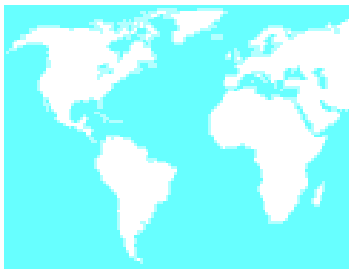




Fig 1.1: Photograph showing Africa, Europe and Americas

You may recall making maps in Class VI and learning about maps which show heights. By now you must have studied a large number of maps relating to different places. Can you say what is the difference between a map and a photograph of the same place taken from the skies? For example look at this photograph (Fig 1.1) and a map (Map 1) relating to the same place. Can you point out all the similarities and differences between the two?



Map 1: Map of Africa, Europe and Americas



Map 2: World after Hecataeus

They travelled widely and wrote down descriptions of the land and people and their histories they saw or heard about. They prepared maps based on these travels and descriptions. Though these maps have not survived, historians have tried to recreate them with the help of their descriptions.

As you can see they placed Greece in the middle of the map. They also divided the world into three continents: Europe, Libya (Africa) and Asia, all of which were separated by the Mediterranean sea (Map 2). The Greeks and after them the Romans were greatly interested in making maps and knowing about places near and far. They wanted to conquer the world, build colonies in far off places and trade with them. You may have heard of Alexander, a Greek king who tried to conquer the whole world and came as far as India some 2300 years ago. Similarly, Roman traders had established trading stations on Indian coasts to which they came by ships. Maps were useful and necessary for them.

In order to help the sailors the maps also had to be accurate. The Greeks tried to make the maps accurate with the help of longitudes and latitudes. Let us see how this was done. They tried to find out a set of places where the midday occurred at the same time. They were joined with a line from the north to the south – this was the ‘Meridian’ (Noon line) or Longitude. They also tried to draw Latitudes by joining places which had equal length of shadow at noon. With the help of these two kinds of lines they drew a grid on the map and located all places from east to west and north to south along these lines. Preparing these lines accurately was not an easy task and it took about 2000 years to finally get correct longitudes and latitudes. But locating places on maps with the help of these two lines became very useful for travelers and sailors who could orient the direction of their travel to their destinations. The sailors in turn helped the map makers by telling them about the places they visited.

Ptolemy was one of the most famous geographers of the ancient world who prepared detailed maps of the world using these lines. However these maps were all lost for a long time.

You may have noticed that most of these maps give more correct information of Europe and nearby countries. In fact they usually place Greece or Rome in the middle of the map. They also give more correct information about places visited by sailors and traders, on the coasts of various countries, but they did not know about the

A map, unlike a photograph does not show any real features. A map is used by geographers to show features that we consider important – for example: distribution of rainfall, soil types, population, languages spoken by people, crops grown, markets, schools etc. A map maker may also leave out many features visible on a photo, like individual houses, trees, etc. A map actually is a model of a place giving those features that the map maker considers to be of importance. Photo may not be able to show you how much it rains in a place, or how hot it gets there or what languages people speak there – All these can be shown on a map. That is why people make different kinds of maps depending upon the purpose. You will now see some examples of maps made in early times and how they depended upon the purpose.

Maps Down the Ages

Maps have a long history behind them. Some of the earliest surviving maps were made by Sumerians (present day Iraq) about

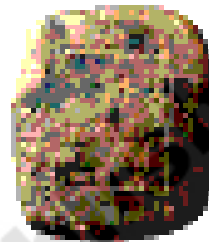


Fig 1.2: Sumerian clay tablet

four thousand years ago. These were imprinted on clay tablets. The Sumerians temples owned large tracts of land and they had to keep account of income from the lands. That is why they tried to keep records of the lands with the help of maps.

Babylonians (also people of present day Iraq) made some of the earliest ‘world maps’; that is the world as they thought of it. See below one such map drawn on a clay tablet about 2600 years ago. They imagined the world as a round disc. The inner circle had all the cities (the small circles), villages, rivers, marshes and mountains they knew about. The city of Babylon was shown in the middle. Beyond the inner circle was ‘bitter river’ or salt water ocean in which were seven triangular islands.

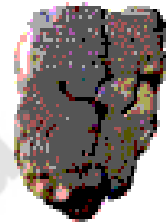
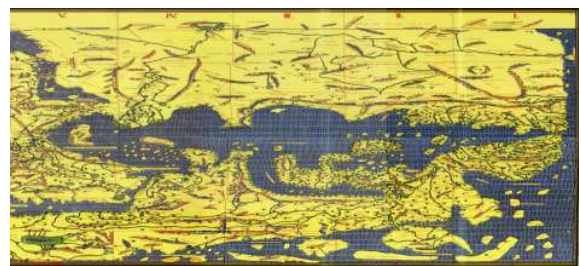


Fig 1.3: Babylonian clay tablet

Around the same time Greek geographers like Anaximander and Hecataeus of Miletus (now in Turkey) and Herodotus, also prepared world maps by arranging places from east to west and north to south. Their ideas were similar to the Babylonians who believed that the earth was a round disc surrounded by ocean river.

interior places. Thus on the map of Asia you can see India shown much smaller than Sri Lanka as the sailors were more familiar with it.

Around the same time the Chinese too were preparing maps as their emperors wanted to know about the villages and towns under their control. These maps showed China at the centre and Europe, half-way



Map 3: Map by Al Idrisi

These books of Ptolemy were used by the Arab scholars and sailors to prepare maps. One famous Arab map maker was Al Idrisi who prepared a world map for his king in 1154. The map, with legends written in Arabic, while showing the Eurasian continent fully, only shows the northern part of the African continent and lacks details of the southern Africa and Southeast Asia.

round the globe, depicted very small and horizontally compressed at the edge. Significantly, Africa was also mapped from an Indian Ocean perspective, showing the Cape of Good Hope area, which Europeans

There are many interesting things about this map. Firstly, it shows the south towards the top of the map and north towards the bottom (map 3)! It places Arabia prominently in the centre of the map.

- Can you guess why? Can you locate India and Sri Lanka (again shown much bigger than it is)?



Map 4: Map of Da Ming Hun Yi Tu of China (1389)

would not visit until much later. See the map of *Da Ming Hun Yi Tu*, painted on 17 sq. m. of silk in 1389 for the emperor of China.

- Can you identify India, Arabia and Africa in Map 4?

Before they discovered the books of Ptolemy, European map makers were greatly influenced by religious ideas of the Bible and made maps of the world to represent those ideas. See below a map made around those times.



Map 5: Model of the world according to Bible

This really was a model of the world according to the Bible. It is surrounded by oceans, and is divided into three continents – Asia, Europe and Africa. Of these Asia was considered the largest and the most important as it had Jerusalem which was the birthplace of Jesus Christ. It is therefore also shown on the top. Europe and Africa are shown at the bottom and in a smaller size.

Around 1480s Europeans rediscovered Ptolemy's books (but not the maps) and were stunned to learn about his accurate description of location of places. They prepared new maps based on them. You can see one such map here.



Map 6: Map based on mathematical calculations prepared after reading the books of Ptolemy

Unlike the map shown above this is based on actual mathematical calculations of distances and directions.

During the 15<sup>th</sup> century, Ptolemy inspired a new enthusiasm in the non-Arabic world and some important schools – the Italian school, the French school, the English school, the German school grew up. Fortunately it happened to be an age of discovery and exploration which popularised map and its importance. The Arabs had blocked the trade route to India across the Mediterranean sea. West European traders (from Spain, Portugal, Holland and England) began to search for other routes to India. Thus Columbus went westwards and discovered America while Vasco da Gama went around Africa and

reached India. All this also helped to prove that the Earth was not a flat disc but a sphere like a ball.

In the 16<sup>th</sup> century, Holland emerged as a major trading power. With the rise of Holland's maritime supremacy and trade, their map makers made major breakthrough in their work. The father of Dutch cartography was Gerardus Mercator (1512-94), who examined the previous works and did much original work on maps. Mercator's map projection is famously known Mercator Projection. Most of the world maps we use are based on his projection.



Map 7: World map by Gerardus Mercator in 16<sup>th</sup> century

### Projection in a Map

As you know the world is like a ball, but when we draw it on paper we cannot show the curvature and have to show it as flat. This inevitably causes some distortion – either the shape of the continents and the distances will get distorted or things will get placed in wrong directions. Sailors needed correct directions and shapes so that they could identify the landmarks.

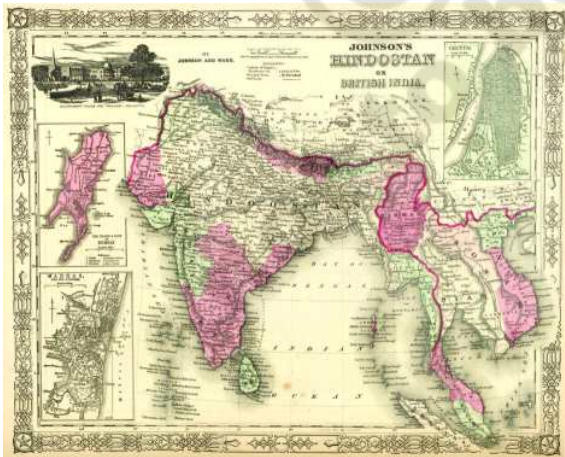
Mercator devised a method for showing the correct shapes and directions of continents but with distortion of sizes and distances. This method (called Mercator's projection) is still used to show the world.

- In what ways do you think the sailors influenced the making of maps in early times?
- Why do you think the map makers placed their own country in the middle of the map?
- Why do you think that in Idrisi's map the top side points to the south while in the maps prepared by the Greeks it pointed to the North?

### Colonisation, Explorations, Military use and Map making

When European powers colonised the entire continents like North and South Americas, Africa, Australia and Asia they needed to know about the places, their climate, crops, mineral resources and about the people

living there. They sent scientific expeditions consisting of map makers and others to explore the different parts of the world and prepare maps. These teams fought their way into interiors of continents crossing mountains, deserts and rivers, fighting local peoples to get the necessary information. This information and the maps enabled the colonial powers to establish their rule over these areas and also exploit their resources.



Map 8: An Early map of India

When the British established their power in India, they began making detailed maps of the interiors of the country. They established a department called 'Survey of India' to survey the entire country and prepare maps. James Rennel was appointed the 'Surveyor General' and he prepared one of the first survey based maps of India. Look at the map of India (Map 8) created during the British period and compare it with a current map.

In 1802 William Lambton began one of the most important geographical surveys in the world starting from Chennai in the south and culminating in the Himalayas to determine the length of a longitude and also

the heights of various places. This survey was completed by Sir George Everest. It is this survey which established that Mt Everest is the highest peak in the world (it was named after George Everest who measured its height for the first time using scientific methods). The survey began in Chennai because all heights are measured from the sea level.

Maps were also in great demand during times of war as armies and air forces needed them. Thus map making received great impetus during the first two World Wars. Many governments tried to keep such detailed maps secret so that enemies could not use them. However, in our own times

the use of satellite imagery has transformed the nature of mapping. We not only have very accurate and detailed maps, but it is no longer possible for governments to keep them as secrets. This information is available to all people for study and use today.

- Do you think this free access to maps is a good thing?
- Why do you think the colonial powers invested so much money to prepare detailed maps?
- Find out about the lives of some of the great explorers like David Livingstone, Stanley, Amudsan etc. Find out who sponsored their expeditions and why.

### Use of Maps in our Times

As we saw above, maps were made and used for a variety of purposes: for trade, sailing, for conquests and colonising and for fighting wars. In our own times maps are used extensively for planning, development of countries. This requires planners to identify the problems faced by a region and its resources etc. This is done with the help of maps. For example we can make a map of regions which have very little drinking water. We can compare this map with maps showing water resources – rainfall, groundwater and rivers. Based on this comparison we can decide what is the best way to make drinking water available to all the people of the region – by sinking tube wells, or building dams across streams or making tanks (*cheruvus*) or bringing water from distant places in large pipes. Similarly, we can plan agricultural

development, setting up new industries, building roads, hospitals and schools with the help of maps.

Can you suggest how maps can be used to plan setting up new schools and colleges? What different kinds of maps would have to be studied for this?

Maps are also used by companies to plan their business work. For example, a mobile telephone company that wants to spread its network in an area will need maps of villages and towns and about hills and forests to set up microwave towers.

- If someone wants to choose an appropriate place to set up a hospital what kind of maps would be useful to her? Make a list.
- Why do you think maps are useful to armies in times of war?

### Reading Thematic Maps

You saw above that maps do not just show the names of places and distances between them. They can also be used to show different kinds of information, like the nature of the terrain (hilly, rock, plain etc), economic activities of people, languages spoken, literacy etc. Usually a map focuses on only one aspect. Such maps are called 'Thematic Maps'. There are for example, Political Maps which give information about mandals, districts, states, countries, capitals etc. Some are Physical Maps which show mountains, rivers, plateaus etc. Some are 'Land Use Maps' which show how people use land. For example some parts of village lands may be used for pasture, for raising food



crops, for raising cash crops like cotton, while some parts may be reserved for residence, schools, places of worship and shops. Some parts may even be kept as waste or fallow land or for water reservoirs. When we make a map to show the use of land in that village we have to use different kinds of symbols, colours and patterns to show each of these separately. Given below is the colour code used to represent the land cover and land use in maps.

Colour	Land cover/ Land use
Dark Green	Forest
Light Green	Grasslands
Brown	Land useful for agriculture
Yellow (Topographical maps)	Cropped area
Dark Grey	Mountains
Light Grey	Hills
Yellow	Plateaus & Swamps
Light Red	Wastelands
Light Blue	Tanks, Rivers, Canals, Wells etc.
Dark Blue	Seas and Oceans
White	Places where minerals are available
Black	Boundaries

In representation of various socio-economic aspects/ details we can use the technique of map patterns like points, symbols, lines etc. Quantitative data can be represented by dot method, circles, graphs, charts etc. In stipulated thematic maps shading can be used as pattern.

### Make a Population Map!

For example, draw a sketch map of your school showing different class rooms; find out the number of students in each class and put one small line( ) for every five students of the class. This is your population map of your school! Remember to write in the key box how many students each line represents.

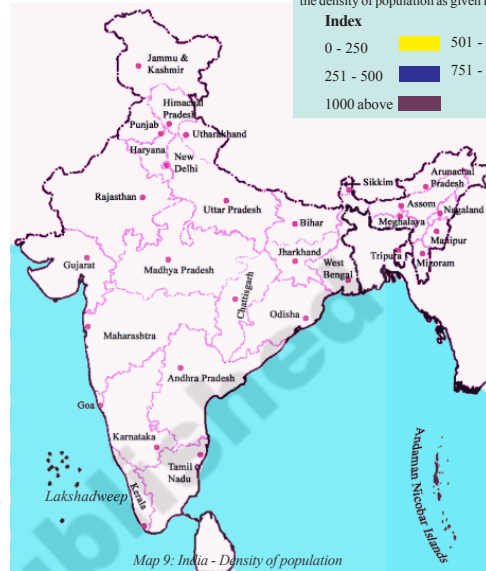
Population can also be shown on a map through shading. These are called population density maps. First we estimate the total number of people living in a place. Then we measure the total area of the place and then divide the number of people by the area of the place. For example if the area of a village is ten square kilometres and one thousand people live in it, the population density of the village is hundred per square kilometre. By using the same method we can find out the density of population of entire states. See the following table which gives the population density of different states of India.

Density of Population year - 2011 (Census - 2011)

State	Density	State	Density	State	Density
Andhra Pradesh	308	Jammu & Kashmir	56	Nagaland	119
Arunachal Pradesh	17	Jharkhand	414	Orissa	269
Assam	397	Karnataka	319	Punjab	550
Bihar	1102	Kerala	859	Rajasthan	201
Chhattisgarh	189	Madhya Pradesh	236	Sikkim	86
Goa	394	Maharashtra	365	Tamilnadu	555
Gujarat	308	Manipur	122	Tripura	350
Haryana	573	Meghalaya	132	Uttarakhand	189
Himachal Pradesh	123	Mizoram	52	Uttar Pradesh	828
				West Bengal	1030

In the map below, colour the states according to the density of population as given in index:

Index	Colour
0 - 250	Yellow
251 - 500	Blue
501 - 750	Green
751 - 1000	Red
1000 above	Brown



Map 9: India - Density of population

### Conventional symbols on maps

While map makers usually use their own symbols, some symbols are used conventionally by most map makers. In India we usually follow the conventions used by the Survey of India. See for example the conventional symbols given below the 'Topo sheets' of Survey of India.

Towns or Villages: inhabited: deserted Fort	.....	.....	.....
Huts: permanent: temporary: Tower: Antiquities	.....	.....	.....
Temple: Chhatra: Church: Mosque: Idgah: Tomb: Graves	.....	.....	.....
Lighthouse: Lightship: Buoys: lighted: unlighted: Anchorage	.....	.....	.....
Mine: Vine on trellis: Grass: Scrub	.....	.....	.....
Palm: palmyra: other Plantain: Conifer: Bamboo: Other trees	.....	.....	.....
Boundary: international	.....	.....	.....
State: demarcated: under demarcated	.....	.....	.....
District: subdiv: tahsil or taluk forest	.....	.....	.....
Boundary: pillars: surveyed: unlocated: village: trijunction	.....	.....	.....
Heights: triangulated: station: point, approximate	.....	.....	.....
Bench mark: geodetic: tertiary: canal	.....	.....	.....
Postoffice: Telegraph office: Combined office: Police station	.....	.....	.....
Bungalows: dak or travellers: inspection: Rest-house	.....	.....	.....
Circuit house: Camping ground: Forest: reserved: protected	.....	.....	.....
Spaced names: administrative: lokakuti of tribal	.....	.....	.....

Roads: metalled: according to importance: distance stone	.....	.....	.....
unmetalled: do. do. bridge	.....	.....	.....
Cart-track: Park-track and pass: Foot-path with bridge	.....	.....	.....
Bridges: with piers: without: Causeway: Ford or Ferry	.....	.....	.....
Streams: with track in bed: undefined: Canal	.....	.....	.....
Dams: masonry or rock-filled: earthwork: Weir	.....	.....	.....
River banks: shelving: steep: 3 to 6 metres over 6 metres	.....	.....	.....
dry with water channel: with island & rocks: tidal river	.....	.....	.....
Submerged rocks: Shoal: Swamp: Reeds	.....	.....	.....
Wells: lined: unlined: Tubewell: Spring: Tanks: perennial: dry	.....	.....	.....
Embankments: road or rail tank: Broken ground	.....	.....	.....
Railways: broad gauge: metre gauge: single with station: under constr.	.....	.....	.....
other gauges: do. do. with distance stone	.....	.....	.....
Mineral line or tramway: Telegraph line: Cutting with tunnel	.....	.....	.....
Contours: with sub-features: Rocky slopes: CLM	.....	.....	.....
Sand features: (1) flat (2) sand-hills and dunes (surveyed), (3) shifting dunes	.....	.....	.....

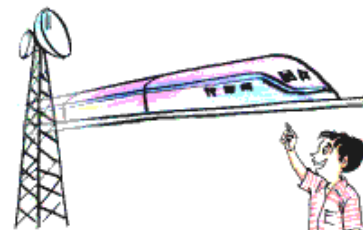


Fig 1.4: Thankfully they did not create symbols for these!

lines. You read about them in Class VII. Contours are lines on map joining places of same height – measured from the sea level. In other words all places on a contour line will have the same height from the sea level. Contour lines are also called isolines – lines joining places with some common features.

### Contour Lines

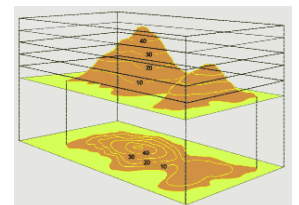


Fig 1.6: Hills

### Representation of relief features on maps

Relief feature means the high and low places on the surface of the earth. The main relief features are: hills, valleys, plateaus, plains, river basins, rocky and sandy places. Since the maps are flat we cannot show the heights on them. We therefore use a special symbol for this called contours or contour



Fig 1.5: Map with intensity of patterns (Isopleth map)

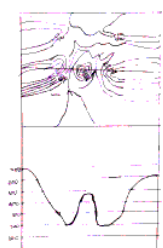


Fig 1.7: 'V' shaped valley

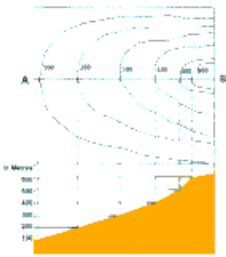


Fig 1.8: Gentle slope

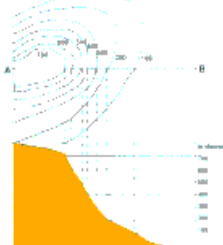


Fig 1.9: Steep slope

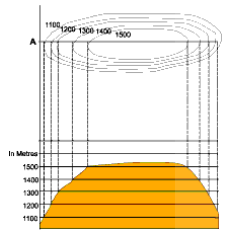


Fig 1.10: Plateau

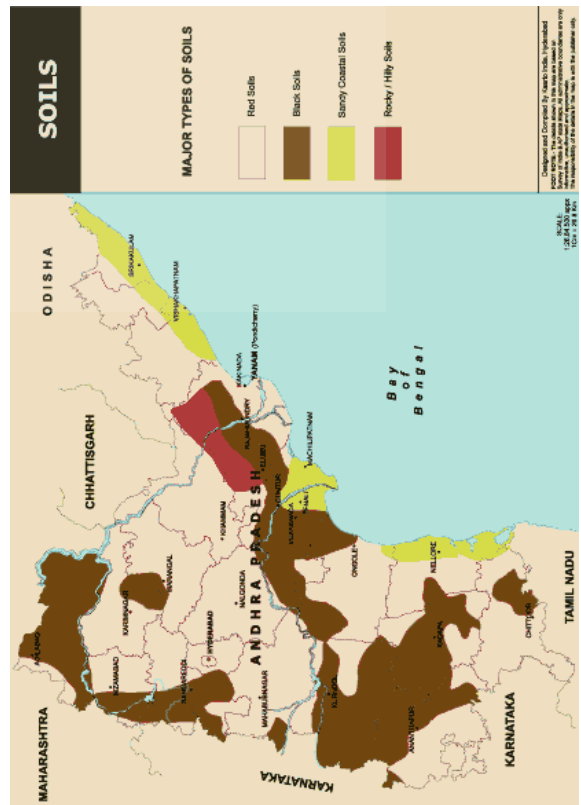
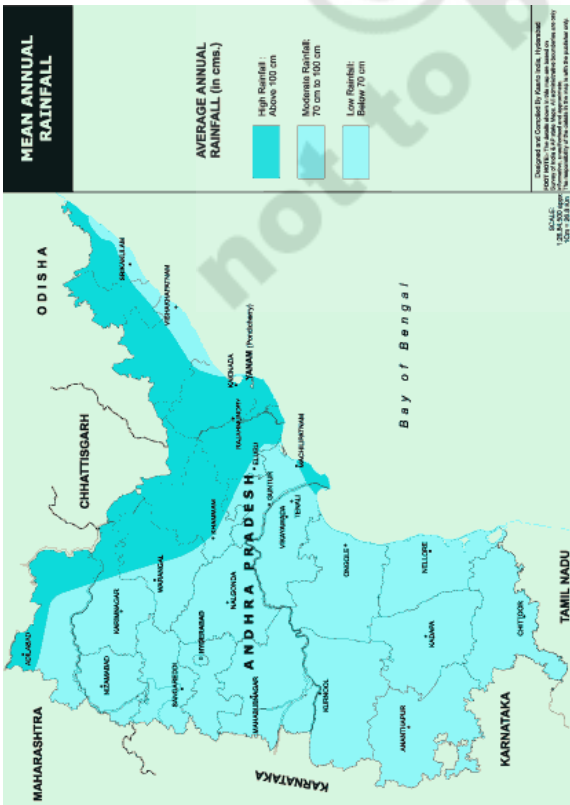
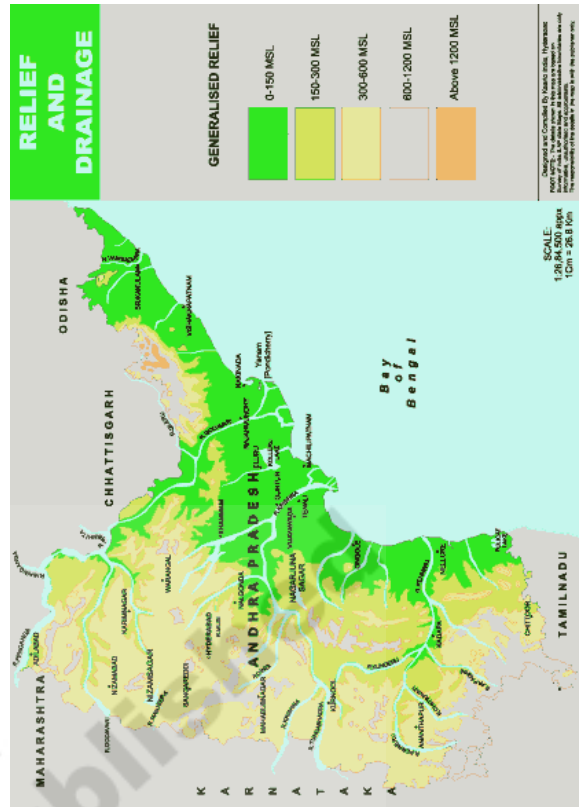
Contour lines are usually drawn at fixed intervals of height such as 20 metres, 50 metres, or 100 metres. Uniform contour interval is maintained on a given map.

Contour lines give an indication of the slope of the land as well as the elevation above sea level. Where contour lines are far apart, it represents a gentle slope, closer lines represent steep slope and uniformly spaced lines represent uniform slope.

- In this book there are different Thematic maps i.e. Relief and Drainage (p.14), Mean Annual Rainfall (p.15), Soils (p.16), Forests (p.55) and Minerals (p.65). Now make a table to identify different information given for your district from the maps mentioned above.

### Atlas

An atlas is a collection of maps – usually arranged according to different themes. Open the School Atlas and look at the list of all the maps shown in it. You can find out much useful information about different places and use it to imagine the life of people living there. Can you imagine the life of people living in Arunachal Pradesh based on the information on the same themes from the Atlas?



**Key words**

1. Projection      2. Symbols      3. Geographer

**Improve your learning**

1. Study the School atlas carefully by looking at various thematic maps.
2. Do you think the use of maps has changed between the time of ancient Greeks and now? In what way is it similar and different?

	<b>In ancient Greece</b>	<b>Now</b>
Similarities		
Differences		

3. Many people believe that making of maps by the Colonial powers was a more powerful tool for exploitation and control of the colonies than guns. Do you agree?
4. In what ways were the maps prepared by the British different from the one made by Ptolemy or Idrisi?
5. Choose two places of your choice from the Atlas and find out about them from at least five different thematic maps. Then compare the life in the two places – what would be similar and what would be different?
6. Read the text of page number 8 about the “Use of maps in our times” and answer the following question:  
What are the various purposes for which maps are used in our times?

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