UNIT EIGHT

GEOGRAPHIC INQUIRY SKILLS AND TECHNIQUES

INTRODUCTION

In this unit, you will explore fundamental concepts related to maps, which are essential tools in geography. Understanding maps is crucial because they are used daily to navigate and gather information. This unit covers the meaning of maps, their basic components, scale conversion, measurement on maps, map sketching, and interpreting maps and graphs.

Main Contents

8.1 Map and Its Basic Components

8.1.1 The Meaning of a Map

A map is a simplified, reduced representation of the Earth's surface, viewed from above. Key features of maps include:

- **Representation**: Maps depict all or part of the Earth's surface, such as cities or continents.
- **Two-dimensional**: Maps are flat and typically printed on paper.
- **Bird's-eye view**: They show the Earth's surface as if seen from above.
- **Scale**: Maps are smaller than the area they represent and use scale to maintain proportional accuracy.
- **Symbols and Notations**: Maps use symbols to represent features and include titles, dates, and scales for clarity.

Historical Development of Maps

Maps have evolved from simple sketches to complex digital representations:

- **Traditional Map-Making**: Early maps used materials like sticks, clay tablets, and parchment. They often included drawings of features and were labor-intensive.

- **Modern Map-Making**: Since the 17th century, advancements in technology, such as aerial photography and satellite imagery, have improved map accuracy. Computers now play a significant role in map-making.

Uses of Maps

Maps are crucial for:

- **Location**: Identifying specific places and their relative positions.
- **Distance**: Measuring distances between locations using map scales.
- **Area**: Calculating the size of areas depicted on maps.
- **Direction**: Determining the direction and bearing of places.

8.1.2 Basic Components of a Map

A map should include the following components:

- **Title**: Indicates what the map represents.
- **Scale**: Shows the relationship between map units and ground units.
- **Direction (North Arrow)**: Shows orientation, with North typically at the top.
- **Grid Reference**: Uses latitude and longitude to locate positions.
- **Legend/Key**: Explains the symbols used on the map.
- **Date/Year**: Indicates when the map was published.
- **Place of Publication and Publisher**: Provides information about the source of the map.

8.2 Scale, Scale Conversion, and Measurements on Maps

8.2.1 Map Scale

The scale of a map indicates how the size of features on the map relates to their size on the ground. Maps are classified into:

- **Large-Scale Maps**: Show smaller areas with greater detail (e.g., 1:50,000).
- **Medium-Scale Maps**: Cover moderate areas with moderate detail (e.g., 1:50,000 to 1:250,000).
- **Small-Scale Maps**: Show larger areas with less detail (e.g., 1:250,000 and smaller).

Ways to Express Map Scale

1. **Scale Statement**: Describes the scale in words (e.g., 1 cm = 1 km).
2. **Representative Fraction (RF)**: Expresses scale as a ratio (e.g., 1:50,000).
3. **Graphic Scale**: A bar scale that visually represents distances.

Scale Conversion

To convert between different forms of map scale:

- **RF to Statement Scale**: Convert the ratio to a verbal scale.
- **Statement Scale to RF**: Convert the verbal scale to a ratio.

Measurement on Maps

Measuring Distance

1. **Straight-Line Distance**: Measure directly between two points. Convert using the map scale.
2. **Curved Line Distance**: Measure along curved paths using a thread or dividers, then add measurements.

Measuring Area

1. **Regular Shapes**: Use geometric formulas for squares, rectangles, triangles, and circles.
2. **Irregular Shapes**: Use tools like a planimeter or methods such as grid square analysis.

8.3 Position on Maps

Understanding the position of places on maps is essential for navigating and locating specific points accurately. This section will explain how to use grid references and compass directions to determine locations on maps.

8.3.1 Grid References

A. Position by the Use of Geographic Grid

Maps often use a geographic grid system composed of lines called **Parallels** and **Meridians**.

- **Parallels** run parallel to the equator and measure latitude. Latitude tells us how far north or south a location is from the equator.
- **Meridians** run from the North Pole to the South Pole and measure longitude. Longitude indicates how far east or west a location is from the Prime Meridian.

Latitude is measured in degrees (°), minutes (′), and seconds (″). For example, a latitude of 10° N indicates a point 10 degrees north of the equator. **Longitude** is similarly measured, such as 75° W, indicating a point 75 degrees west of the Prime Meridian.

Example: To find the geographic grid of a point (e.g., Point C):

1. Determine whether the point is north or south of the equator.

2. Read the latitude (e.g., 10° N).
3. Read the longitude (e.g., 75° W).
4. Combine them: 10° N 75° W.

B. Position by the Use of National Grid Reference

Maps can also use a National Grid system. This grid is made up of **Eastings** (vertical lines) and **Northings** (horizontal lines) that provide a framework for locating points.

- **Eastings** run from west to east and are numbered sequentially from a grid origin.
- **Northings** run from south to north and are also numbered from the grid origin.

Four-Digit Grid Reference:

1. Identify the grid square where the point is located.
2. Read the Eastings and Northings from the grid lines surrounding the point.
3. Combine the numbers to form the four-digit reference.

Example: For point F:

1. Locate the vertical and horizontal grid lines.
2. Read the Easting and Northing numbers.
3. Combine them (e.g., 5525).

Six-Digit Grid Reference:

1. Follow the same steps as the four-digit reference but include additional digits for more precision.
2. This method provides accuracy to the nearest 100 meters.

Example: For point B, F, and N on a larger scale map, use the six-digit grid reference to get more precise locations.

8.3.2 Compass Directions

A compass is used to find directions and has 32 points. The four main cardinal points are:

- **North (N)**
- **East (E)**
- **South (S)**
- **West (W)**

Intermediate points, found between the cardinal directions, are:

- **North-East (NE)**
- **South-East (SE)**
- **South-West (SW)**
- **North-West (NW)**

Additional subdivisions include:

- **North-North-East (NNE)**
- **East-North-East (ENE)**
- **East-South-East (ESE)**
- **South-South-East (SSE)**
- **South-South-West (SSW)**
- **West-South-West (WSW)**
- **West-North-West (WNW)**

Directions can also be expressed in degrees, with 0° for North, 90° for East, 180° for South, and 270° for West.

8.3.3 North Points

Three types of north points are commonly used:

- **True North**: The direction towards the North Pole. It is aligned with the Earth's axis and is used for geographic reference.
- **Magnetic North**: The direction a compass needle points. It varies slightly over time due to changes in the Earth's magnetic field. The difference between True North and Magnetic North is called Magnetic Declination.
- **Grid North**: The direction of the vertical grid lines on a map. It is used for mapping and drawing but may not align exactly with True North.

Understanding these concepts will help you accurately determine and describe locations on maps.

8.4 Map Sketching

What is a Sketch Map? A sketch map is a simplified, freehand drawing of a geographical area. Unlike precise maps created from exact measurements, sketch maps are drawn from observation and highlight only the main features. They are useful for quickly conveying basic geographic information without getting bogged down in details.

Steps to Draw a Sketch Map:

1. **Determine the Area:**
   - Decide which part of the area you want to map. Set boundaries that cover only the necessary space.
2. **Plan the Space:**
   - Estimate how much space you need for your map. Ensure that objects of similar size in reality are depicted similarly on your map.
3. **Set the Orientation:**
   - Choose a direction for your map, usually with north at the top. Most maps include a directional indicator.
4. **Select Reference Points:**
   - Pick landmarks that will help viewers understand the map, such as major streets or rivers.
5. **Decide on Detail:**
   - The level of detail depends on the size of the area you're mapping. A larger area may require less detail.
6. **Begin Sketching:**
   - Start by drawing general shapes and landmarks. Use simple shapes like circles, rectangles, or triangles if exact details are unclear.
7. **Add Details:**
   - Include names of places and major features as they come to mind.
8. **Limit Time:**
   - Spend no more than an hour on your map. Avoid making it overly detailed or perfect.

8.5 Interpreting Maps and Graphs

8.5.1 Interpreting Features of Physical and Human Landscapes

Map Symbols and Signs: Maps use standardized symbols and signs to represent various features. These symbols are agreed upon globally to ensure consistency. Key symbols include:

- **Cities and Towns:** Represented by dots or shaded areas.
- **Water Bodies:** Often shown in blue.
- **Political Boundaries:** Indicated by dashed or solid lines.

Creating Symbols:

- Ensure symbols are uniform, easy to read, and consistently sized.

8.5.2 Interpreting Graphs, Tables, and Diagrams

Statistical Diagrams: These visual tools help present and analyze numerical data. They make it easier to see trends, make comparisons, and understand complex information. Common types include:

1. **Simple Line Graphs:**
    - **Purpose:** Show changes over time or relationships between two sets of data.
    - **Example:** Population changes over years.
    - **Steps:**
        - The x-axis (horizontal) typically shows time.
        - The y-axis (vertical) shows the dependent variable.
        - Plot values using dots or small crosses.
2. **Simple Bar Graphs:**
    - **Purpose:** Compare quantities across different categories or over time.
    - **Example:** Monthly rainfall variations.
    - **Steps:**
        - The horizontal axis usually represents categories or time.
        - Bars represent quantities and should start from zero.
        - Leave gaps between bars for clarity.
3. **Pie Charts:**
    - **Purpose:** Show proportions of a whole as segments of a circle.
    - **Example:** Distribution of export destinations.
    - **Steps:**
        - Draw a circle and divide it into segments proportional to the data values.
        - Each segment represents a part of the total.