of natural resources?
2. Describe the human resource potential of Africa.
3. Identify the resources that are associated with water resources in Ethiopia.
4. Discuss the mineral resource potentials of Ethiopia.

Answer key for additional questions

1. The diverse topography, climate and natural vegetation of Africa are among the most important factors that make the continent rich in terms of natural resources.
2. Africa is a continent with large population. The continent is the second most populous in the world. As Africa's population is generally young, the continent has a huge potential of energetic human power that could be used as engine for the continent's socio-economic development.
3. Among the resources that are associated with rivers and lakes in Ethiopia, some are fish and other aquatic animals, sand, gravel, minerals of different types and the like.
4. As a result of its geology, Ethiopia is among the richest countries in terms of mineral resources in Africa. The country is believed to have high reserves of minerals like gold, tantalum, coal, potash and the like.

Answer Key for Activities

Activity 4.13

1. Diamonds, gold, petroleum, cobalt
2. RSA, Zaire, Angola, Libya
3. Coffee, cotton, sisal, groundnuts, cacao
4. They have high potential for
   - ✓ HEP generation
   - ✓ Fishing
   - ✓ Irrigation
   - ✓ Mineral extraction
5. Most African countries do not have adequate trained labour. Such a problem affects almost all sectors of the economy and service rendering activities. Africa is forced to import trained personal wherever necessary.
   Importation of skilled labour from abroad is extremely expensive, especially for countries that have fragile economy. Therefore African countries should train adequate trained human power in different fields to meet its immediate demand of trained human power.

4.3.2 Natural Resources Exploitation and Mineral Extraction Methods in Africa

Periods Allotted: 2

1. Competencies

At the end of this lesson, the students will be able to:

- *State the actual mineral extraction methods of Africa; and*
- *Relate the paradox between the potential and actual resources exploitation in Africa.*

2. Contents

- Natural resources exploitation and mineral extraction methods in Africa

3. Overview

Despite the richness of the continent in terms of resources, the benefit that Africa obtains from them is almost insignificant. This is due to the traditional methods of resource exploitation and the exportation of most of the resources raw without any further processing. Though Africa is rich in terms of mineral resources, the degree of extraction of minerals is very low and under developed. Modern mining technologies are almost unknown in many areas of the continent. As a result, mineral extraction is dominated by

traditional methods of mining. This makes the continent and its population earn little of the rewards of the continent's huge mineral potential. The agricultural sector is also highly traditional that it is less productive. Many farmers do not have the access for modern agricultural inputs such as fertilizers, selected seeds, insecticides, pesticides, tractors and combiners. As a result, farming remains less productive and at subsistence stage in the continent.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Pictures/photographs
- Maps/films/charts/diagrams

4.2 Suggested Teaching Methods

- Oral presentation/lecture
- Discussion
- Case study
- Debate
- Students' presentation

4.3 Pre-lesson Preparation

Before you start teaching the lesson, prepare the materials that are suggested above. As most of the things may not be readily available in the school's pedagogical centre, do not forget to prepare them by yourself or acquire the materials from any other source possible, such as from local libraries or mass media. You should also make intensive reading on the topic by referring to relevant books, searching the internet or consulting various published and unpublished documents prepared on the area.

4.4 Presentation of the Lesson

a) Introduction to the lesson

To help you better organize your lesson, it is better to check where the students are and how far that they are familiar with the topic. Such brainstorming sessions could help you assess the students' background and thereby you could make adjustments to the organization of your lesson. You can start your lesson by raising such questions as:

1. To what extent are the natural resources of Africa utilized?
2. How do Africans extract natural resources?
3. How do you describe the methods of resource extraction in Africa?
4. Are the resources of Africa fully developed and utilized? Why?

b) Body of the lesson

- Attentively listen to your students' reflection to the above questions. This would help you identify how far your students are in relation to what you have planned to teach.
- Then, make your own presentation to the class by basing yourself on what has been provided by the students as response to the above questions and substantiating their ideas while correcting the wrong impressions.
- By displaying the teaching aids which you have arranged earlier to the class, make the students develop the required level of competence.

c) Stabilization

- Despite the richness of the continent in terms of resources, the benefit that Africa obtains from them is almost insignificant. This is due to the traditional methods of resource exploitation and the exportation of most of the resources raw without any further processing to add their value.

4.5 Evaluation and Follow up

a) Evaluation

Your lesson should be concluded by checking how far that your specific objectives have been achieved and that the required changes in the students' behaviour are attained. To do so, you should ask the students questions related with what you have been teaching. Note that your questions should be based on the stated specific objectives of the lesson. You can ask the students questions like the following.

- What are the methods that are used to extract resources in Africa?
- Can you describe the extent to which natural resources are extracted in Africa?

b) Follow up

To further assist your students develop better insight on the lesson, you should make them work on topics that are related with your lesson. For instance, you can give them tasks/projects/assignments on the following topics either individually or in small groups.

- Methods of mineral extraction in Ethiopia.
- The utilization of African rivers for fishing /irrigation/ HEP generation/ mineral recreation and tourism/ transporation.
- The Hydro electric potentials of Africa's rivers.

c) Additional Questions

1. Why are the mineral resources of Africa less exploited?
2. Discuss the problems associated with the utilization of African rivers for irrigation.
3. Discuss the utilization of Ethiopian rivers for hydroelectric power production.

Answer key for additional questions

1. The mineral resources of Africa are less exploited due to lack of capital, skilled human power and modern technology as well as recurrent conflicts that occur in resourceful areas on issues related with resource exploitation and affair utilization.
2. Among the major problems that limit the utilization of African rivers for irrigation, some are settlement patterns (most people live far away from potentially irrgable areas), lack of technology, lack of capital and lack of skilled human power.
3. One of the major importances of Ethiopia's rivers is their utilization for hydro electric power generation. The country has been utilizing its rivers for this purpose. So far many dams have been constructed on the major rivers of the country including those on the Awash, Tekeze, and Gibe. And now the grand renaissance project is under way on the Abay River.

4.3.3 Resource Utilization and Conflict Management

Periods Allotted: 2

1. Competencies

At the end of this lesson, students will be able to:

- *Defend for the advantages of peaceful mechanisms of conflict management around resource utilization in Africa against aggressive mechanisms.*

2. Contents

- Resource utilization and conflict management

3. Overview

Though the continent possesses huge resource potential of all sorts, the resources are not yet fully utilized to promote the continent's socio-economic development. Instead, they have been sources for the continent's deep rooted backwardness. This is because most of the resource rich and productive areas are zones of repeated conflict and civil war that are caused by the resources. In many countries where mining is a potential way out for economic development, clashed between groups of different interests caused serious of conflicts and civil wars that claimed the lives of many Africans. For instance, there had been conflicts caused by resources in Liberia, DRC, Congo, Sierra Leone, Angola and Morocco. Similarly, the civil war in the oil rich southern province of the Republic of the Sudan is still affecting the lives of millions of people. Hence, if the resource potentials of Africa have to be used to promote the continent's development, instead of being causes for conflict and violence, modern conflict management mechanisms need to be devised and used. This may include giving the local population where resources are being developed the required opportunity including employment, environmental safety and health, making them beneficiary of the development and promoting good governance and democracy. Otherwise, the opportunities that Africa has as a result of its huge resource potential would remain being a hindrance for the continent's future development.

4. Teaching-learning Process

4.1 Suggested Teaching Aids

- Pictures/photographs
- Maps/films/diagrams

4.2 Suggested Teaching Methods

- Oral presentation/lecture
- Discussion
- Case study
- Action research
- Debate
- Students' presentation

4.3 Pre-lesson Preparation

Before you start teaching the lesson, prepare the materials that are suggested above. As most of the things may not be readily available in the school's pedagogical centre, do not forget to prepare them by yourself or acquire the materials from any other source possible, such as from local libraries or mass media. You should also make intensive reading on the topic by referring to relevant books, searching the internet or consulting various published and unpublished documents prepared on the area.

4.4 Presentation of the Lesson

a) Introduction to the lesson

To help you better organize your lesson, it is better to start by checkins where the students are and how far they are familiar with the topic. Such brainstorming sessions could help you assess the students' background and thereby you could make adjustments to the organization of your lesson. You can start your lesson by raising such questions as:

1. What do you think are the major causes of conflicts and civil wars in Africa?
2. What do you think should be done to minimize conflicts that are associated with mineral extraction in Africa?
3. How should states /government/ people solve their conflicts that are caused by resources exploitation to come up with better outcomes?

b) Body of the lesson

- Attentively listen to your students' reflection to the above questions. This would help you identify how far your students are in relation to what you have planned to teach. This in turn would help you to reorganize your lesson.

- Then, make your own presentation to the class by basing yourself on what has been provided by the students as response to the above questions and substantiating their ideas while correcting the wrong ideas and help the students to comprehend the lesson.
- By displaying the teaching aids which you have arranged earlier to the class, make the students develop the required level of competence.

c) Stabilization

- Though the continent possesses huge resource potential of all sorts, the resources are not yet fully utilized to promote the continent's socio-economic development. Instead, they have been sources for the continent's deep rooted backwardness and socio – economic and political instability.
- So as to maximize Africa's benefit from its resources. Peaceful and modern techniques of conflict mange need to be employed.

4.5 Evaluation and Follow up

a) Evaluation

Your lesson should be concluded by conducting an assessment so as to see how far your specific objectives have been achieved and whether the required changes in the students' behaviour are attained. To do so, you should ask the students questions related to what you have been teaching. Note that your questions should be based on the stated specific objectives of the lesson. You can ask the students questions like the following.

- What are the resources that are better utilized in Africa?
- What are the roles that the resources of Africa playing in the development of the continent? Why are most of the resources of Africa appear being causes of civil war and political unrest?
- Can you mention some areas where resource caused conflicts are being seen?

b) Follow up

To further assist your students in developing a better understanding of the lesson, you can have them work on topics that are related to your lesson. For instance, you can give them tasks/projects/assignments on the following topics, either individually or in small groups.

- Traditional methods of mineral extraction in Africa
- The cause of the civil war in Liberia.
- Traditional gold mining in Gambella Ethiopia.

c) Additional Questions

1. Why is mining more of traditional in its extraction methods in Africa?
2. Mention some of the conflicts in Africa that are associated with resource extraction.

Answer Key for Activities

Activity 4.14

1. Countries like DRC, Liberia, Sudan, Angola, and Congo
2. Answers may vary. However, you can take the case in Ethiopia where the Somali and Oromo pastoralists were in conflict over grazing land in southern Ethiopia. The conflict was solved peacefully via referendum.
3. Promoting fair utilization of resources among citizens and developing the culture of tolerance, mutual respect and understanding. Promoting the utilization of peaceful conflict resolution techniques is also important.

Activity 4.15

1. "Blood Diamond" is a name given to the diamond resources of Liberia to show that the diamond is more a cause for the civil war than for development.
2. Minerals such as opium &gems in Angola and Copper, Cobalt, diamond, gold &cobalt in the DRC.

Answer key for additional questions

1. Due to lack of technology and skilled human power.
2. Among the major conflicts that are associated with mineral extraction in Africa some are: a. The conflict in Liberia;
   b. The conflict in the Democratic Republic of Congo;
   c. The conflict in Angola;
   d. The conflict in Sudan;
   e. The conflict in Nigeria.

Answer Key for Review Exercise

Part I

1. False 2. True 3. False 4. True 5. False 6. B 7. D 8. E 9. C 10. A

Part II

11. Economic growth is used to describe the increase in the total amount of production and wealth of a given country.
12. Economic development is both qualitative and quantitative, in that it involves increment in production service provision, and income implies improvement in the overall living conditions of the population.
13. 1. Gross Domestic Product (GDP) 2. Per capita Income
    3. Standard of living
14. a. Botswana b. South Africa c. Nigeria
    d. Coted'Ivoire e. Tanzania f. Ghana
15. Lack of capital,
    Lack of skilled manpower
    Lack of modern technology
    Rapid population growth
    HIV/AIDS

Unit Assessment

- Students' performance has to be assessed continuously over the whole unit. The assessment will be made by comparing students' performance with the specified level of competencies. Besides, the teacher has to recognize the level of performance of each student and provide assistance accordingly, Thus

- A student at a minimum requirement level will be able to explain population size and growth in Africa using map, show regional variation of population of Africa, describe the fertility and mortality patterns in Africa, discuss the characteristics of African population, elaborate the concept of migration and its type, discriminate the rate and level of urbanization in Africa, explain the rate of urbanization and associated socio-economic problems in Africa, describe the concept of economic growth and development, realize the characteristics of African economy, discuss the present features of Africa, predict the socio-economic development, organize data of socio-economic growth and development for cast the socio-economic challenges and prospects of Africa, predict the socio-economic challenges and prospects of Africa based on the organized data, relate major resources of Africa to its exploitation and development of Africa, state the actual mineral extraction methods of Africa, relate the paradox between the potential and the actual resources exploitation in Africa, defend for the advantage of peaceful mechanisms of resource conflict management around resource utilization in Africa against aggressive mechanisms.

- In addition, a student working above the minimum requirement level and considered as higher achiever should be able to: discuss factors that regulate the fertility and mortality patterns of Africa, give a brief description of pushing and pulling factors of migration in Africa, prepare a short essay on the emergence of urbanization in Africa, analyze the concept of sustainable development, differentiate factors that hinder the realization of sustainable development, provide evidence how westerners have interfered and brought conflict in mineral exploitation and utilization of various African countries.
- Students working below a minimum requirement level will require extra help if they are to catch up with the rest of the class.
- Students reaching at the minimum requirement level but achieved a little bit higher should be supported so that attain the higher achiever competencies students who fulfill the higher achiever competencies also need special support to contribute and achieve more.

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Check List

Check the student's performance according to the given competencies referring the questions under the check list for every unit. Put a tick (✓) mark against each task weather they are able to perform in the competencies of each unit. The students are expected to respond saying Yes or No. then, you can make your own evaluation whether the competencies are met or not.

Can you:

	Yes	No
1. Explain population size and growth in Africa? ----------		
2. Demonstrate population distribution of Africa using map? ----------		
3. Show regional variation of population in Africa? ----------		
4. Describe fertility and mortality of Africa? ----------		
5. Discuss characteristics of African population? ----------		
6. Elaborate the concept of migration and its type? ----------		
7. Discriminate the rate and level of urbanization in Africa? ----------		
8. Explain the rate of urbanization and associated socio - economic problems in Africa? ----------		
9. Describe the concept of economic growth and development? ----------		
10. Describe the concept of economic growth and development? ----------		
11. Analyze economic growth and development rend of Africa? ----------		
12. Realize the characteristics of African economy? ----------		
13. Explain how and why most countries of Africa may be judged as less developed? ----------		
14. Discuss the present features of African socio - economic development?		
15. Organize data of socio - economic growth and development to forecast the socio - economic challenges and prospects of Africa? ----------		
16. Predict the socio - economic challenges and prospects of Africa based on the organized data? ----------		
17. Relate major resources of Africa to its exploitation and development of Africa? ----------		

18. State the actual mineral extraction methods of Africa? ----------

19. Relate the paradox between the potential and the actual resources exploitation in Africa? ----------

20. Define for the advantage of peaceful mechanisms of conflict management around resource utilization in Africa against aggressive mechanism? --------

Minimum Learning Competency of Geography for Grade 11

Theme	*Competencies*
	Grade 11
I. The Science of Geography & research	• Examine the various definitions, scope of geography and arrive at sound judgment. • Compare and contrast the strength and weakness of various approaches of study in geography. • Distinguish the major elements of various schools of thought in geography. • Appreciate the relationship between geography and other disciplines.
II. Map Interpretation & Map Work	• Acquire the technique of drawing contour lines from given spot heights through interpolation. • Display relief on a contour map by using cross-section to show features of landforms. • Indicate drainage patterns on a map. • Interpret human made features by using conventional signs and symbols. • Discuss the concept of geographical information system (GIS)
III. Physical features of Africa & Ethiopia	• Describe the position, size and shape of Africa & their economic, political and social implications. • Use regional divisions of Africa to show geographical characteristics of the continent. • Relate geological & relief structure of Africa in relation to the continent's land formation. • Analyze the climatic variations of different areas in Africa. • Relate drought with desertification of Africa & Global warming. • Distinguish the major rivers, lakes, swamps, and drainage systems of Africa on a map & appreciate their characteristics. • Appraise the importance of African rivers & lakes. • Identify the major natural vegetation, wild animals and soil types of Africa and relate them in accordance with their geographical distribution.

Theme	*Competencies*
	Grade 11
IV. Population-socio-economic interface of Africa & Ethiopia	• Discuss the historical background and demonstrate the population growth and distribution of Africa. • Describe the changing characteristics of African population. • Examine how and why urban areas of Africa grow and appreciate rapid rate of urbanization. • Analyze the physical and cultural impact of human migration in Africa. • Discuss the similarities and differences between the concept of economic growth and development. • Distinguish the major characteristics of African economy and analyze the potential and existing economic cooperation among African countries. • Give a clear picture of the present features of African socio economic development in various ways. • Visualize and state the many challenges African face in the effort of socio-economic development and compare with the prospects. • Formulate points why and how cooperation and conflict are triggered and the involvement of countries around resources of Africa. • Confirm richness of Africa in its mineral and other resources. • Verify the role of selected partnership program for managing conflicts in utilizing resources of Africa.

Federal Democratic Republic of Ethiopia
Ministry of Education

Geography Syllabus

For
Grade 11

Introduction

Students at second cycle secondary education have already decided the broad stream-natural science/social science – in which their future area of study to be.
The purpose of second cycle secondary education are enabling learners choose subjects/areas of training to be attended in higher education within the framework of their respective preparatory stream, and preparing students for the world of work. Within these context students of social science stream at preparatory (11 and 12) level are expected to study one of the specialized fields of social sciences, language, business and management and law faculties.
Geography, as one of the offered subjects in social science stream of preparatory education, aims at providing learners with necessary foundations of knowledge, attitudes, and skills to manage future higher education academic carrier and world of work. This is possible by:-

- elaborating spatial relationships and peoples interaction with their natural and social environment through deeper understanding of such relationship;
- understanding of population resource balance in relation to sustainable development and poverty reduction;
- facilitating conditions to create citizens who have the attitude of informed appreciation and the understanding of the world as man's habitat within the context of global interdependence;
- fostering certain skills like map reading and interpretation, observation, gathering and recording data, and analysing data, and problem solving.

The provision of quality education has become the first line issue at present time of Ethiopia. Assessment and other feedback reports demanded the improvement of curriculum materials. Besides, the curriculum revision made at lower education levels subsequently demanded revision of curriculum at this level.
In addressing these issues the current grades 11 and 12 geography curriculum is founded on out come based learning which is defined in the new curriculum framework and in linen to the international standards. Thus, the present curriculum is organized in such a way that it is suitable to realize active learning methods and equate learner's performance with the specified competencies.
To enable users of this curriculum document understand it fully, it is made to contain:

- Profile of geography student at the end of grade 12 which reflects the contribution of attending geography lesson in bringing the desired general profile of learners at the end of second cycle secondary education.
- Minimum learning competencies for geography education of grades 11.
- Content flow chart of the cycle.
- Grade level learning outcomes of each grades 11.
- Respective syllabuses.

The competencies and content flow charts are organized around four themes – the science of geography and research, map interpretation & map work, physical features of Africa and Ethiopia, and population-socio-economic interface of Africa and Ethiopia. Using these themes, the syllabuses of each of grades (11 and 12) have been arranged in four units.
Thirty four weeks are allotted in a year to cover the lesson of each grade with four periods per week.
Profile of Geography students at the end of Preparatory Secondary School Grade 11.

Students:

- Can be capable to continue their education for further academic carrier in different human and business economics sciences using their geographical knowledge.
- Can conduct simple geographical research that demands data collection, organization, analysis, and evaluation.
- Can be active participants in collective works.
- Respect democratic values, rules and regulations.
- Become ready to participate in various citizenship activities by recognizing and appreciating:-
  - Cultural aspects (including languages and religions) and livelihood of various places.
  - Peaceful world co-existence in respect to territory and resources.
  - Sovereignty of states of the world.
- Become knowledgeable in the relationship of production-distribution-consumption.
- Are ready to find solution for problems using enquiry skills.

Second Cycle Secondary Education 11 Learning Outcomes in Geography

After completing Geography Education of Grades 11
Students will be able to:

- Show an appreciation for the importance of geography as a field of study by examining the various definition and scope of Geography and its relationship with other disciplines.
- Practice basic research methodologies of Geography to examine problems by employing the methods step by step.
- Use methods and procedures of reading and constructing various types of maps such as contour maps, maps representing settlement and human activities, distribution maps and topographic maps.
- Realize the impact of natural and human-made influences on sustainable development both in Ethiopia and Africa.
- Identify major economic activities of Ethiopia and Africa and be able to examine natural as well as human-made factors that affect their development.
- Aware the roles and responsibilities of international organizations in planning developmental programmes both for Ethiopia and Africa.
- Develop and use basic geographic knowledge and skills that are prerequisite for further education.
- Understand the many challenges and prospects Ethiopian and Africans face in the effort of socio economic development.
- Identify how and why conflicts are triggered around resources in Africa and assess ways of conflict resolution.

Grade level learning outcomes of Geography for Grade 11

1. **To develop understanding and acquire knowledge of:**
   - The meaning and scope of geography
   - The concept of determinism and possibilism in geography and environmental problems and the role of geography in bridging various fields of study.
   - Regional division, geological history, major relief structure, climate, climatic regions, rivers and water bodies, and natural vegetation and wild animals of Africa.
   - Types of contour lines, representing various landforms using contour lines and inter visibility over landforms.
   - Catchment areas, drainage patterns, stages of river valley development and river capture.
   - Representing settlement patterns on maps, shape and types of settlements on maps and factors influencing the siting of settlements.
   - Transport net work, representation, factors affecting development of transport network and shortest length of route for various land transport meanses on rugged landforms.
   - Relative and absolute location, size and shape of Africa.
   - Size, growth and distribution of population in Africa and thereby characteristics of population and migration of population in Africa including its urbanization.
   - Socio-economic development of Africa.
   - Major resources and utilization of Africa and conflict management around utilization of resources in the continent.

2. **To develop skills and abilities of:**
   - Drawing contour lines and constructing relief cross-section from contour maps.
   - Designing patterns of land transport routes on a given contour maps.
   - Demonstrate the relative and absolute location of Africa using world map.

3. **To develop the habits and attitudes of:**
   - Justifying the merits/demerits of approaches used in geography to study physical and human environment.
   - Appreciating the significance of quantitative revolution in geography.
   - Relating elements of geographical study with other fields of study.
   - Reflecting settlement related aspects on contour maps.
   - Appreciating the techniques of contour lines in representing various forms of land.
   - Demonstrating transport net work on contour maps.
   - Appreciating the unique land feature of Africa.
   - Realizing the economic use of African rivers and lakes.
   - Admiring natural vegetation and wild animals of Africa.
   - Realizing characteristics of African population and African economy.
   - Reflecting the paradox between the potential and the actual resource exploitation of Africa.
   - Defending the advantage of peaceful conflict management around resource utilization against aggressive mechanisms in Africa.

Unit One: The Science of Geography *(8 periods)*

***Unit Out comes*:** At the end of this unit students will be able to:

- Understand the meaning and basic concept of geography.
- Realize the scope of geography and its relationship with other disciplines.
- Discuss different approaches of geographic studies.
- Recognize major schools of thought in geography.

Competencies	*Main Contents*	*Suggested activities*
Students will be able to: • State the meaning of geography.	***1. The science of Geography*** **1.1 Meaning** *(1 period)*	• Students are asked to define the term geography for anybody that asks them. Then, give various definition of geography and let the students discuss and compare the given definition. Students justify why the definition which is selected as appropriate and being widely acceptable. At last, summarize the discussion and the comparison, and assist the students to arrive at a conclusion.
• Determine the scope of geography.	**1.2 Scope** *(1 period)*	• Students are asked to determine the scope of geography from their previous experience in grade 9^{th} and 10^{th}. For brainstorming "What is the concern and focus of geography? Why it focuses on it? Students, let, forward their idea and then consolidate the gist of the discussion by letting them to know the scope of geography-to biosphere, hydrosphere, litasphere and atmosphere.
• Justify the merit and demerit of approaches used to study physical and human environments.	**1.3 Approach** *(1 period)*	• Let students discuss on the concept approach in small groups and the teacher is expected to facilitate the conditions. Give a brief explanation on the two geographic approaches and let students justify the merit and demerits of these approaches.
• Compare and contrast the concept of determinism with possibilism.	**1.4 Major school of Thought in Geography** *(4periods)* • Possibilism • Determinism • Quantitative revolution • the emergence of	• Students are invited to argue for/against "Is it possible to think of development without having natural resources?" They can be provided the case of Japan and African countries to give life for the discussion. Human being has changed the natural environment to human made environment and made it suitable for his

Competencies	*Main Contents*	*Suggested activities*
• Show appreciation for the significance of quantitative studies. • Verify the importance of applied geography in solving social and environmental problems.	Applied Geography	survival. However, the environment influenced and shaped the way of living, settlement, economic system of human being. Although human being could overcome and minimize the influence of the environment, the environment still places its impact against human being. The students are asked to argue against for the theory of determinism i.e. the environment determines human life and activity or the theory of possibilism i.e. even if environment has undeniable impact against human life, it is possible to avoid or minimize this challenge. The students should be grouped into two and debate each other. Finally, consolidate the points by whole class discussion.
• Relate elements of geographical study with other fields of studies. • Explain the role of geography in connecting (bridging) various field of studies.	**1.5 The relationship between geography and other disciplines** *(1 period)*	• Geography is a discipline that shares facts, concepts, ideas and theories with various disciplines. Students are asked to identify the origin and sources of facts, concepts, ideas and theories of geography and discuss its relationship with other disciplines.

Assessment

- Students' performance has to be assessed continuously over the whole unit. The assessment will be made by comparing students' performance with the specified level of competencies. Besides, the teacher has to recognize the level of performance of each student and provide assistance accordingly, Thus:

Student at minimum requirement level

- A student at a minimum requirement level will be able to state the meaning of geography, determine the scope of geography, justify the merit and demerit of approaches used to study physical and human environments, compare and contrast the concept of determinism with possibilism, show appreciation for the significance of quantitative studies, verify the importance of applied geography in solving social and environmental problems, relate elements of geographical study with other fields of studies, explain the role of geography in connecting various fields of study.
- In addition, a student working above the minimum requirement level and considered as higher achiever should be able to:- compare and contrast the varied meaning of geography and show the strength and

weakness of varied definition of geography, explain the boundaries shared between geography and other fields of natural and social

science, differentiate the approach used in writing varied articles or textbooks, argue for/against how major school of thoughts in geography affect human life, prove/disprove the argument of determinism/possibilism, differentiate cases which are more appropriate to use qualitative method than quantitative method, give a brief explanation how applied geography has brought a significant changes in human life, write a short essay that shows how a given element is treated in geography and other field of studies.

Student below minimum requirement

- Students working below a minimum requirement level will require extra help if they are to catch up with the rest of the class.

- Students reaching at the minimum requirement level but achieved a little bit higher should be supported so that attain the higher achiever competencies students who fulfill the higher achiever competencies also need special support to contribute and achieve more.

Unit Two: Map Reading and Interpretation *(37 periods)*

***Unit Out comes*:** The students will be able to:

- Review the definition and properties of contour lines.
- Realize how contour lines used to represent relief features on map and types of contour.
- Acquire the skills of drawing contour lines, cross section and determine intervisibility.
- Assess the difference among watershed, catchment area; drainage patterns and river capture using contour maps.
- Discriminate settlements and communication features from contour maps.

Competencies	*Main Contents*	*Suggested activities*
Students will be able to:	**2. *Map reading and interpretation***	
	2.1 Relief representation on contour map. *(13* periods)	
• Draw contour lines from spot heights using interpolation.	**2.1.1 Drawing contour lines from heights** *(4 periods)*	• Demonstrate how to draw contour lines from a given spot heights. Then let them try to draw contour lines from spot heights using interpolation.
• Construct relief cross section to visualize feature of landscape.	**2.1.2 Drawing relief cross section (profile)** *(4 periods)*	• Give a brief explanation concerning the importance of drawing relief cross section. Then, show them how to draw a relief cross section. Students are motivated to perform each step of drawing relief cross section and there by determine weather intervisibility occurs between two points. On top of that, students are asked to differentiate factors/land forms that prohibit intervisibility between two points.
• Determine the intervisibility of land feature by section drawing or contour maps.	**2.1.3 Intervisibility** *(1 period***)**	
• Differentiate different land forms on contour maps.	**2.1.4 Land forms on contour map** *(3 periods)*	
• Identify types of contour lines.	**2.`1.5 Types of contour lines** *(1 period)*	• Students are given different contour maps that show different land forms and asked to differentiate each type of land form. Above all, they are expected to justify how they differentiate each land form type on a given contour map. Let them identify types of contour lines and discuss their importance.
	2.2 **Drainage on map** *(6 periods)*	
• Determine catchment areas from water shed on contour map.	**2.2.1 Watershed and catchment areas** *(2 periods)*	• Students are given a brief explanation how drainage features are presented on a contour map. Besides, they are asked to sort out and attempt to draw different drainage features such as watershed, catchment areas, and drainage patterns.
• Distinguish different drainage	**2.2.2 Drainage patterns** *(2 periods)*	

Competencies	*Main Contents*	*Suggested activities*
patterns • Demonstrate river capture • Demonstrate stages of river valley development using contour lines	**2.2.3 River capture and stages of river valley development** *(2 periods)*	
	2.3 **Study of human made features on maps** *(14 periods)*	
	2.3.1. Representation of settlement on maps *(4 periods)*	
• Distinguish various patterns of settlement on maps. • Interpret the shape of settlements.	• Signs and symbols • The shape of settlement	• Students are questioned to reason out factors that determine settlements sites and shapes. They are also asked to draw a map that shows settlement patterns using signs and symbols they learned in previous grade levels. In addition, they are also expected to explain types of settlement and their functions whether they are agricultural, pastoralist, industrialist, etc. At the end, they are given a map containing varied information such as its altitude, drainage features, minerals, forest density, slope, etc. Then, they are asked to decide where to find a new settlement and to justify why they recommend such site for a settlement. Finally, the class would discuss on the selected site.
• Explain the types of settlements • Estimate factors influencing the siting of settlement • Reflect the function of settlement	• Types of settlement • Factors influencing the siting of settlement • The function of settlement	
	2.3.2. The study of transport communication on maps *(8 periods)*	
• Demonstrate transport network • Examine factors affecting development of transport network • Design different patterns of land transport route on given contour map.	• Transport network • Factors affecting development of transport net work • Different patterns of transport network	• Students are motivated to suggest some ideas how a transport network is built and to identify factors that affect its construction. Then, they are given a brief explanation the techniques used to design different patterns of land transport routs. To stabilize the lesson, students are given, in groups, an assignment to design different patterns of land transport routs on a given contour maps.
• Identify various air fields on maps	• Air transport	• Students are given maps showing air fields of varied standards so that students can differentiate

Competencies	*Main Contents*	*Suggested activities*
• Compute the shortest length route for different vehicles and railways using their climbing capacity of each on contour map.	**2.3.3. Climbing capacities of vehicles including train** *(2 periods)*	them. • In addition, they are asked to search the shortest path for different vehicles and railways using their climbing capacity of each on contour map.
• Discuss what geographical information system (GIS) means. • Explain turning points in the development of GIS. • State the uses of GIS. • Show appreciation for the uses of GIS.	**2.4. Geographical Information System** (GIS) (*4 periods)* • What is geographical information system (GIS) • Turning points in the development of GIS (brief history) • Uses of geographical information system (GIS).	• Let students review what they learnt about geographical & national grid system in their 10^{th} grade i.e. how they found location of particular place using grid reference numbers. Then, assist learners to imagine what will happen to scale up this method by digitizing the data as input and read it as output using computer. • After learners are immersed in the discussion direct them to reach as what GIS means. Then, arrange a short whole class discussion and present points that inform learners the turning points in the development of GIS. • Finally, arrange small groups discussion so that students mention and discuss the uses of GIS in various aspects of fields and life. Encourage students to use one of the GIS softwares (like Google earth) in searching for a given place in the world.

Assessment

Student above the minimum requirement

Students' performance has to be assessed continuously over the whole unit. The assessment will be made by comparing students' performance with the specified level of competencies. Besides, the teacher has to recognize the level of performance of each student and provide assistance accordingly, Thus:

- A student at a minimum requirement level will be able to draw contour lines from spot heights using interpolation, construct relief cross section to visualize feature of the landscape, determine the intervisibility of land feature by contour maps, identify types of contour lines, determine catchments areas from watershed on countour map, distinguish different drainage patterns, demonstrate river capture, demonstrate stages of river valley development using contour lines, distinguish various patterns of settlement on maps, interpret the shape of settlements, explain the types of settlement, estimate factors influencing the siting of settlement, reflect the function of settlement, demonstrate transport network, examine factors affecting development of transport network, design different pattern of land transport route on given contour map, identify various air fields on maps, compute the shortest length route for different vehicles and railways using their climbing capacity of each on contour map, discuss what GIS means and turning points in the development of GIS, and state the use of GIS.

- In addition, a student working above the minimum requirement level and considered as higher achiever should be able to: differentiate different sources that show the heights of varied places, identify the origin of the place where elevation is measured as a datum, compute the altitude differences of varied land forms from a given map, justify why a cartographer uses different types of contour lines, differentiate factors that shape and govern drainage patterns, discuss the activity of a river at every course and its resulted land features, justify why settlement patterns varied in different environments. Use one of the GIS software to search for geographic information.

Students below minimum requirement

- Students working below a minimum requirement level will require extra help if they are to catch up with the rest of the class.
- Students reaching at the minimum requirement level but achieved a little bit higher should be supported so that attain the higher achiever competencies students who fulfill the higher achiever competencies also need special support to contribute and achieve more.

Unit Three: An Overview of Physical Geography of Africa *(56 periods)*

***Unit Out comes*:** The students will be able to:

- Understand the locational and geological aspect of Africa.
- Recognize the climate of Africa that is climatic elements, controls, regions and drought in Africa.
- Know and appreciate the characteristics of drainage patterns, lakes, swamps and their importance.
- Appreciate the natural vegetation and wild animals of Africa.
- Differentiate soils of Africa.

Competencies	*Main Contents*	*Suggested activities*
Students will be able to: • Demonstrate the relative and absolute location of Africa using world map. • Compare the size of Africa with other continents. • Discuss the impact of the coastal and continental shape of Africa on its development. • Describe the regional division of Africa. • Show the geographical location of each region. • Relate the sub regions in terms of size, access to the sea and major relief features. • Analyze the socio-economic and geo political	**3.** ***An overview of physical, geography of Africa*** **3.1. Position, size and shape of Africa** *(4 periods)* • Regional division of Africa • Major features of each sub-region of Africa • socio-economic and geo political similarities of each region	• Students are provided with world political map and asked to demonstrate the relative location of Africa in terms of geologic location with a reference to oceans, seas and continents. They are expected to show how Africa is bounded by Europe and Antarctica in the North and South America in the West. They should also explain how the water bodies surrounded Africa in all directions. Additionally, they also show the absolute location of Africa and explain that Africa is the only continent crossed by three imaginary lines drawn on the face of a map such as Equator, tropics of cancer and Capricorn. They also invited to discuss on the advantages and disadvantages of Africa's tropical location and compare its size with other continents. • Students are told to look at the shape of Africa on maps and are asked to explain what it looks like. They, would discuss in groups, the impact of the coastal and continental shape on Africa's development. The discussion is facilitated and summarized by the teacher. • Students are given a political map of Africa and requested to shade its regional division with varied colors. There by, they enlisted the member

Competencies	*Main Contents*	*Suggested activities*
similarities of each region.		states of each region. Each and every student has to carry out this activity. • Provide students with a map of Africa, so that they can distinguish the sub regions of Africa. Group the class into five and let them produce a report on the general characteristics of each region. They are also expected to discuss on the common features of each region. Provide them a table indicating the list of the countries according to their respective regions in which basic information are included. At the last give a brief summary of each region.
• Explain the geological history of Africa. • Identify major relief structures of Africa on a map. • Show appreciation to the unique relief features of Africa and compare it with that of Europe.	**3.2. Geological and relief structure of Africa** *(8 periods)* • Geological history •Relief structure	• Ask students to explain what geological history means. They, should be assisted to write down the geological history of Africa and draw its major relief structure on the map provided. They are also given an assignment to gather pictures, photographs, sketches and stamps that show the unique relief features of Africa. In the mean time, they are also told to write short essay that express their feeling towards the unique relief features of Africa.
• Review elements of weather and climate. • Identify major climatic controls of Africa.	**3.3. Climate** *(14 periods)* **3.3.1 Climatic controls** *(2 periods)* **3.3.2 Temperature condition** *(3 periods)*	• They are also asked to identify the role of climatic controls in Africa and to justify why the south eastern and southwestern, the northern tip and the southern tip, the interior part of the south and the eastern part of Africa experience different temperature and rainfall distribution.

Competencies	*Main Contents*	*Suggested activities*
• Describe the seasonal temperature conditions of Africa. • Discuss the seasonal distribution of rainfall in Africa. • Locate climatic regions of Africa. • Compare similarities and differences of climatic regions of Africa. • Relate climatic data with respective climatic regions of Africa.	**3.3.3 Rainfall distribution** *(3 periods)* **3.3.4 Climatic regions** *(4 periods)*	• Ask if they can explain why and how Sahara, Kalahari and Namib deserts appeared in Africa. Ask them, in groups, to suggest climatic regions of Africa based on rainfall distribution and temperature variation. They are also expected to suggest why these variations occur. At the end, summarize the discussion and give a brief explanation on this topic. This should be supported by climate maps.
• Discuss causes and consequences of drought in Africa. • Locate drought prone areas of Africa.	**3.3.5 Drought in Africa** *(2 periods)*	• Ask the students what they know about the concept drought and let them discuss in pairs on the causes and consequences of drought. They are also expected to explain why Africa is frequently affected by drought. Let them discuss on the relationship between droughts and famine. Provide them a map illustrating drought prone areas of Africa. Finally let them suggest measures to be taken in combating drought. The teacher should assist learners in every step and give a brief summary on the topic.
• Demonstrate major rivers and drainage systems of	**3.4 Drainage in Africa** *(10 periods)* **3.4.1 The major rivers and drainage system fo Africa** *(4 periods)*	• Let students discuss on factors that affect the drainage system of a given area. The discussion would gear with the major rivers and drainage system

Competencies	*Main Contents*	*Suggested activities*
Africa. • Discuss the characteristics of major rivers of Africa. • Identify the location of lakes and swamps in Africa. • Realize the economic uses of African rivers and lakes. • Analyze the hydro politics of the Nile River.	**3.4.2 General characteristics of African rivers** *(2 periods)* **3.4.3 Lakes and swamps in Africa** *(2 periods)* **3.4.4 The uses of African rivers and lakes** *(2 periods)*	of Africa, and in the course of the discussion, the concept of drainage basin, catchment area and drainage system should be addressed. • Organize the class in different groups and assign them to discuss on the general characteristics of African rivers. In addition, ask them to locate the lakes and swampy areas of Africa on map of Africa. Motivate them to relate artificial lakes and dams built on major rivers of Africa. On the top of that, question them to gather data that show the size, length and major tributaries of African rivers and lakes. • Ask students to produce a report on the hydro-politics of river Nile. Which countries are more beneficiaries from river Nile, which countries are the least beneficiaries? How and why? How could we create equity on the utilization of water resource in river Nile? Assist the students to discuss on the issue and to recommend what they feel as a solution for this. Assist them to discuss on the role of Nile Basin Initiative in this respect.
• Relate natural vegetation and wild animals with climatic regions. • Show appreciation for economic uses and types of wild animals in Africa. • Show interest to implement conservation measures used for natural vegetation and wild animals.	**3.5 Natural vegetation and wild animals of Africa** *(8 periods)*	• Case study: In some National parks and reserved areas of Ethiopia, the local/native people invaded the habitat of wild animals. For example, the Bale National Park is invaded and occupied by the local people. In addition, the species of endemic wild animals like red fox are under serious threat. In other areas, wild animals are fiercely attacking human being and invading human settlement due to habitat destruction. Ask students:- how can we avoid the problem and resolve the conflict? What should be done by the stake holders such as:- the native people, the local and federal government's, GO's and NGO's, professionals and civic society? Let them state the role and contribution of each stake holders and present it to the class. At the end, wrap up the

Competencies	*Main Contents*	*Suggested activities*
• State the major soils of Africa with their specific characteristics. • Relate the African soils with their respective climatic regions. • Analyze soil problems and measures of conservation in Africa.	**3.6. Soils of Africa (12 periods)** • Formation • Characteristics • Distribution	discussion with additional explanation on the economic uses and types of wild animals in Africa. • Students are invited to prepare a short essay on the definition, formation, major characteristics of soil, and factors that affect its distribution. Assign the aforementioned sub topics to different groups and let the group present its topic to the class. In addition, ask the students to discuss on the need of conservation and the measures to be taken to conserve natural vegetation and soil. Let the class debate on "What should the priority be – conservation of natural vegetation or conservation of soil?" Each side should back his argument with scientific analysis. At the end, let them explain what they ought to implant conservation measures at home and at school.

Assessment

- Students' performance has to be assessed continuously over the whole unit. The assessment will be made by comparing students' performance with the specified level of competencies. Besides, the teacher has to recognize the level of performance of each student and provide assistance accordingly, Thus:
- A student at a minimum requirement level will be able to demonstrate the relative and absolute location of Africa with other continents, discuss the impact of coastal and continental shape of Africa on its development, describe the regional division of Africa, explain the geological history of Africa, identify major relief structures of Africa on a map, show appreciation to the unique relief features of Africa with that of Europe, review elements of weather and climate, identify major climatic controls of Africa, describe the seasonal distribution of rainfall in Africa, locate climatic regions of Africa, compare similarities and differences among climatic regions of Africa, relate climatic data with different climatic regions of Africa, discuss causes and consequences of drought in Africa, locate drought prone areas of Africa, demonstrate major rivers and drainage systems of Africa, discuss the characteristics of major rivers of Africa, identify the location of lakes and swamps in
  Africa, realize the economic uses of African rivers and lakes, relate natural vegetation and wild animals with climatic region, show appreciation of economic uses and types of wild animals in Africa, discuss soil types and its distribution in Africa, show interest to implement conservation measures used for natural vegetation and soil.
- In addition, a student working above the minimum requirement level and considered as higher achiever should be able to:- explain the advantages and disadvantages of the tropical location of Africa, discuss the difference between compact and elongated shapes of a continent, justify why and how Africa possesses different relief structures, demonstrate how the apparent movement of the sun affects the climate of Africa, give a reason why some pocket areas of Africa, such as NW, SW, SE, the South interior part and the North interior parts, experienced a unique type of climate, discuss how rivers that cross international boundaries are administered by African countries that are touched by these rivers, prepare a short essay that shows how wild animals are endangered in Africa and the measures to be taken.
- Students working below a minimum requirement level will require extra help if they are to catch up with the rest of the class.
- Students reaching at the minimum requirement level but achieved a little bit higher should be supported so that attain the higher achiever competencies. Students who fulfill the higher achiever competencies also need special support to contribute and achieve more.

Unit Four: Population, Economy & Natural Resources of Africa *(35 periods)*

***Unit Out comes*:** The students will be able to:

- Describe the size, growth and distribution of population of Africa.
- Discuss determinants and characteristics of African population.
- Analyze the extent of migration and level of migration in Africa.
- Explain the concept economic growth and development and describe the characteristics of African economy.
- Assess the present features of African socio-economic development
- Distinguish indicators of development and analyze the challenges and prospects of African economic development.
- Recognize major resources, its exploitation and development.
- Appraise resource utilization and conflict management.

Competencies	*Main Contents*	*Suggested Activities*
Students will be able to: • Explain population size and growth in Africa. • Demonstrate population distribution of Africa using map. • Show regional variation of population in Africa. • Describe fertility and mortality of Africa. • Discuss characteristics of African population.	**4.** ***Population, Economy & Natural Resources of Africa*** ***4.1*** **Aspects of population, economy and natural resources of Africa**. *(13 periods)* **4.1.1 Population size, growth and distribution** *(4 periods)* **4.1.2 Determinants of population change in Africa.** *(2 periods)* **4.1.3 Characteristics of African population**. *(2 periods)* **4.1.4 Migration and**	• Give data that show population size, growth and distribution of Africa and ask them to shade the densely populated and the sparsely populated regions of Africa. Let them discuss the fertility and mortality patterns and the characteristics of African population. • In addition, they are also asked to elaborate the concept of migration, its type and positive and negative impacts on the source and destiny areas of migrants. Similarly, ask them to relate the impact of migration to the rate and level of urbanization in Africa. At the end, let students explain the socio economic problems associated with rapid rate of urbanization.

<table>
<tr><th>Competencies</th><th>Main Contents</th><th>Suggested Activities</th></tr>
<tr><td>• Elaborate the concept of migration and its type.
• Discriminate the rate and level of urbanization in Africa
• Explain the rate of urbanization and associated socio-economic problems in Africa.
• Describe the concept of economic growth and development.
• Describe the condition of utilizing resources in Africa
• Analyze economic growth and development trend of Africa.
• Realize the characteristics of African economy.</td><td>urbanization(5 periods)
• Migration
• Urbanization
4.2 Concept of economic growth and development (16 periods)
4.2.1 What is economic growth and development (2 periods)
4.2.2 Economic growth and development trend in Africa (4 periods)
• utilization of natural resources in Africa
• Indicators of development.
4.2.3 Characteristics of African economy</td><td>• Ask students the basic difference between the concept of economic growth and economic development. Are they one and the same or different but interrelated concepts? Which is a pre-requisite for the other? Or are they occur simultaneously? Can one exist with out the other? Let students argue for/against these questions and assist them to reach at a conclusion.
• Start the lesson by the following questions.
What would be an optimum rate of economic growth for Africa-high, medium or low? Completing the following table might help students reach a conclusion.
<table><tr><td>Arguments for high growth</td><td>Arguments for medium growth</td><td>Arguments for low growth</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>Students to reach their own conclusion then feed back to the class teacher pulls together the discussion.
• Provide data that show varied product items of African countries and let the students categorize each product under the major economic sectors. Then ask them to write a report on what they realize about the characteristics of African economy.
• Ask students to discuss on the present features of African-socio economic development. Are they promising or not? What would happen, if the existing socio economic development continues for the next decade? Shall Africans design a new plan to</td></tr>
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Competencies	*Main Contents*	*Suggested Activities*
• Explain how and why most countries of Africa may be judged as less developed • Discuss the present features of African socio-economic development. • Organize data of socio-economic growth & development to forecast the socio-economic challenges and prospects of Africa. • Predict the socio economic challenges and prospects of Africa based on the organized data.	*(4 periods)* **4.2.4 Present features of African socio-economic development***(2 periods)* **4.2.5 Challenges and prospects of economic development for Africa.** *(4 periods)*	improve the present features? What would be the role and contribution of NEPAD for the socioeconomic development of Africa? Let students prepare a paper on these issues and give them a clue how to prepare it and browse information from varied websites.
• Relate major resources of Africa to its exploitation and development of Africa. • State the actual mineral extraction methods of Africa. • Relate the paradox between the potential and the	**4.3 Natural Resources of Africa & its Politics** *(6 periods)* **4.3.1 Major resources of Africa** *(2 periods)* **4.3.2 Natural resource exploitation and mineral extraction methods in**	• Africa is a continent that possesses abundant resource both renewable and non-renewable. However, it is the least developed continent in the world due to un proper and poor utilization of its resources. The natural resource of Africa has not brought any significant change in the life of the natives rather it makes them poorer and poorer while their ex-colonizers became richer and richer. Those African countries that mined natural resources very well turning to be a battle field where civil war, anarchy and instability is a daily phenomena. The developed countries have strong economic interest in Africa, so they directly or indirectly in the political affairs of Africa. Ask students how they realize the exploitation of natural resources and its politics.

Competencies	*Main Contents*	*Suggested Activities*
actual resources exploitation in Africa. • Defend for the advantage of peaceful mechanisms of conflict management around resource utilization in Africa against aggressive mechanisms.	**Africa** *(2 periods)* **4.3.3 Resource utilization and conflict** *(2 periods)* • Resource utilization and conflict management	Choose an example of an issue where natural resources are a source of conflict. This might be the Congo, the Sudan, or another example. Hold a class debate on the issue. How might you settle such a conflict?

Assessment

- Students' performance has to be assessed continuously over the whole unit. The assessment will be made by comparing students' performance with the specified level of competencies. Besides, the teacher has to recognize the level of performance of each student and provide assistance accordingly, Thus

- A student at a minimum requirement level will be able to explain population size and growth in Africa using map, show regional variation of population of Africa, describe the fertility and mortality patterns in Africa, discuss the characteristics of African population, elaborate the concept of migration and its type, discriminate the rate and level of urbanization in Africa, explain the rate of urbanization and associated socio-economic problems in Africa, describe the concept of economic growth and development, realize the characteristics of African economy, discuss the present features of Africa, predict the socio-economic development, organize data of socio-economic growth and development forcast the socio-economic challenges and prospects of Africa, predict the socio-economic challenges and prospects of Africa based on the organized data, relate major resources of Africa to its exploitation and development of Africa, state the actual mineral extraction methods of Africa, relate the paradox between the potential and the actual resources exploitation in Africa, defend for the advantage of peaceful mechanisms of resource conflict management around resource utilization in Africa against aggressive mechanisms.

- In addition, a student working above the minimum requirement level and considered as higher achiever should be able to: discuss factors that regulate the fertility and mortality patterns of Africa, give a brief description of pushing and pulling factors of migration in Africa, prepare a short essay on the emergence of urbanization in Africa, analyze the concept of sustainable development, differentiate factors that hinder the realization of sustainable development, provide evidence how westerners have interfered and brought conflict in mineral exploitation and utilization of various African countries.
- Students working below a minimum requirement level will require extra help if they are to catch up with the rest of the class.
- Students reaching at the minimum requirement level but achieved a little bit higher should be supported so that attain the higher achiever competencies students who fulfill the higher achiever competencies also need special support to contribute and achieve more.