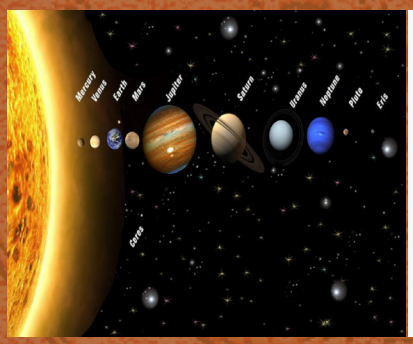
SOCIAL STUDIES

STUDENT TEXT BOOK

GRADE 7







Addis Ababa City Administration Education Bureau

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SOCIAL STUDIES
STUDENT TEXT BOOK
GRADE 7

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Unit One

Physical Characteristics of the Earth

Unit learning outcomes

After studying this unit, you will be able to:

- Explain the origin of the earth and the solar system;
- Describe the four components of the earth and their interaction;
- Explain the earth's internal layers and their characteristics;
- Identify direct and indirect sources of information regarding the interior layers of the earth;
- Identify major elements, minerals and rocks forming the crust of the earth;
- Analyze the spatial distribution and economic importance of rocks in Ethiopia.

Main contents

1.1. Origin of the earth and the solar system
1.2. External components and internal structure of the earth
1.3. Materials forming the crust of the Earth
1.4. The distribution and economic value of the different rock types in Ethiopia
- Unit Summary
- Review Exercise

1.1. Origin of the earth and the solar system

Competency: After studying this lesson, you will be able to:

- Discuss how the earth and other members of the solar system were originated and evolved to the present state

These are the words you should try to learn for this lesson

Top 5 words

- **Solar system**
- **Planet**
- **Meteoroid**
- **Sun**
- **Asteroids**

More Key words

- **Inner planet**
- **Outer planet**
- **Dwarf planets**
- **Orbit**

A. The origin of the Earth

Start-up questions

- ✓ What do you understand about the origin of the Earth and the solar system?
- ✓ Where did the Earth come from, and how it is formed?

The origin of the Earth is intimately related to the formation of the solar system. Some scientists believe that the sun, planets and other smaller bodies in the solar system were formed from a large flammable of hot swirling gases. The flammable was loosely packed gases, largely made up of hydrogen and helium, and dust particles. Gradually, the gases and dust particles drew together because of gravitational pull and formed a thin disc. Through time, the disc split into rings and kept spinning.

The spinning rings at the center formed the sun. The outer rings resulted in the formation of the eight planets, including the earth. Geologists estimate that the earth was formed 4.6 billion years ago.

Focus

Till August 2006, Pluto was considered a planet. However, in a Meeting of the International Astronomical Union, a decision was taken that **Pluto** like other celestial objects **(Ceres, 2003 and UB_{313})** discovered may be called "dwarf planets".

B. Members of the solar system

Our solar system is made up of a star, eight planets and countless smaller bodies such as dwarf planets, asteroids and meteoroids.

I. The Sun

The sun is the centre of the solar system. It is huge and made up of extremely hot gases. It provides the pulling force that binds the solar system. The sun is the ultimate source of heat and light for the solar system. But that tremendous heat is not felt so much by humans because despite being our nearest star, it is far away from us. The sun is about 150 million km away from the earth.

Things to do!

The earth orbit the Sun at a distance of about 150 million km. Light travels at a speed of 300,000 kilometers/second. How long does it take sunlight to reach the Earth? This sounds like a strange question, but think about it.

Focus

The sun is a star, just like many of the stars that you can see in the night sky. It is the largest object, comprising 99.8% of the system's mass.

II. Planets

What is planet? What is the name of the planet we live in?

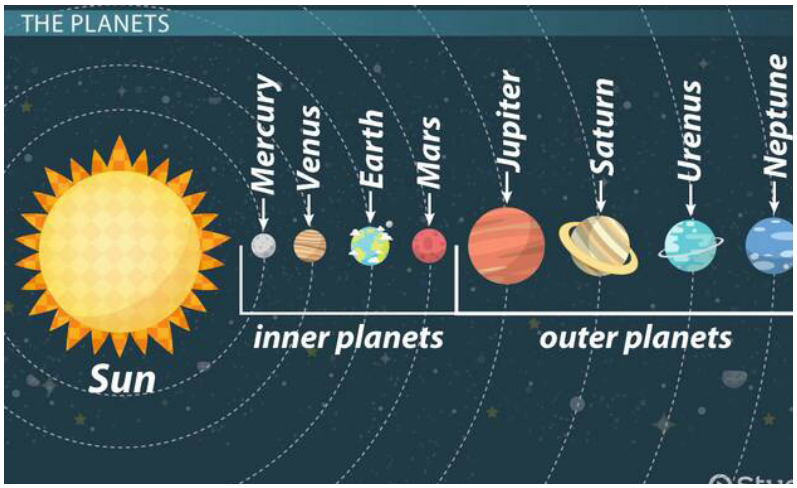


Figure 1.1 The Planets

The word 'planet' comes from the Greek word **"Planetai"** which means 'wanderers'. There are eight planets in our solar system. All the planets revolve around the Sun on paths called **o bits.** The orbit is elliptical in shape. Inorderoftheirdistancefromthesun,theyareclassifiedintotwo;innerplanetsandouterplanets.

Inner planets

The four planets closest to the Sun - Mercury, Venus, Earth, and Mars are the inner planets. They exist in solid state. Astronomers call them the **"terrestrial planets"** because they have solid and rocky surfaces. Compared to the outer planets, the inner planets are small in size.

Outer planets

Jupiter, Saturn, Uranus, and Neptune are the outer planets of our solar system. These planets are farthest from the Sun. The outer planets are much larger than the inner planets. Since they are mostly made of gases, they are also called **gas giants.**

III. Asteroids

Apart from the stars and planets, there are numerous tiny bodies which also move around the sun. An asteroid is a relatively small rocky body that orbits the sun. Most asteroids in our solar system are found in the main asteroid belt. They are found between the orbits of Mars and Jupiter.

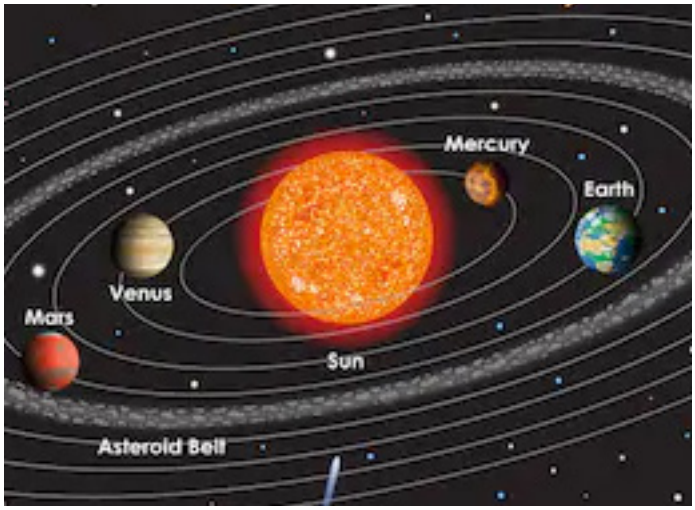


Figure 1.2 Asteroids belt

III. Meteoroids

Sometimes one asteroid can crush into another. This can cause small pieces of the asteroid to break off. The broken pieces of asteroid are called **meteoroids**. When a meteoroid enters the earth's atmosphere, it vaporizes and turns into a **meteor:** a streak of light in the sky. Because of their appearance, these streaks of light are sometimes called "shooting stars." Sometimes meteoroids don't vaporize completely in the atmosphere. In fact, sometimes they survive their trip through earth's atmosphere and land on the earth's surface. When they land on earth, they are called **meteorites**.

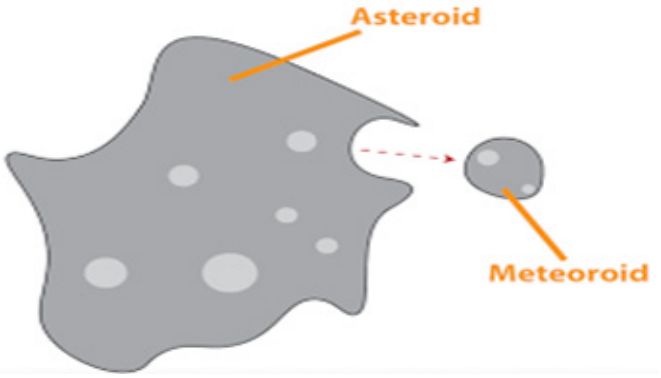


Figure 1.3 Asteroid and Meteoroid

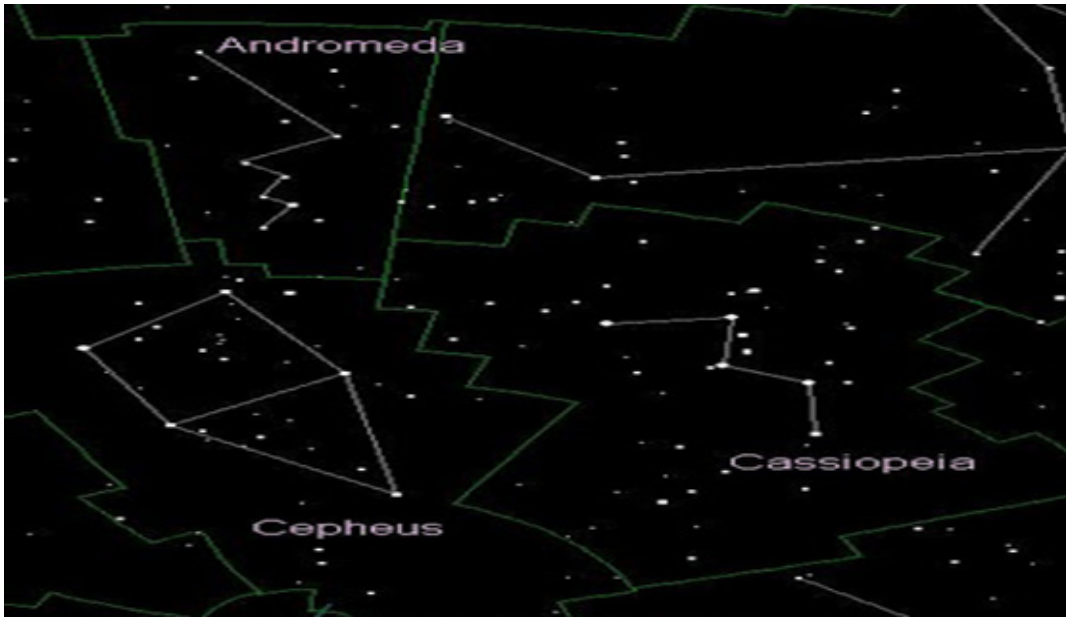


Figure 1.4 Constellations

Interesting Fact!

While watching the night sky, you may observe various patterns formed by different groups of stars, these are called **constellations.** Today there are a total of 88 constellations that cover the entire night sky including the Andromeda (Princess of Ethiopia), Cassiopeia (Queen of Ethiopia) and Cepheus (King of Ethiopia). You can see the patterns of constellation in figure 1.4.

Latin Name	English Name or Description
Andromeda	Princess of Ethiopia
Apus	Bird of Paradise
Aquarius	Water bearer
Cassiopeia	Queen of Ethiopia
Cetus	Sea monster (whale)
Cepheus	King of Ethiopia
Gemini	Twins

Source: https://starchild.gsfc.nasa.gov/docs/StarChild/questions/88constellations.html

Things to do!

Why the stars are not visible at the day time?

You'll need:

- 1 torch,
- 1 sheet of plain paper, pencil and a needle.

Steps:

1. Place the torch in the centre of the paper with its glass front touching the paper.
2. Now draw a circle around the torch.
3. Perforate the paper with the needle within the circled area.
4. Now place the perforated circle part of the paper on the glass front and cover the paper around the torch with a rubber band.
5. Take care that the switch of the torch is not covered.
6. In a dark room, stand at some distance facing a plain wall, switch off all other lights. Now flash the torch light on the wall. You will see numerous dots of light on the wall, the like stars shine in night.
7. Switch on all the lights in the room. All dots of light will be almost invisible.
8. You may now compare the situation with what happens to the bright objects of the night sky after the sun rises in the morning.

After you practice at home write a report and present to the class.



Activity 1.1

A. **Individual work**

1. What is 'Solar System'?
2. Name all the planets according to their distance from the sun.
3. Which one is the nearest planet to the sun?

B. **Group discussion**

Discuss the following question in small groups and present your discussion outcome through your group representative.

- How the earth and other members of the solar system were originated and evolved to the present state?



1.2 External components and internal structure of the earth

Competencies: After studying this lesson, you will be able to

- State the four components (subsystems) of the earth and their constant interaction;
- Distinguish the difference and similarity between direct and indirect sources information about the internal parts of the earth

These are the words you should try to learn for this lesson

Top 5 words

- **Atmosphere**
- **Hydrosphere**
- **Components**
- **Biospehere**
- **Lithospehere**

More Key Words

- **Core**
- **Crust**
- **Mantle**

1.2.1. External Components of the earth

Start-up questions

- ✓ Do you know what each of these spheres represents - lithosphere, hydrosphere, biosphere and atmosphere?
- ✓ Are these external components or sub systems interacted?

The physical environment of the earth can be divided into four components or sub systems. They are the **"lithosphere"** (land), **"hydrosphere"** (water), "**biosphere"** (living things) and the "**atmosphere"** (air).

A. The lithosphere

The lithospehere is the solid or rock part of the Earth. It is the coolest and most rigid part of the Earth. It is an irregular surface with various landforms such as mountains, plateaus, plains, valley etc. The surface of

Word Origin

Many words used in a language may have been taken from some other languages. The following words are having origin from Greek words.

Atmos– meaning vapor

Hydro – meaning water

Bio – meaning Life

Lithos – meaning Stone

Things to do!

Discuss the following question in small groups and present your discussion outcome through your group representative.

1. List the name of highest mountains, major rivers, and plants grow in your locality.
2. Associate the features you have listed with the components of the earth (to which components of the earth they belong?

the lithosphere is very uneven. There are highest mountains like Ras Dejen (Ras Dashen), and lowest places like Dallol depression in Ethiopia.

B. **The Hydrosphere**

The hydrosphere is the water section of the earth. The hydrosphere contains all of the water on earth in liquid, solid and vapor form. They can be found in oceans, seas and lakes etc.The oceans are the most prominent features of the hydrosphere, covering nearly 71 percent of the earth's surface and 97 percent of earth's water.

C. **The Biosphere**

The biosphere is part of the earth's surface where living things exist. It is concentrated near the surface in a zone that extends from the ocean floor upward for several kilometers into the atmosphere.

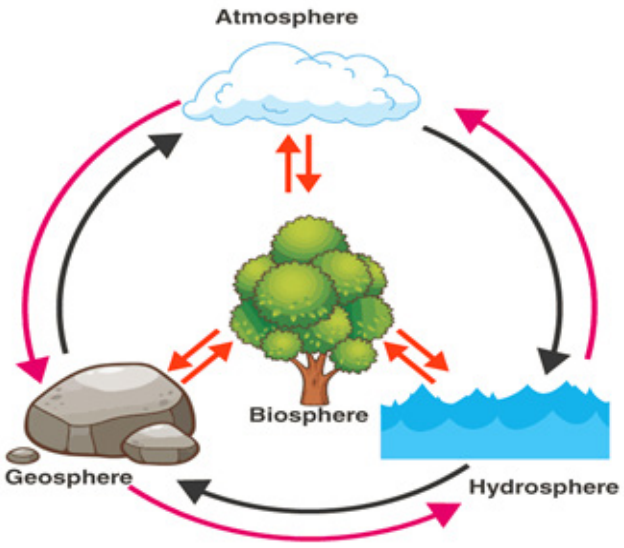


Figure 1.5 Components of the Earth and their interaction

D. The Atmosphere

Atmosphere is the envelope of air that surrounds the earth. It is a mixture of gases. The most abundant gas in the atmosphere is nitrogen (78%). Nitrogen enters the atmosphere when volcanoes

Figure 1.6 Composition of the atmosphere

erupt and when dead plants and animals decay. The second most abundant gas in earth's atmosphere is oxygen (21%). Oxygen is primarily produced by plants.

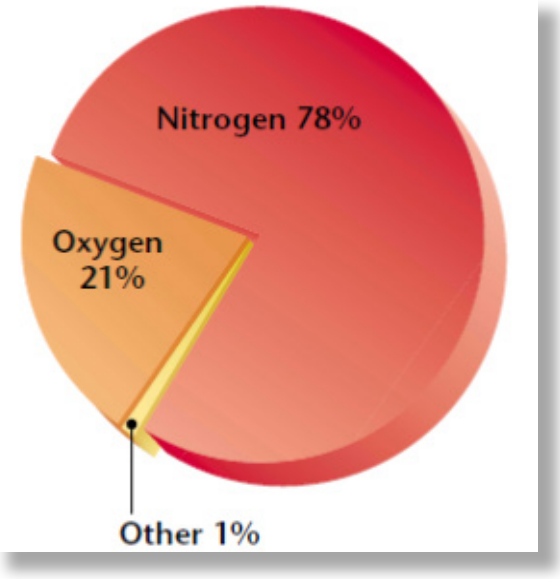
Nitrogen and oxygen accounts for about Ninety-nine percent of the gases. Gases including argon, carbon dioxide, methane, and water vapor make up the rest of the atmosphere.

Things to do!

Discuss the following question in small groups and present your discussion outcome through your group representative.

- State the four external components of the earth and discuss their interaction?

The components (sub systems) of the earth is highly interacted eachother. The interaction of these systems influences every environment on Earth. Tall mountains, for example, often have lower temperatures than valleys or hills. In high-altitude mountain ranges, the lithosphere interacts with the thinner air and precipitation to create a cool or even icy climate zone. Over time, plants and animals have adapted to life in these unique environments.



How do earth's spheres interact?

The earth is an integrated system that consists of rock, air, water, and living things that all interact with each other. Scientists divide this system into four parts. These are the lithosphere, hydrosphere, biosphere and atmosphere. The spheres are closely connected. For example,

- Many birds (biosphere) fly through the air (atmosphere), while water (hydrosphere) often flows through the soil (lithosphere).
- Human beings from the (biosphere) walk on the ground (the lithosphere); breath the air (the atmosphere); and drink the water (the hydrosphere). We could not exist without any one of these systems.

Interactions also occur among the spheres. For example a change in the atmosphere can cause a change in the hydrosphere, and vice versa. Examples:

- Humans (biosphere) built a dam out of rock materials (lithosphere)
- Humans (biosphere) harness energy from the water (hydrosphere) by having it spin turbines (lithosphere) to produce electricity.

1.2.2. Internal structure and sources information about the internal parts of the earth

1.2.2.1 Sources of information about the internal parts of the earth

Start-up questions

List out the various sources of information about the interior of the earth?

How do we get information about the interior of the earth?

Human lives on the surface of a globe that has a radius of nearly 6500 km, yet no one has ever penetrated more than a few kilometers below the solid earth. The knowledge about the internal parts of the earth is obtained from direct sources and indirect sources.

A. Direct sources

The direct source of information about the internal parts of the earth includes rock materials from **mining** areas and molten magma from **volcanic eruptions.** Besides scientist are working on "**deep ocean drilling** projects".



Figure 1.7 The Kola Super deep holes, the deepest manmade hole on Earth

i. Mining

Mining is the process of extracting useful materials from the earth. The gold mining that is being undertaken in the Republic of South Africa enabled human beings to secure rock sample from a depth of 3 – 4 km beneath the surface.

ii. Volcanic eruption

Volcanic eruption forms another source of direct information. When the molten material (magma) thrown in to the surface of the earth, during volcanic eruption it becomes available for laboratory analysis.

iii. Deep ocean drilling projects

Many holes have been dug for research purpose. The deepest hole by far is on the Kola Peninsula in Russia, referred as the ***"Kola well".*** The deepest drill at Kola, has so far reached a depth of 12km. This and many deep drilling projects have provided large volume of information through the analysis of materials collected at different depth.

B. Indirect Sources

The vast interior of the earth is largely inaccessible to direct study. The indirect sources of information about the internal part of the earth are obtained from **earth quake wave** and by studying the **meteorites** that fall to the earth.

i. Earth quake wave

An earth quake wave is one of the most important sources of information about the interior of the earth. An earth quake is simply the shaking of the earth. It is a natural event. It is caused due to release of energy, which generates wave that travel in all direction. The wave generated by an earth quake tells us a lot of things about the material property of the interior of the earth.

ii. Study of meteorites that fall to the earth

The materials and the structures observed in the meteorites are similar to that of the earth. The analysis indicated that the core of the meteorites consists of iron and nickel. Since the earth is a celestial body like that of the meteorite, it can easily inferred that our earth also contain iron and nickel in its core.

1.1.1.1 Internal structure of the earth

Start-up questions

How do you describe the structure of the earth?

How many layers are there?

The structure of the earth's interior is basically divided into three layers. These are crust, mantle and core.

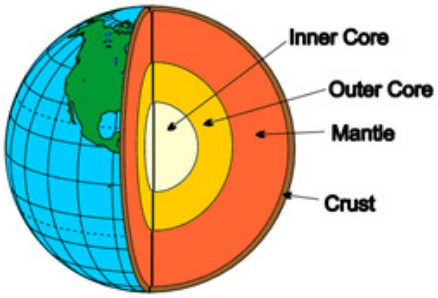


Figure 1.8 Structure of the Earth

A. Crust

The crust is the outermost and thinnest layer of the earth. It has two different parts: **continental crust** and **oceanic crust**. The average thickness of continental crust is about 30 to 40 km. In contrast oceanic crust is between 5 to 6 km thick. The crust consists of hard and strong rock. Major constituent elements of the crust are **Silica** (Si) and **Aluminum** (Al) and thus, it is often termed as **SIAL.**

B. Mantle

The portion of the interior below the crust is called the mantle. The mantle is about 2,900km thick, and takes up 84% of Earth's volume. The mantle is the thickest layer of the earth. The major constituent elements of the mantle are **Silicon** and **Magnesium** and hence it is also termed as **SIMA.**

C. Core

The core is the innermost layer of the earth. It is composed mainly of and **Nickel** (Ni) and **Iron** (Fe) hence it is also called as **NIFE**. The cores temperature is about 6000^0c. The core constitutes nearly 15% of earth's volume. The core has two layers: an inner core that is solid and an outer core that is liquid (or semi-liquid). In the inner core the force of gravity is so intense that the molten metal (iron and nickel) is compressed in to a solid material.

Focus

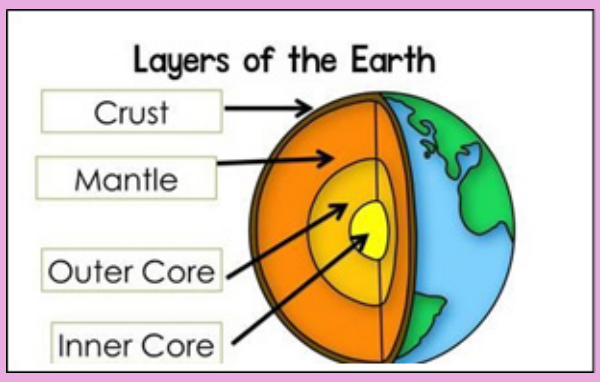
You can think of the earth like an apple with three layers – skin, flesh and core. Except, in the earth, the layers are called the crust, the mantle and the core.

Activity 1.2



A. Individual work

1. Name the three layers of the earth?
2. Which layers of the earth is the outermost and thinnest?
3. List out the various sources of information about the interior of the earth?
4. Which layers of the earth accounts about 15% of the earth's volume?
5. Using the following picture, label the layers of the earth that make up the structure of the earth?



B. Group discussion

Discuss the following question in small groups and present your discussion outcome through your group representative.

1. State the four components (sub systems) of the earth and explain their constant interaction?
2. Discuss why inner core become solid?



1.3 Materials forming the crust of the Earth

Competencies: After studying this lesson, you will be able to

- Identify major elements, minerals and rocks forming the crust of the earth;
- Analyze how and why different earth's materials are differentiated into different layers;

These are the words you should try to learn for this lesson

Top 10 words

- **Elements**
- **Minerals**
- **Igneous rock**
- **Metamorphic rock**
- **Sedimentary rock**
- **Volcanic rock**
- **Plutonic rock**
- **continental crust**
- **Oceanic crust**
- **Metamorphism**

More key words

- **Oxygen**
- **Basalt**
- **Rock**
- **Magma**
- **Lava**
- **Granite**

1.3.1 Major Elements

Start-up questions

- ✓ What type of material makes up the earth's crust?
- ✓ Name the major elements present in the earth's crust?

Earth's crust is made up of several elements. These elements are in a solid form in the outer layer of the earth and in hot and molten form in the interior. About 98% of the total crust of the earth is composed of eight elements. As you can see from the table (table 1.1) the most abundant elements in the Earth's crust are oxygen, silicon, aluminum, iron, calcium, sodium, potassium, and magnesium.

Table 1.1 Weight percentage of the most abundant elements the earth's crust

Elements	Relative abundance (%)
Oxygen (O)	46.6
Silicon (Si)	27.72
Aluminum (Al)	8.13
Iron (Fe) 5	.00
Calcium (Ca)	3.63
Sodium (Na)	2.83
Potassium (K)	2.59
Magnesium (Mg) 2	.09
Others 1	.41

Source: Data of Geochemistry, sixth edition, Michael Fleischer (1967)

1.3.2 Major Minerals

Start-up question

✓ What are the major minerals forming the crust of the earth?

The materials that the earth's crust is made of are called rocks, and all rocks are made of minerals. There are many known mineral species, but the vast majority of rocks are formed by combination of a few common minerals, called rock forming minerals. Minerals, the building blocks of rocks, are inorganic solids with a specific internal structure and a definite chemical composition. Major rock forming minerals are those minerals which are found in abundance in the rocks of the earth's crust. Refer the (table 1.2) which shows the major rock forming minerals: such as silicates, Oxides, Carbonates, Sulfides etc are the major rock forming minerals.

Table 1.2 Major rock forming minerals

Mineral group	Example
Silicates	Mica, feldspar, olivine
Oxides	Quartz, Magnetite,
Carbonates	Calcite, Dolomite etc
Sulfides	Pyrite, Galena
Sulfates	Gypsum
Chlorides	Rock salt

1.3.3 Major rocks forming the crust

Start-up questions

- ✓ List the major rocks forming the crust of the earth?
- ✓ How different rocks are formed?

On the basis of their mode of formation (origin), rocks of the Earth's crust are classified into three. These are igneous, sedimentary and metamorphic rocks.

1. Igneous rock

The word igneous was derived from the Latin word **"ignis",** which means fire. Igneous rocks are formed when molten rock (magma) cools and solidifies either on the surface or inside the surface. Sometimes the hot rock erupts, on the surface. Magma that gets to the surface is called **lava.** There are two main types of igneous rocks. These are extrusive and intrusive igneous rocks.

A. **Extrusive igneous rock**

Extrusive igneous rocks are also called volcanic rocks. They are formed when magma cools and solidifies on the surface of the earth. An abundant and important example is basalt and obsidian.

B. **Intrusive igneous rocks**

Intrusive igneous rocks are also called plutonic rock. They are formed when magma cools and crystallizes within the interior of earth. Granite is the most abundant intrusive igneous rock.

Focus

Magma is a name for molten rock material found below the Earth's surface, and this name changes to lava when magma reaches the Earth's surface. It is produced in the earth's interior at a depth of about 60 to 200km where temperature is between 900 ^{o}c and 1600^{o}c

2. **Sedimentary rock**

The term sedimentary was derived from the Latin term **"sedimentum",** which means settling (laid down). Sedimentary rocks are formed when sediments come to settle in a certain areas after they have been transported in to those areas by various erosion agents. Most of these types of rocks are formed in rivers, seas and oceans. Sedimentary rocks differ from other types of rocks for the fact that it has layers. A layer indicates the amount of sediment deposited at a time. The bottom layer is the oldest and the hardest of all the layers deposited above it while the top layer is the youngest and the softest.

Sedimentary rocks contain fossils which indicate evidences of past events. These rocks are ware house of major energy resources, such as coal, petroleum and natural gas.



Figure 1.9 Sedimentary rocks, laid down in layers

3. Metamorphic rock

Start-up questions

How metamorphic rocks are formed?

What is Metamorphism? What are the agents of metamorphism?

Metamorphic rocks get their name from the Greek words **"meta"** meaning change, and **"morpho"** meaning form. Metamorphic rock results from changes in other kinds of rocks. They are produced from pre-existing igneous, sedimentary, and even other metamorphic rocks through heat and pressure inside the earth's crust. Sometimes they are called **changed rocks.** Marble is an example of metamorphic rock. It is formed from limestone (sedimentary rock).

Focus

Metamorphism involves the transformation of pre existing rocks, i.e igneous and sedimentary rock and other qualitatively different rocks. Heat and pressure are the most important agents of change of igneous and sedimentary rocks into metamorphic rocks.

Limestone → **Heat and Pressure** → Marble

Activity 1.3



A. **Individual work**

1. How the different types of rocks are formed?
2. Mention the names of the different types of igneous rocks?
3. List the major elements forming the crust of the earth?
4. List the major minerals forming the crust of the earth?
5. What are the most important agents of metamorphism?

B. **Group discussion**

Discuss on the following question in small groups and present your discussion outcome through your group representative.

1. State the main difference between intrusive and extrusive igneous rock?
2. Discuss on the major elements, mineral and rocks forming the crust of the earth



1.4 The distribution and economic value of the different rock types in Ethiopia

Competency: After studying this lesson, you will be able to

- Describe the distribution and economic value of the different rock type in Ethiopia

Start-up questions

- ✓ Which areas of Ethiopia are largely covered by igneous, sedimentary and metamorphic rocks?
- ✓ List the different uses of rocks in your locality?

A. Distribution of rocks

The igneous, sedimentary and metamorphic rocks are found in different parts of Ethiopia. As you can see from the map (figure 1.10) igneous rocks cover large areas in the central part of the country. Eastern Ethiopia is mainly covered with sedimentary rocks. Metamorphic rocks are found in the northern, western and southern edges of the country.

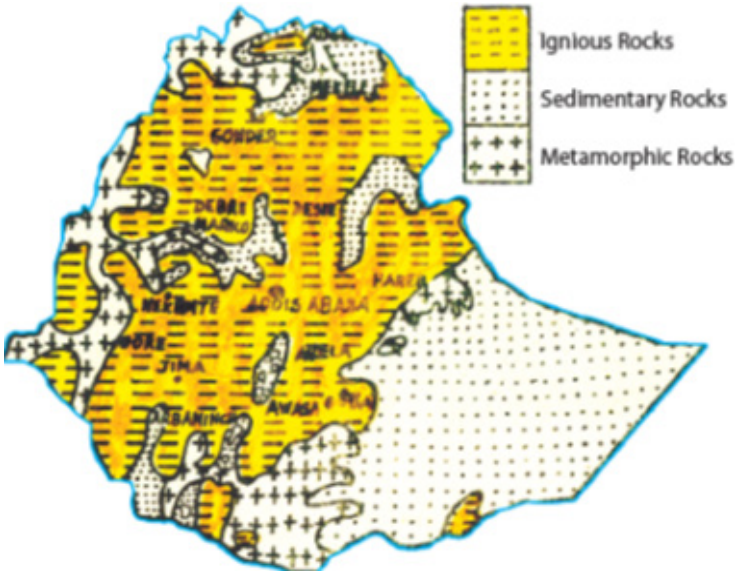


Figure 1.10 Distribution of the major outcropping rocks in Ethiopia

B. Economic importance of rocks in Ethiopia

Rocks have a broad range of uses that makes them significantly important to human life. These include:

A. **Source of fuel:** Sedimentary rocks like coal are a source of fuel for industrial use.
B. **Construction purpose**: Some rocks like granite and sandstone are quarried and used for road, bridge and building construction. Rocks like marble can be polished as an ornament for decorating floors, walls of buildings etc
C. **Source of food nutrient**: Rock salt such as sodium chloride from sedimentary rock provide minerals used in cooking.
D. **Formation of soil:** Soils are formed from the disintegration of rocks.

Table 1.3 Economic importance of rocks

Major Rocks	Associated mineral	Importance
Metamorphic rock	Metallic minerals, such as - gold, - nickel, - diamond, - copper, - uranium, iron, platinum and lead	-Decorative and Jewelry materials -Construction, -Electrical wire making, -industrial machinery production etc
Sedimentary rock	Mineral fuels, such as - coal - petroleum - natural gas - limestone, and gypsum	- Energy sources - Construction - Writing materials
Igneous rock	Basalt, granite, sand etc	Building and construction materials

Activity 1.4



A. **Individual work**

1. What type of rock is dominant in Addis Ababa and its surrounding? (refer figure 1.10, distribution of the major outcropping rocks in Ethiopia)
2. List down the uses of rocks?

B. **Group discussion**

Discuss on the following question in small groups and present your discussion outcome through your group representatives.

1. Is it possible to learn of past conditions of the earth by studying sedimentary rocks?
2. In a group, walk around your school compound and its surroundings. Collect samples of several types of rocks and bring them back to the classroom. Finally, report to the class about the uses of rocks you have collected in your locality?





UNIT SUMMARY

In this unit, we have discussed the physical characteristics of the earth. We discussed how the earth and other members of the solar system were originated and evolved to the present, explained the external components and internal structure of the earth, examined the materials forming the crust of the earth and we have described the distribution and economic value of the different rock type in Ethiopia.

- The origin of the earth is related to the formation of the solar system. The sun and the sun's family (planets, asteroids, meteors etc) were formed from a large filament of hot whirling gases. Finally as a result of long time processes the sun and the planets were formed.
- Geologists estimate that the earth was formed 4.6 billion years ago.
- The four components (sub systems) of the earth are the lithosphere, hydrosphere, biosphere and the atmosphere.
- The knowledge about the internal parts of the earth is obtained from direct sources and indirect sources.
- The internal structure of the earth is divided in to three major components: the crust, the mantle and the core.
- The materials that the Earth's crust is made of are called rocks, and all rocks are made of minerals.
- On the basis of their mode of origin, rocks of the Earth's crust are classified into three: igneous, sedimentary and metamorphic rocks.
- Rocks are used as a source of fuel, construction and serves as a source of food nutrients

Glossary

Asteroids: a relatively small rocky body that orbits the sun.

Atmosphere: the envelope of air that surrounds the earth, held in place by gravity.

Biosphere: part of the earth's surface where living things exist.

Celestial bodies: refers to the sun, the moon, and all those objects shining in the night sky.

Constellation: The patterns of stars seen in the sky

Core: the central layer of the earth which is composed of nickel and iron.

Crust: the outer surface or layer of the earth

Hydrosphere: is the water surface of the Earth including oceans, seas and lakes.

Lithosphere: the solid or rock part of the Earth.

Magma: Molten rock beneath the surface of the earth.

Mantle: an intermediate layer of the earth. It is found between the crust and the core layers of the earth

Meteors: Shooting star; fragment of solid matter which enters the upper atmosphere from outer space.

Minerals: naturally occurring inorganic solids with a specific internal structure and a definite chemical composition.

Orbit: the path each planet follows when it moves around the sun

Planet: a spherical object that orbits around a star

Rock: a solid material that comprises the earth's crust. They are made of minerals. In turn minerals are made up of elements.

Solar system: the sun, the eight planets and all other objects that revolve around the sun.

REVIEW EXERCISE FOR UNIT ONE

I. True or False

Direction: Write "True" if the statement is correct and write "False" if it is incorrect

_____1. The core of the earth consists of nickel and iron.

_____2. The layer of the earth beneath the mantle is core.

_____3. The crust is the innermost layer of the earth.

_____4. Mineral fuels such as coal, petroleum and natural gas are associated with metamorphic rocks.

_____5. An earth quake wave enables us to acquire information about the interior of the earth.

_____ 6. Rock is a solid material that comprises the earth's crust.

II. Matching

Direction: Match the items in column "A" with items in "B"

	A		B
_____	1	Lithosphere	A. The water section of the earth
_____	2	Hydrosphere	B. The cultural landscape of the Earth
_____	3	Atmosphere	C. The part of the earth that supports all sorts of life
_____	4	Biosphere	D. The gaseous envelop of the Earth
			E. The solid or rock part of the earth

III. Multiple choices

Direction: Choose the correct answer from the given options.

_____ 1. The type of rock that shows layered arrangement is:

A. Igneous
B. Metamorphic
C. Sedimentary
D. Magma

_____2. Which is the third nearest planet to the sun?

A. Venus
B. Mercury
B. Earth
D. Mars

_____3. How long does it take for the Sun's light to reach Earth?

A. 10 minutes B. 8 minutes C. 7 minutes D. 12 Minutes

_____4. Which of the following two important elements constitute the earth's innermost core?

A. Potassium and Magnesium
B. Silicon and Aluminum
C. Nickel and Iron
D. Magnesium and Silicon

IV. Fill in the blank

Direction: Fill the following blanks with appropriate word(s)

1. The star from which we get light and heat is _____.

2. All the planets revolve around the Sun on paths called _____which is_____ in shape.

3. _____ is naturally occurring inorganic solids with a specific internal structure and a definite chemical composition.

V. Short answer

Direction: Give short answers for the following questions.

1. How the earth and other members of the solar system formed?

2. How many planets are there in our solar system? List them

3. Write down the direct and indirect sources of information about the interior of the earth?

Check List

Put a tick (√) mark in each of the boxes for activities you can perform

I can

1	Discuss how the earth and other members of the solar system were originated and evolved to the present state	☐
2	State the four components (sub-systems) of the earth and their constant interaction	☐
3	Distinguish between direct and indirect sources information about the internal parts of the earth	☐
4	Identify major elements, minerals and rocks forming the crust of the earth	☐
5	Analyze how and why different earth's materials are differentiated into different layers	☐
6	Describe the distribution and economic value of the different rock type in Ethiopia.	☐

Unit Two

Human Evolution and World Population

Unit learning outcomes

After studying this unit, you will be able to:

- Explain the origin of human beings;
- Point out the archeological sites that show the origin of earlier human beings;
- Discusses world population growth distribution;
- Calculate different demographic rates;
- Evaluate the role of different mode of transportation;
- Identify and show significant road signs

Main Contents

2.1 Human Evolution

2.2 Trend of World Population

2.3 People and the Development of Transportation

- Unit summery
- Review Exercise

2.1. Human Evolution

Competencies: After studying this lesson, you will be able to

- Point out archeological sites that show the origin of earlier human beings;
- Examine the historical routes humankind has passed through over time;

These are the words you should try to learn for this lesson

Top 10 words

- **Evolution**
- **Fossil**
- **Genus homo**
- **Bi-pedal**
- **Homo**
- **Hominids**
- **Homo habilis**
- **Homo erectus**
- **Homo sapiens**
- **Pre-history**

More key words

- **Archeology**
- **creationist**

2.1.1. Archeology and archeological works

Start-up question

- ✓ What is Archeology?

Archeology is the science in which archeologists dig out material objects and fossils of the past. It helps us in the study of pre-history. Pre-history was the distant past before the beginning of writing and recording. Fossils are the remains of dead plants, human beings and animals. Therefore, the study of fossils and other material remains of the past help us to reconstruct what happened before the art of writing started.



Figure 2.1 Artifacts and fossils

2.1.2. Origin of the first human beings

Start-up question

- ✓ Distinguish the difference between the Creationist theory and the scientific theory?

With regard to the origin of human beings, there are two theories suggested.

These are: creationist theory and scientific (evolution) theory

Creationist theory said that human beings were created by God. Those who believe in the assumption that God creates humans and the whole universe are Creationists.

The Scientific theory believe that human beings and other living things are the result of gradual and natural process of changes that took millions of years. English Scientist, Charles Darwin (1809-1882) explained about evolutionary process.

Hominids were the ancestors of human beings. Human beings belong to the species called homo sapiens. Australopithecines (southern ape) were the earliest (the first)

human species that was appeared in Africa around 6 million years ago. Its fossils were discovered in Ethiopia, Kenya, South Africa and Chad.

The fossil remains of Australopithecus Afarensis, Known as *Lucy* or *Dinikensh*, were found in 1974 at Hadar, in the Afar region, Ethiopia. Afarensis may have been ancestor of Genus Homo.

2.1.3. Historical paths human kind passes over time

There are different species that belong to genus homo are: homohabilis, homo erectus and homo sapiens.

The homo habilis (handy human being) is considered to be the oldest human being that appeared in Africa. Its fossils were found at Olduvia Gorge in Tanzana, at lake Turkan in Kenya and in the Omo valley in Ethiopia.

Home erectus (up right walking human being) was the first human being to master the use of fire and the earliest species to migrate from Africa to other part of the world. Its fossils discovered in Ethiopia in the Omo Basin, Melka-Kunture, Konso-Gardula and Middle Awash.

Homo sapiens (wise human being) were very similar to modern human being. Fossils of this species were found in the Awash and Omo valleys and in the areas near Dire Dawa. Modern beings appeared about 40,000 years ago in Africa. They are different in many ways from their ancestors. They have large brains, are bi-pedal and wake erect, use languages, develop culture, invent tools and transmit knowledge from generation to generation

Focus

There are three stages through which the Homo species passed before the emergence of modern humans. These are:-

1. Homo habilis-i.e. able to make tools
2. Homo erectus-i.e.able to erect upright and walk
3. Homo sapiens-i.e. knowledge is the distinctive feature of modern human

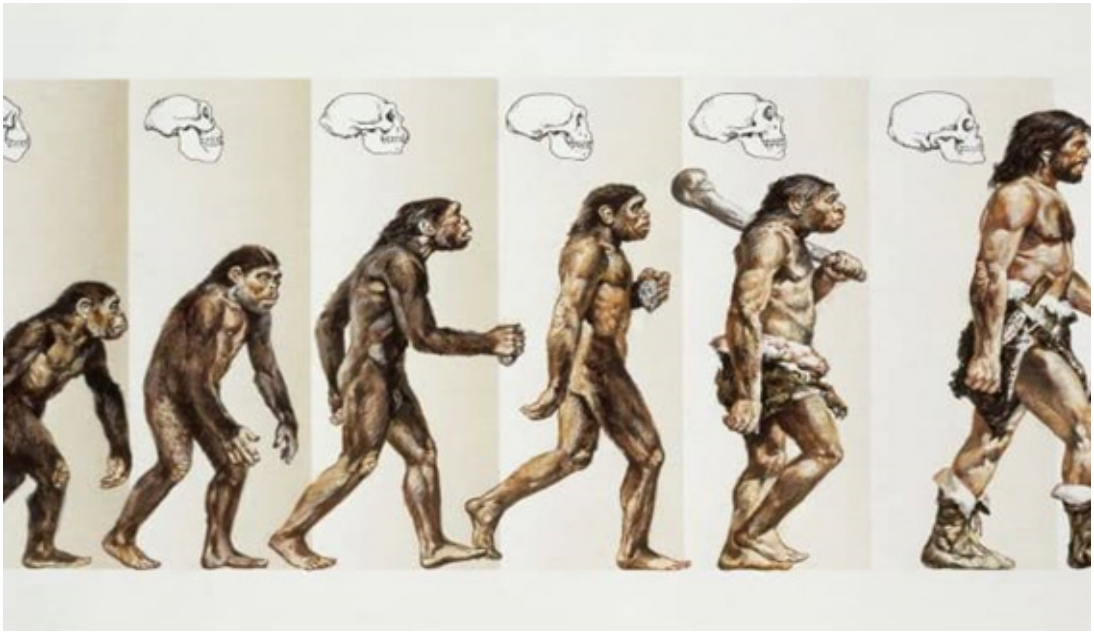


Figure 2.2 Human evolution from Homo habilis to Homo erectus



Activity 2.1

A. Individual work

Using the reference materials, write very short notes on the following terms:

1. Archaeology
2. Fossils, Hominids
3. Creationist theory
4. Evolutionary theory

B. Group discussion:

Discuss on the following question in small groups and present your discussion outcome through your group representative.

1. List the sites where the fossils of Homo erectus were discovered in Ethiopia.
2. By using map Africa indicate the location of archeological sites that show the origin of early human being



2.2. Trends of world population

Competencies: After studying this lesson, you will be able to

- Predict future world population growth pattern on the basis of present and past population growth rate
- Calculate different demographic rates such as growth, mortality, fertility, net-migration and etc.;
- Identify types and causes population movement;
- Locate densely and sparsely populated regions on world population map;

Evaluate growth trend of Ethiopian population in line with world population growth;

These are the words you should try to learn for this lesson

Top 10 words

- **Birth rate**
- **City**
- **Death rate**
- **Emigrant**
- **Fertility**
- **Immigrant**
- **Hamlet**
- **Mortality**
- **Migration**
- **Population**

More key words

- **Dependency ratio**
- **Infant mortality**
- **Natural increase**
- **Settlement**
- **Population explosion**
- **Population Cluster**

Start-up questions

- ✓ What do you mean by human population?
- ✓ What factors have contributed to the growth of world population?

Human population refers to the total number of human inhabitants of a specified area, such as a city, country, or continent, at a given time. Population is one of the most critical

factors that determine the socio-economic and environmental conditions of every country in the world. The world's population has been experiencing continuous growth since the 15thcentury.The UNDP estimated that world population reached 6 billion with an annual growth rate of 1.5% by 2000 A.D. The number added to world population per year would increase from 80 million to 90 million if the growth rate of 1.5% continues, and world population would double in a period of 40-50 years from about 2000 A.D. Such rapid and dramatic growth rate of the world population is known as **population explosion**.

Focus

Population doubling time is length of time needed by a population to double itself. It can be calculated using the following formula:

$$\text{Doubling Time} = \frac{70}{\text{growth rate}}$$

Factors that contribute for rapid population growth

The rapid increase in the size of the human population is attributed to many factors. These include:

- Advancements in scientific knowledge, agriculture, industry, medicine;
- Improvement in peoples living conditions;
- Humans ability to control famine and disease, which have been major killers of humans;
- The relatively lower cost of importing vaccines, antibiotics, insecticides, and high-yielding varieties of seeds.

As indicated in (Table 2.1) below, by 1750 there was only about 791 million peoples in the world. However, in a matter of 250 years, the world population reached over 6 billion. The growth of human population between 1750 and 2000 has been very rapid.

Table 2.1 Trends in world population growth (1750-2050)

Region	Population size (in millions)						
	Years						
	1750	1800	1850	1900	1950	2000	2050
Asia	502	635	809	947	1,437	3,689	5,369
Africa	106	107	111	133	228	797	1,846
Europe	163	203	276	408	546	727	642
Latin America and the Caribbean	16	24	38	74	166	523	480
North America	2	7	26	82	221	481	722
Oceania	2	2	2	6	12	30	45
Total	791	978	1,262	1,650	2,556	6,073	9,104`
Source :- Microsoft Encarta (2009)							

Trend and growth rate of Ethiopian population

According to the 2007 Census, the population of Ethiopia was 73.8 million. The country's population is among the fastest growing in the world

It was estimated that, in 1900, Ethiopia had only 11.8 million persons. As shown in (Table 2.2), this number increased to about 12.9 million in 1920 and to 23.5 million in 1960. The table shows that, in 1960, the country had twice the population it had in 1900. These values show that, during those decades, it took 60 years for the population to double in size. In contrast, since 1960, the time required for the population to double has been on the decline. This is because of rapid rate of population growth.

As shown in (Table 2.2)the growth rates of the Ethiopian population since 1900 shows that the population increased by less than 1.0% until about 1920. With worldwide efforts to control malaria and other diseases in the 1950s, the growth rate rises from year to year and reached 2.8% in 1984, and 3.1% in 1994.

According to the results of the three censuses, there was a slight decline in the population growth rate over recent decades, changing from 3.1 percent in 1984 to 2.9 percent in 1994, and to 2.0 percent in 2007. This was mainly the result of the government's efforts to regulate fertility rates through the delivery of family planning services.

Table 2.2 Population estimate and growth rate in Ethiopia (1900-2007)

Year	1900	1920	1940	1960	1970	1984	1994	2007
Population (million)	11.8	12.9	16.3	23.5	29.5	42.6	53.5	73.8
Growth rate (%)	0.2	1.0	1.5	2.2	2.8	3.1	2.9	2.0
Source: Central Statistical Authority (CSA) 1994 and 2007								



Activity 2.2

A. Group discussion

Discuss on the following question in small groups (based on Table 2.1 and 2.2) and present your discussion outcome through your group representative.

1. Identify the two continents whose population growth rates differ the most?
2. Discuss the consequences of any rapid population growth you have observed in your locality? What measures do you suggest to correct the situation?
3. Discuss about the growth and distribution pattern of Ethiopian population?



2.2.1 Components of population dynamics

Start-up question

- ✓ What are the components of population dynamics?

The main components of population dynamics/ determinants are fertility, mortality and migrations. Fertility and mortality are biological factors, while migration is purely non-biological. The combined effect of the three factors controls the changes in population size and composition.

A. Fertility

Start-up questions

- ✓ What do you mean by fertility?
- ✓ What factors affect the fertility of a society?

Fertility refers to the actual reproductive performance of a population. The growth of world population depends largely on human fertility. This is so because any society replenishes itself through the process of human fertility.

Measures of fertility

Fertility can be determined using different methods but the most commonly used measure of fertility is birth rate.

Birth Rate (BR)

Birth rate is the most common and simplest index of fertility. It is simply the number of live births observed in one year among one thousand people in a given region.

Birth rate can be expressed as a number of live births per thousand people.

$$\mathbf{BR} = \frac{B}{} \times \mathbf{K}$$

Where **B** is the total number of live births during a year, **P** is mid-year total population and **K** is a constant, conventionally 1000.

Example

If the number of live births in a population of 50,686,000 was 150,800, the birth rate is:

$$BR = \frac{B}{P} \times K = \frac{150{,}800}{50{,}686{,}000} \times 1000 = 2.9 \text{ births per1000 per year}$$

Factors of Fertility Distribution

Various factors affect fertility distribution in the world including

- Low access to contraceptives;
- Backwardness and poverty;
- Low status of women;

- Need of children's for labour;
- Children are considered as symbol of virility and
- Low educational background.

B. Mortality

Start-up questions

- ✓ What is mortality?
- ✓ What factors affect mortality?

Mortality refers to the occurrence of death in the human population. Mortality rates are higher in the developing countries than in the developed ones. This difference is caused by variations in standards of living, nutrition, medical services, personal hygiene and environmental sanitation.

Measures of Mortality

Mortality can be measured in a number of ways, including the use of death rate and infant mortality rate.

Death rate (DR): is the ratio of the total registered deaths of a specified year in a region to the total mid-year population, multiplied by 1000.

DR= $\frac{D}{P} \times K$ where DR is crude death rate, D stands for total observed deaths, P is total mid-year population, and k is a constant, 1000.

Example

In a hypothetical region, the total number of deaths observed in 2011 was 21,000, and the total mid-year population was 7,000,000. What is death rate?

DR = $\frac{D}{P} \times K = \frac{21,000}{7,000,000} \times 1000$ =3/1000.This number indicates that the deaths of 3 persons were observed for each 1000 people.

Focus

Rate of natural increase is refers to the difference between the number of live births and the number of deaths occurring in a year.

Rate of natural increase=**Birth rate-Death rate**

Infant mortality is the death of young children's aged below one year.

Major factors that attributed for high death rate are the following:

- Low standard of living
- Low access to health facilities
- Poor nutrition, and sanitary practices
- Civil war and political instability
- Wide spread of famine and starvation
- High incidence of disease and infections

C. Migration

Start-up questions

- ✓ What is migration?
- ✓ Why do people migrate?

Migration refers to the movement of humans from one place to another. Migration takes place with two major factors. These are:

I. **Push factors**: impose pressure on peoples to migrate, which includes poor employment, civil war, and harsh climate etc.
II. **Pull factors:** attract peoples to migrate, which include good job opportunity, favorable climate and good welfare service.

An emigrant (out migrant) is a person who is leaving one country to live in another.

An immigrant (in migrant) is a person who is entering a country from another to make a new home.

Measures of migration

Immigration rate it is the number of people arriving at a destination per 1000 people in a given year.

$$\text{Immigration rate} = \frac{\text{Number of Immigrants}}{\text{Total population at destination}} \times 1000$$

Emigration rate it is the number of departing people from an area of origin per 1000 people in a given year.

$$\text{Emigration rate} = \frac{\text{Number of Emigrants}}{\text{Total population at origin}} \times 1000$$

Net Migration Rate (NMR): shows the net effect (balance) of immigration and emigration in an area. It can be expressed as an increase or decrease per 1000 people in the area in a given year.

$$NMR = \frac{\text{Number of Immigrants} - \text{Number of Emigrants}}{\text{Total population}} \times 1000$$

Example:

Assume the number of emigrants and immigrants of country 'A' are 50,000 and 260,000 respectively. If the total population is 105 million, what will be the NMR?

$$NMR = \frac{\text{Number of Immigrants} - \text{Number of Emigrants}}{\text{Total population}} \times 1000 =$$

$$\frac{260{,}000 - 50{,}000}{105{,}000{,}000} \times 1000 = 2/1000$$

Activity 2.3



A. Individual Work

1. What are the factors that led fertility differences in developed and developing countries?
2. What are the major factors that attributed for high death rate in the world?

B. Group work

Discuss on the following question in small groups.

1. The number of live births for place "A" was 2400, and its mid-year population was 160,000. Find BR.
2. The number of deaths for place "B" was 219,300, and its mid-year population was 19,297,000. Calculate DR.
3. Assume the number of emigrants and immigrants are 30,000 and 150,000 respectively, if total population is 100 million. Calculate NMR?



2.2.2 Population characteristics

Start-up question

✓ What are the major characteristics of population?

The structure of a population is the distribution of males and females within different age groups.

The structure or composition of population can be classified in to two categories; these are biological and cultural characteristics.

Biological characteristics include race, ethnicity, sex and age and cultural characteristics comprise education, health, nutrition, religion, occupation, etc.

Age structure is the distribution of a given population into age groups. There are two important statistical tools used to understand age structure. These are: age groups and population pyramid.

Age groups: in the broad age groups, age structures were;

- Young age, 0-14 (the young dependent population),
- Working age, 15-64 (the economically active population)
- Old age, 65+ (the elderly dependent population).

Population Pyramid: It is the graphic representation of the age distribution of a given population by sex.

Look the figures given below which shows the population of Ethiopia by sex.

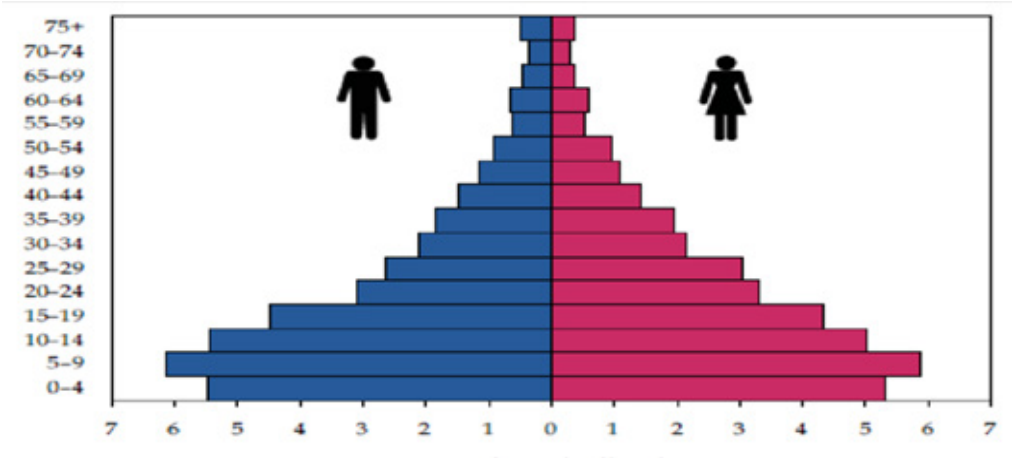


Figure 2.31 typical example of population pyramid

Population Pyramid of Ethiopia for 2007 Source: PCC [14].

In general, population pyramids of developing countries like Ethiopia have very broad bases, showing the dominance of the young-age population.

Sex Structure

Start-up question

✓ What is sex structure?

The sex structure of a population is shown by its sex ratio, which is the ratio of male population to female population. Sex ratio is usually expressed as the number of males per 100 females in a population.

$$Sex\ ratio = \frac{Male\ population}{Female\ population} \times 100$$

Age dependency ratio

Start-up questions

- ✓ What is age dependency ratio?
- ✓ Is the dependency ratio of your locality or city high or low? Why?

Age dependency ratio (ADR) is the relationship between the working or economically active population and the non-working population. In Ethiopia, the age dependency ratio is very high. In other words, the dependency burden of the young and old age populations on the working or economically active population is very heavy.



Activity 2.4

A. Individual work. Try to calculate individually in the class

1. Assume total students of a given school were 3000. Out of this 1650 were females. What is sex ratio?
2. Suppose region "A" has the number of dependent population under-15 years is 12,191,000, number of old age (dependent) population > 64 is 5,127,000 and number of independents 15 – 64 = 29,120,000. Calculate ADR?



2.2.3 Population, distribution

Start-up question

✓ What factors have influenced the distribution of world population?

Population distribution refers to the way people inhabit and occupy the earth's surface. Generally, the distribution of population in the world is uneven.

Factors of population distribution

The major factors of population distribution can be classified in to two groups. These are: physical factors and human factors.

Physical Factors

The most significant physical factors affecting the distribution of population are:

- Natural resources (water, soil, vegetation and minerals etc)
- The nature of topography (slope and altitude)
- Climate condition (mainly rainfall and temperature)

Human factors

The major factors affecting distribution of population includes:

- Socio-economic factors(job opportunities, availability of technology)
- Political factors(civil war, political unrest)
- Type of farming and transportation facilities,
- Social organization

Spatial distribution of world population

1. **Densely Populated Regions**

There are three main belts of high population density and concentration in the world. These areas are also called "Population Clusters". These regions are:

A. Asiatic population belt

B. Peninsular Europe

C. North-eastern North America

A. **Asiatic Population Belt:** The region accounts for about 60% of the world's total population. The belt includes:

- **East Asia**- Japan and China are the most populous in the sub-region.
- **South Asia**- India, Pakistan and Bangladesh are densely populated.

B. **Peninsular Europe**: Europe makes up 10.8% of the world's total population.

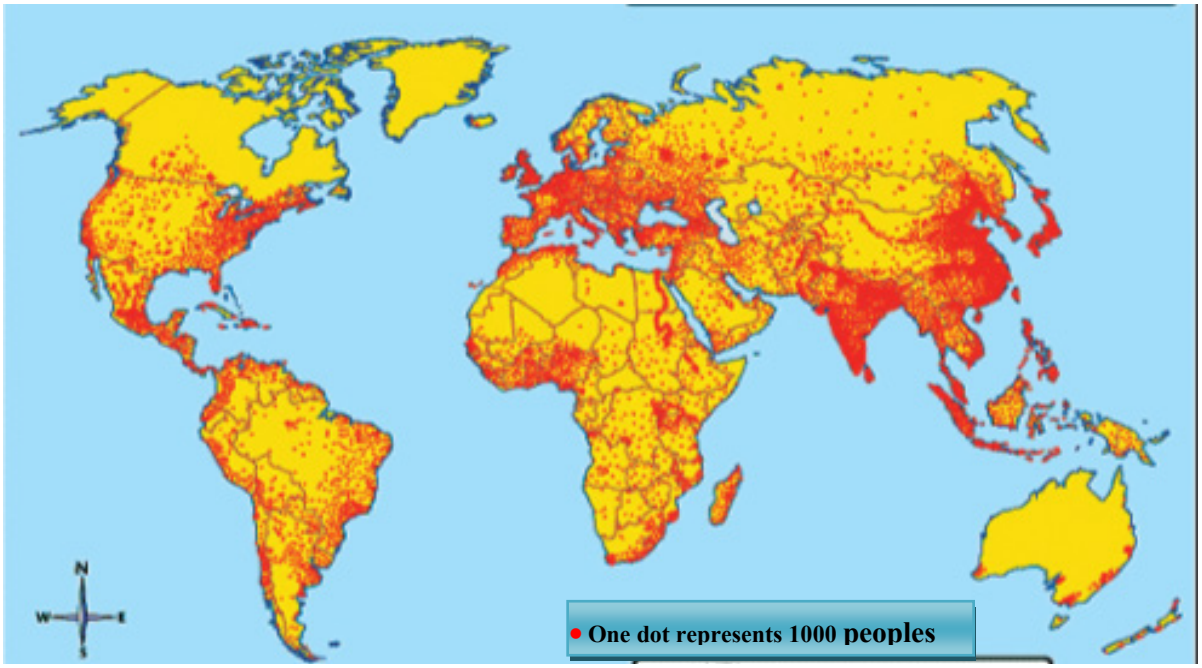
C. **North-eastern North America**: It accounts for about 5% of the world's total population. This part of North America (mainly the USA) is highly urbanized and industrialized

2. Sparsely Populated Regions

Sparsely populated areas simply mean an area that contains few people because of physical and human factors which are not suitable for peoples living.

These regions include the following areas.

- Tundra
- Hot-dry- land
- Areas with poor soil
- Hot-wet-land
- High relief



Dot map of world-population Distribution, 2000 (Source: Maps.com)

Figure 2.4 spatial distribution of world population



Activity 2.5

A. **Group discussion**

Discuss on the following question in small groups and present your discussion outcome through your group representative.

1. Why are some part of the world so crowded and others so sparsely populated?
2. What does population distribution mean?
3. List some natural and human factors that affect population distribution in your locality?



2.2.4 Population movement (national and intra-national)

Start-up question

✓ Why do peoples move from one place to another?

The movement of population can be national (cross boundary) and intra-national (within) a nation.

Intra-national migration has taken place when people move from one part of a country to another part. It takes the following forms:

- ➲ Rural-urban
- ➲ Rural-rural
- ➲ Urban-rural
- ➲ Urban-urban

For example, peoples migrate from Afar region to Addis Ababa is considered as **intra-national migration.**

When migrants move cross a national territory of a country, the movement is called **national migration**. For instance, peoples migrate from Ethiopia to Saudi-Arabia is considered as **national migration.**

Activity 2.6



A. Individual work

Do the following question in your exercise book.

1. Can we consider all kinds of people's movements as "migration"? Why or why not?
2. What are some of the possible consequences of migration, both in areas of origin and destination?



2.2.5. Population settlement (rural and urban)

Start-up questions

- ✓ What is the difference between a rural settlement and an urban settlement?
- ✓ What are the advantages of living in an urban area?

A settlement is defined as a place in which people live, carrying out a variety of activities, to make their livings, such as trade, agriculture and manufacturing.

Settlements can be divided into rural and urban, based on the density of human-made structures and dominant economic activity.

Rural settlement refers to peoples live in villages and dispersed (scattered) settlements in areas far from urban centres. In rural settlements peoples are mainly engaged in agriculture.

Urban settlement refers to peoples live in town or city and they are engaged on non-agricultural activities.

All settlements are a part of settlement hierarchy, but it differs in size, number of population and range of goods and services provision. For instance, small settlements, like hamlet and village, are found in rural areas with isolated homesteads and less service provision. Whereas town and cities are urban areas with higher population and wider range of goods and service provision. See figure 2.5, that show hierarchy of settlement and the range of goods and services which provides.

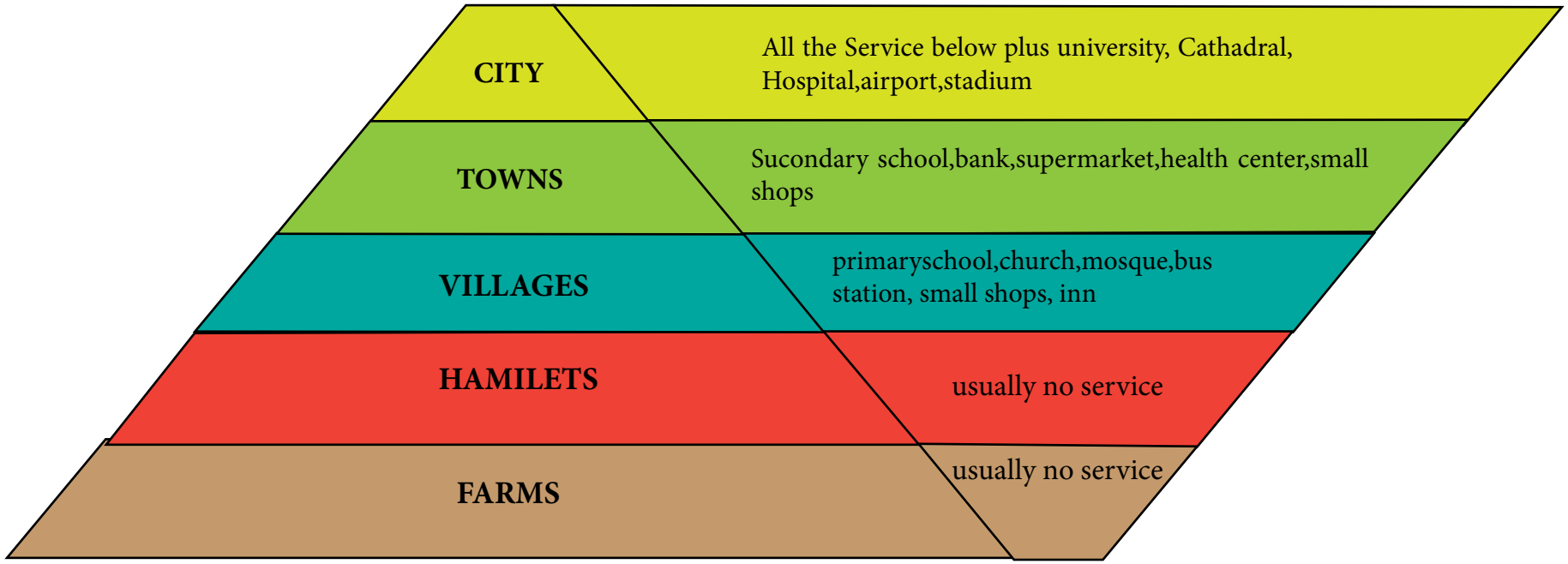


Figure 2.5 Hierarchy of settlement

Activity 2.7



A. Practical activity:

Visit or observe the surrounding settlement of your locality then, discuss the following questions based on your visiting, and present it to your classmate by your representatives.

1. Write down the difference between rural and urban settlement based on

   a. Style of buildings

   b. Density of population

   c. Dominant economic activity

2. Why do most people prefer to live in cities?



2.3 People and the development of transportation

Competencies: After studying this lesson, you will be able to

- Explain basic terms and concepts related to transport activities;
- Describe the historical development of means of transportation;
- Evaluate the role of transportation by using the different modes of transport system;
- Compare the different modes of transportation on the basis their use;
- Identify significant road signs in class room;
- Explain basic road safety rules.

These are words you should try to learn for this unit

Top 10 words

- **Air transport**
- **Passengers**
- **Light train**
- **Pack animal**
- **Shipping**
- **Pipelines**
- **Railway**
- **Transportation**
- **Traffic signs**
- **Road safety**

More key words

- **Water transport**
- **Road traffic accident**

2.3.1 The concept and historical development of transport

Start-up question

✓ What sorts of transportation systems are available in your area?

Transportation refers to the movement of passengers, animals and goods from one place to another place. There are different means of transportation system that are available in different area like human powered and pack animal transports. In the earlier time there was no means of transportation other than walking, but gradually the development began to uses animals to travel and transport things on land. The man invented wooden cart with four legs as means of land transport. Then advances in technology have allowed people to travel farther and invented different modern means of transport after industrial revolution.

Nowadays, the types and quality of transportation have made much progress. This has

enabled people to travel longer distances in shorter times than ever before.

Over the year, faster means of transportation have been introduced, and now distances which used to take days or months to cover, can be covered in a matter of minutes or hours. The rapid progress in transportation and other forms of communications have made places all over the earth functionally closer to each other.



Figure 2.6 Different mode of transport

2.3.2 The role of transport for socio economic development

Start-up question

✓ How do you explain the usefulness of transportation in the world and in Ethiopia?

When transport systems are efficient, they provide economic and social opportunities and benefits that result in positive multiplier effects such as better accessibility to markets,

employment, and additional investments. When transport systems are deficient in terms of capacity or reliability, they can have an economic cost such as reduced or missed opportunities and lower quality of life.

Good transportation systems are needed to move goods within a country and abroad. They are also essential to spreading the benefits of health care and education.

Transportation plays a crucial role in the activity of a community. For instance, public transportation provides people with mobility, access to employment, community resources and recreational opportunities.

Focus

Transportation allows for access to food, healthcare, educational opportunity and employment.

Efficient and affordable transportation is important driver in economic growth in rural areas and help ensure that people can obtain service and participate in public life.

2.3.3 Modes of transport

Startup question

- ✓ What are the major modes of transport?

Modes of transport refer to different ways by which goods or people are transported from one place to the other through land, air or water. Basically, modes of transport classified in to three categories. These are;

1. Land Transport (road, railway, pipelines)
2. Water Transport (shipping)
3. Air Transport

1. Land transport

Land transport is accomplished either by rail or by road. It includes bus, car, bicycle, railway and the means of transportation that go from one place to another by land.

Types of land transport

A. Road transport

It is the most common and oldest mode of transportation. Road transport includes animal transport such as mules, donkey, and horses and transport on vehicles such as trucks and buses.

Domestic animals like donkey, horses, mules and camels are widely used in Ethiopia to transport goods and peoples from place to place.

Road transport has advantages of other mode of transportation for two reasons.

I) It provides door to door services,

II) They operate on public high ways that do not require an expensive terminal



Figure 2.7 Road transport

B. Railway transport

It involves the use of trains that carry large amount of goods usually for long distance. They can carry heavy bulk products like iron ore, coal and petroleum.

However, railway lines are not easy to construct. They are expensive to build, especially in mountainous countries like Ethiopia because train cannot climb steep hill sides. Railway transport is important to carry out vast quantities of goods at any time.

For example the main railway route in Ethiopia is Addis Ababa -Djibouti railway which covers a distance of 784 km.

Addis Ababa light train is the first light train in eastern Africa and launched in the city on 20 September 2015. It covers 31.6 km running from city in two lines. These are East-West line stretches from ***Ayat*** village to ***Torhayloch*** through ***Megenagna, Meskel Square***, ***Legehar,*** and ***Mexico.*** The North-south line stretches from ***Menilik Square*** to ***Kality*** through ***Merkato,Lideta, Legehar, Meskel, Square***, and ***Gotera.***

It is important to reduce traffic congestion, air pollution, and increase mobility in the city.



Figure 2.81 Addis Ababa light train and Ethio-Djibouti railway

Focus

Pipelines are specialized form of transport used to transport liquids and gases. For example a pipeline can be used to transport oil deposits from Sudan to Ethiopia. The other modes also includes cable (internet, energy supply), and space,(satellite).

2. Water transport

Water transport is the cheapest form of transport for bulky goods over long distance. Water transport involves the use of shipping to transport various goods from place to place. Water transport does not require heavy construction like road and railway lines. It needs ports and canals construction. Water transport is not well developed in many parts of Ethiopia. However, in some parts of the country, river and lakes use for water transportation like,

- Lake Tana, (***Gojjam*** to ***Gonder***),
- River Baro, (Ethiopia to Sudan),
- Lake Abaya, ***Arba Minch*** to ***Dilla***



Figure 2.9 Ethiopian shipping

3. Air transport

Air transport is the latest and fastest mode of transport. Planes can carry only a certain types of cargo because of size and shape limitation. Furthermore, planes are least dependable and most expensive form of transportation.

It is speedy transport so that it is suitable to transport perishable products and electronic materials. Aeroplanes, helicopter etc are examples of air transport that travel by air ways.



Figure 2.10 Ethiopian air transport

2.3.4 Road safety, road traffic accidents and its socio economic implication

Start-up questions

- ✓ Why is road safety important?
- ✓ What are the most important road safety rules?

Road traffic safety refers to the method and measures used to prevent road users from being killed and injured.Typical road users include pedestrians, cyclists, motorists, vehicle passengers, and passengers of on-road public transport (mainly buses and trains).

The most important road safety rules for pedestrians

- Know your safety signal
- Take extra care in crossing curve road.
- Be careful while crossing the road
- Always use sidewalks
- Never jump over the divider railings

Wait a suitable gap in the traffic flow before cross the road







Figure 2.11 Road traffic signs for pedestrians

The most important road safety rules for drivers

- Never drink and drive
- Never break red signal
- Always drive with in speed limit
- Understand and follow the road signs
- Keep the left while driving vehicle from opposite direction.

Road traffic accidents and its socio economic implication

Startup questions

- ✓ Who are affected by road accidents?
- ✓ Is road accident a social problem?
- ✓ What is the effect of road traffic accident on economic growth in Ethiopia?

A road traffic accident occurs when a vehicle that is moving along a roadway crashes with another vehicle or object.

Road accident is most unwanted thing which happens to road user. Road accident causes loss of lives, increase of dependency, and destruction of property, increase of poverty, injuries and permanent disability. Road traffic injuries caused significant economic losses to individuals and their family and countries all over the world. These losses may be associated with cost of treatment, loss of productivity, and valuable working time for victims and relatives, loss of skilled labor force.

More than half of all road traffic deaths and injuries involve vulnerable road users such as pedestrians, cyclists and motorcyclists and their passengers.

SUMMARY

- Archaeology is the science in which archaeologists dig out material objects and fossils of the past. It helps us in the study of pre-history.
- With regard to the origin of human beings, there are two theories suggested. These are: Creationist theory Scientific (Evolution) theory
- Human population refers to the total number of human inhabitants of a specified area, such as a city, country, or continent, at a given time.
- The main components of population dynamics/ determinants are fertility, mortality and migrations.
- The structure or composition of population can be classified in to two categories; these are biological and cultural characteristics.
- The distribution of population in the world is uneven, because of two major factors. These are natural and human factors.
- There are three main belts of high population density and concentration in the world. These are Asiatic population belt, Peninsular Europe and North eastern North America.
- The movement of population can be national (cross boundary) and intra-national (within) a nation.
- Settlements can be divided into rural and urban, based on economic activity.
- Modes of transport includes land, water, and air transport.
- Road traffic safety is a measures used to prevent road users from being killed and injured. Road accident causes loss of lives, increase of dependency, and destruction of property, injuries and permanent disability.

Glossary

Air transport: the movement of passengers and cargo by aircraft such as airplanes and helicopters.

Archeology: is the science dig out material object and fossils of the past.

Australopithecines: the first earliest human species.

Bi-pedal: walk erect

Creationist: human being created by God.

Doubling time of population: is length of time needed by a population to double itself.

Evolution: gradual process of change.

Fossil: remains of dead material object.

Homo: family of modern human being.

Hominids: ancestor of modern human being.

Pipelines: is the long-distance transportation of a liquid or gas through a system of pipes

Pre-history: the period before the beginning of writing.

Population explosion is the rapid (sudden) increase of population.

Population: is the number of people in a city or town, region, country or world.

Population cluster: refer to a large population concentration.

Population structure refers to the age-sex composition of any population.

Spatial distribution of population: is concerned with how people are distributed spatially.

Settlement: a place where people live and form communities.

Traffic signs: a sign conveying informa tion, an instruction, or a warning to drivers.

Transportation: the movement of people and goods from one location to another.

Railway: is also known as train transport

Road traffic accident: is any injury due to crashes originating from terminating with or involving vehicle partially or fully on public road.

Road transport: means transportation of goods and personnel from one place to another via road.

Road safety: refers to the method and measures used to prevent road users from being killed or seriously injured.

Rural: the countryside rather than the town.

Transportation: the movement of people and goods from one location to another.

Urban: a place characteristic of a town or city.

Water transport: is the process of moving people, goods, etc. by barge, boat ship over water bodies.

REVIEW EXERCISE FOR UNIT TWO

I. True or False

Direction: Write "True" if the statement is correct and write "False" if it is incorrect

_____**1.**Archeology is the science in which archeologists dig out material objects and fossils of the past.

_____**2**. The distribution of population in the world is uniform in all countries.

_____**3.** Migration is a biological factor that determines the size of population.

_____**4.** Air transport is very latest and fastest form of transport.

II. Multiple choices

Direction: Choose the correct answer from the given options.

____1. The graphical representation of age distribution of a given population by sex is:

A. Age structure
C. Age dependency ratio
B. Population pyramid
D. None

____2. Which one of the following is not the feature of modern human beings?

A. Large brains
C. Bi-pedal
B. Large jaws
D. Transmitting knowledge

____3. The cheapest form of transport for bulky goods over long distance is

A. Air transport
C. Road transport
B. Land transport
D. Water transport

____4. Which of the following is not factors that contribute rapid population growth in the world?

A. Human ability to control disease
B. improved vaccinations
C. Improvement in knowledge
D. Increase in illiteracy

____5. Which of the following region is not sparsely populated?

A. Peninsular Europe
B. Tundra
C. High relief areas
D. Hot dry land areas

III. Fill in the blank:

Direction: Fill the following blanks with appropriate word(s)

1. The remains of dead plants, animals and human beings are called_____
2. The actual reproductive performance of a population is called_____
3. Human beings belongs to the species is called_____
4. A person who is leaving one country to live in another is_____
5. Mode of transport which is accomplished either by road or rail way is called___

IV. Short answer

Direction: Give short answers for the following questions.

1. What are the main factors that control the change in population size?
2. Write down some factors affecting fertility distribution?
3. Describe the two important statistical tools to understand age structure.
4. Explain the difference between urban and rural settlement.
5. Explain the socio economic implication of road traffic accidents.

Check List

Put a tick (√) mark in each of the boxes for activities you can perform

I can

1	Point out archaeological sites that show the origin of earlier human beings;	☐
2	Examine the historical routes humankind has passed through over time;	☐
3	Predict future world population growth pattern on the basis of present and past population growth rate	☐
4	Calculate different demographic rates such as growth, mortality, fertility, net-migration and etc.;	☐
5	Identify types and causes population movement;	☐
6	Locate densely and sparsely populated regions on world population map	☐
7	Evaluate growth trend of Ethiopian population in line with world population growth;	☐
8	Explain basic terms and concepts related to transport activities;	☐
9	Describe the historical development of means of transportation;	☐
10	Evaluate the role of transportation by using the different modes of transport system;	☐
11	Compare the different modes of transportation on the basis their use;	☐
12	Identify significant road signs in class room;	☐
13	Explain basic road safety rules.	☐



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