

UNIT 2

THE EARTH AND ITS SURROUNDINGS

Unit Outcomes

After studying this unit, you will be able to:

- Draw a sketch map step by step to identify your school and its surrounding area;
- Explain the effects of the earth's movement;
- Identify permanent and seasonal water resources in Ethiopia.

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

- Explain the use of map.
- Explain how to draw a sketch map.
- Prepare a sketch map which shows the location of your school.

Key Terms

↔ Map

↔ Scale

↔ Sketch map

↔ Direction

◆ Use of Sketch Map to Show Direction and Location

- What is location?
- Can you explain the location of your village, town or sub city?
- Tell the location of your school in reference to prominent points.
- How do you show location with the help of a map?
- What makes a sketch map different from a map?

As you remember, in unit one you knew some important points about location. You identified the relative location of the Horn of Africa. Thus, generally, location may mean the position of an object or a person in relation to other things. It may also mean a place an object occupies.

What is a map? A map is the pictorial representation of features on the ground as transferred on to a plane sheet of paper with the help of a scale. Maps are usually made by trained persons with advanced instruments. Maps are used to show location and direction.



Location could be shown on the ground or on a map or on a sketch map. In order to show location on a map or a sketch map, you need to identify the direction of the object or objects you have planned to show on a map or sketch map. When you show an object on a map or sketch map, you should reduce the size of the object to a manageable size with the help of a scale. Thus, scale is the ratio between map distance and ground distance obtained through measurement. Look at the example below:



Scale: 1cm to 1km- this reads one centimeter to one kilometer. What does it mean? It means one centimeter distance on the map represents one kilometer distance on the ground.

Direction may mean the course taken by a moving person or thing. Or it may mean point towards which a person or thing looks or faces (See Fig.2.1). On a map or sketch map, direction is shown with north indicating arrow as shown in Fig. 2.1.

- Observe Fig. 2.1 and tell the direction of the man and the car.
- Where does the arrow point to?

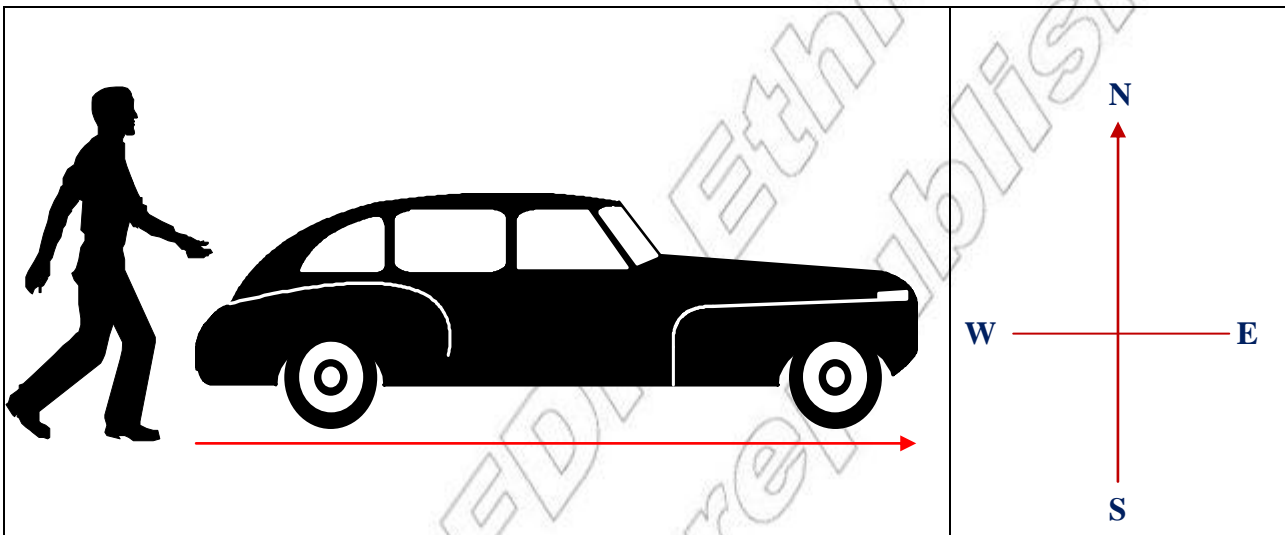


Fig. 2.1. Direction in reference to moving person and object

◆ Making a Simple Sketch Map

What is a sketch map?

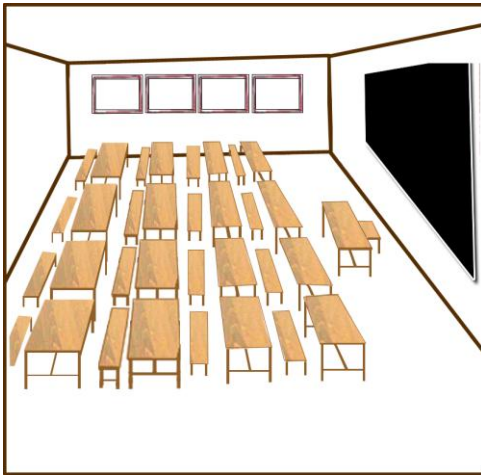
Sketch map is a plan of a definite area drawn in free hand. It is better than a photocopied map because it allows you to include only the detail you need. Sketch map should be drawn in pencil and labelled neatly in pen. The sketch map should be given a suitable title and surrounded with a border. Colour and key can be added if needed.

When you make a sketch map, you need to use instruments which include ruler, pencil, eraser, pen, tape-measure, piece of paper or any of the pages of your exercise book.

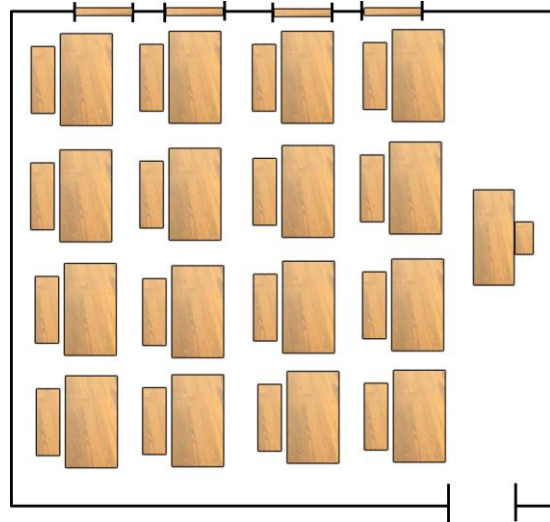
Before you start drawing your sketch map, you should measure the bases of the front and side walls with a tape measure. Next you should identify the size of your paper. Then, you make margins that determine the size of your plan paper on all sides.

Once the size of your plan paper is determined, it is simple to fix the length and breadth of your sketch map. Why should you determine the size of your paper? This is simply to make your sketch map simple,

readable and usable and dimension bound as well. The sketch map of your classroom may show the doorway and the windows with the help of gaps left between two points in each case. Look at the sketch map at **Fig. 2.2(b)**. It is clearly put with definite dimensions in the middle of your plan paper.



a) Diagram of a classroom



b) Sketch map of a classroom

Fig. 2.2 Representation of a classroom

Lesson

2.1

Review

Activity

A. Questions based on facts:

Look at Fig.2.2 and answer the following questions:

- What are the features included in the sketch map?
- Can you mention the size of the plan paper on which the sketch map is drawn?
- How are the length and breadth of the sketch map determined?

B. Things to do:

I. Group work:

- Measure the back, the side and the front walls of your classroom and draw the room to scale.
- Put the door and the windows in their right places.
- Put the desks in your classroom in their right places.
- Draw an arrow indicating the north direction.

II. Individual work:

- Gather information about your village.
- Draw the sketch map of your village.
- On your sketch map, include important features, such as roads, rivers and important buildings.

The Earth's Shape, Movement and its Effect

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

- Identify the shape and movements of the earth.
- Explain the effects of the earth's movements.

Key Terms

- | | |
|--------------|--------------|
| ↔ Shape | ↔ Season |
| ↔ Orbit | ↔ Current |
| ↔ Rotation | ↔ Deflection |
| ↔ Revolution | |

◆ Shape of the Earth

- What is shape?
- What does the shape of the earth look like?
- Can you mention any model that portrays the shape of the earth?

The shape of the earth had remained questionable throughout history. The general acceptance of the fact that the earth is round came about in the first century A.D. The earth on which we live is one of the planets in the universe. The earth is round. However, it is not a perfect circle. It has almost a spherical shape. The globe is the best model of the earth (See Fig. 2.3).



Fig. 2.3. The Globe

Look at the globe.

1. What shape does it have?
2. Have you ever seen an object with such a shape?
3. What do you observe on the globe?

As the globe in Fig.2.3 portrays, the earth is spherical in shape. It is slightly flattened at the poles. This indicates that the equatorial and the polar diameters are slightly different. Thus, the diameter from pole to pole is shorter than the diameter at the equator. In fact, the difference is small. The equatorial diameter is about 12,700 kilometers while the pole to pole diameter is only about 40 km shorter. The polar diameter is, thus, 12,660 kilometers.

Lesson

2.2

Review

**Activity A****A. Questions based on facts:**

- What is the difference between the earth's shape and the globe?
- What significant importance does the globe have in terms of understanding the shape of the earth?

B. Things to do :

Can you make a globe? Go to your school's pedagogical center and get advice from the person in charge of the center and try to make a globe of your own.

◆ Earth's Movement and Its Effect

- What does movement mean?
- How does the earth move?
- What are the results of the earth's movement?



Movement is the act of shifting position along a definite line. It appears to be horizontal, vertical or ecliptic along a given direction following a definite line, in course of time. Everything has its own axis of movement (See Fig. 2.4).

Axis of the Earth

Axis of the earth is an imaginary line that passes through the center of the earth from north to south. The earth rotates on this axis. As you see Fig. 2.4, the earth's axis is not situated in a vertical position. It is tilted from the vertical position. The angle of tilt is measured to be $23^{\circ}30'$ ($23\frac{1}{2}^{\circ}$). Later on you will learn how this affects the length of day and night and other climatic phenomena.



Fig. 2.4. Tilted axis of the earth

- What is axis?
- Have you ever caused a coin to rotate rapidly on a table? If yes, what did you observe in the center of the rotating coin?

Everything in the universe moves. There is nothing that does not move. So is our earth which has several movements.

The earth is one of the planets in the universe. The most noticeable movements of the earth are that it rotates on its axis, and revolves round the sun. It also moves with the sun in the middle and numerous other stars in space. In this unit, you will learn only about the earth's rotation and revolution. These two movements, which take place at the same time, are important because, they result in phenomena that affect your life on earth.

Like all other planets, the earth moves round the sun along a definite direction and line without stopping for a while. The imaginary line or path along which the earth revolves is called **orbit**. This orbit is not a perfect circle, but elliptical in shape. Because of the elliptical shape of the earth's orbit, the distance between the earth and the sun changes as the earth revolves round the sun. In general, the earth makes two movements. These movements are known as **rotation** and **revolution**. Every 24 hours, the earth makes one complete movement on its axis. This movement is known as **rotation**. The earth makes one complete movement round the sun in a year i.e. in $365\frac{1}{4}$ days. This movement is known as **revolution**. The two movements go hand in hand.

The rotation of the earth on its axis is effected from west to east. This may mean, once every 24 hours, the earth makes a complete **west to east** turn on its axis (See Fig.2.6).

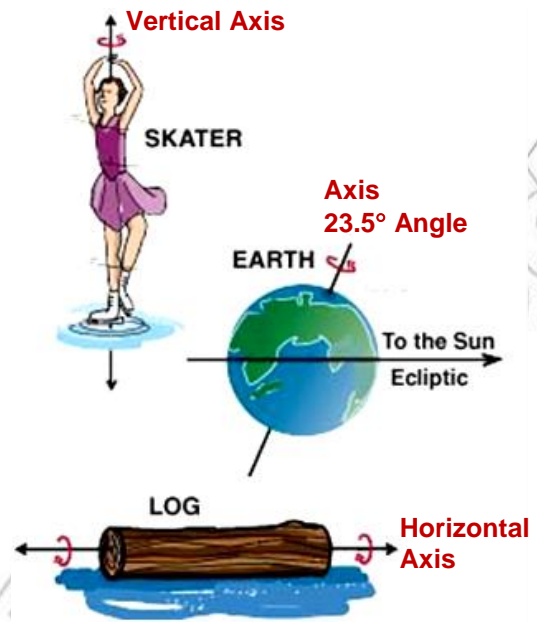


Fig.2.5 Various movements and their axes

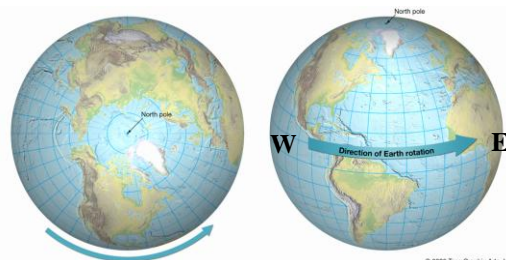


Fig. 2.6 Direction of Movement of the Earth

◆ Effects of Rotation

- Take a spherical object and place it in front of a burning bulb. Move the spherical object from west to east in front of the burning bulb.
 - From your observation, what proportion of the spherical object gets light cast by the burning bulb?
 - What conclusion can you give with regard to receiving light on a still or moving spherical object?
- What causes day and night?

The rotation of the earth on its axis causes the following major phenomena. These are changing day and night, and apparent movement of the sun. The noticeable effect of rotation is the manifestation of day and night. Moreover, rotation of the earth causes deflection of the wind and ocean currents.

◆ Day and Night

As indicated earlier, the earth has a spherical shape. Because of this shape, only one half of the earth gets the sun's light at any rotational movement. The part of the earth on which the sun is shining has day and the other part which is hidden from the shining of the sun experiences night. As the earth turns from west to east, the part of the earth which was facing the sun will turn away from the sun and the part of the earth which was away from the sun will face the sun. This is how day and night succeed one another.

The difference between day time and night time is that in day time the sun is above the horizon while during night time it is below the horizon.

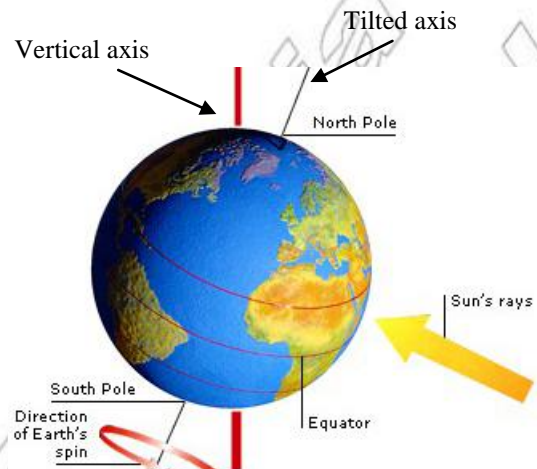


Fig. 2.7 Vertical Axis of the earth

◆ Apparent Movement of the Sun



Apparent movement means seemingly true movement, but in actual sense it is not true.

The rotation of the earth makes the sun as if it were moving across the sky from east to west. But this apparent movement of the sun is caused by earth's actual rotation from west to east.

◆ Effects of Revolution

- What effect does the revolution of the earth have?

The revolution of the earth round the sun results in:

- a. Difference in the length of day and night
- b. Manifestations of seasons

Difference in the length of day and night

Day and night are not of equal length at all places. This is because of the inclination of the earth's axis. As indicated earlier, the inclination of the axis is $23\frac{1}{2}^{\circ}$ from its vertical position. This inclination of the earth's axis makes the sun to seem "moving" north and south of the equator. Variation in length of day is observed due to incoming and outgoing seasons. Length of day time and night time varies from season to season and from place to place. This is mainly due to the tilting of the earth's axis. If the earth's axis were not tilted, each night and day every where on earth would always be 12 hours long and there would be no seasons.

2.2

Lesson

Review

**Activity B****A. Questions based on facts**

Individual work:

- Describe axis of the earth.
- Mention the two movements of the earth.
- Explain how each movement of the earth differs from the other.
- List manifestations of each movement of the earth.

Pair work:

- Explain the characteristic features of rotation and revolution.
- Compare and contrast rotation and revolution.

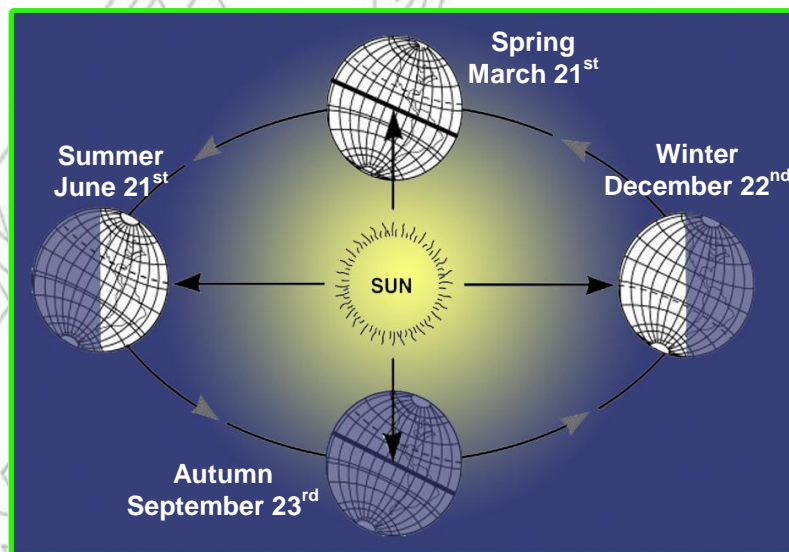
B. Things to do:

- Make a model of the earth and show the vertical and the tilted axes.

Seasons

Season is one of the four divisions of the year, defined by the position of earth along its orbit round the sun. The seasons—winter, spring, summer, and autumn or fall—are characterized by differences in average temperature and in the amount of time that the sun is in the sky each day (See Fig.2.8).

The Earth is inclined $23\frac{1}{2}^{\circ}$



The Seasons on Earth

Fig. 2.8 Revolution of the earth around the sun

The seasons are divisions of the year caused by the earth's revolution. As the earth revolves round the sun, changes like temperature conditions are experienced on the earth. You have learned that the length of day and night changes throughout the world as a result of revolution. These changes of the length of day and night are followed by changes in the seasons. For example, summer depends on the angle of the sun's rays and the length of day time. Look at **Fig. 2.8**. How many seasons do you observe? You observe four seasons; they are summer, autumn, winter and spring. Each season has its own characteristics.

Lesson

2.2

Review

**Activity C****A. Questions based on facts:**

- What is the difference between summer and winter?
- What is the month that marks summer in the northern hemisphere?
- What effects do the seasons cause on economic activities of farmers and pastoralists?
- Discuss in groups the characteristics of the four seasons in Ethiopia.

B. Things to do:

- Make models of the earth and the sun using locally available materials. Color the model of the earth brown and that of the sun red. Then show the position of the earth in relation to the sun and its tilt to cause the variations in seasons.
- On a big drawing paper, show the revolution of the earth round the sun with varied seasons.

◆ The Earth's Tilt and the Seasons

The seasons occur because the axis on which the earth turns is tilted with respect to the plane of the earth's orbit round the sun. Earth's tilt causes the north pole to be tilted toward the sun for half of the year, and the south pole to be tilted toward the sun for the other half of the year. The hemisphere that is tilted toward the sun has a longer day, and receives the sun's rays more directly than the hemisphere tilted away from the sun (See Fig.2.9). The northern hemisphere experiences the summer season when the North Pole is tilted toward the sun. On the other hand the southern hemisphere experiences winter as the South Pole is tilted away from the sun. However, the four seasons are more clearly noticed and experienced outside the tropical areas.



Look at the proportion of the surface of the earth facing the sun.
What can you conclude?

Fig. 2.9 Surface of the earth facing the sun



Hemisphere is half of a sphere and usually refers to half of the Earth. The Northern Hemisphere and Southern Hemisphere are divided by the equator. The Eastern Hemisphere and Western Hemisphere are divided by the Prime Meridian.

The Effect of Seasons on Farming and Pastoralists

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

- Relate the effects of seasons on economic activities of farmers and pastoralists.


Key Terms

- ↔ Farming
- ↔ Pastoral activities
- ↔ Transhumance
- ↔ Season

◆ Seasons in Ethiopia

- How many seasons are there in Ethiopia?
- What are the equivalent names given to them in Amharic or any other local language?
- What causes the seasons to vary in Ethiopia?
- Do the seasons influence human ways of life in Ethiopia?
- When do farmers, in your surroundings, cultivate the land?
- When do you usually observe shortage of water in your locality?
- What do you think causes the shortage of water?

In the tropical areas, temperature is high. There are two well known seasons in these areas. They are the dry and the wet seasons. There is no rain in the dry season while there is rainfall in the wet season. The two seasons are distinct because of variation in temperature and rainfall. This is also true in Ethiopia where the temperature does not change much between summer and winter. But traditionally the year is divided into four seasons.



Tropical area: It is the portion of the earth where temperature is high. On a world map or globe, you observe it between $23\frac{1}{2}^{\circ}$ N and $23\frac{1}{2}^{\circ}$ S of the equator.

Table 2.1 Seasons of the earth as shown by month and hemisphere

Northern Hemisphere		Southern Hemisphere	
June	Summer – Kiremt	June	Winter
July		July	
August		August	
September	Autumn – Meher / Metsew	September	Spring
October		October	
November		November	
December	Winter – Bega /Hagay	December	Summer
January		January	
February		February	
March	Spring - Belg/ Tsedey	March	Autumn
April		April	
May		May	

In the Ethiopian case, Kiremt and Bega are reversed. In Ethiopia, Kiremt is the rainy season and relatively a cold season and Bega is a dry season.

◆ The Effect of Seasons on Farming

- Which rainy seasons are the most valuable for cultivation of land in your locality?
- Compare and contrast the Meher and the Belg seasons in Ethiopia.
- When is farming usually conducted in Ethiopia?
- When does rain fed agriculture become dangerous?

The traditional division of seasons in Ethiopia is four. Out of the four seasons, three are wet. The wettest season for most parts of Ethiopia, especially, the highlands, is the summer season. For the lowland areas and the eastern parts of the escarpments of the north-south highlands, autumn and spring are the wet seasons.

Most farmers in the highland and plateau lands depend on the Kiremt rains. The Kiremt rains are heavier than those of the other wet seasons. Farmers produce a large amount of crops during the Kiremt season which is the summer season of the northern hemisphere. Though their occurring time is different, even comparatively, the little rains that are experienced during autumn and spring are of paramount importance in the areas where they prevail. In the Ethiopian context, autumn and spring are known as Meher and Belg, in Amharic, respectively. As compared to Meher, Belg covers large areas of the highlands and lowlands. Thus, it is the second important rainy season for the farmers. Its absence may affect the income of the farmers and the livelihood of their cattle.

These days, the wet seasons suffer from irregularities of rainfall. The irregularities may be attributed to global warming, in general, and degradation of the local environment in particular.

◆ The Effect of Seasons on Pastoral Activities

- What does pastoral activity or pastoralism mean?
- What is the basic economic activity of pastoralists?
- Why do pastoralists follow this type of economic activity?
- Where are pastoral activities carried out?

Pastoralism is a term used to describe an economy based predominantly on the herding of animals, such as cattle, goats, sheep, and camels (see Fig. 2.10). Pastoral societies are most common in Eastern Africa. Among the best-known pastoral societies are the Masai of East Africa.

Pastoralism is particularly well suited to life in harsh environments, such as arid grasslands and semi deserts. In these areas poor soil does not sustain an agricultural economy, but the vegetation can be used for animal husbandry.



Fig. 2.10 Pastoralist with his camel

The herds produce dairy foods, blood, meat, wool, hides, and dung. The dung is used for fuel. Pastoralists' movements are governed to a great extent by the needs of their animals. Many pastoralists migrate seasonally in search of pasture and water for their herds. This seasonal migration of pastoralists is known as *transhumance*.

In Ethiopia, pastoralists inhabit, mainly, the southern, south eastern and north eastern parts of the country. Their modes of livelihood are based largely on pastoral activities, such as animal husbandry. As the areas they inhabit are rainfall shortage areas, it is likely that they move from one place to another in search of food and water for their cattle.

In areas where the soil is productive, there are semi pastoralists. The livelihood of these pastoralists is based on both animal herding and farming. Such pastoralists stay relatively permanently in their areas till any change arises in the climatic condition. In general, pastoralists and/or semi pastoralists are affected by shortage of rain in a given wet seasons of the regions.

Lesson

2.3

Review

**Activity****A. Questions based on Facts:**

- How do the seasons of the year occur?
- What will happen to the southern hemisphere when it is summer in the northern hemisphere?
- What does hemisphere mean?
- Explain the effects of season on farming and pastoral activities.
- What does pastoralism mean?
- Discuss in groups the effects of dry season on pasture lands.
- Debate on the advantages and disadvantages of pastoralism over sedentary farming in semi desert areas of Ethiopia.

B. Things to do:**Pair work:**

- Construct a sketch map of Ethiopia that shows pastoral areas in reference to the political map of Ethiopia.

Group work:

- Collect information about pastoralism and write a report and present it to the class at a time.

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Summary

- Map is the pictorial representation of features on the ground as reduced to scale on a plane sheet of paper.
- Location could be shown on the ground, or on map or on sketch map.
- Scale is the ratio between map distance and ground distance.
- Direction may be the course taken by a moving person or object.
- Sketch map is a plan of a definite area drawn in free hand.
- The shape of the earth is spherical.
- Axis of the earth is tilted by $23\frac{1}{2}^{\circ}$ from the vertical position.
- The noticeable movements of the earth are rotation and revolution.
- The path the earth follows when it revolves round the sun is called orbit. It is elliptical in shape.
- Effects of rotation include changing day and night and apparent movement of the sun as well as deflection of the wind and ocean currents.
- Effects of revolution consist of difference in the length of day and night and manifestations of seasons as well.
- Seasons are divisions of the year caused by the earth's revolution.
- Traditionally, the year is divided into four seasons in Ethiopia.
- Seasons have effects on farming and pastoral activities.

Glossary

- **Current:** movement of the surface water of the ocean.
- **Deflection:** the action of changing or causing wind to change direction.
- **Direction:** is a point towards which an object looks or faces.
- **Farming:** activity of cultivating the land.
- **Map:** is the pictorial representation of features on the ground as reduced to scale on a plane sheet of paper.
- **Orbit:** the line along which the earth goes when it travels round the sun.
- **Pastoral activities:** activities concerned with rearing animals for different purposes.
- **Revolution:** the movement of the earth round the sun in the time span of $365\frac{1}{4}$ days.
- **Rotation:** the movement of the earth on its axis every 24 hours.
- **Scale:** is the ratio between map distance and ground distance obtained through measurement.
- **Season (s):** traditional division of the year based on well known weather conditions.
- **Shape:** original form of something.
- **Sketch map:** is a plan of definite area drawn in free hand.
- **Transhumance:** the practice among pastoral farmers who move their herds and flocks between two regions of different climates.

UNIT

2

Review Questions

I. True-False Item

Write True if the statements are correct or write False if the statements are incorrect.

- _____ 1. Location of an object can be known in relation to another thing.
- _____ 2. Direction may mean the position taken by a stationary person or object.
- _____ 3. Sketch map is a plan of definite area drawn free hand.
- _____ 4. The earth's shape is likened to perfectly circular object.
- _____ 5. Globe is another version of map.

II. Matching Item

Match the item under 'B' with the corresponding item under 'A'

Item A

- _____ 6. Causes variation in day and night
- _____ 7. Planet
- _____ 8. Autumn
- _____ 9. Imaginary line that passes through the center of the earth
- _____ 10. Act of shifting position along a definite course
- _____ 11. Causes variations in seasons
- _____ 12. Portrays the earth is spherical in shape

Item B

- A. Globe
- B. Axis
- C. Movement
- D. Earth
- E. Rotation
- F. Revolution
- G. Season
- H. Atmosphere
- I. Tropical area
- J. Hemisphere

III. Choose the Correct Answer Item

Choose the correct answer and write the letter of your choice on the space provided.

- _____ 13. Which one of the following is spherical in shape?
 - a) Sun
 - b) Earth
 - c) The earth's orbit
 - d) None
- _____ 14. The best model of the earth is known as:
 - a) Map
 - b) Sketch map
 - c) Globe
 - d) Earth's satellite photo
- _____ 15. The axis of the earth is tilted from the vertical by:
 - a) 30°
 - b) 20½°
 - c) 23½°
 - d) 22½°

- _____ 16. An imaginary line or path along which the earth revolves round the sun is called:
- | | |
|----------|----------|
| a) axis | c) angle |
| b) Orbit | d) tilt |
- _____ 17. What do you call the complete movement that the earth makes on its axis every 24 hours?
- | | |
|---------------|------------------|
| a) Revolution | c) Rotation |
| b) Season | d) Day and night |
- _____ 18. Which one of the pairs of words shows the direction of movement of the earth on its axis?
- | | |
|---------------|---------------|
| a) East-west | c) West-east |
| b) East-south | d) North-east |

IV. Fill in the Blank Item

Fill in the blank spaces with appropriate words or phrases.

19. The pictorial representation of features in reference to a given scale is called _____ .
20. If the scale of a map is 1cm to 1km, a one-centimeter distance on the _____ represents a one-kilometer distance on the _____.
21. Point towards which a person or thing looks or faces is called _____.
22. A plan of a definite area or enclave drawn free hand based on the information selected to be depicted is called _____.

V. Short Answer Item

Give short answer to each of the following questions:

23. Mention some uses of map.
24. Define location.
25. Explain the earth's shape and its movements.
26. How much is the axis of the earth tilted from the vertical? What effect does it have on length of day and night and the seasons?
27. What are the manifestations of the earth's rotation and revolution?
28. Generally, in to how many seasons is the year divided? Name the seasons.
29. How many seasons does the tropical area have? Why?
30. Name the four traditionally divided seasons of Ethiopia.
31. What are the effects of seasons on farming and pastoralists?

Check List

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

I can:

1. Explain the use of map.
2. Explain how to draw a sketch map.
3. Prepare a sketch map which shows the location of my school.
4. Identify the shape and movements of the earth.
5. Explain the effects of earth's movements.
6. Relate the effects of seasons on economic activities of farmers and pastoralists.