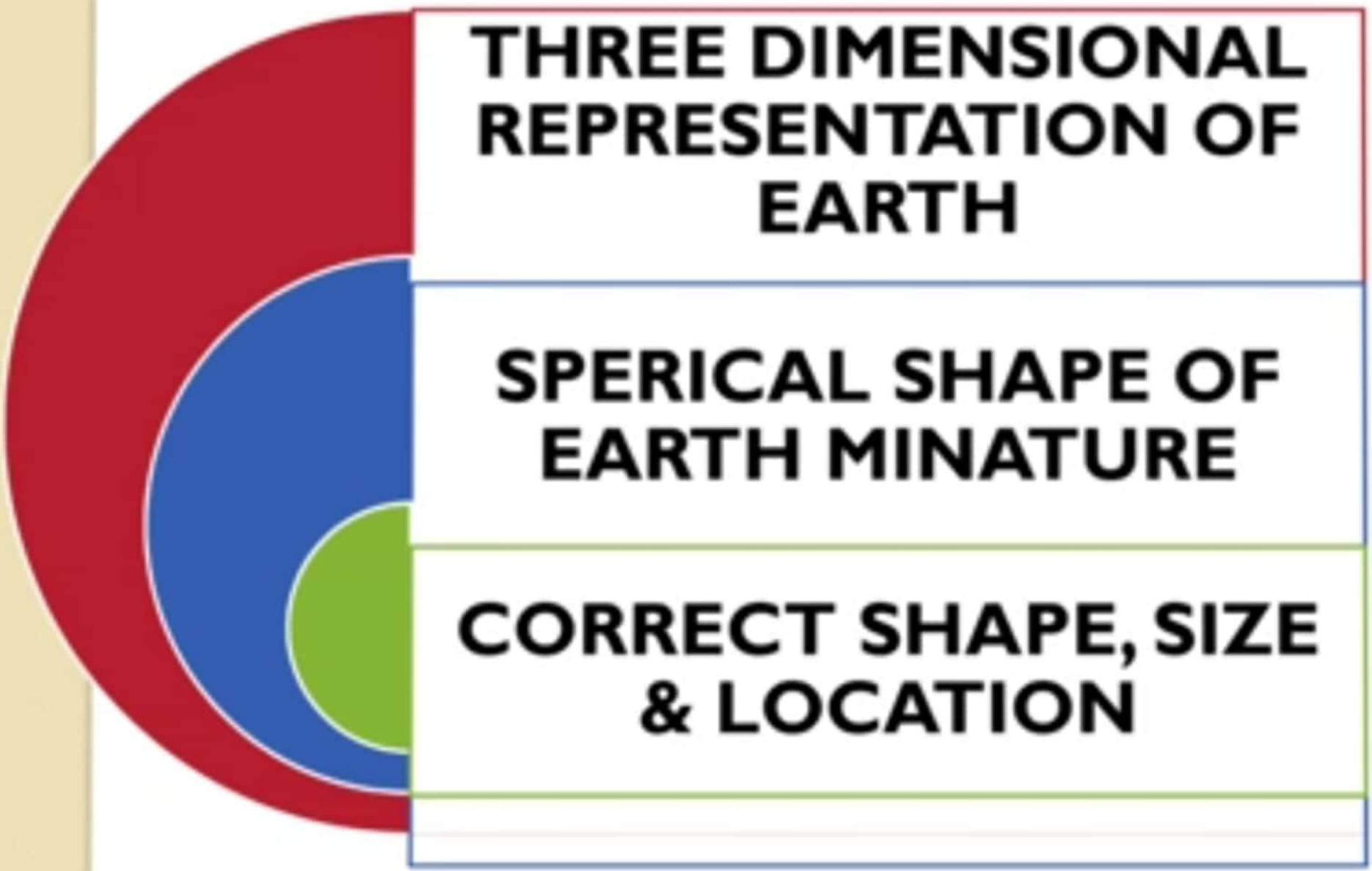
MAPS

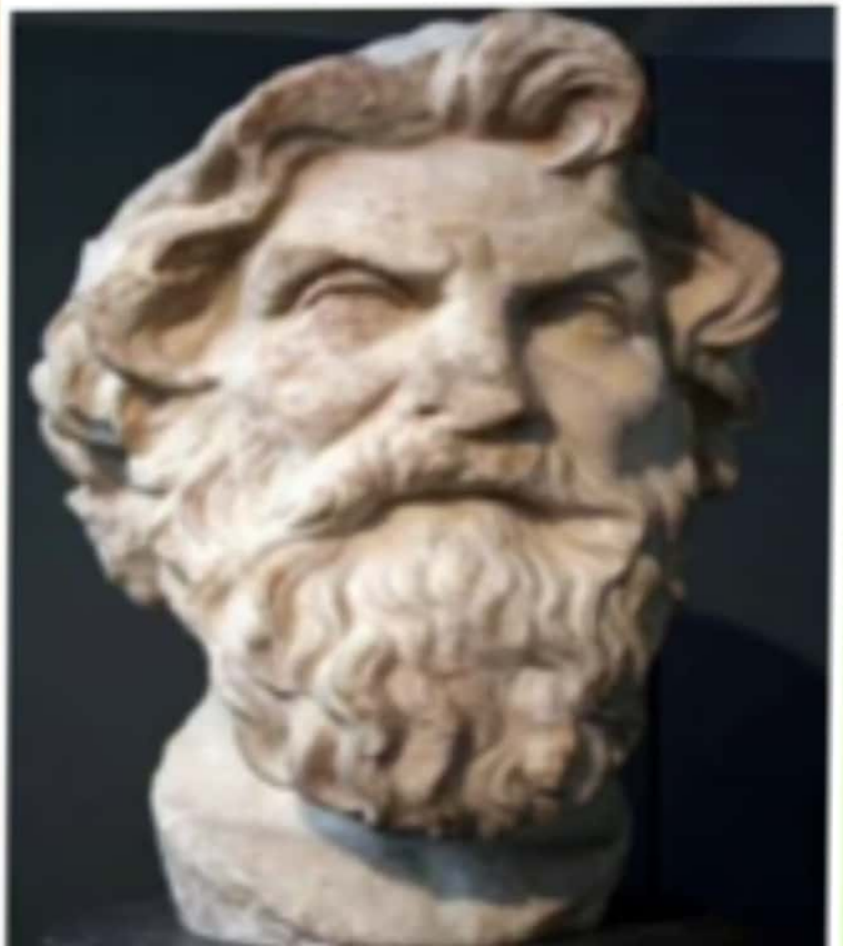
CLASSIFICATION OF MAPS & ITS TYPES

Dr. Ritu Jain

GLOBE



Historians believe that the first globe was invented by Crates of Mallus in Ancient Greece in about 150 BCE



What is a Map?

- Pictorial Representation
- Part or whole of the earth's surface
- Drawn to scale
- On a flat sheet of paper

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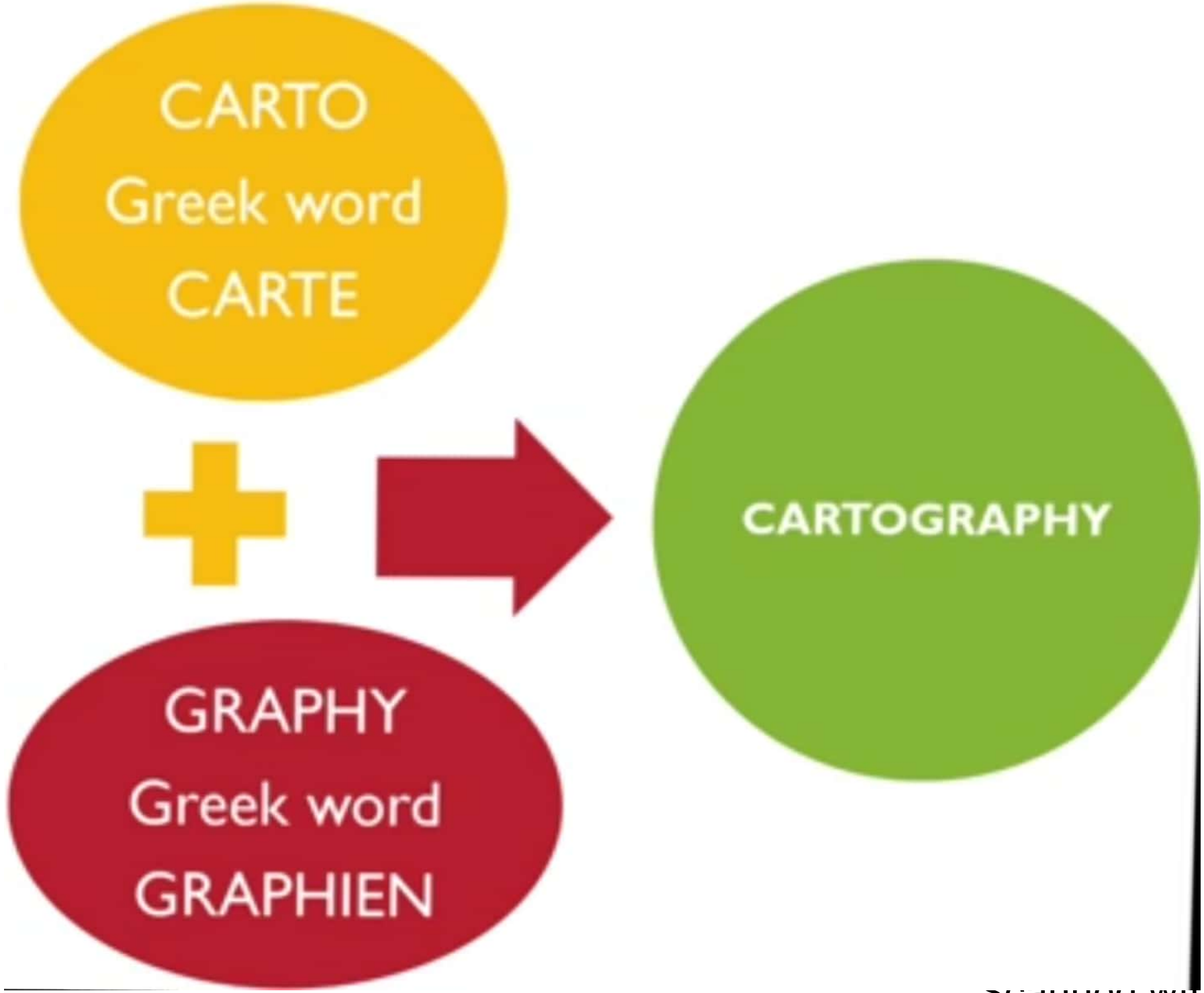
MAP

TWO DIMENSIONAL REPRESENTATION

REPRESENT THE EARTH AS WHOLE OR PART ON PIECE OF PAPER

MAP IS DERIVED FROM LATIN WORD MAPPO

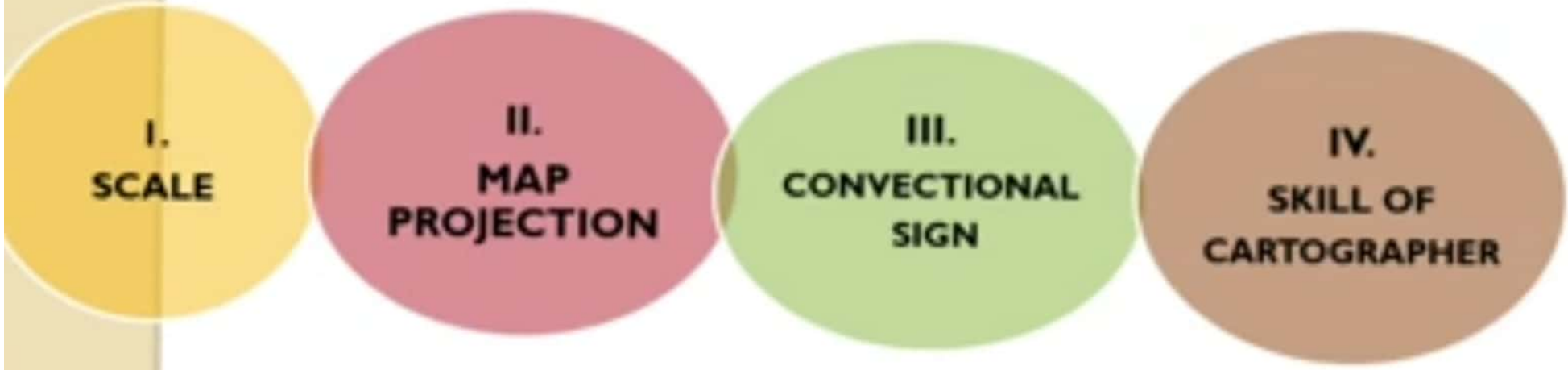
MEANING NAPKIN OR COVER CLOTH



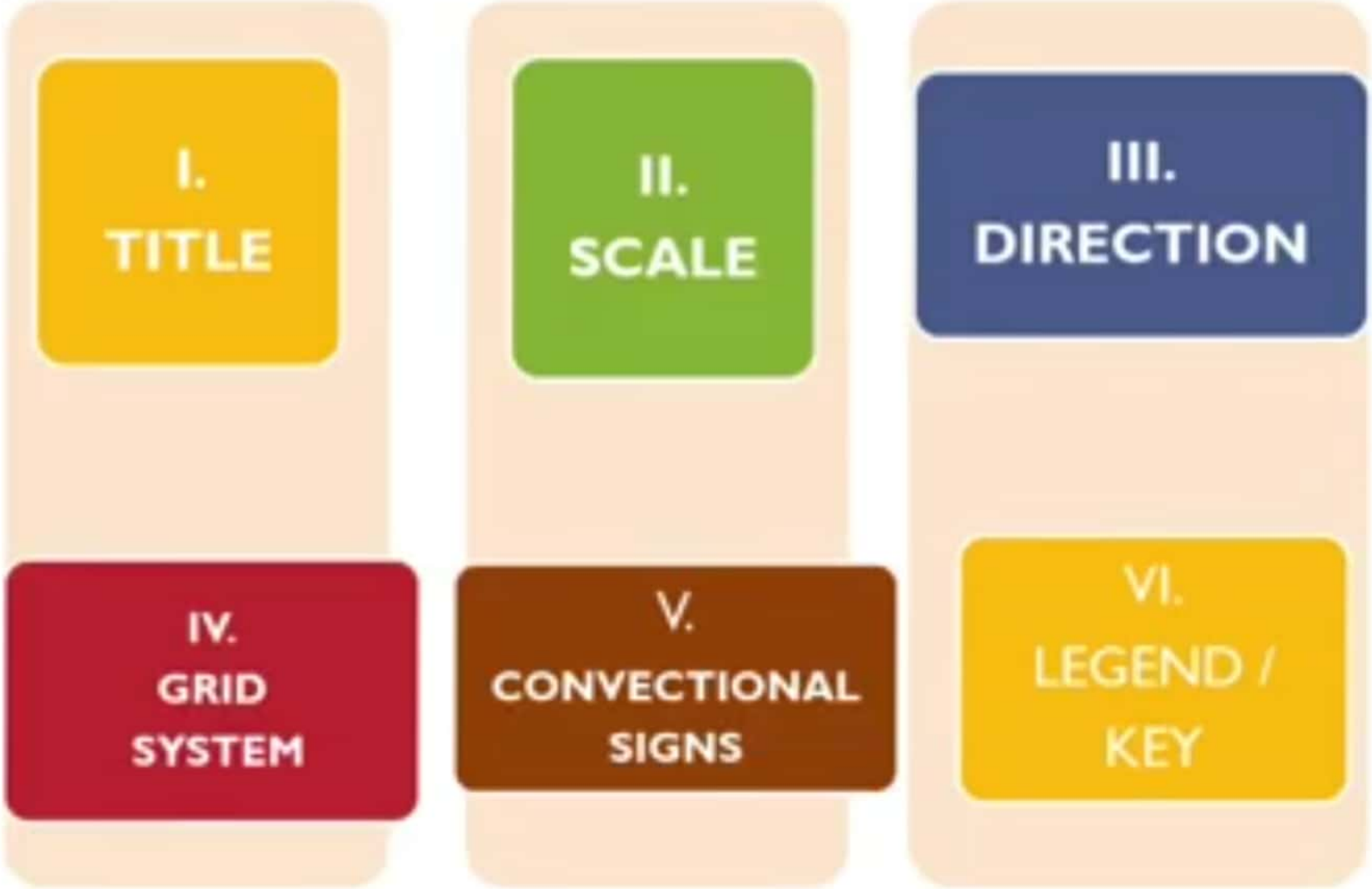
MAP & CARTOGRAPHY

- 1st Map: 150 AD – Ptolemy
- Medieval times – maps dominated by religious views. Jerusalem at the center.
- The first whole world maps began to appear in the early 16th century, following voyages by Columbus and others to the New World.
- Mercator -1569. Created a navigational map. All straight lines were true bearings

INFORMATION ON MAP



ELEMENTS OF MAP



1. Title

- The title explains the subject of the map and gives you an idea of what information the map conveys

Title

- Represents
  - Name of the region depicted
  - Theme of the map

- Example

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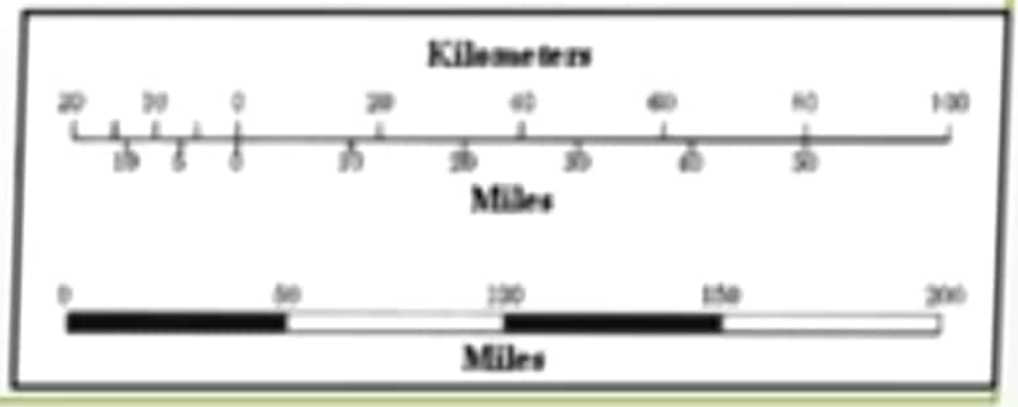
5. Scale

Scale shows the ratio between a unit of length on the map and a unit of distance on the earth

- Ratio
  - Distance between two places on map
  - Distance between same two places on ground
- Can be expressed as
  - Statement (2 cm = 1 km OR 2 cm to 1 km)
  - Representative Fraction (1:50000)
  - Linear Scale



Large Scale Maps v/s Small Scale Maps

	Small Scale	Large Scale
Scale	Smaller number	Larger number
Example of Scale	1 cm = 100 km OR 1/10000000 OR 1: 10,00,000	2 cm = 1 km OR 2/100000 OR 1:50,000
Area depicted	More	Less
Details	Less	More
Example	India	Rajkot

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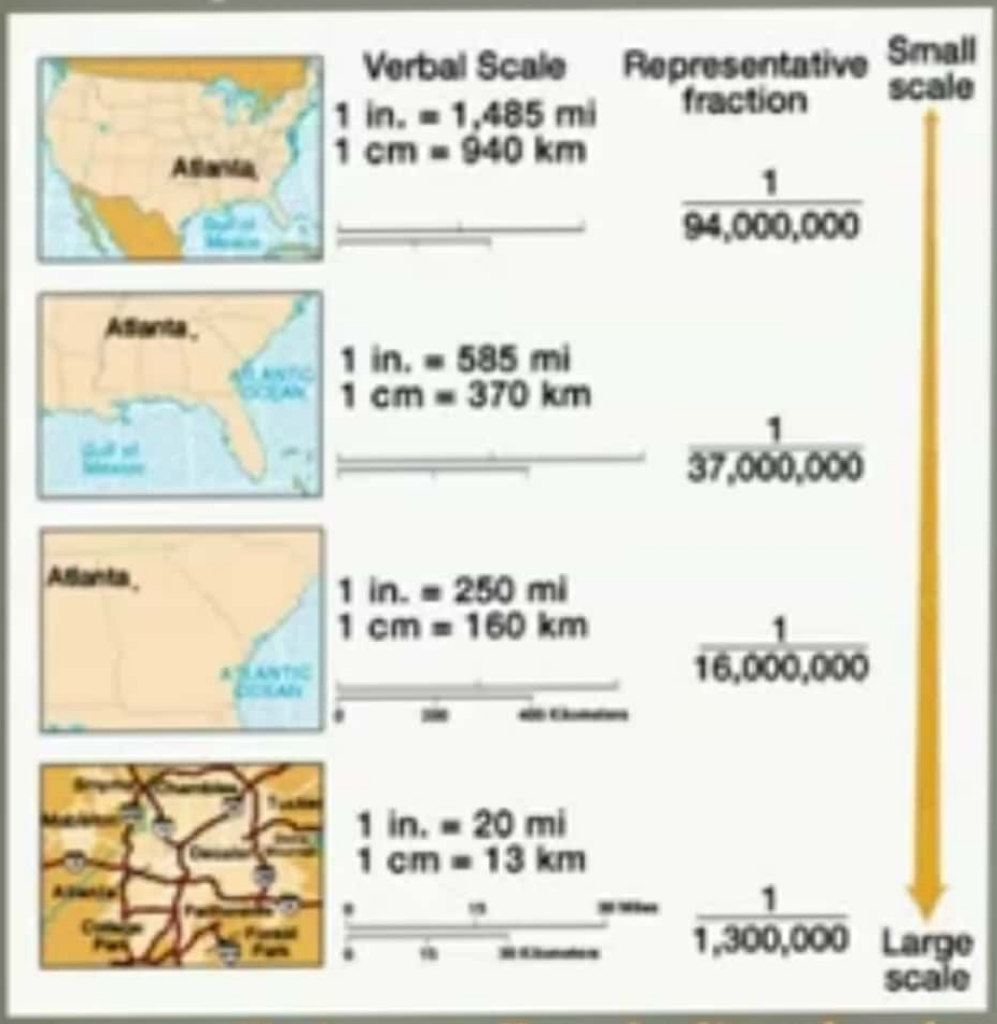
Map Science: Small or Large Scale? Why?

Map Science: Scale



A map will always tell us the literal scale of the map, but what exactly is meant by large and small scale?

Here's how I remember the difference between small and large scale:

Small Scale

- Features look "small", as in features get smaller and smaller the "smaller scale" the map is,
- Just to confuse things, on the verbal scale, the distance 1 unit represents gets increasingly larger ,
- And to confuse things further, the representative fraction number also gets larger and larger,

Or, the a larger amount of area with lesser detail.

Large Scale

- Visually, the "larger" features look on a map. the larger the scale is,
- On the verbal scale, the difference between a single unit and what it represents is smaller,
- Similarly, the representative fraction is smaller,

Or – a smaller amount of area with a greater amount of detail.

Remember, all this terminology is not fixed but exists in comparison with other maps scales. One can generally say scale is large or small because we know the relative size of things on the planet and in relation to each other.

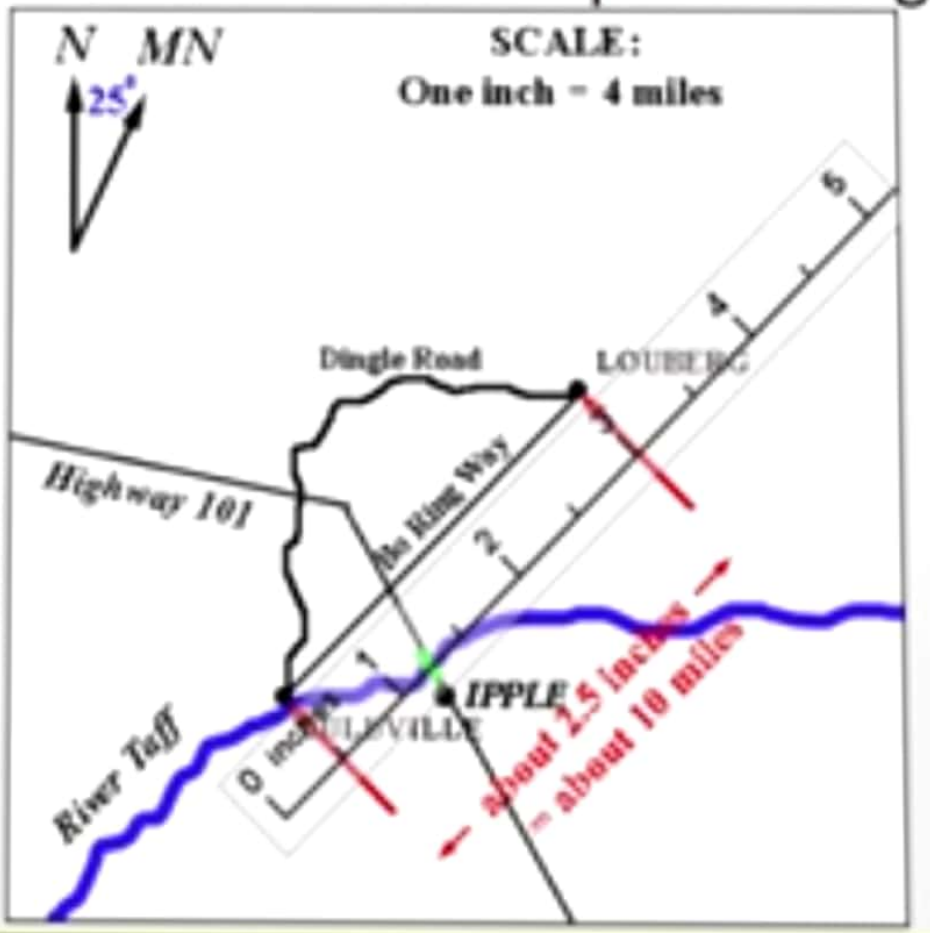
MATIC

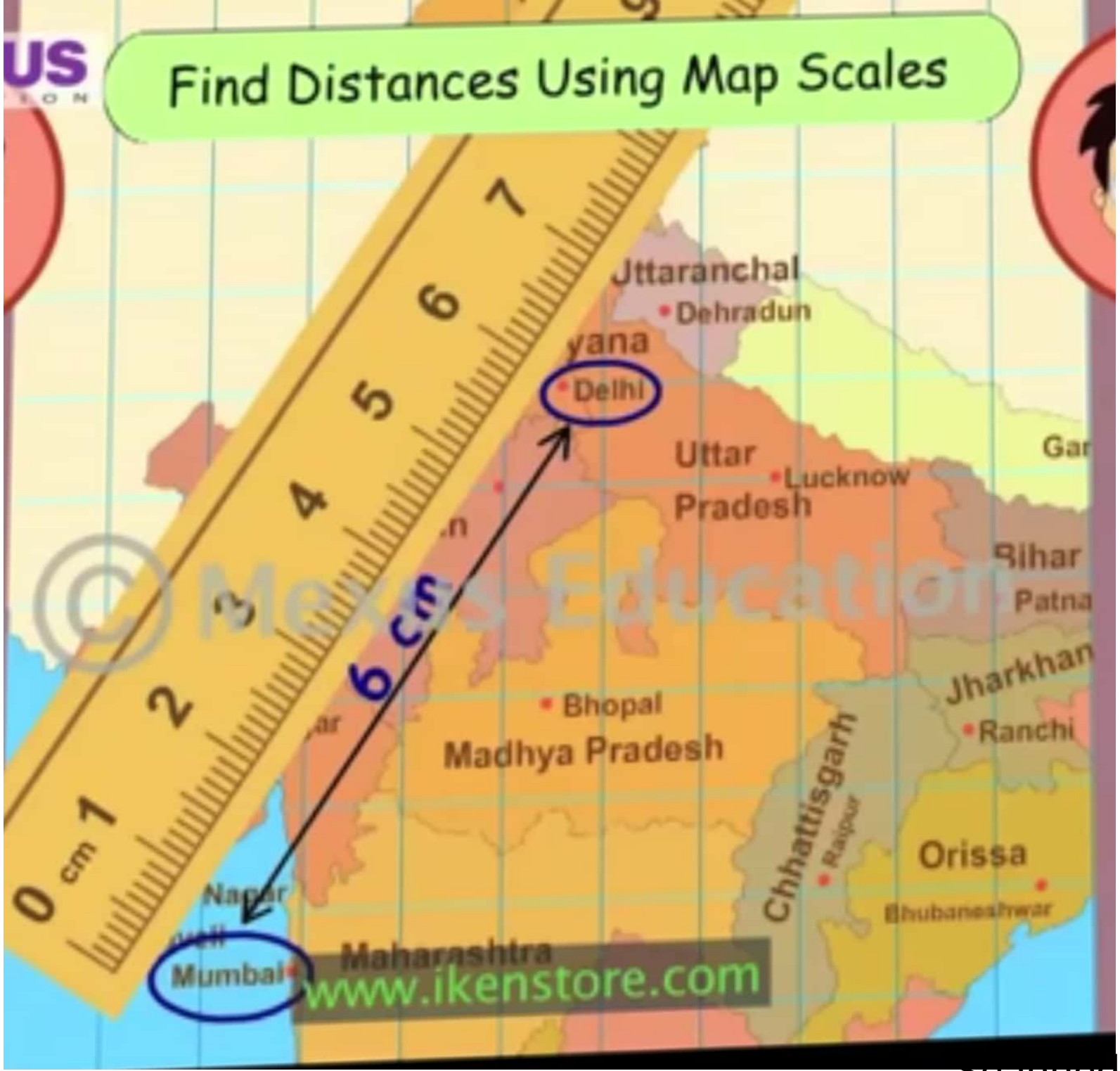
Understanding Scale

- Scale

Distance between two places on map (*a*)

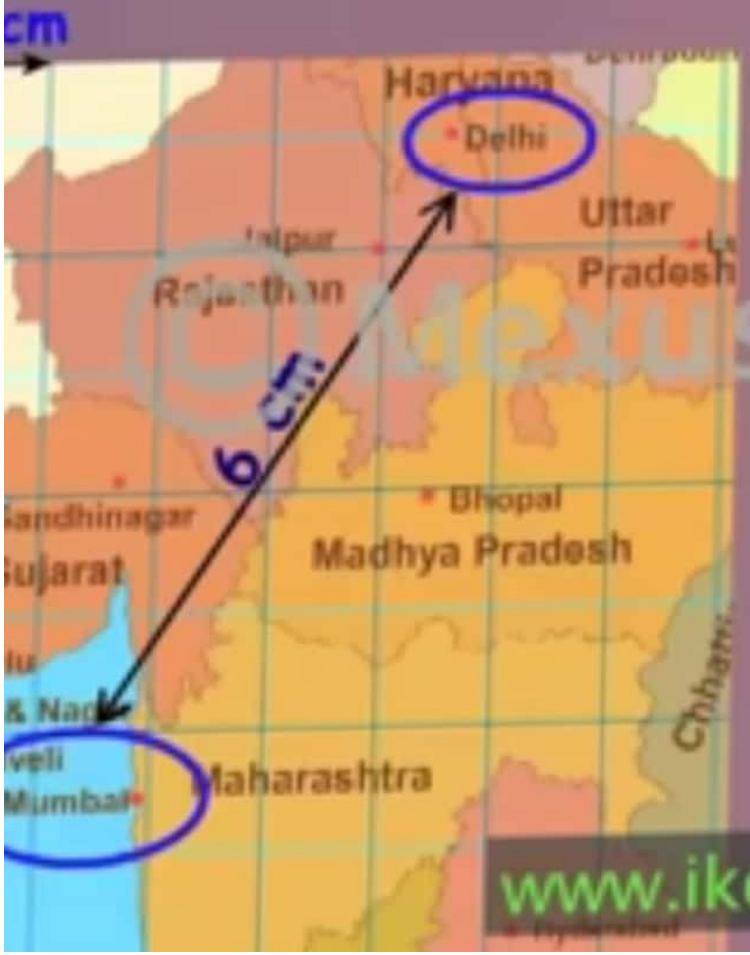
Distance between the same two places on ground (*b*)





Find Distances Using Map Scales

To Find: The Distance between Mumbai and Delhi



Distance on the map = 6 cm

Distance on the ground
= Distance on the map x 200
= 6 x 200 = 1,200 km

The estimated distance between Mumbai and Delhi is: 1,200 km

Find Area Using Map Scales

To Find: The Area of Maharashtra

Find Area Using Map Scales

To Find: The Area of Maharashtra

Total number of squares covering Maharashtra = 5 + 3 = 8 squares

The area of 1 square on the map = 1 cm x 1 cm = 1 cm^2

The area of 1 square on the ground = 200 km x 200 km = 40,000 km^2

Estimated area of Maharashtra on the ground

= Area of 1 square on the ground x 8

= 40,000 km^2 x 8 = 3,20,000 km^2

Direction

- Angular distance
  - From observer's position
  - To any place on map
  - With respect to NORTH
    (Position of Pole Star)

- Can be expressed as
  - Conventions (N, S, E, W, etc.)
  - Bearing OR Azimuth (Angle)

True North- the direction of the Earth's North Pole which is 90 degrees North. The North pole star is directly above the North Pole.

Magnetic North- the direction of the Earth's Magnetic pole, i.e. the direction in which the needle of a compass point.

Grid North- the direction of the vertical grid lines called eastings.

Note- All three North do not point at the same direction.

2. Compass Rose

The compass rose shows you directions on a map

- **Cardinal directions** are north, south, east, and west
- **Intermediate directions** are northeast, northwest, southwest, and southeast

Direction

Angle NOP is the direction

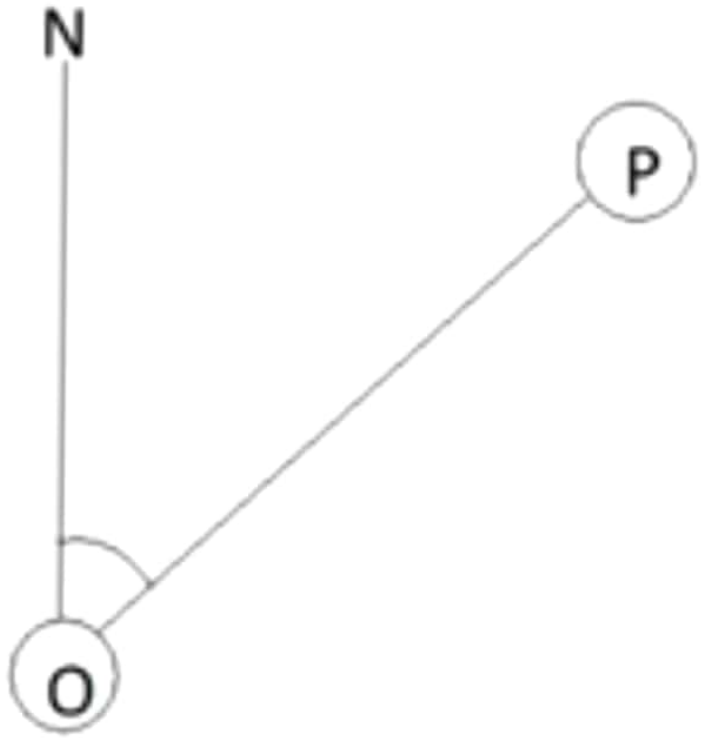
Can be expressed as

45°

(0 to 360; clockwise)

OR

NE



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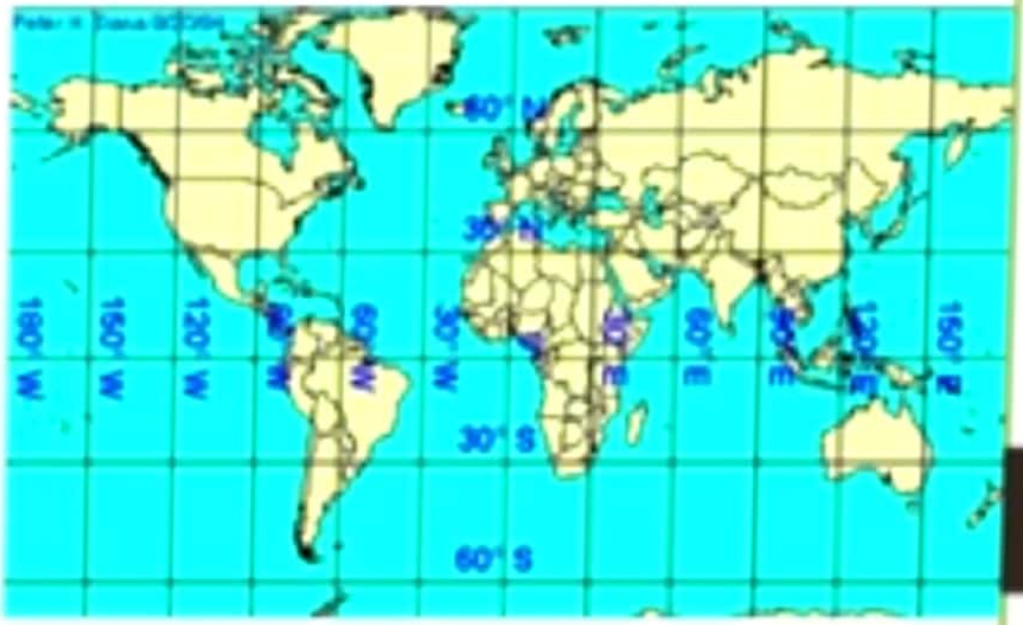
GRID SYSTEM

The imaginary vertical and horizontal lines which collectively forms the grid

Grid

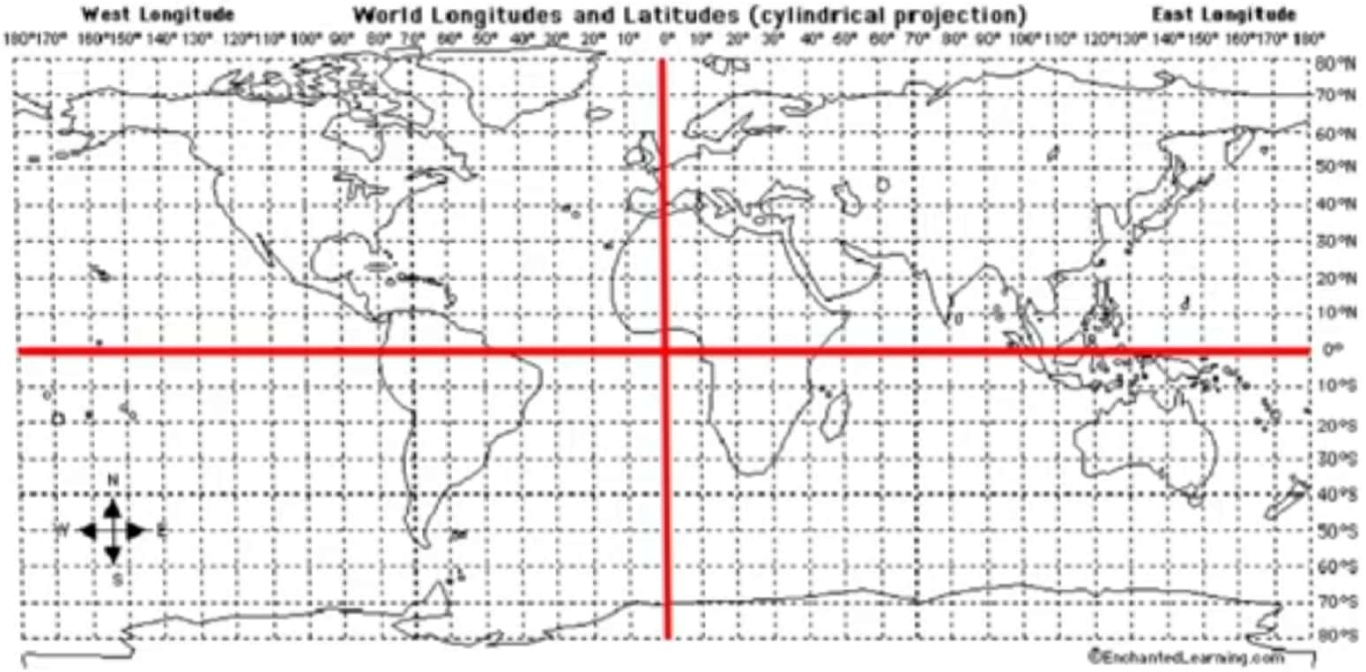
- Set of
  - Vertical lines
  - Horizontal lines
  - Examples
    - Latitudes & Longitudes
    - Northings & Eastings



- USES
  - Used to locate places
  - Draw an area to proportion on map
  - Could be used to determine area

1. Relative Location
   - Location expressed using landmarks
     - Behind Big Bazaar
     - Opposite Shiv Temple
     - Near Patel Pan
2. Absolute Location
   - Location expressed using known grid system
     - 19° N; 78° E

1. Latitudes and longitudes
2. Eastings and Northings



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Eastings	Northings
Vertical Lines	Horizontal Lines
North to South	East to West
Numbered 00 to 99	
Placed 2 cm (1 km) apart	
Value increases towards east	Value increases towards north

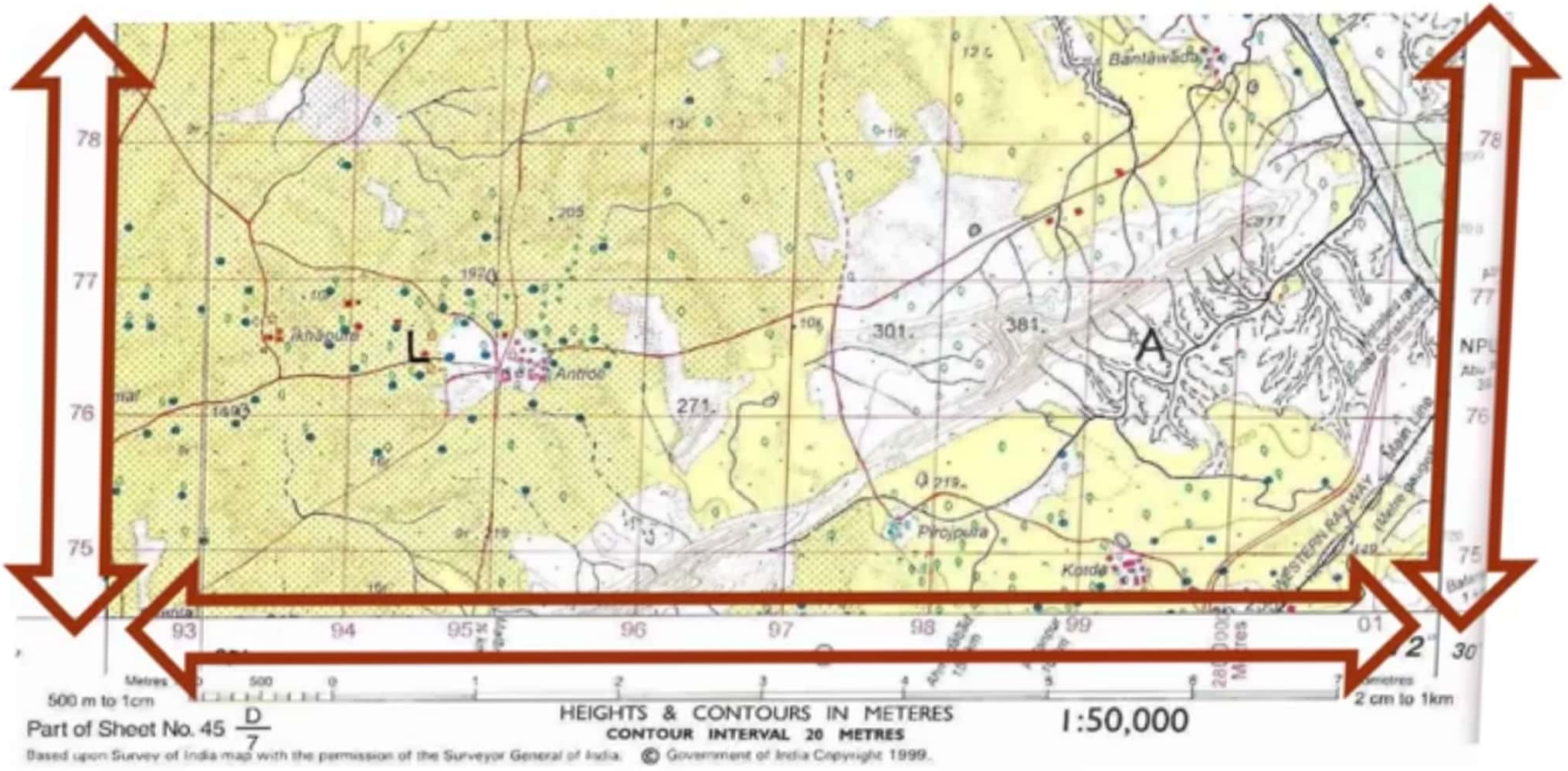
Eastings and Northings	Latitudes and Longitudes
Parallel and Equidistant	Longitudes not Parallel and equidistant
Distance between successive eastings or northings is 2 cm	Distance between two degrees of latitude may be as large as 222 cm

Comparison of grids

Eastings and Northings	Latitudes and Longitudes
Parallel and Equidistant	Longitudes not Parallel and equidistant
Distance between successive eastings or northings is 2 cm	Distance between two degrees of latitude may be as large as 222 cm

- Conclusion
  - Both grid systems do not overlap
  - System of Eastings and Northings is more accurate

Eastings and Northings



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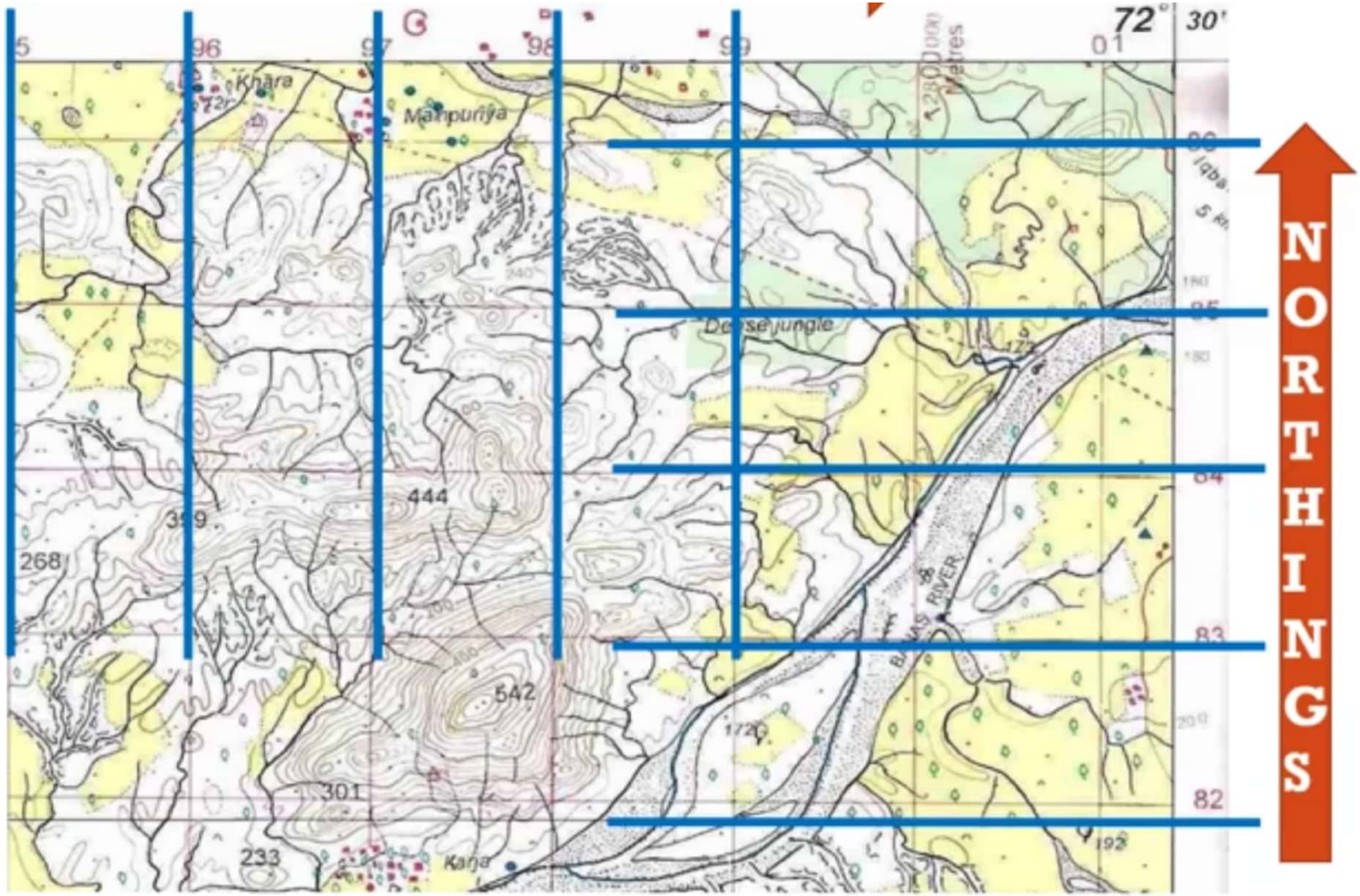

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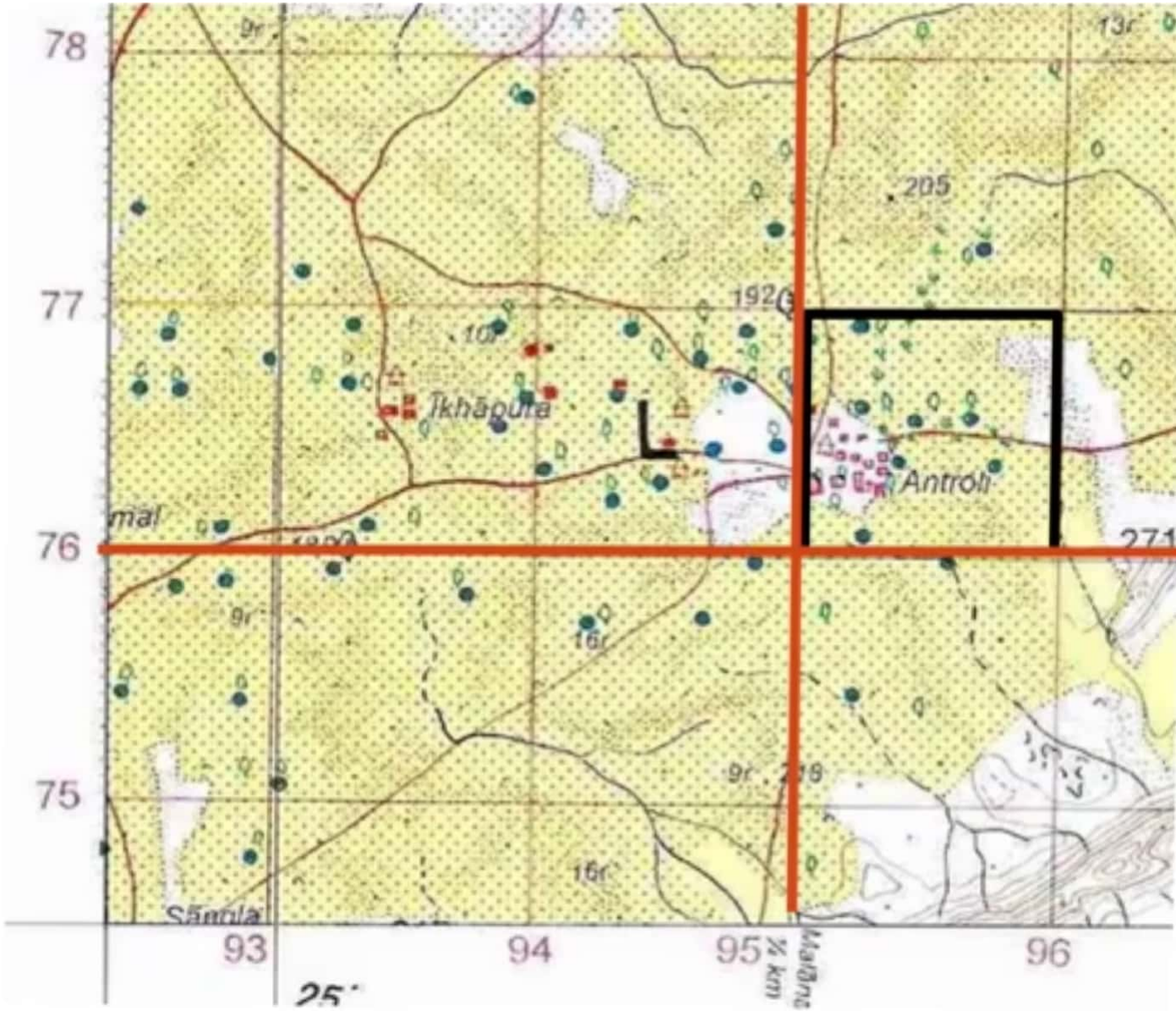
GRID REFERENCE- 4 FIGURE

- First two digits are eastings
- Next two digits are northings
- By convention, lesser value is always taken

- ANTROLI

Eastings		Northings	
9	5	7	6



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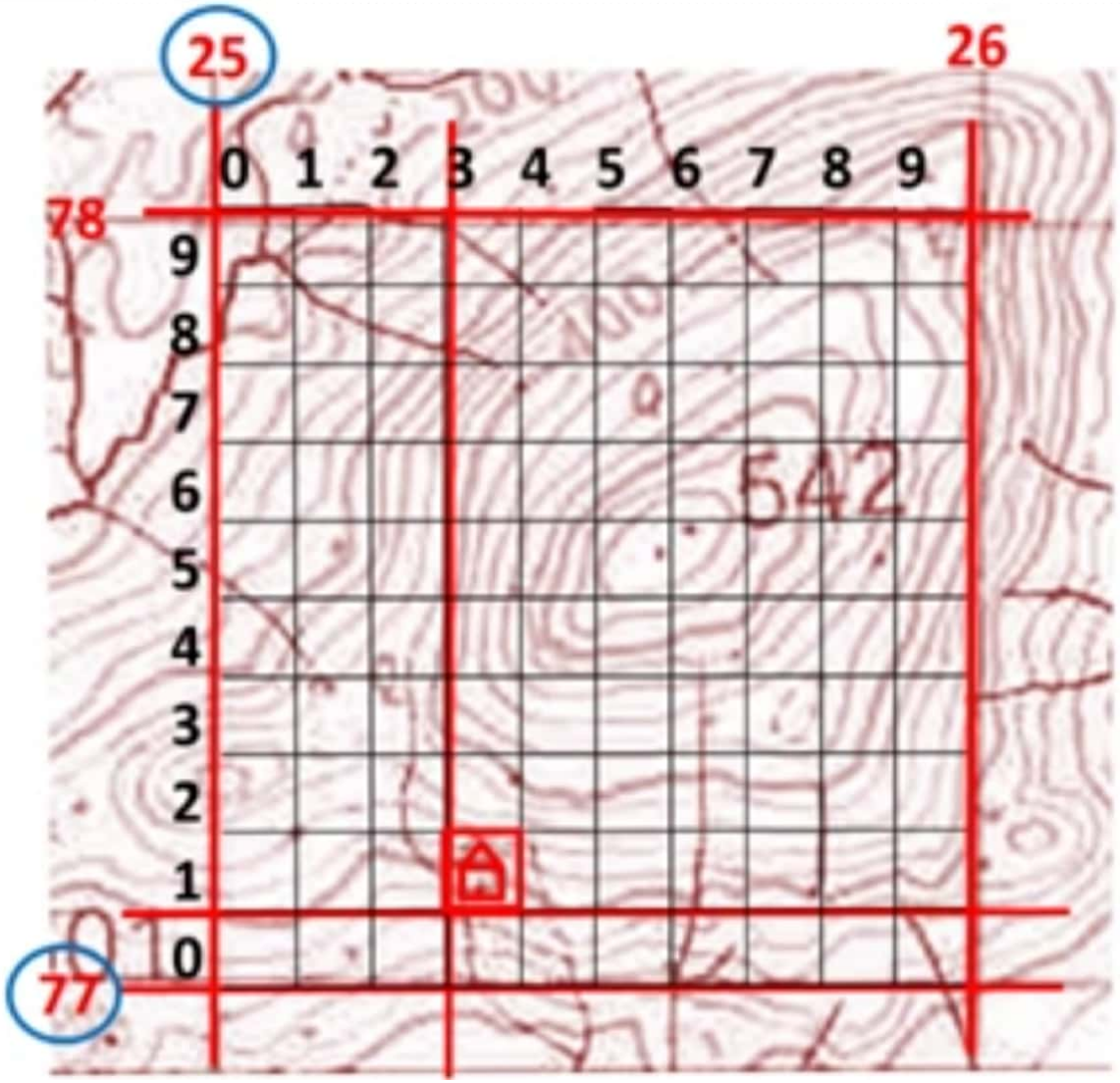
GRID REFERENCE- 6 FIGURE

- First two digits are eastings
- 3rd digit is the 10th division of eastings
- Next two digits are northings
- 6th digit is the 10th division of northings

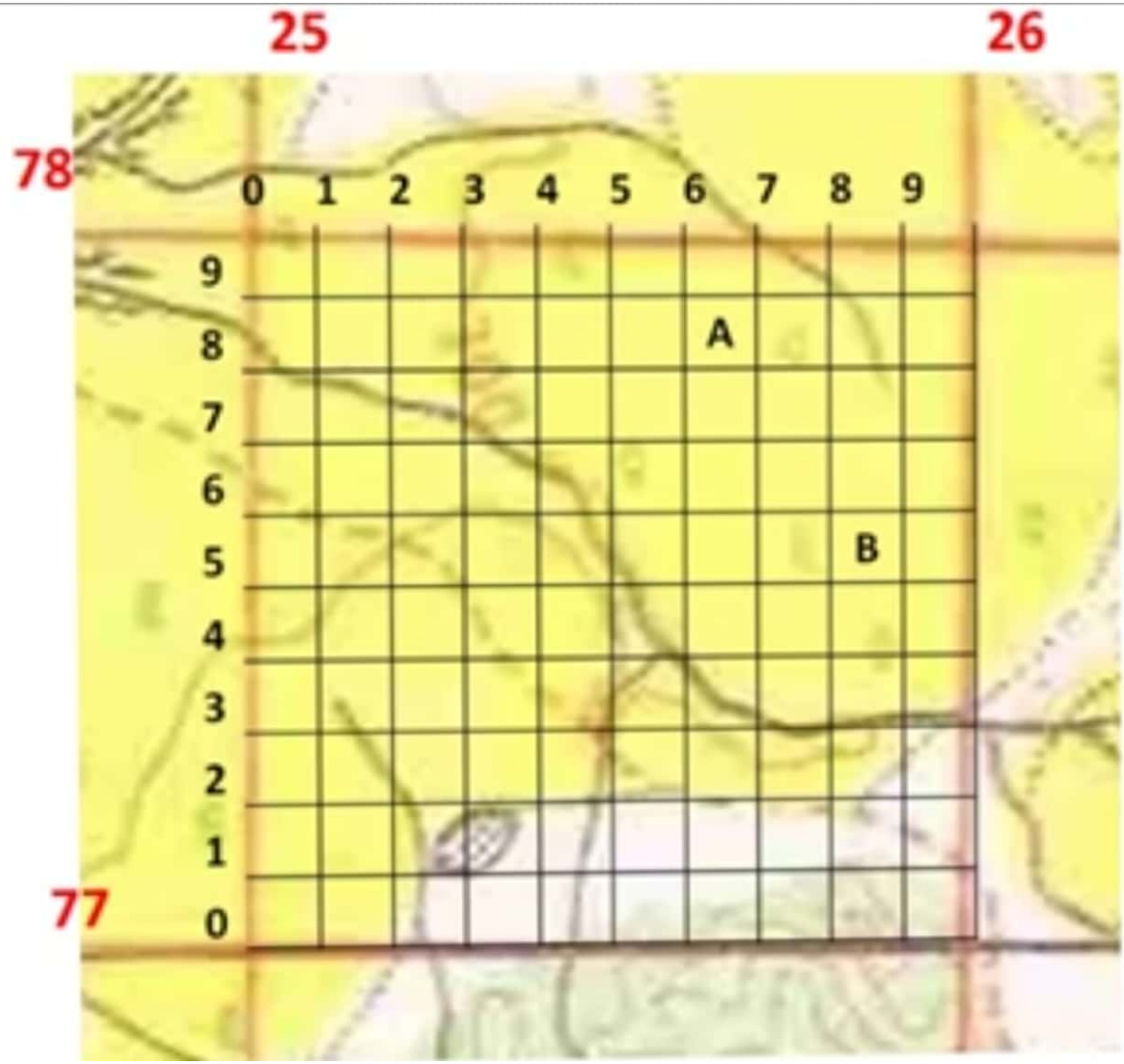
Eastings		10th division of eastings	Northings		10th division of northings
1	6	5	2	2	7

- 4 figure grid reference is 2577
- Six figure grid reference of temple is

2	5	3	7	7	1



- 4 figure grid reference is 2577
- Six figure grid reference
- A – 256778
- B – 258775



CONVECTIONAL SIGN

Railroad Tracks

Golf Course

Church

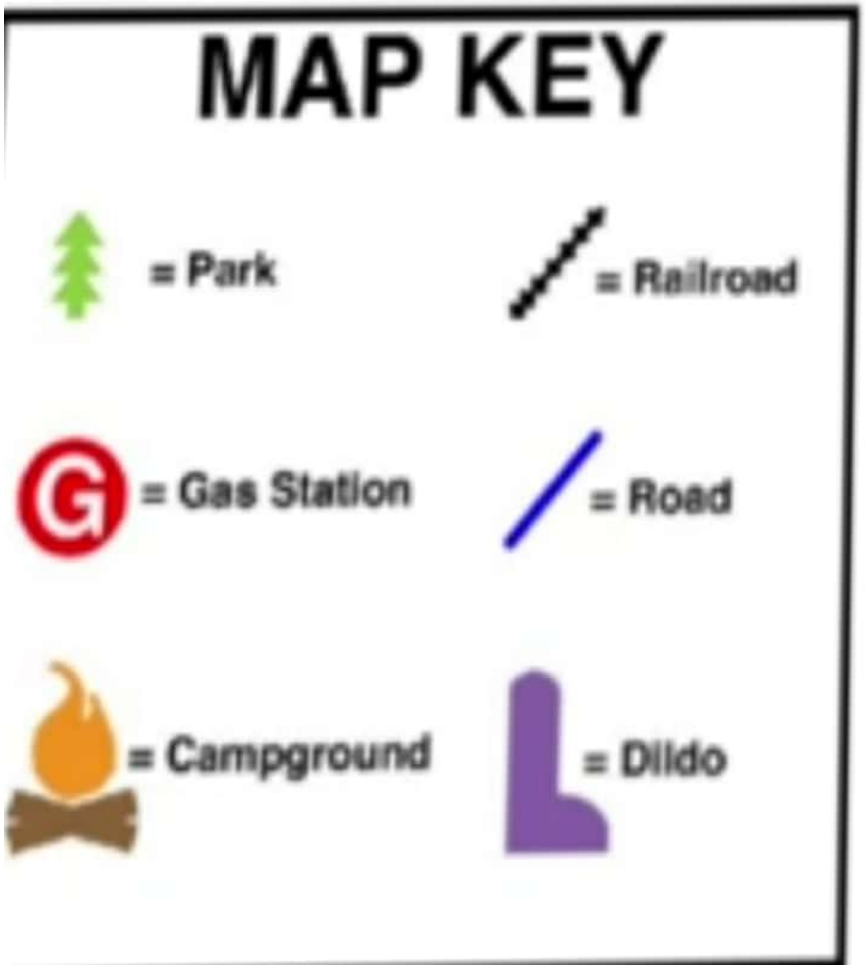
Swamp

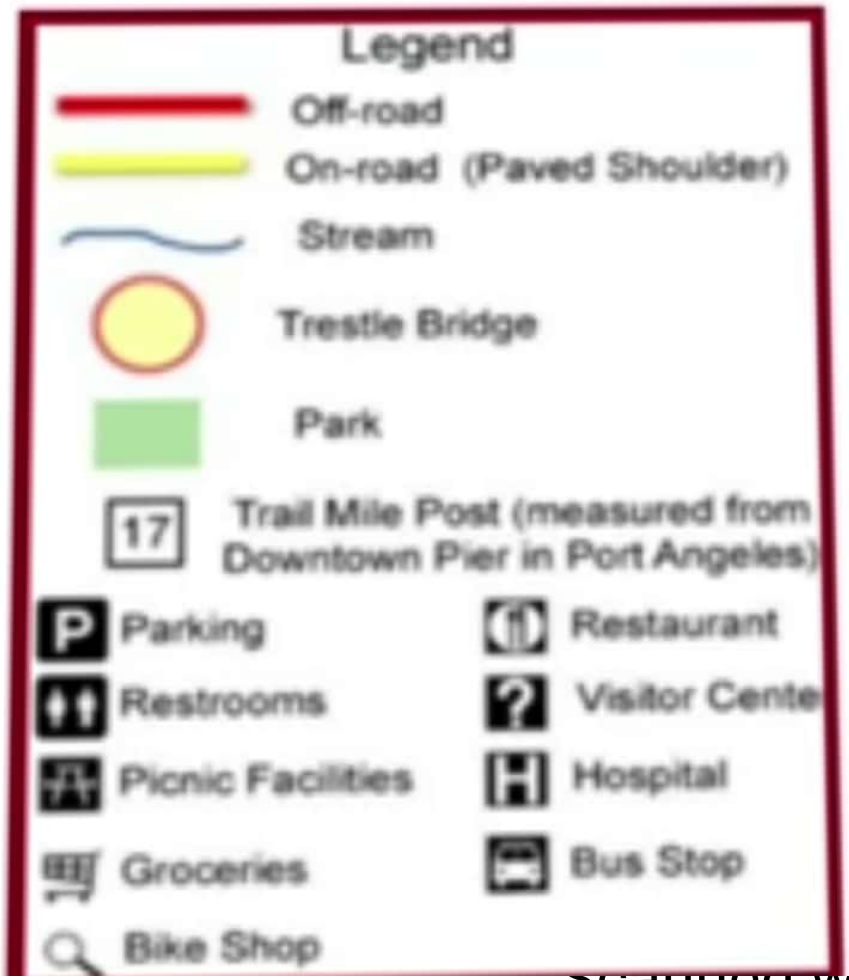
School

Telephone

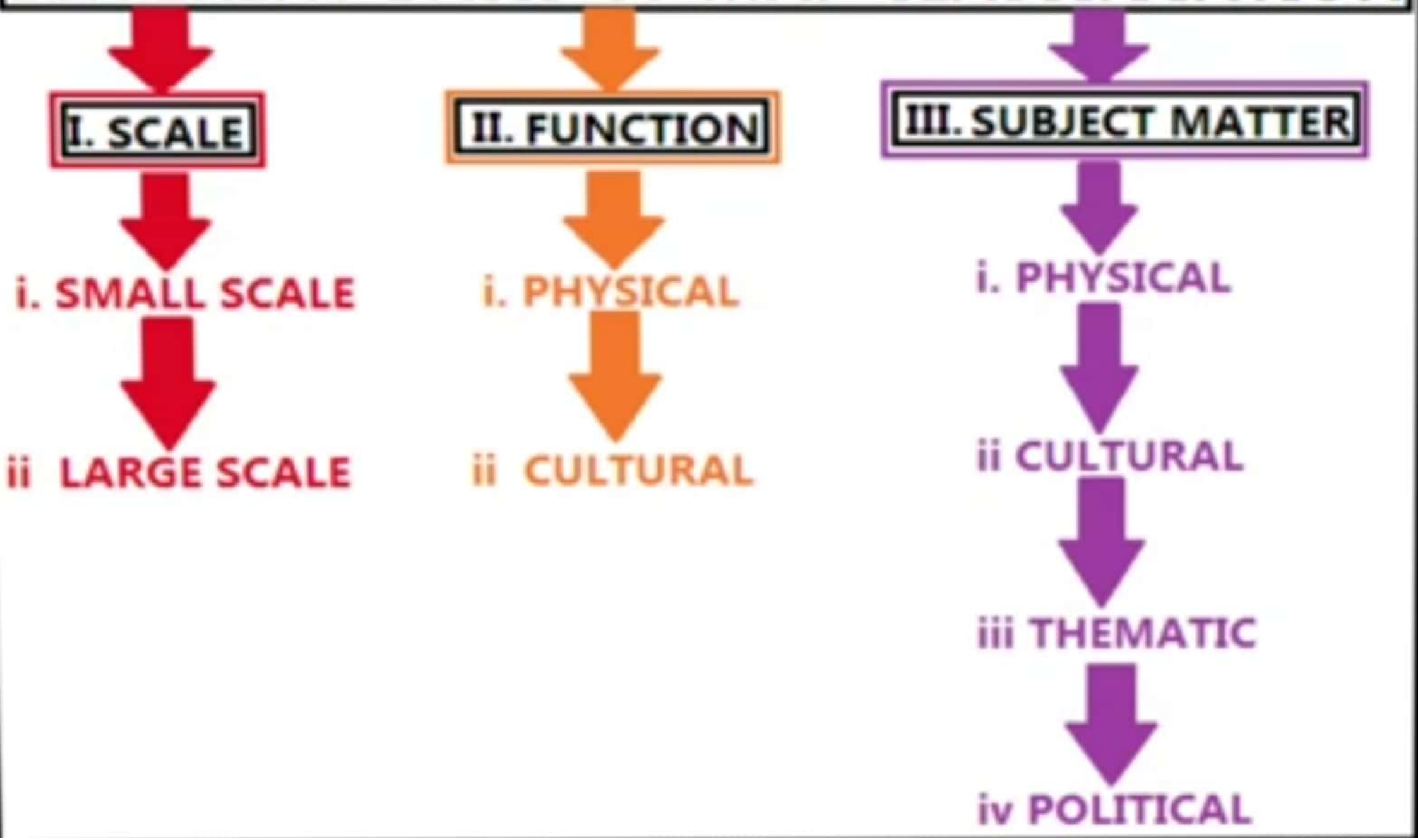
LEGEND OR KEY

- The legend on a map provides essential information for the map reader

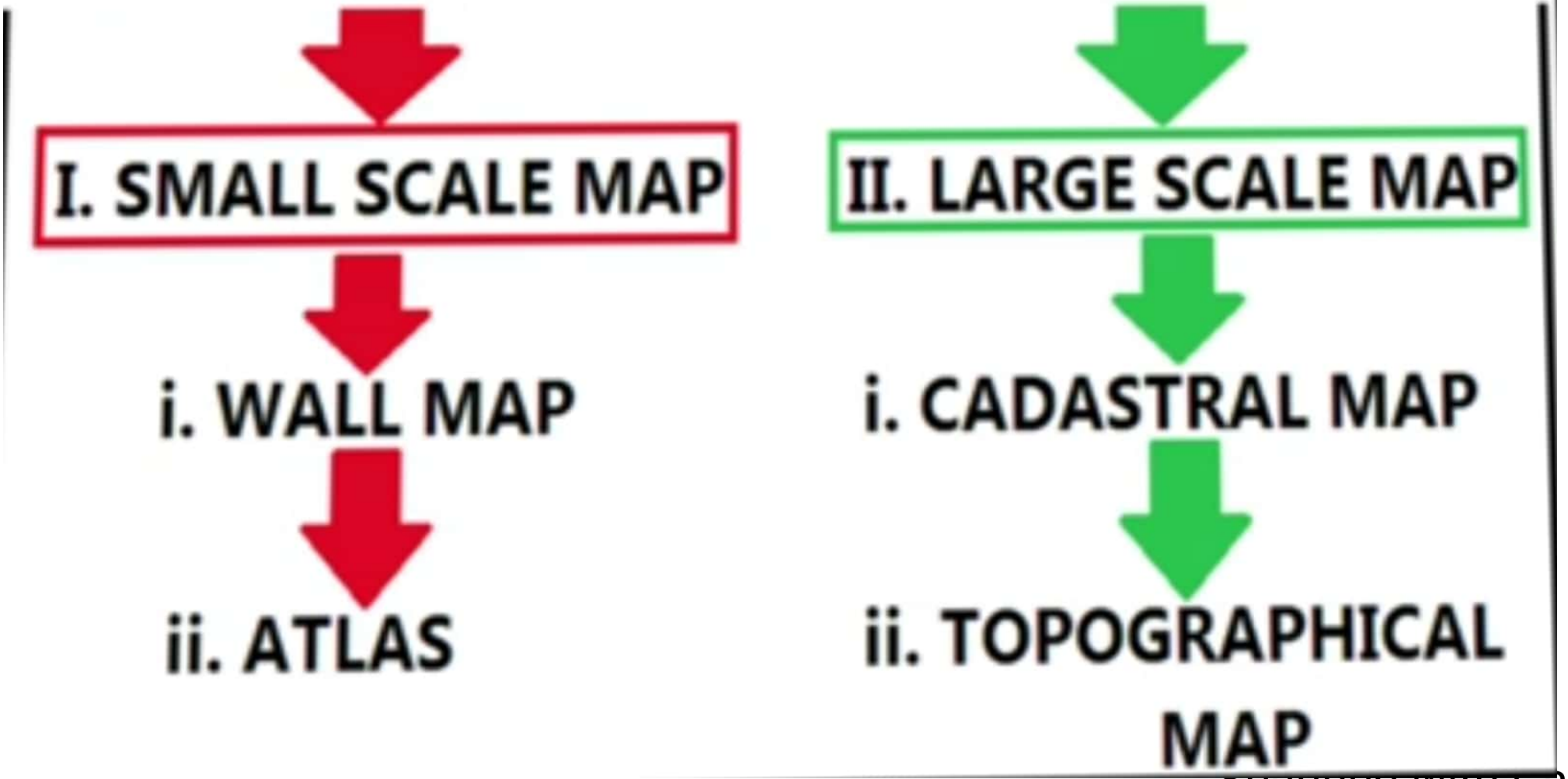




DIFFERENT BASIS OF MAP CLASSIFICATION

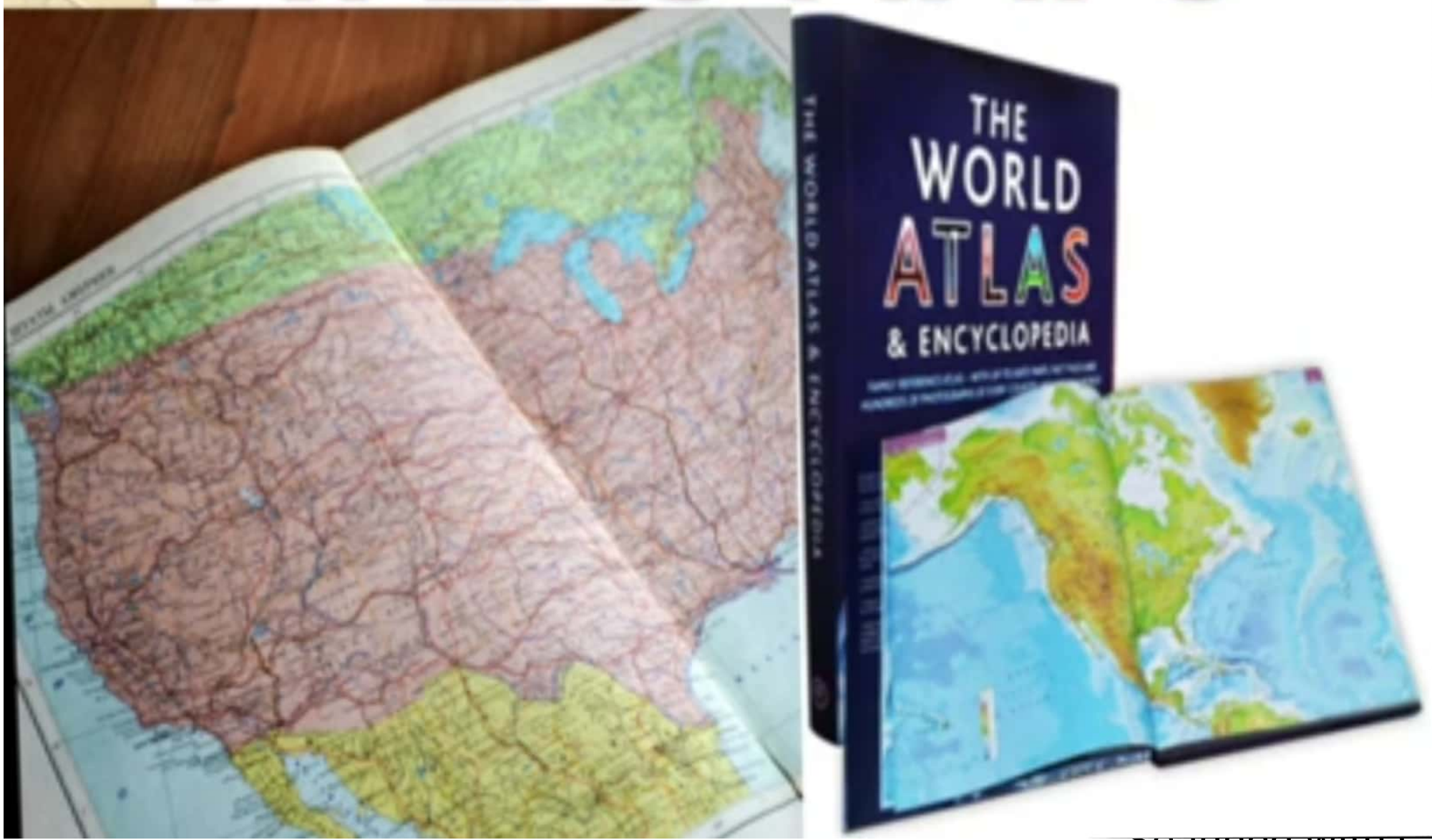


CLASSIFICATION ON BASIS OF SCALE

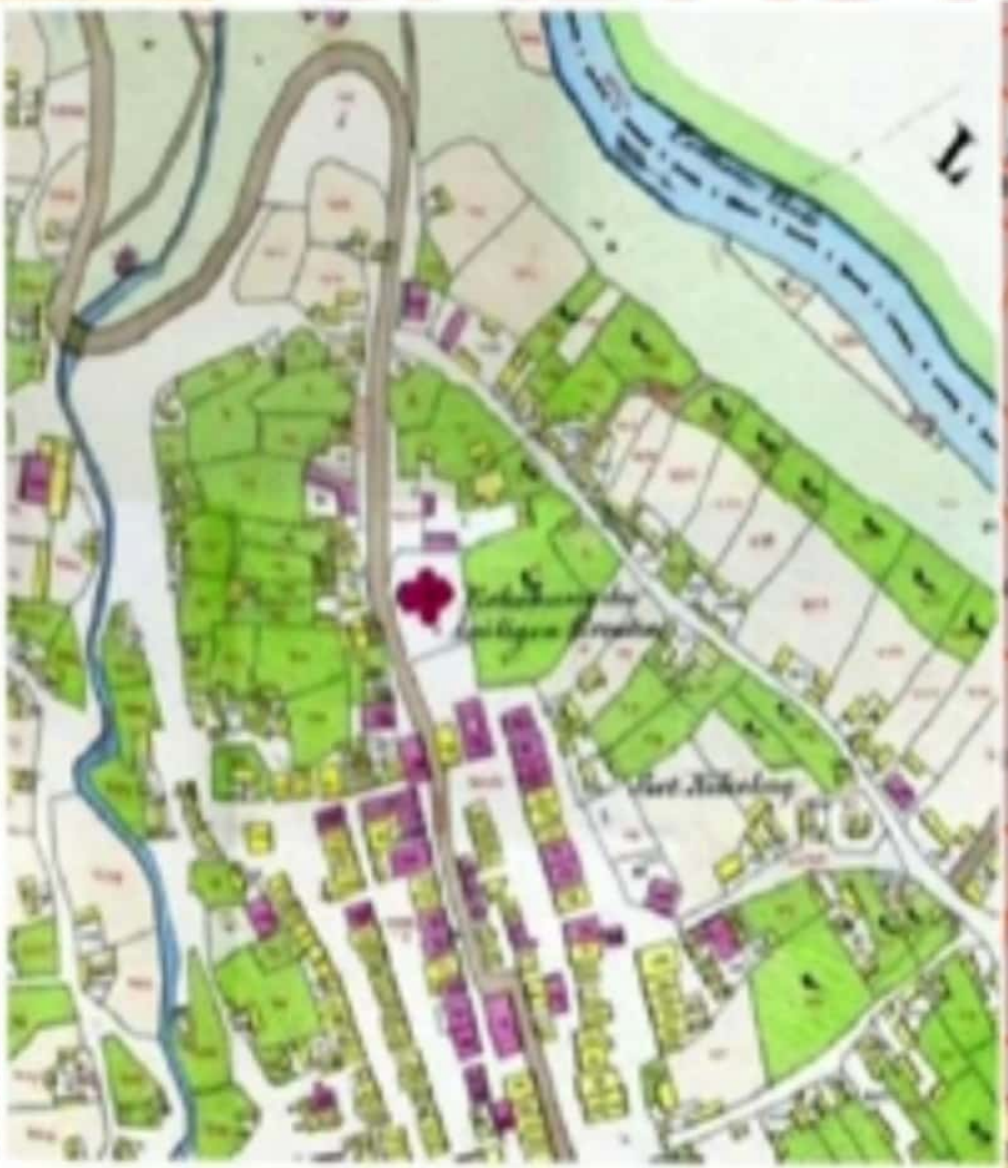


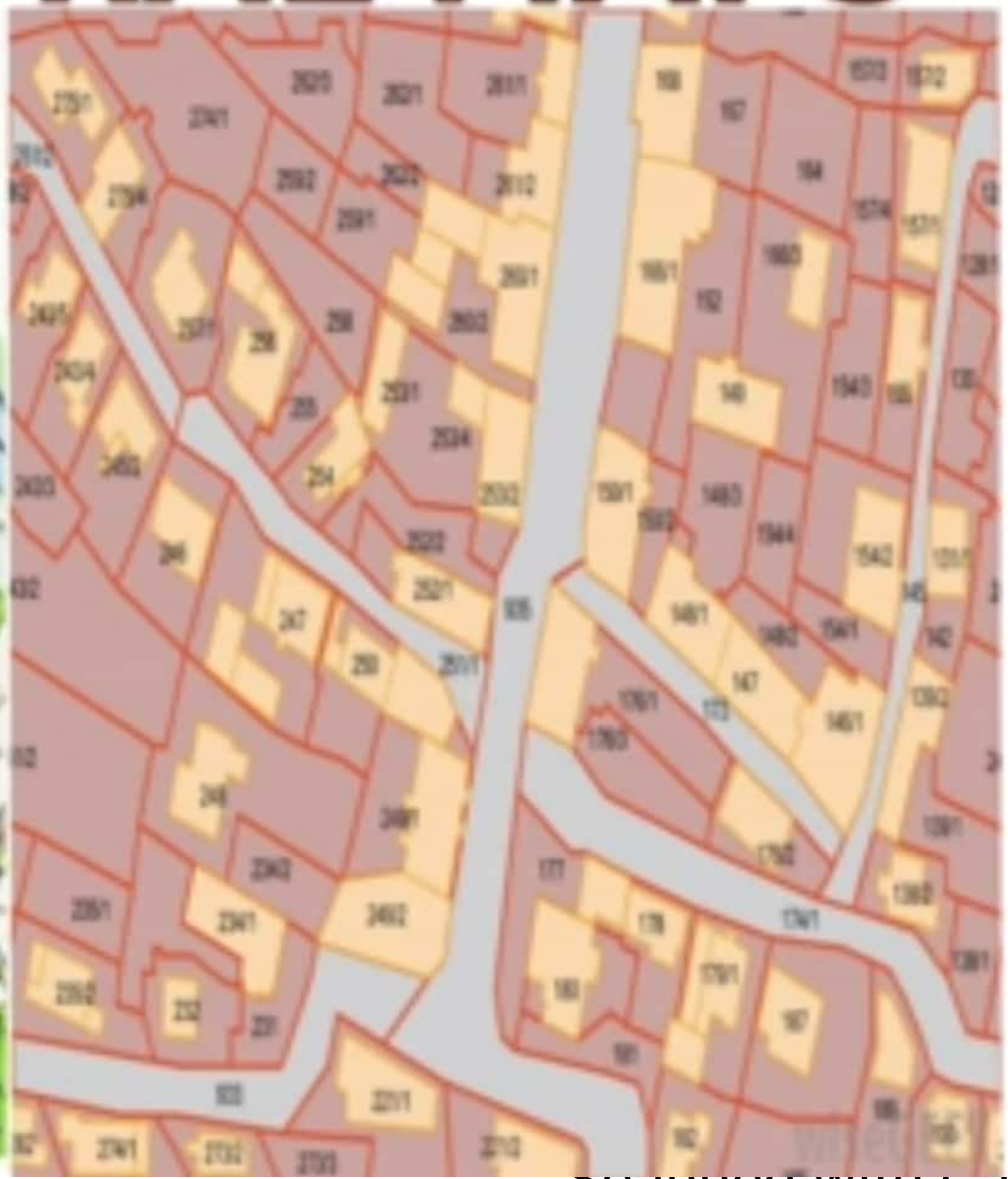
WALL MAPS

ATLAS MAPS

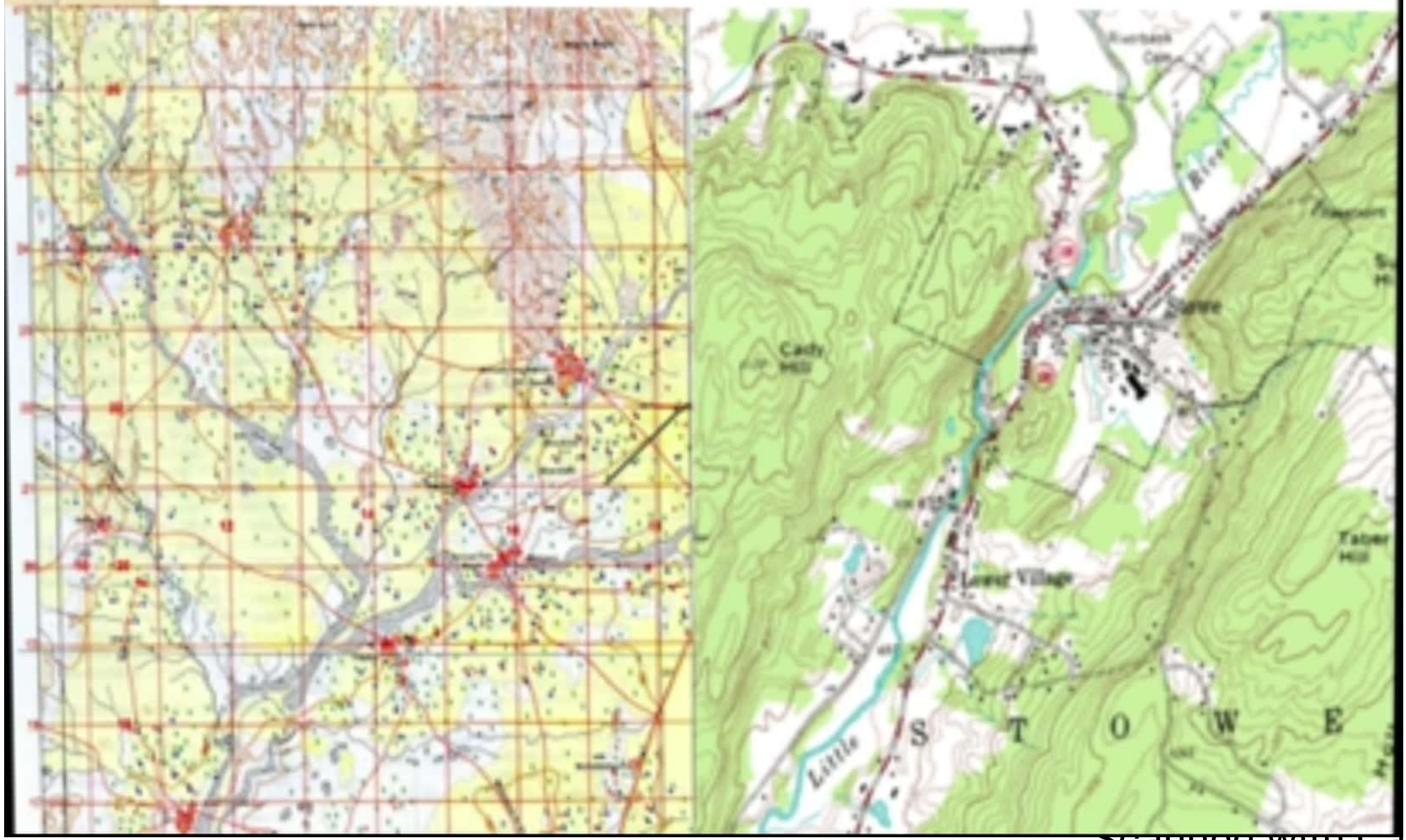


CADASTRAL MAPS





TOPOGRAPHICAL MAPS



PHYSICAL MAPS

CLASSIFICATION ON BASIS OF SUBJECT MATTER

I. PHYSICAL

i. RELIEF
ii. GEOLOGICAL
iii. NATURAL
iv. VEGETATION
v. BATHYMETRIC
vi. METEROLOGICAL
vii. WEATHER

II. CULTURAL/REGIONAL/THEMATIC

i. MILITARY
ii. ETHNOGRAPHY
iii. LINGUISTIC
iv. ECONOMIC
v. COMMUNICATION
vi. AGRICULTURAL
vii. HISTORICAL
viii. INDUSTRIAL
ix. POPULATION
x. POLITICAL

CLASSIFICATION ON BASIS OF FUNCTION

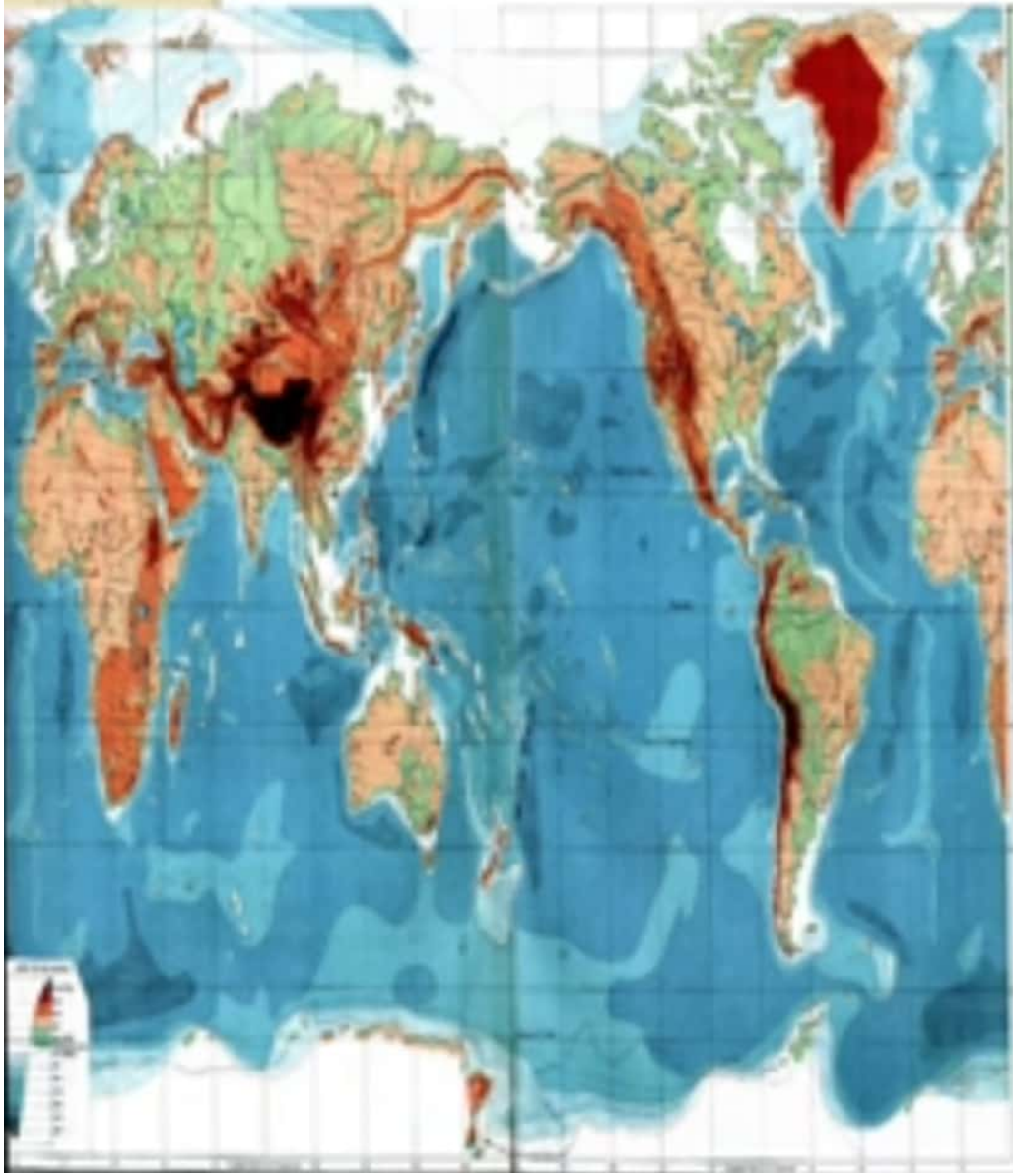
I. PHYSICAL MAP

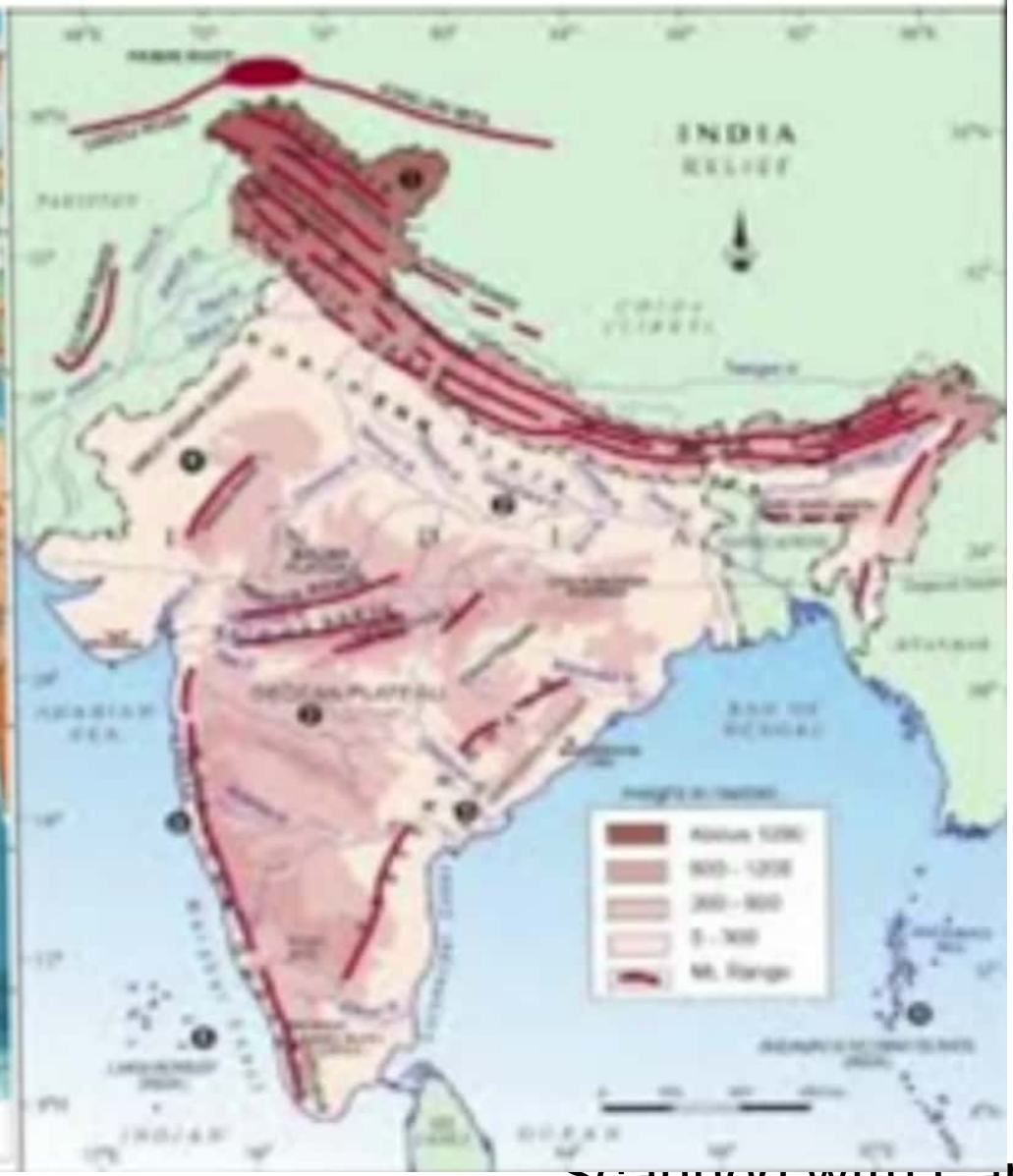
i. RELIEF MAP
ii. GEOLOGICAL MAP
iii. METROLOGICAL MAP
iv. NATURAL VEGETATION MAP
v. BATHYMETRIC MAP
vi OROGRAPHIC MAP
vii. WEATHER MAP

II. CULTURAL MAP

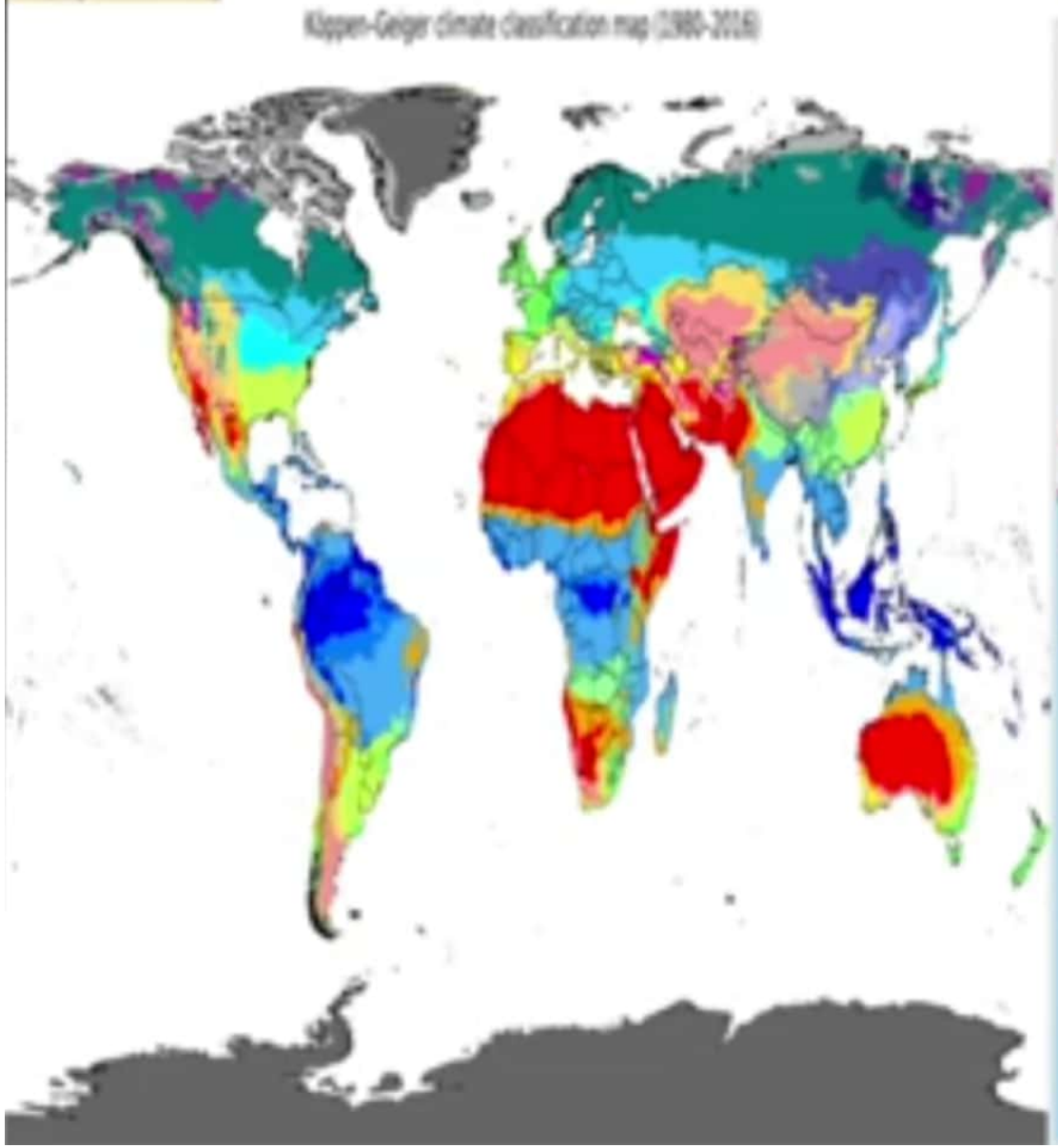
i. POLITICAL MAP
ii. POPULATION MAP
iii. ECONOMIC MAP
iv. MILITRAY MAP
v. ETHNOGRAPHIC MAP
vi. LINGUISTIC MAP
vii. COMMUNICATION MAP
viii. AGRICULTURAL MAP
ix. INDUSTRIAL MAP
x. HISTORICAL MAP

RELIEF MAPS / OROGRAPHIC MAPS



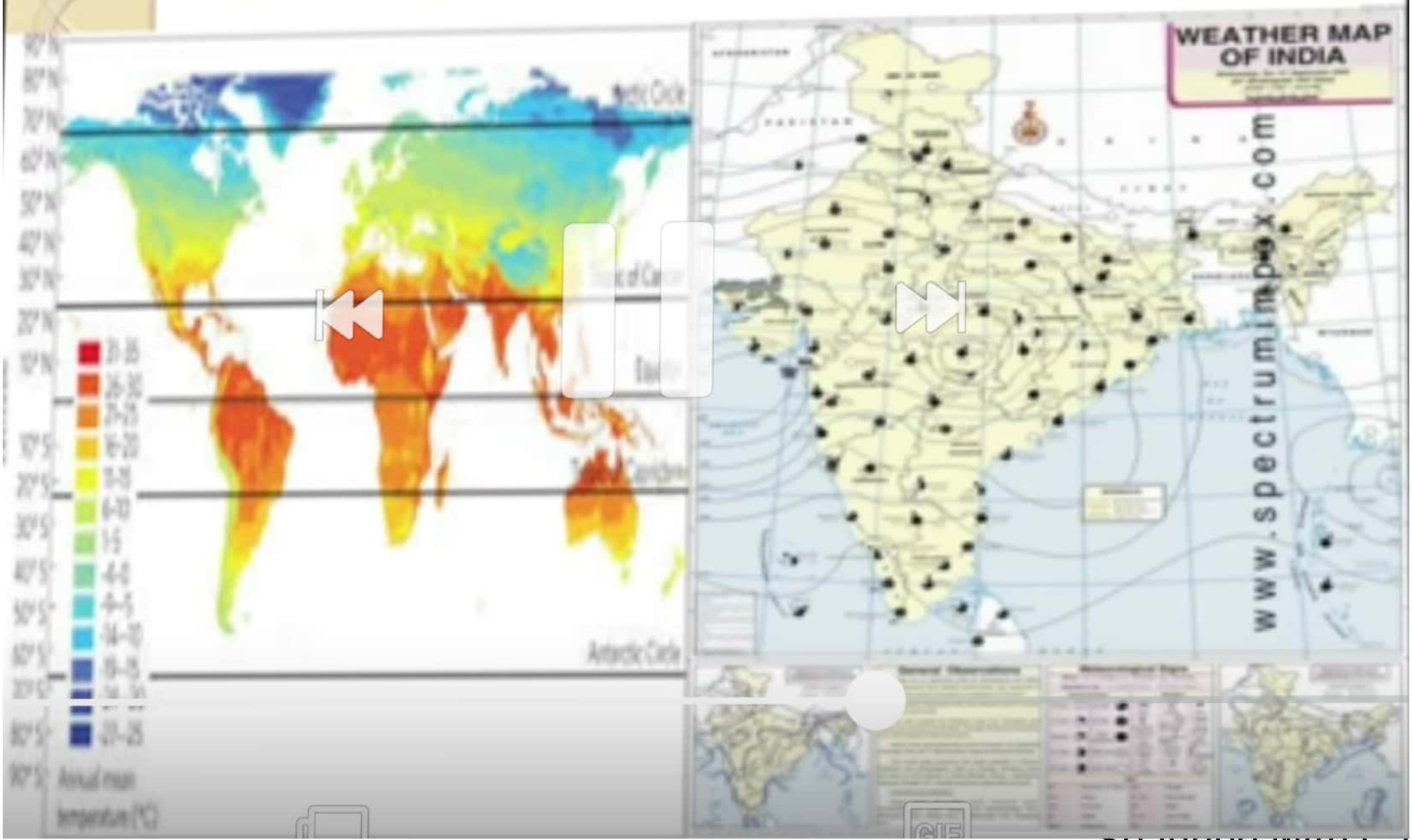


CLIMATIC MAPS

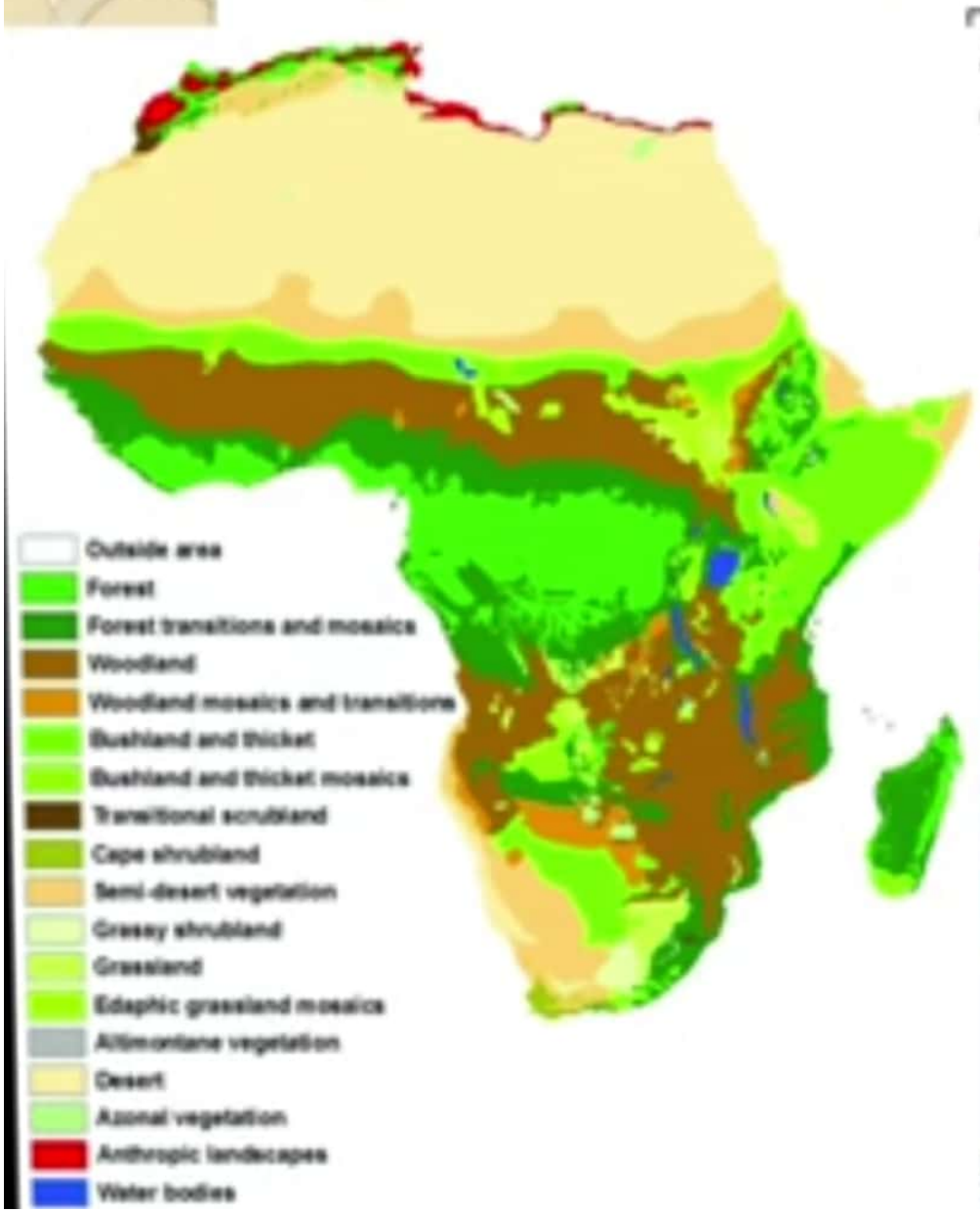


tion of Maps & its Types (1024 x 640)

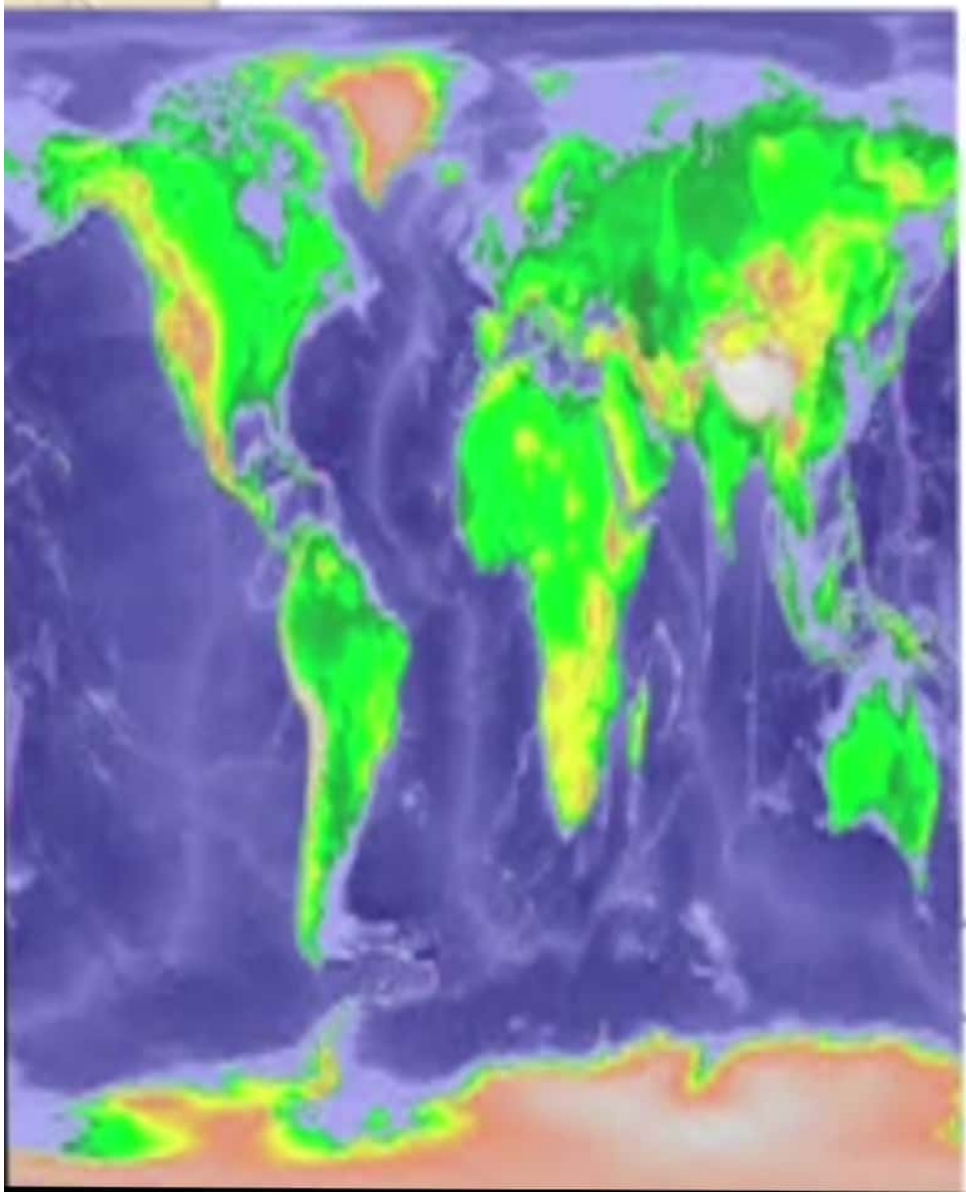
WEATHER MAPS

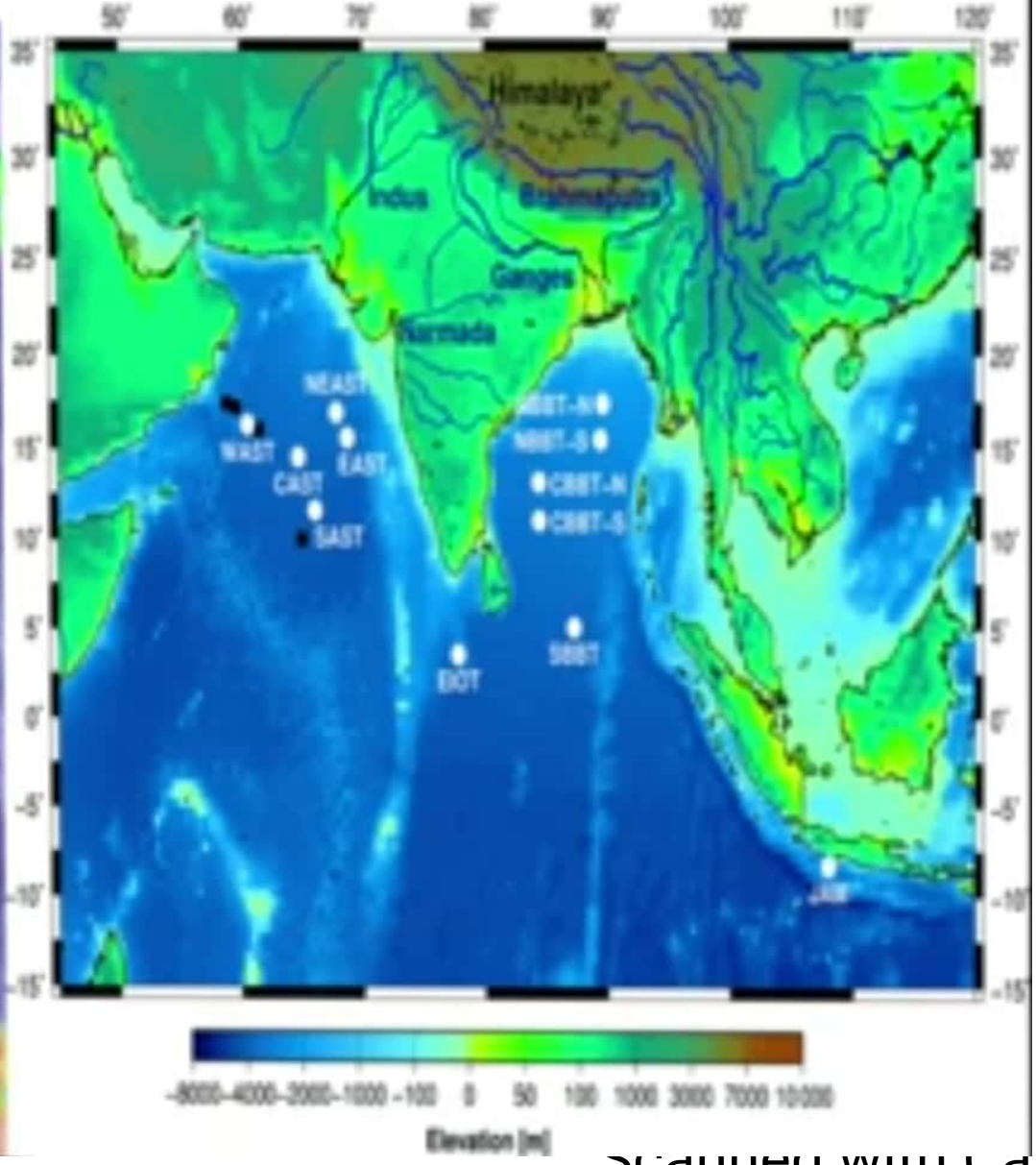


VEGETATION MAPS



BATHYMETRIC MAPS

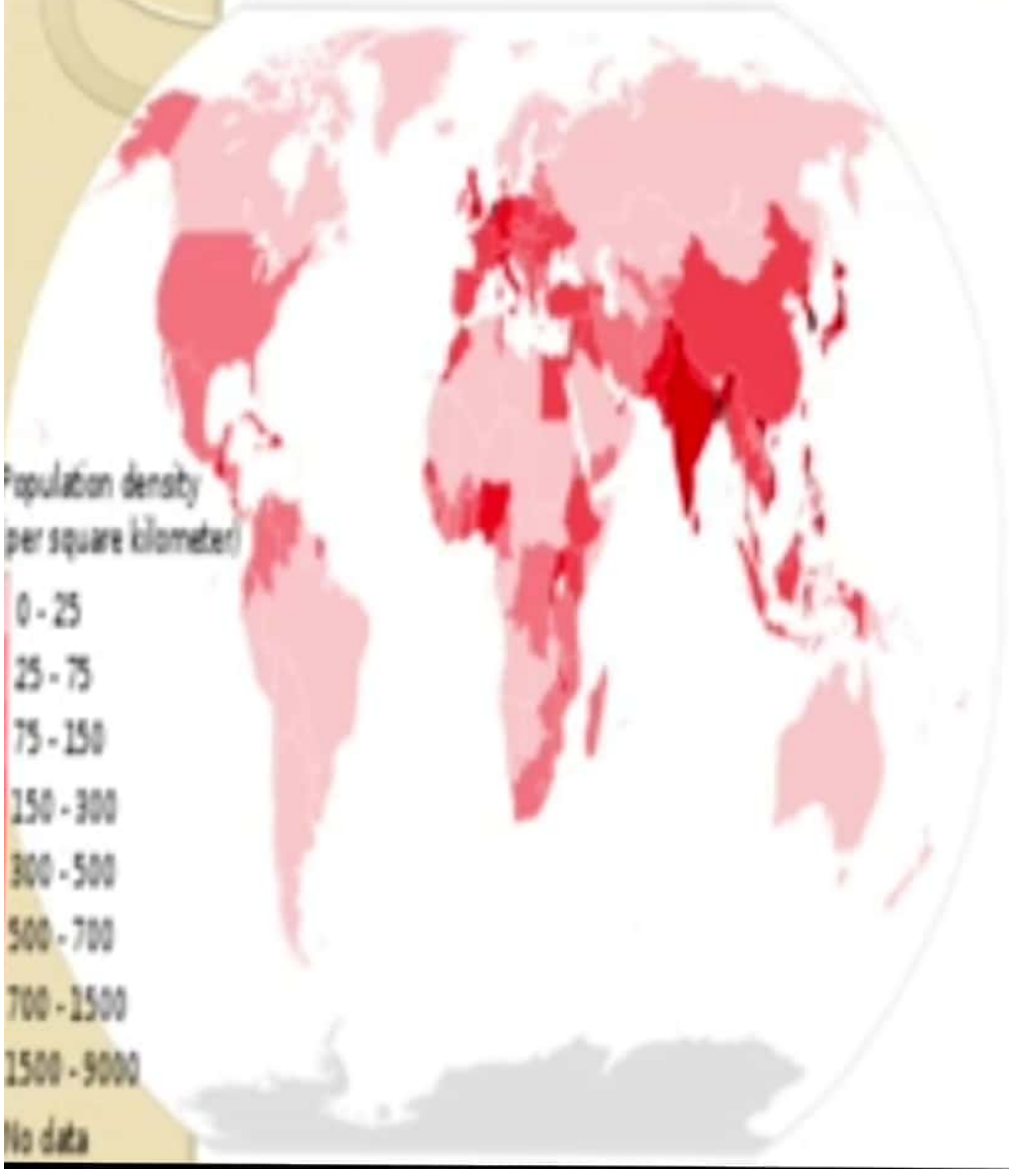


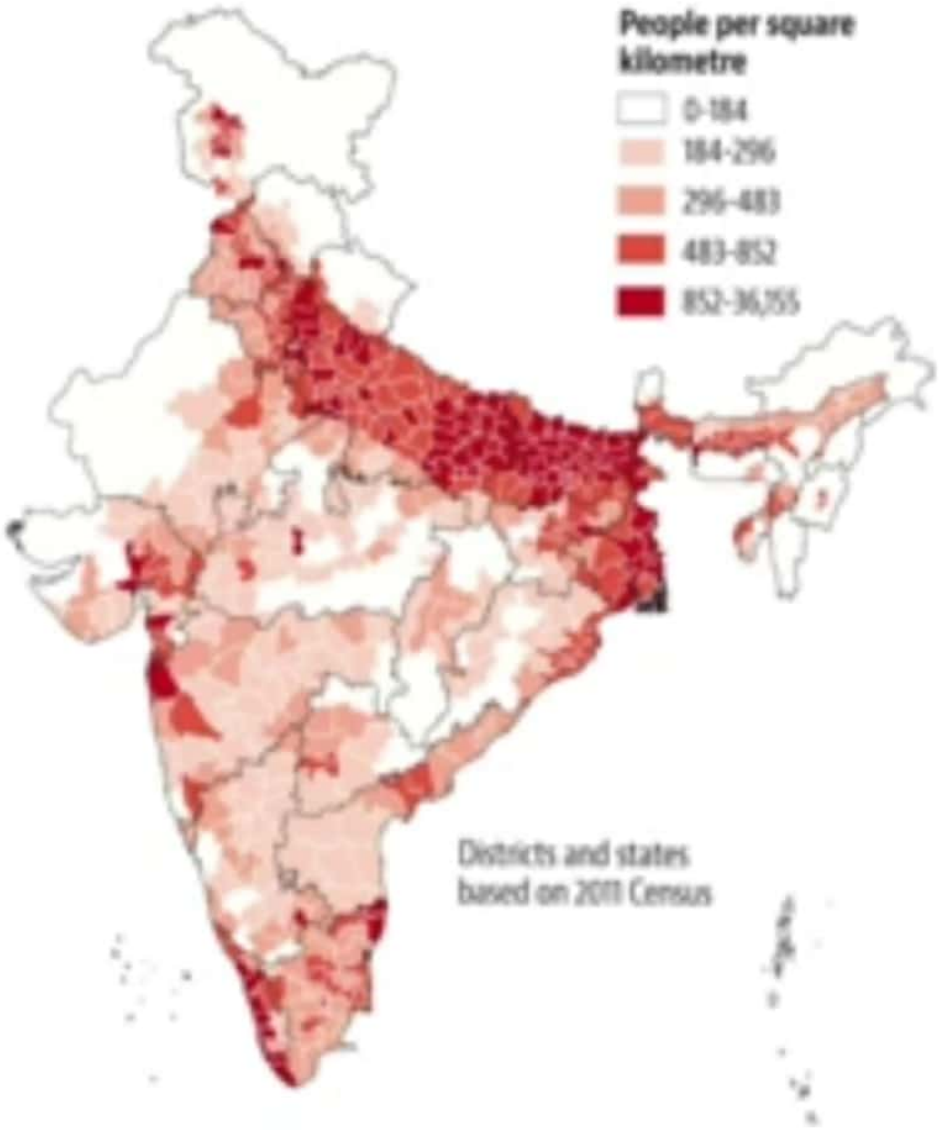


CULTURAL MAPS
OR
THEMATIC MAPS

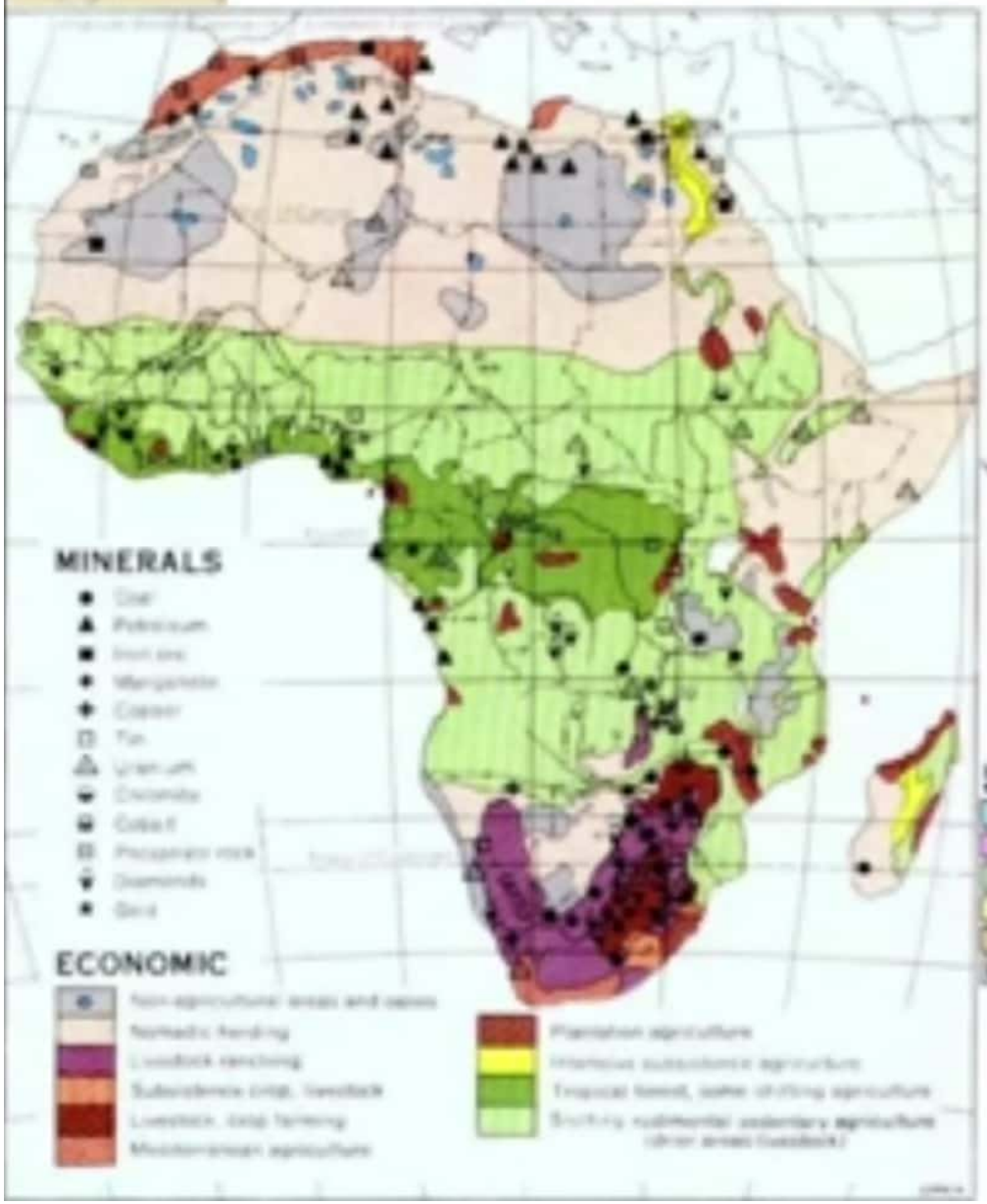
POLITICAL MAPS

POPULATION MAPS

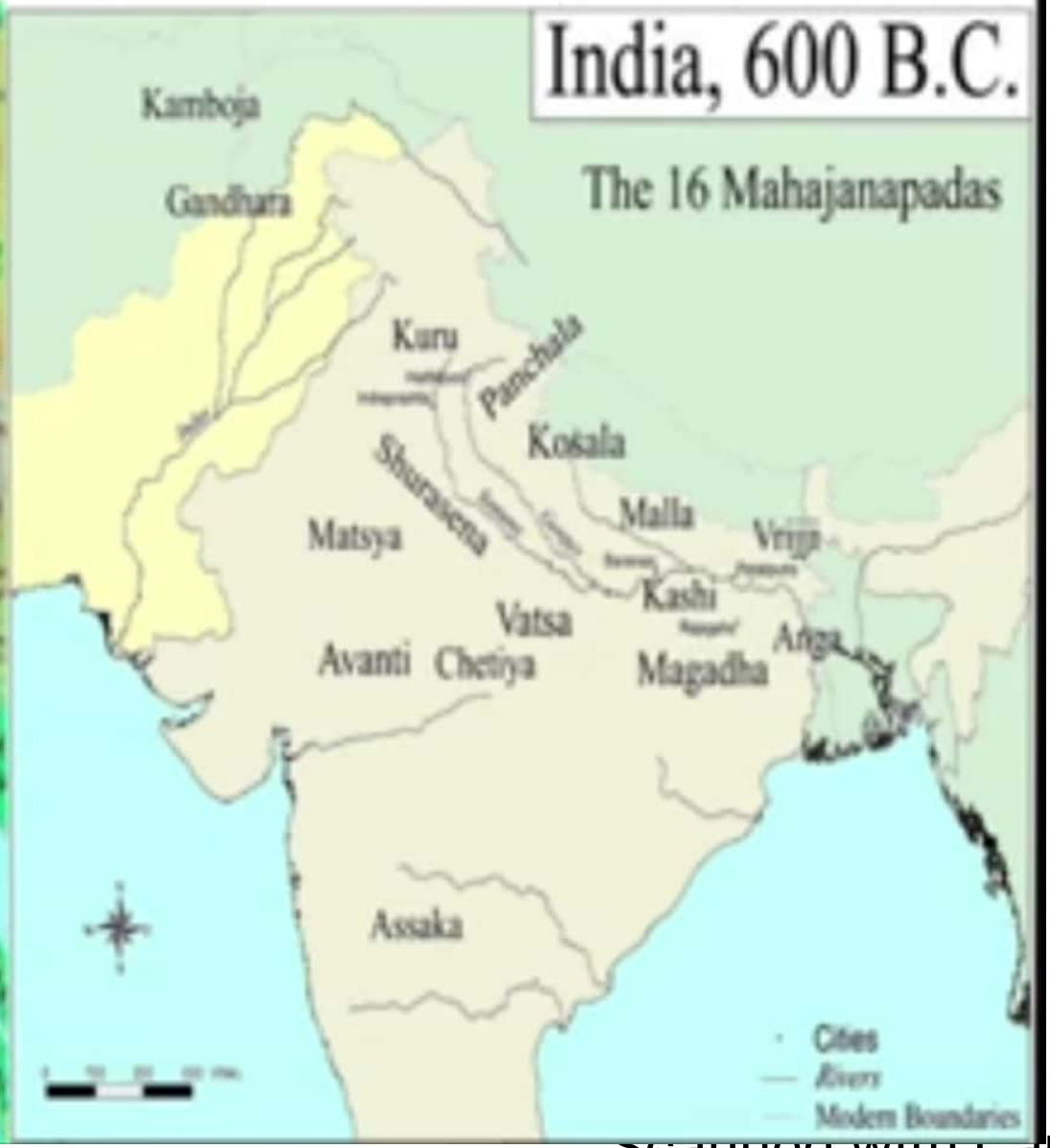




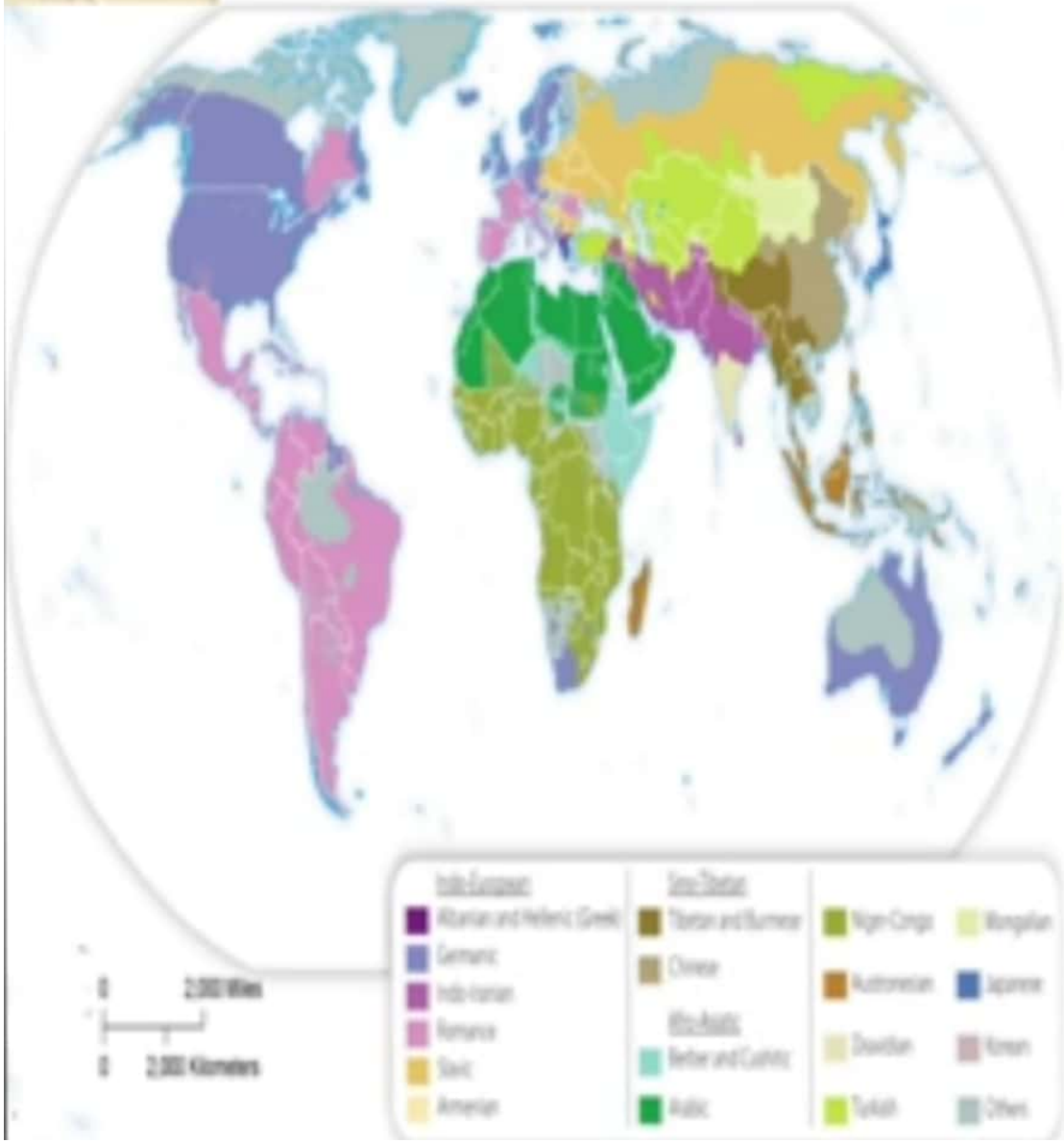
ECONOMIC MAPS



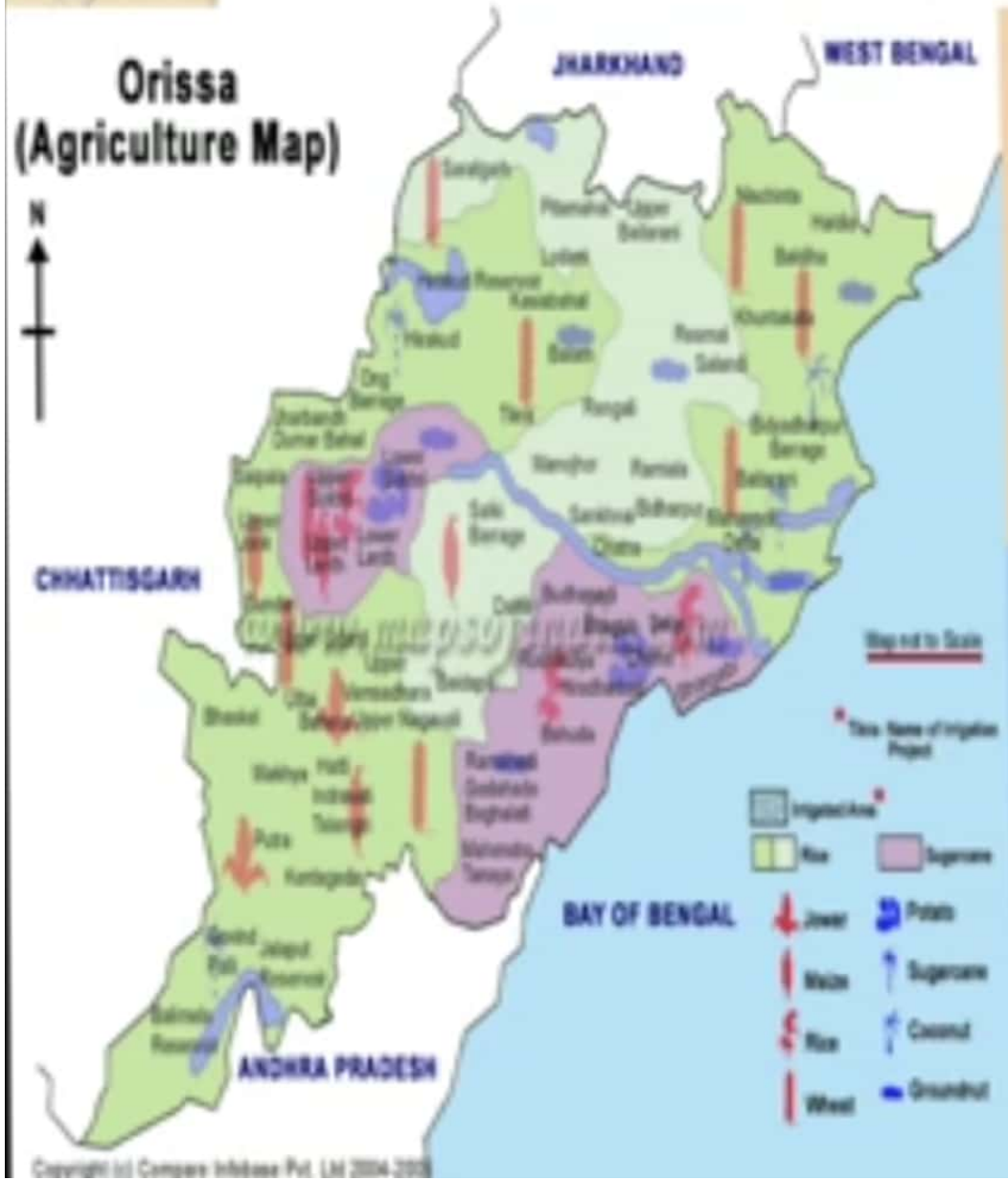
HISTORICAL MAPS

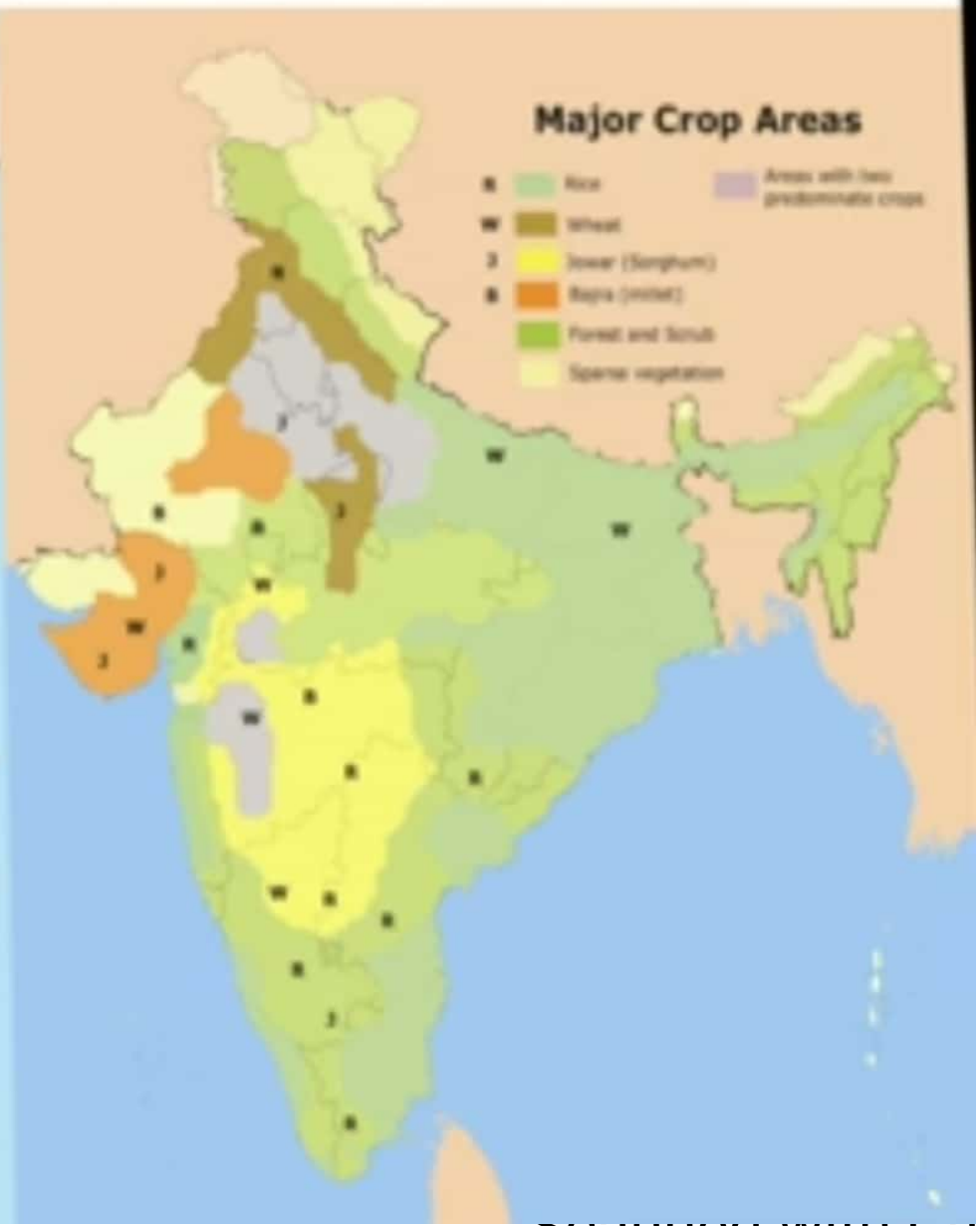


LINGUISTIC MAPS

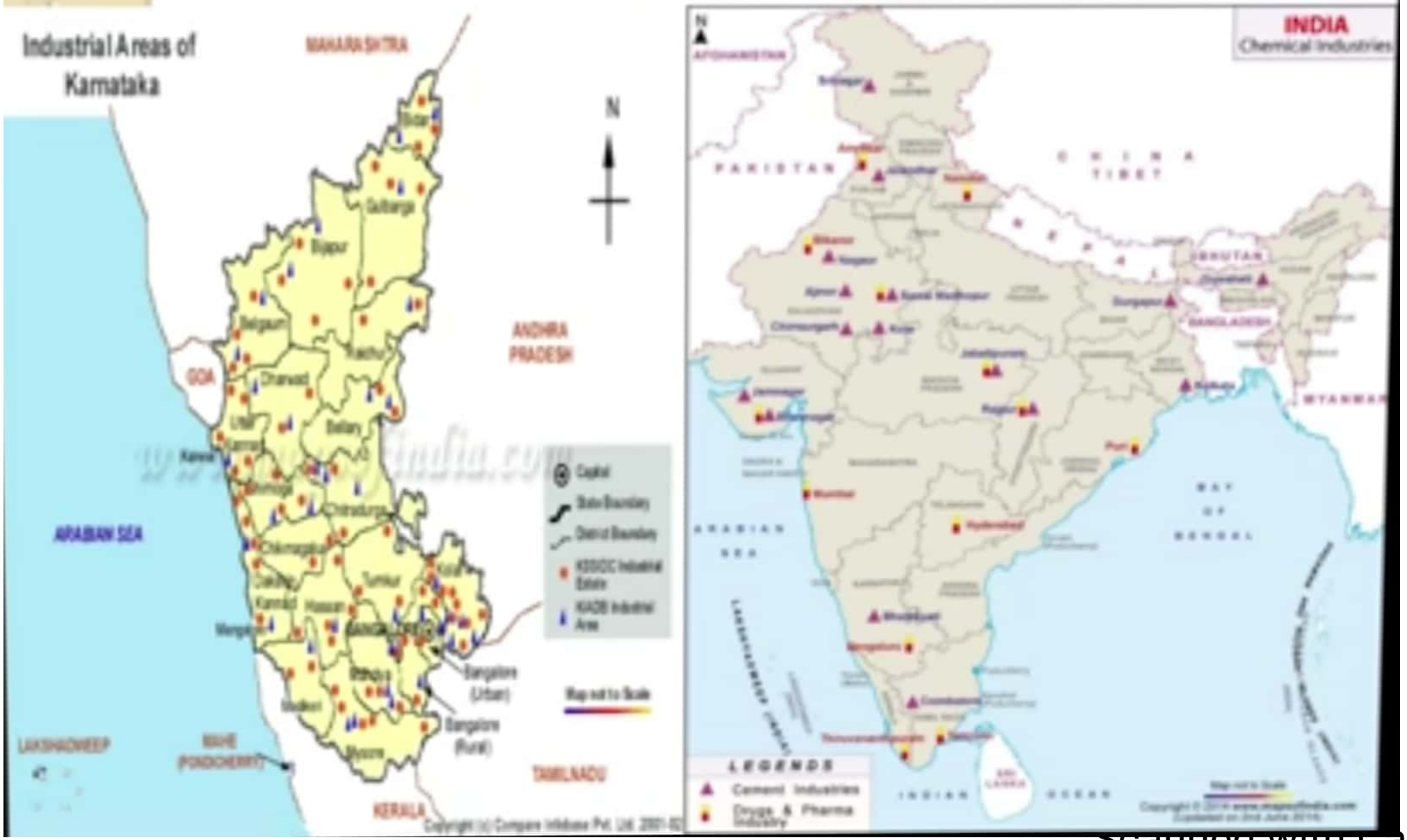


AGRICULTURAL MAPS





INDUSTRIAL MAPS



COMMUNICATION MAPS

TYPES OF GEOGRAPHY

HUMAN GEOGRAPHY The impact of people on the earth

PHYSICAL GEOGRAPHY The natural world without people

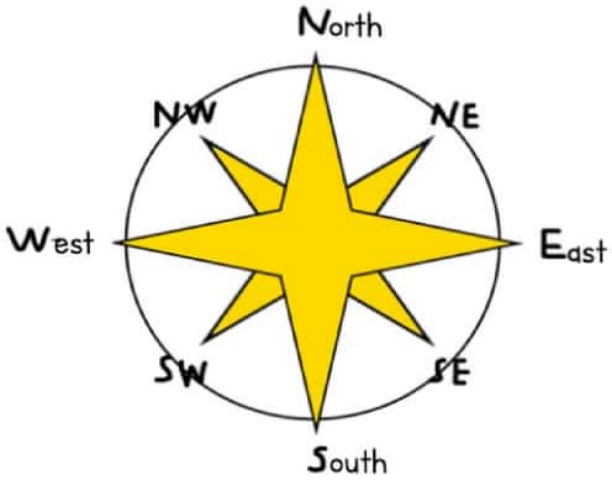
ENVIRONMENTAL GEOGRAPHY Human interaction with nature

WHAT IS GEOGRAPHY

"Geography is the study of the Earth's landscapes, peoples, places and environments. It is, quite simply, the study of the world we live in."

Geography is part of your everyday life; you use it every day without even realizing!

COMPASS POINTS



WHERE IS THE UK?

The United Kingdom (UK) is an Island country located in the continent of Europe, it is made up of four countries: England, Scotland, Northern Ireland and Wales.

THE UK

4 FIGURE GRID REFERENCES

Along the edges of each map there are numbers. These numbers help you work out where a location is on a map. Northings are numbers that go from bottom to top, Eastings go from left to right.

The first two numbers give the eastings.

32 26

The second two numbers give the northings.

Remember... eastings then northings!

Along the corridor and up the stairs!

MAP SYMBOLS

Symbols are useful for lots of reasons including, space saving on a map, multi-lingual (all languages can understand them), saves time, clear.

ATLAS SKILLS

There are generally three main types of maps shown in an atlas:

PHYSICAL MAPS these show topography/relief (the shape of the land) and other physical features such as rivers and lakes.

POLITICAL MAPS these show country borders, cities, transport links etc.

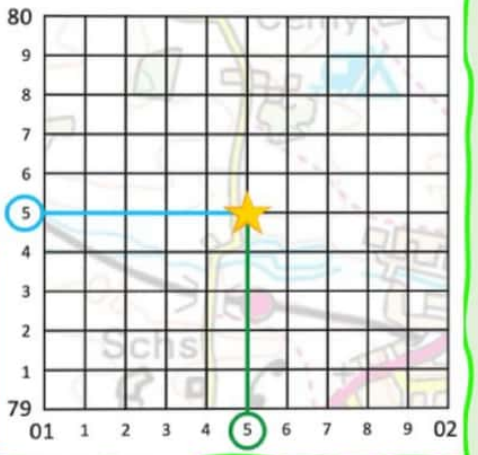
THEMATIC MAPS these show information such as climate data, agriculture types etc.

6 FIGURE GRID REFERENCES

We can use six-figure grid references to find an exact location within a grid square, so they are much more accurate
The grid square is divided into tenths.

Example:

015 795



The first three numbers give the easting which includes the number of tenths.

The last three numbers give the northing which includes the number of tenths.

KEY WORDS

SPACE			NORTH	
PLACE	EAST	DISTANCE	RELIEF	CONTOUR
SCALE	SOUTH	SCALE	WEST	TOPOGRAPHY

LONGITUDE AND LATITUDE

Unlike grid lines where we go along the corridor and the stairs, here we go **UP** and **ACROSS**

LONGITUDE

Long lines – up and down

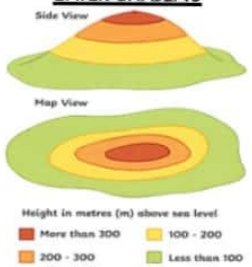
LATITUDE

Flat lines. Flat-itude!

HEIGHT AND RELIEF

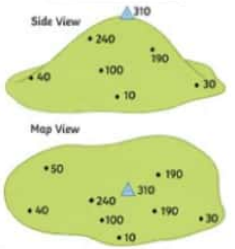
RELIEF the difference between the highest and lowest heights of an area.
TOPOGRAPHY the surface features of the earth like hills, mountains, valleys etc.

LAYER SHADING



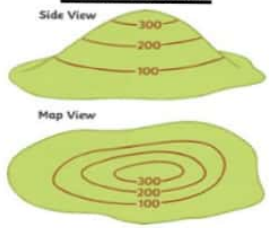
Areas of different heights are shown using different colours. A key is used to show how high the land is.

SPOT HEIGHTS



The exact height of a place above the ground is measured and written onto a map.

CONTOUR LINES

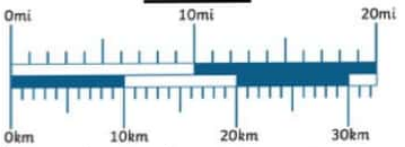


Contour lines are lines on a map which join up places of the same height. Everywhere along a contour line is the same height.

SCALE AND DISTANCE

OS maps have a scale. On some smaller maps, 1cm on the map equals 250m in real life. On some larger maps, 1cm on the map equals 500m. Different maps might have different scales, so check on your map to find its scale.

LINE SCALE



Using a line scale on a map is as easy as using a ruler. The important thing to remember is that a line scale shows measurements in km and the measurements on a ruler are in cm.

WORD SCALE

One centimeter on the map represents 3 kilometers on the ground. (1cm = 3 km)

Using the scale above, if we measure the distance on a map between two places with our ruler. The measurement is 4cm. We then have to multiply that measurement by 3 to calculate that the real distance between the two places is 12km.

Map Scales

SCALE

THE size of a map is very small as compared with the size of the earth it represents. Before pr a map of the earth or a part of it we decide how much ground distance should be represent map distance, *i.e.*, we establish a relation between map distance and ground distance. The relation b the map distance and the ground distance is called a scale and it is *defined* as a proportion between a d on the map and the corresponding distance on the ground. Thus, if a length between two points on t is 1 cm. and the distance between the same two points on the ground is 5 km, the scale of the m cm. to 5 km; and if the scale of a map is 1 cm. to 5 km. it means that a distance of 1 cm. betwe points on a map represents a distance of 5 km. between the same two points on the ground.

Scale is appended to every map generally at its southern margin in three ways.

METHODS OF EXPRESSING A SCALE

A scale is expressed in three ways. It is (a) stated in words; (b) expressed as a fraction; (c) as a line divided into certain parts.

(a) When stated in words it is called *statement of scale*. Evidently it is the simplest way of expr a scale and is expressed as

1 cm to 2.5 km, 2 cm to 1 km, 1 inch to 4 miles.

Map distances are represented by a centimetre, centimetres, an inch or inches and the ground dis by a kilometre or kilometres, a mile or miles. It may be noted that either map distance or ground di is represented by unity. It is very easy to calculate ground distances with the help of a statement of As for example, a distance of 6 cm. on a map on the scale of 1 cm. to 2.5 km, represents a dista 15 km. on the ground. Its main drawbacks are :

(i) The fractional distances involve mathematical calculations.

(ii) Since different countries have different units of length in use, the statement of scale m be understood by the foreigners.

(b) When expressed as a fraction, the scale is called *representative fraction* (R.F.). In some cou it is also called a *numerical scale*.

The scale is represented by a vulgar fraction $\left(\text{as for example, } \frac{1}{100,000}\right)$ the numera which is always unity. The numerator indicates the length on the map and the denominator indicat

length on the ground.

$$\text{R.F.} = \frac{\text{Distance between two points on the map}}{\text{Distance between the same two points on the ground}}$$

It should be borne in mind that the numerator and the denominator are in the same measure of length (denomination). Thus if the representative fraction of a map is $\frac{1}{63360}$, it means that one unit of length on the map represents 63,360 units of length (in the same denomination in which the numerator represents the map distance) on the ground. If the numerator *i.e.* the distance on the map, in this case is 1 inch, the denominator *i.e.* the distance on the ground will be 63,360 inches or one mile.

The ground distances are measured in kilometres, miles, metres, etc., and not in centimetres or inches. As the denominator is to be converted into kilometres or miles, evidently this method of expressing a scale involves calculations as well. However, it has a great advantage in that, it can be interpreted in different units of length very easily. When a scale of a map is appended as 1/100,000, it will mean a distance of 1 cm. on the map represents 100,000 cm. or 1 kilometre on the ground. It will also mean that if the distance between two objects on the map is 1 inch, the distance between the same two objects on the ground is 100,000 inches or 1.578 miles.

The representative fraction when printed in fractional form such as $\frac{1}{50,000}$, occupies much space. It is, therefore, adjusted in a line by using a small type. These figures are often so small as to make it difficult to read the fraction. In view of this difficulty, the R.F. is printed in books as 1/50,000 or 1 : 50,000.

CONVERSION OF THE STATEMENT OF SCALE INTO R.F.

As already stated a centimetre or centimetres of a statement of scale represent map distance and a kilometre or kilometres ground distance. Now

$$\text{R.F.} = \frac{\text{Map distance}}{\text{Ground distance}}$$

To convert a statement of scale into R.F., take the distance on the map as numerator and the distance on the ground after converting it into centimetres or inches as the case may be as denominator and change the fraction so formed to a fraction whose numerator is unity.

Example. Find out the R.F. of a map which is drawn to the scale of 2 cm to 1 km.

$$\text{R.F.} = \frac{\text{Map distance}}{\text{Ground distance}}$$

Now 2 cm. on the map represent 1 km or 100,000 cm on the ground.

$$\therefore \quad \text{R.F.} = \frac{2}{100,000} \quad \text{or} \quad \frac{1}{50,000} \quad \text{or} \quad 1:50,000$$

CONVERSION OF R.F. INTO THE STATEMENT OF SCALE

Now

$$\text{R.F.} = \frac{\text{Map distance}}{\text{Ground distance}}$$

Both the map distance and the ground distance are in inches or centimetres. Since ground distance is

is either in kilometres or miles, the denominator is changed into kilometres or miles.

Example 1. The R.F. of a map is 1: 10,560. What is the statement of scale?

1 inch on the map represents 10,560 inches or $\frac{10,560}{63,360}$ mile or $\frac{1}{6}$ mile or

In other words 6 inches on the map represent 1 mile on the ground. Therefore, t of scale is 6 inches to a mile.

Example 2. Distance between two points on a map is 1.25 cm. The distance between the sa on the ground is 2.50 km. Find out the R.F. and the statement of scale.

(i) $\text{R.F.} = \frac{\text{Map distance}}{\text{Ground distance}}$

Now 1.25 cm. on the map represent 2.50 km. or 250,000 cm. on the

$\therefore \quad \text{R.F.} = \frac{1.25}{250,000}$ or $\frac{1}{200,000}$ or 1 : 200,000.

(ii) 1.25 cm on the map represent 2.50 km on the ground or 1 cm on the ma 2.50÷1.25 or 2 km on the ground.

$\therefore$ Statement of scale is 1 cm to 2 km.

(c) When shown as a line the scale is called a *plain scale, graphic scale* or *linear sca*

A plain scale is a graduated straight line showing ground distances in kilometres, metres Ground distances can readily be found out from a plain scale and thus mathematical calcula avoided. Therefore, every map has a plain scale.

Sometimes we reduce or enlarge maps photographically. When we do so, the plain scale reduced or enlarged in the same proportion in which the map is reduced or enlarged. In the reduction and enlargement, the statement of the scale and representative fraction will not change on some maps in the atlases the plain scale without the statement of scale and representative appended.

Use of scale. Map scale is the basis of drawing maps. It enables us to represent correctly of the ground on a map of a convenient size. The distances between various objects on the map to those on the ground. We can also calculate ground distances and ground areas from the m help of its scale.

Large and small scales. To determine which one of any two scales is large or small, we them into representative fractions. Then the sizes of the two representative fractions are com fraction which is greater in value is called a large scale and the other as a small scale. To explain one R.F. is $\frac{1}{500}$ and the other R.F. is $\frac{1}{1,000}$

Now $\frac{1}{500} = 0.002$

In other words the R.F. $\frac{1}{500}$ is larger than the R.F. $\frac{1}{1000}$ Exactly speaking the scale $\frac{1}{500}$ is twice as large as the scale $\frac{1}{1000}$.

Categories of scale. The words 'large', 'medium' and 'small' are frequently placed before scales to qualify them. Thus, a scale may be termed as a large-scale, medium-scale or a small-scale. Every country has its own way of categorising the scales and no definite system is followed for differentiating one category from the other. With the adoption of metric system of measurements, the 'Survey of India' has started publishing maps on the scales of 1 : 25,000, 1 : 50,000, 1 : 250,000, 1 : 1000,000, etc. It may be helpful to categorise the scales as under :

Large-scale	1 : 50,000 and larger
Medium-scale	1 : 50,000 to 1 : 250,000
Small-scale	Smaller than 1 : 250,000

A map drawn on a large-scale is known as a large-scale map and the one drawn on a medium-scale is known as a medium-scale map and that drawn on a small-scale is known as a small-scale map.

Relation between scale and area. If we have two maps of the same size but on different scales, the one on a smaller scale represents more ground area than the one on a larger scale. Thus, a map on the scale of 1 : 250,000 will represent more ground area than the map on the scale of 1 : 50,000. For example, the ground area shown on the map on the scale of 1 : 250,000 is 25 times as large as that shown on the map on the scale of 1 : 50,000.

Thus, if the scale is enlarged, less ground area is represented. If the scale is enlarged two times of the original scale, the area represented is one-fourth, if enlarged 3 times the area represented is one-ninth, if enlarged 4 times the area represented is one-sixteenth of the area represented by the original map of the same dimensions.

Similarly if the scale is reduced, more ground area is represented on the map of reduced scale but of similar dimensions. If the scale is reduced to one-half of the original scale, the area represented will be 4 times, if reduced to one-third, the area will be 9 times, if reduced to one-fourth the area represented will be 16 times of the area represented by the original map.

Deduction of scales. We need to deduce scale when scale is either not given on the map or the scale given on a foreign map shows distances in the units unknown to us.

(i) *From degrees or minutes of latitudes.* Length of 1° latitude is 111 km or 69 miles on the ground. Measure the length of 1° latitude along a straight meridian in the central part of the map. Suppose the length of 1° latitude on the map is 3 cm.

Now 3 cm. on the map represent 111 km or 11,100,000 cm on the ground. Therefore, R. F. of the map = $\frac{3}{11,100,000}$ or $\frac{1}{3,700,000}$

(ii) *By comparing map distance with ground distance.* Select two objects which are given on the map and also on the ground taking care that the distance on the ground is easily measurable and the ground is almost level. Measure the distance between the objects on the map as well as on the ground.

If the distance on the map is 1.5 cm and that on the ground is 450 metres

$$R.F. = \frac{1.5}{450 \times 100} \text{ or } \frac{1.5}{45,000} \text{ or } \frac{1}{30,000}$$

CONSTRUCTION OF A PLAIN SCALE

If the scale of a map is 1 cm to 2.5 km and the plain scale is 15 cm long, it is evident that distance up to 37.5 km can be measured directly from the scale. If, however, the scale-line is on long, it is possible to measure ground distance up to 2.5 km only. Since long scale-lines have the ad of showing greater ground distances, plain scales of sufficiently long lengths are drawn. A scale-l 15 cm (6 inches) long is neither too small nor too long for our practical purposes. Therefore, us draw a scale-line about 15 cm (6 inches) long.

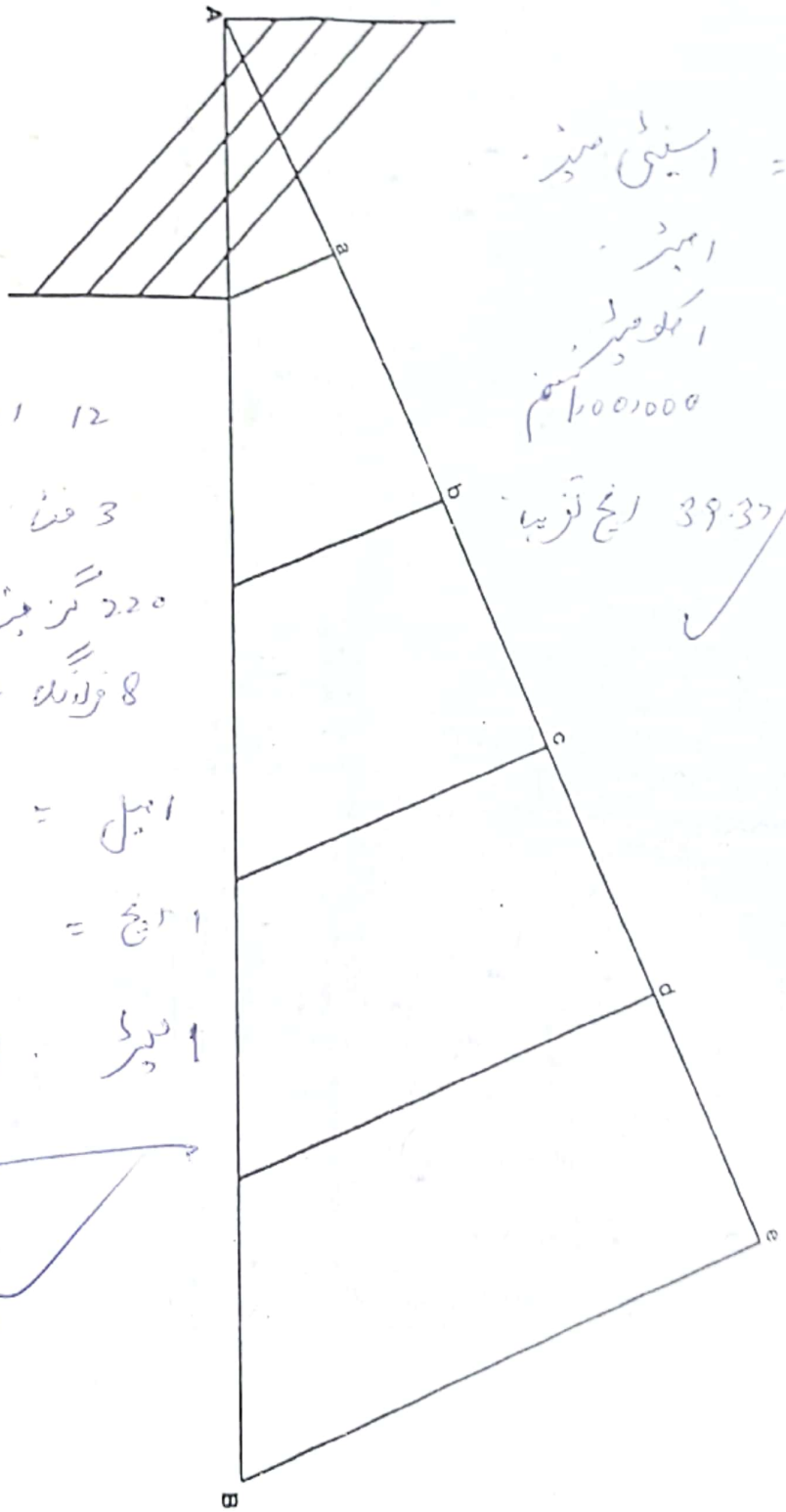
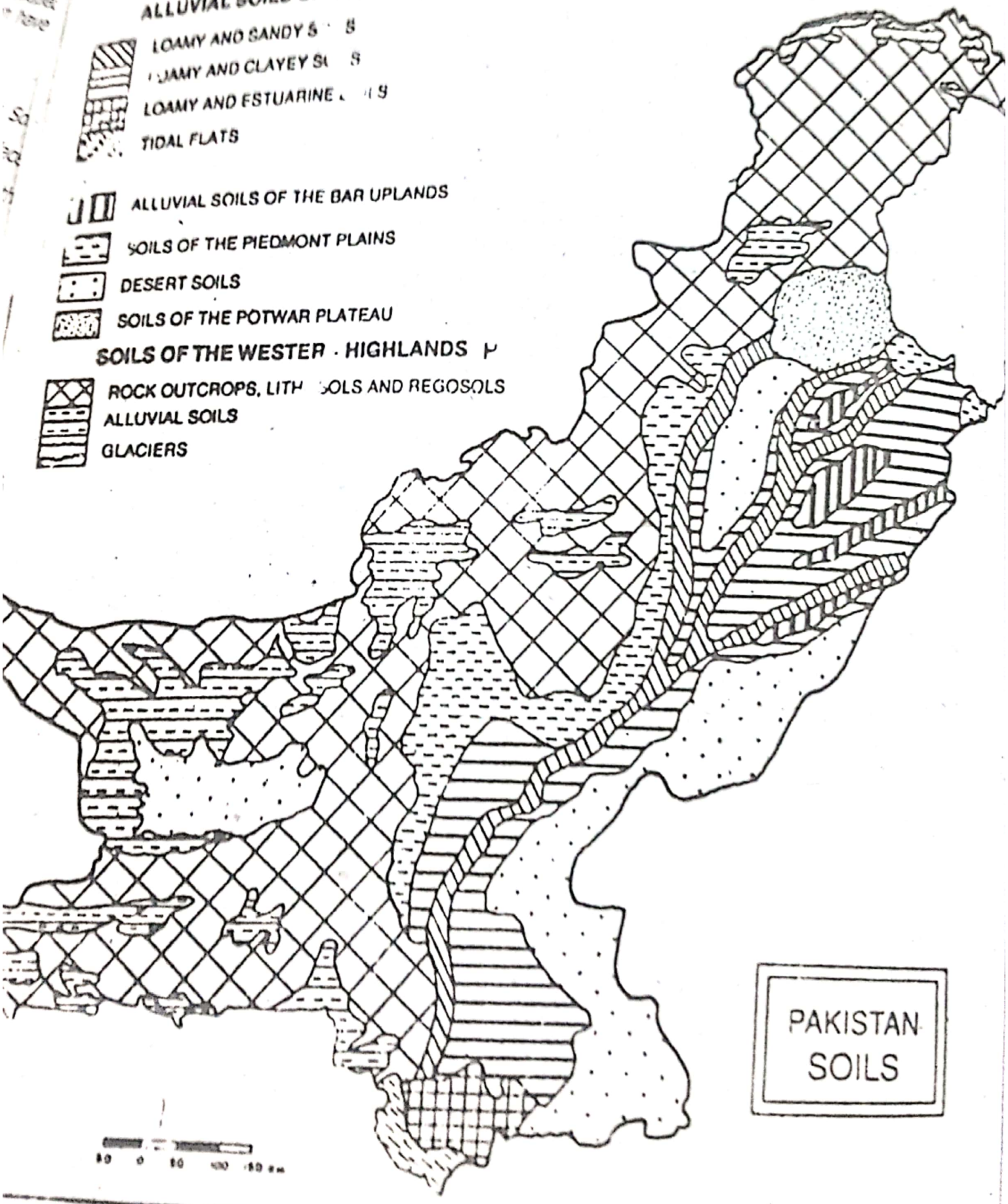
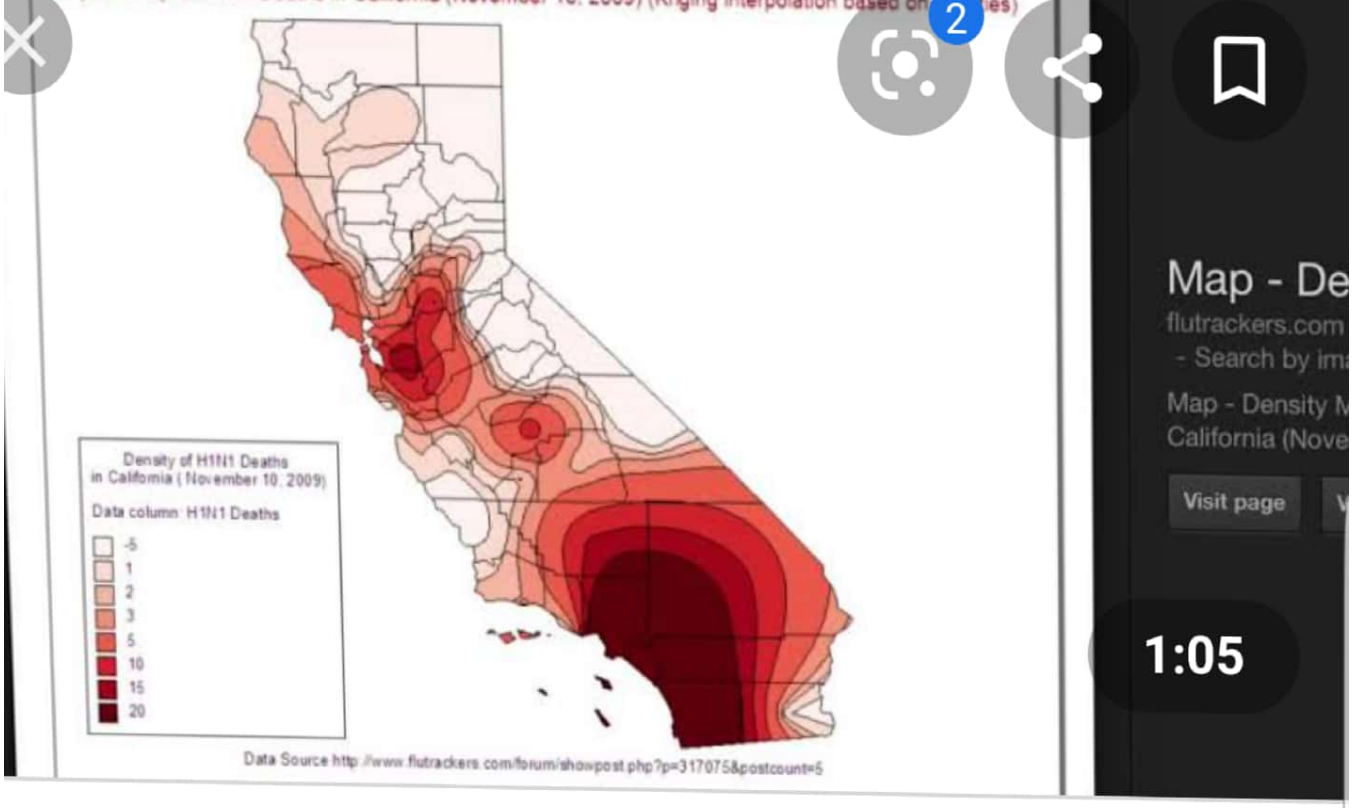


Fig. 2





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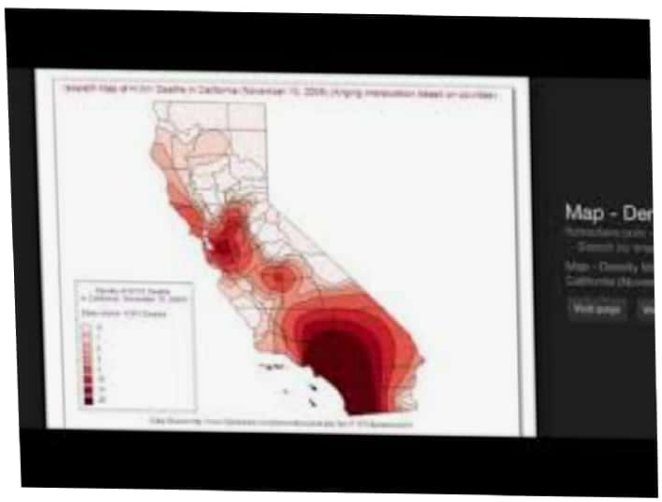

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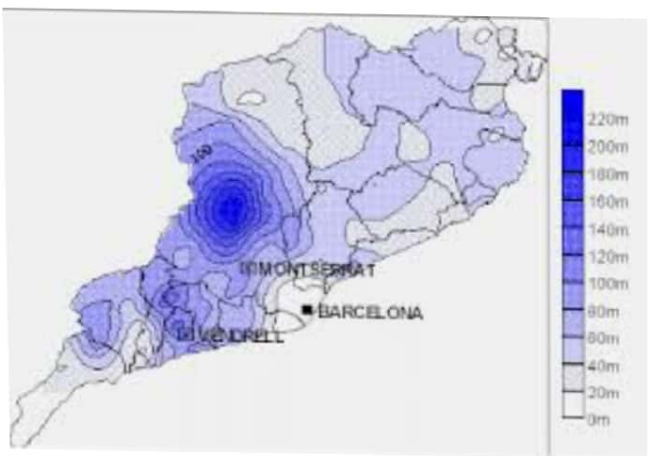

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