GEOGRAPHY

STANDARD SIX

The Constitution of India

Chapter IV A

Fundamental Duties

ARTICLE 51A

Fundamental Duties- It shall be the duty of every citizen of India–

(a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;

(b) to cherish and follow the noble ideals which inspired our national struggle for freedom;

(c) to uphold and protect the sovereignty, unity and integrity of India;

(d) to defend the country and render national service when called upon to do so;

(e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities, to renounce practices derogatory to the dignity of women;

(f) to value and preserve the rich heritage of our composite culture;

(g) to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures;

(h) to develop the scientific temper, humanism and the spirit of inquiry and reform;

(i) to safeguard public property and to abjure violence;

(j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;

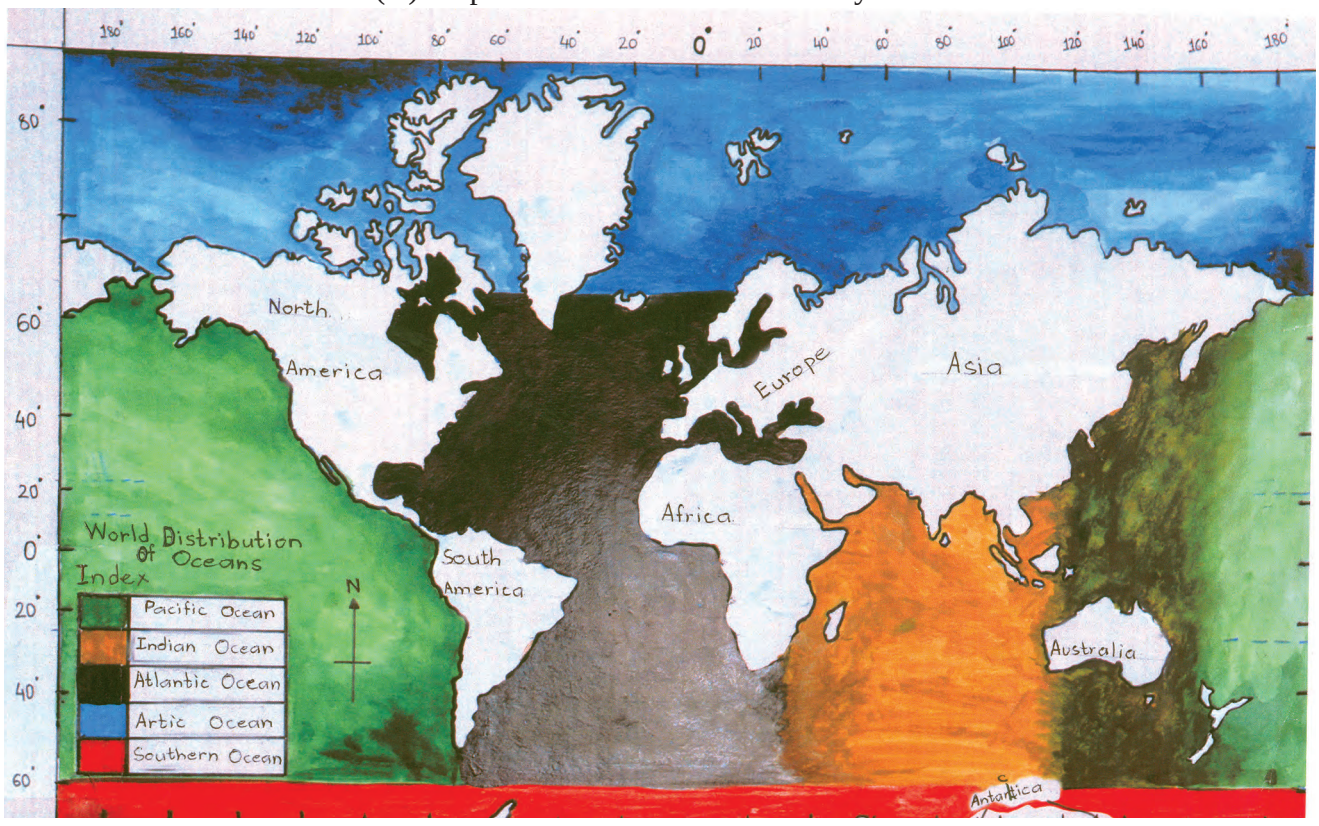
(k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

Chart depicting the temperature details of Solapur City. MARCH 2016

Date	Temperature			Date	Temperature		
	Max (° Celsius)	Min (° Celsius)	Difference in temp (° Celsius)		Max (° Celsius)	Min (° Celsius)	Difference in temp. (° Celsius)
1st March 2016	34	24	10	16th March 2016	38.4	23.5	14.9
2nd March 2016	37	21	16	17th March 2016	40	22	18
3rd March 2016	34	21	13	18th March 2016	41	24	17
4th March 2016	35	23	12	19th March 2016	41	26	15
5th March 2016	36	23	13	20th March 2016	41	24	17
6th March 2016	37	24	13	21st March 2016	40	24	16
7th March 2016	38	23	15	22nd March 2016	41	24	17
8th March 2016	38.3	25.1	13.2	23rd March 2016	42	23	19
9th March 2016	37.6	24.6	13.0	24th March 2016	42	24	18
10th March 2016	39.2	24.2	15.0	25th March 2016	41.6	28.1	13.5
11th March 2016	40.7	24.5	16.2	26th March 2016	41.3	27.9	13.4
12th March 2016	40	25	15	27th March 2016	41.3	27.9	13.4
13th March 2016	37.4	25.4	12.0	28th March 2016	39.7	25.5	14.2
14th March 2016	36.7	20.5	16.2	29th March 2016	40.9	25.0	15.9
15th March 2016	36.7	18.9	17.8	30th March 2016	40.2	24.8	15.4
				31st March 2016	40	22.00	18

Source: The internet and Solapur edition of the Daily Divya Marathi

(A) A Specimen of a Student's Activity Sheet



(B) A Specimen of a Student's Activity Sheet

(This is a specimen, not a model sheet. Help the children to correct their errors, if any.)

Sanction no. : MSCERT/avivi/sp/2015-16/1673 Date : 06/04/2016

GEOGRAPHY

STANDARD SIX

Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune.

3UB2XL

The digital textbook can be obtained through DIKSHA APP on a smartphone by using the Q. R. Code given on title page of the textbook and useful audio-visual teaching-learning material of the relevant lesson will be available through the Q. R. Code given in each lesson of this textbook.

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Preface

The **'Primary Education Curriculum - 2012'** was prepared in the State of Maharashtra following the '**Right of Children to Free and Compulsory Education Act, 2009'** and the **'National Curriculum Framework 2005'**. This syllabus approved by the State Government is being implemented from the academic year 2013-2014. In the syllabus as well as in the textbooks for Std III to V, 'Geography' was included in 'Environmental Studies'. However, Std VI onwards, it is included separately. This textbook has also been prepared accordingly. We are happy to place it in your hands.

Our approach while designing this textbook was that the entire teaching-learning process should be child-centred, the emphasis should be on self-learning and the process of education should become enjoyable and interesting. In this process of teaching-learning, the specific competencies that children are expected to achieve at the various stages of primary education should be outlined clearly. That is why, the expected competencies regarding Geography have been given in the textbook.

As this is a Geography textbook, the Committee have given a thought to the following points: The textbook should not be a burden, but at the same time, it should introduce essential geographical concepts and skills. It is a right of the student to achieve modern contemporary education and that is how we have tried to introduce Geography to the student. The maps, graphs, charts, etc. given in this textbook are designed in such a way that they will help the children to acquire skills useful in their daily life.

The world, the earth, the graticule, the biosphere, the weather and the environment are all abstract concepts but the students are always curious about them. We have tried to take these concepts closer to the students. The conventional structure of exercises has been replaced with open-ended, thought-provoking questions. Special instructions have also been given to the teachers. To make teaching more activity-oriented, projects have been provided.

This book was scrutinized by teachers, educationists, and experts from all parts of the State to make it as flawless and useful as possible. Their comments and suggestions have been duly considered while finalizing the book.

The Geography Subject Committee and the Study Group of the Textbook Bureau, and the artist have taken great pains to prepare this book. The Bureau is thankful to all of them.

We hope that this book will receive a warm welcome from students, teachers and parents.

Pune
Date : 9 May 2016,
Akshay Tritiya
Indian Solar Year :
Vaishakh 19, 1938

(Dr. Sunil Magar)
Director
Maharashtra State Bureau of Textbook
Production and Curriculum Research, Pune

The Constitution of India

Preamble

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

NATIONAL ANTHEM

Jana-gana-mana-adhināyaka jaya hē
Bhārata-bhāgya-vidhātā,

Panjāba-Sindhu-Gujarāta-Marāthā
Drāvida-Utkala-Banga

Vindhya-Himāchala-Yamunā-Gangā
uchchala-jaladhi-taranga

Tava subha nāmē jāgē, tava subha āsisa māgē,
gāhē tava jaya-gāthā,

Jana-gana-mangala-dāyaka jaya hē
Bhārata-bhāgya-vidhātā,

Jaya hē, Jaya hē, Jaya hē,
Jaya jaya jaya, jaya hē.

PLEDGE

India is my country. All Indians are my brothers and sisters.

I love my country, and I am proud of its rich and varied heritage. I shall always strive to be worthy of it.

I shall give my parents, teachers and all elders respect, and treat everyone with courtesy.

To my country and my people, I pledge my devotion. In their well-being and prosperity alone lies my happiness.

ENGLISH GEOGRAPHY- STANDARD VI - LEARNING OUTCOMES

Suggested Pedagogical Processes	Learning Outcomes
The learner may be provided opportunities in pairs/groups/individually and encouraged to :	**The learner-**
• Understand concepts like angular distance, latitudes and longitudes, etc. • Using globe for understanding latitudes and longitudes. • Using map/technology to find out the location of country/state/district/ village/school, etc.	06.73G.01 Visualizes the angular distances in three dimensions. 06.73G.02 Identifies latitudes and longitudes, for example, the Poles, the equator and the tropics. 06.73G.03 Shows location and extent with the help of latitudes and longitudes in the map and globe.
• Explaining the climate of a place with the help of daily winds. • Discussing various elements of weather. • Identifying the average temperature of a place with the help of isotherms on a map. • Correlating the distribution of sunrays and the temperature zones. • Making note of temperatures in the newspapers and with the help of thermometers.	06.73G.04 Differentiates between climate and weather. 06.73G.05 Explains the factors affecting temperature. 06.73G.06 Thinks about the curvature of the isotherms on the map. 06.73G.07 Understands / explains the global distribution of temperature on the basis of thermal zones. 06.73G.08 Records temperatures accurately and interprets them.
• Understand the importance of oceans and discuss the reasons behind marine pollution. • Using maps to show oceans on world outline maps.	06.73G.09 Explains the importance of oceans to mankind with examples. 06.73G.10 Shows oceans on maps and globes.
• Collect various types of rock samples. • Obtain information regarding the rocks found in the surrounding, rocks used in making historical monuments, houses, etc. • Explain the distribution of rock types in Maharashtra with the help of a map of Maharashtra.	06.73G.11 Explains differences in rock types. 06.73G.12 Identifies rock types with the help of pictures. 06.73G.13 Explains the rock types in Maharashtra with the help of map.
• Explaining the use of natural resources giving examples. • Discussing that the judicious use of the reserves of natural resources is necessary. • Collect information regarding the distribution of various natural resources like land, soil, water, natural vegetation, minerals, energy resources, etc,. and relating it with India and the world.	06.73G.14 Analyses the uneven distribution of natural resources on earth. 06.73G.15 Explains the dependence of living organisms on natural resources. 06.73G.16 Supports the judicious use of natural resources.

• Give examples of process-based and substance-based energy resources. • Suggesting measures to conserve energy resources.	06.73G.17 Classifies energy resources. 06.73G.18 Shows the distribution of important energy resources like mineral oil and coal.
• Correlating on the basis of the differences between various occupations. • Interpreting the pie charts showing various occupations. • Visiting an occupation in the locality, collecting information and discussing it.	06.73G.19 Classifies various human occupations. 06.73G.20 Correlates various human occupations.
• Understand the difference between uses of maps and globes.	06.73G.21 Tells the difference between a globe and a map. 06.73G.22 Uses maps and globes.
• Collecting information regarding various occupations by visiting them and correlating them.	06.73G.23 Verifies the information regarding occupations through field –visits.

CONTENTS

Front Cover : A girl and a boy hugging a globe. Back Cover :Various photographs according to the content of the chapters. (1) Mining (2) Samples of rocks (3) Modern weather instruments (4) Bhedaghat (5) Power generation centre (6) Collection of rubber latex (7) Coconut grove (8) Agriculture (9) Water transport (10) Pollution of sea water and air due to oil spill and fire.

– For Teachers –

- ✓ To begin with, get familiar with the textbook yourself.
- ✓ Please plan carefully and independently for the activities in each chapter. Please do not teach without planning.
- ✓ The teaching-learning interactions, processes and participation of all students are very necessary and so is your active guidance.
- ✓ Please use the geographical teaching aids in the school as required for the appropriate understanding of the subject. It is necessary to use the globe, the maps of the World, India and the State, atlases and thermometers.
- ✓ Though the number of chapters has been reduced, the number of periods required for each chapter has been given a thought. Abstract concepts are difficult to follow and therefore you are expected to use the given number of periods fully. This will help the students to assimilate the content without feeling the 'burden of learning'.
- ✓ Like other social sciences, geographical concepts too are not easy to understand. Major concepts of geography have a scientific base and they deal with abstractions. Encourage group work, learning through each other's help, etc. Facilitate peer learning as much as possible by reorganizing the class structure frequently.
- ✓ You will find that the character 'Globee' appears in different boxes and instructions given in the chapters. Please ensure that it helps to create interest in the subject.
- × The present book has been prepared for constructivist and activity-based teaching. Please do not teach the lessons in the book by just reading them aloud.
- ✓ Follow the order of the chapters as given in the contents because the concepts have been introduced in a graded manner to facilitate knowledge-building.
- ✓ Do not use the boxes titled 'Do you know?' for evaluation.
- ✓ A glossary is given at the end of the book. Detailed information of important geographical terms / concepts in the chapters is given in this glossary. The words are given alphabetically. The words included in the glossary are enclosed in blue highlights in the chapters, e.g. Bhuvan (Chapter 1, Page 7)
- ✓ Some websites have been given for reference at the end of the chapter and the glossary. Also, a list of references used is also given. You as well as the students are expected to use these references. These references will surely help you to go beyond the textbook. Please bear in mind that extra reading is always helpful for understanding any subject in depth.
- ✓ Use thought-provoking, activity-oriented, open-ended, multiple choice questions for evaluation. Some examples are given at the end of the chapters in the 'exercises'.


– For Students –


The character **'Globee'** will meet you in every chapter. Have you guessed who he is? He will help in the various tasks you are expected to do. Try to follow his instructions.


1. The Earth and the Graticule

Make friends with maps!

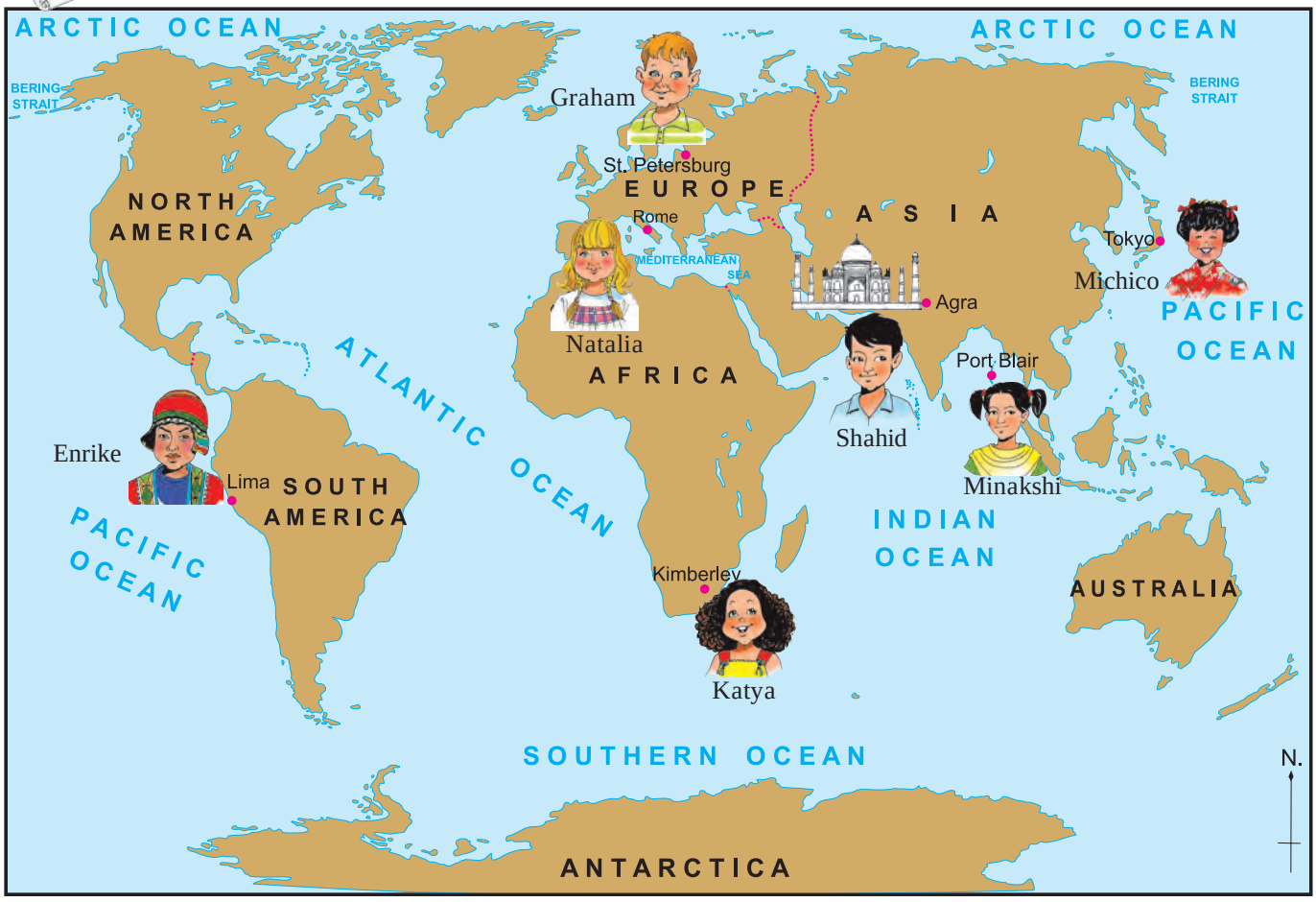


Figure 1.1 : World

Observe figure 1.1 and answer the following questions:

- Which places are shown on the map?
- In which city is the Taj Mahal located?
- In which continent is the Taj Mahal located?
- In which direction is the Taj Mahal located for Graham in St. Petersburg, for Katya in Kimberley, for Michico in Tokyo and Minakshi in Port Blair?
- Shahid in Agra is specifying the directions in which the others live. How will he express them?
- In what direction will Natalia in Rome and Enrike in Lima say the other child lives? Will their answers be the same?

Graham, Katya, Michico, Natalia, Minakshi, Shahid and Enrike have answered the above questions differently using directions and subdirections. The Taj Mahal is located at one and the same place and that is Agra. However, when each one of the children told the direction from their respective places, their answers were different. This means that the use of directions alone does not help us to accurately describe the location of a place. That is why, it became necessary to find a new system to state the precise location of any place on the earth.

Let us see what it is!

Think a little!

Observe the globe in your school. Think about the following questions and then discuss them.

- There are some vertical and horizontal lines on the globe. Which of these lines are more in number?
- What labels do these lines have? What similarities and differences do you see in the labels?
- Will it be possible to actually draw such lines on the earth?

Explanation

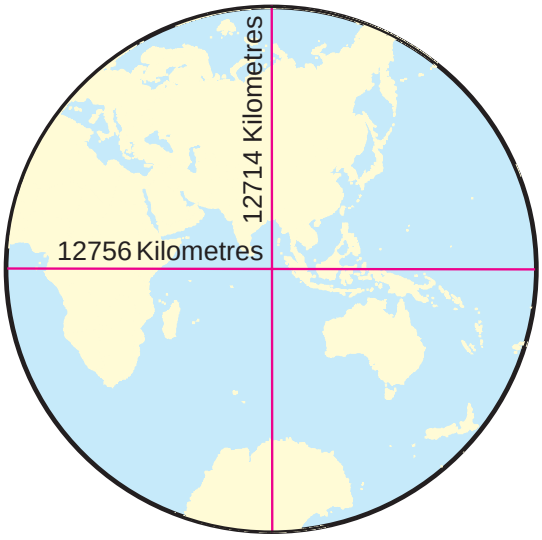


Figure 1.2 : Earth's Size

Figure 1.2 shows the lengths of the east-west and north-south diameters of the earth. This will give you some idea about the size of the earth. Oceanic waters, uneven nature of the land, forests, innumerable islands of different sizes, and buildings make it impossible to actually draw such lines on the earth. In order to overcome this difficulty, geographers developed a miniature model of the earth in the form of a globe. This can be used to determine locations on the earth. One can actually draw horizontal and vertical lines on a globe though not on the earth. Thus, they are imaginary lines on the earth.

⁎ Angular Distance

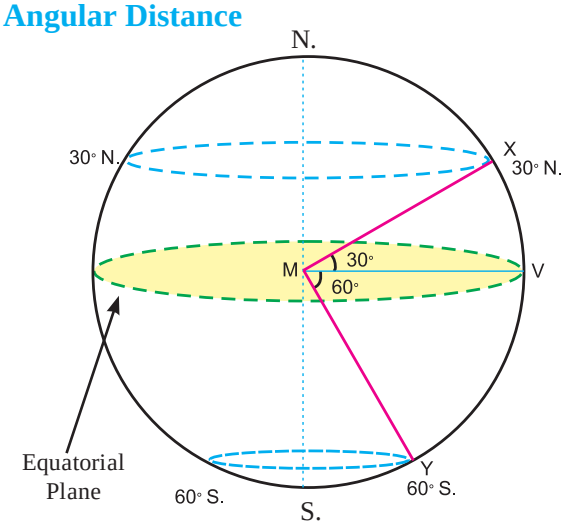


Figure 1.3 : Angular Distance – 1

The location of any place on the earth is determined with reference to the centre of the earth. In order to do it, we consider a straight line joining the point on the surface and the centre of the earth. At the centre, it makes an angle with the plane of the equator. The measure of this angle is used in determining the locations. For example, in figure 1.3, the measure of angle XMV is 30°. That is, its angular distance from the equator is 30°. Look at the figure and tell the angular distance of 'Y' from the equator.

Figure 1.3 shows another plane. It passes through X. It is parallel to the plane of the equator. Observe figure 1.3 and see how it meets the surface of the earth. Note that it forms a circle on the surface. Any point on this circle and the equatorial plane form an angle of 30° at the centre of the earth.

Do it yourself !

Use figure 1.4 for the following:

- In the upper portion of the circle, at the centre X, draw angles of 20°, $V_1X\ K_1$ and $V_2X\ K_2$; K_1 and K_2 being the points on the circle. Draw an ellipse joining K_1 and K_2.
- In the lower half of the circle, mark angles of 60° and name the points on the circle as P_1 and P_2.
- Draw an ellipse joining P_1 and P_2.

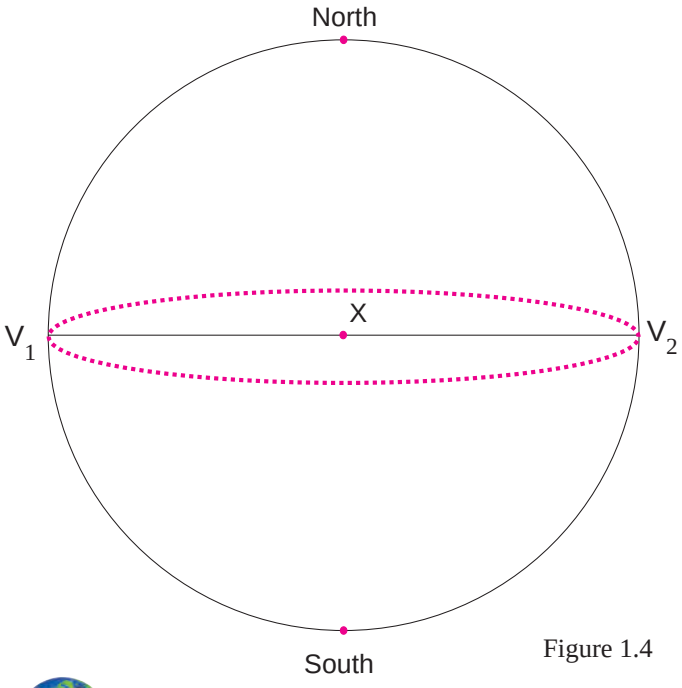


Figure 1.4

Can you tell?

- Are the distances between K_1 K_2 and P_1 P_2 the same?
- Compare the distances XK_1 and XP_2. Are these distances the same or are they different?
- Now compare the ellipses you have drawn.
- Which is the larger ellipse? Why?

Explanation

⁎ Parallels of Latitude

You must have realized that the ellipse drawn by joining the 20° points is larger than the ellipse that joins the 60° points. However, the distances X K_1 and X P_2 are the same. This is because we are dealing with a sphere.

Note that though these lines appear to be ellipses in the diagram, on the globe they are circles. The circles thus created at some angular distance from the centre of the earth are parallel to one another. Hence, they are called **parallels** of these **latitudes** . The values of parallels are angular measures expressed in degrees.

The degrees of the parallels are measured from

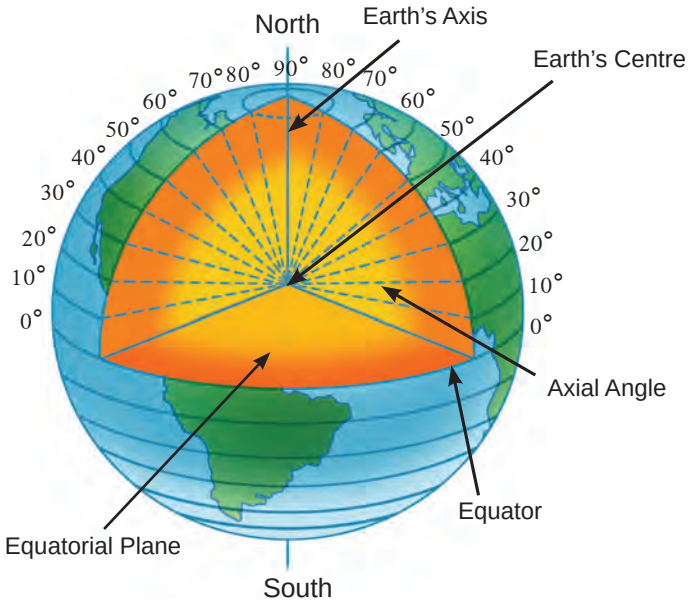


Figure 1.5 : Parallels of Latitude

the equator as shown in figure 1.5. That is why, the equator is considered as 0° parallel. It is the largest parallel, and also a great circle. The angular distance of other parallels towards north and south goes on increasing away from the equator.

Use your brain power!

Explain the meaning of the term equator.

The equator bisects the earth into north and south parts. The one to the north is called the **northern hemisphere** while the one to the south is called the **southern hemisphere** . Towards the north and south of the equator, parallels of latitude progressively become smaller and smaller. On the globe (and also on the earth), at the north and south ends of the earth's axis, they appear as points. These are called the **North Pole** and the **South Pole** respectively.

While mentioning the value of a parallel, it is necessary to mention whether it is in the northern or southern hemisphere. The parallels from the northern hemisphere are referred to as 5°N, 15°N, 30°N, 50°N whereas the parallels from the southern hemisphere are referred to as 5°S, 15°S, 30°S, 50°S.

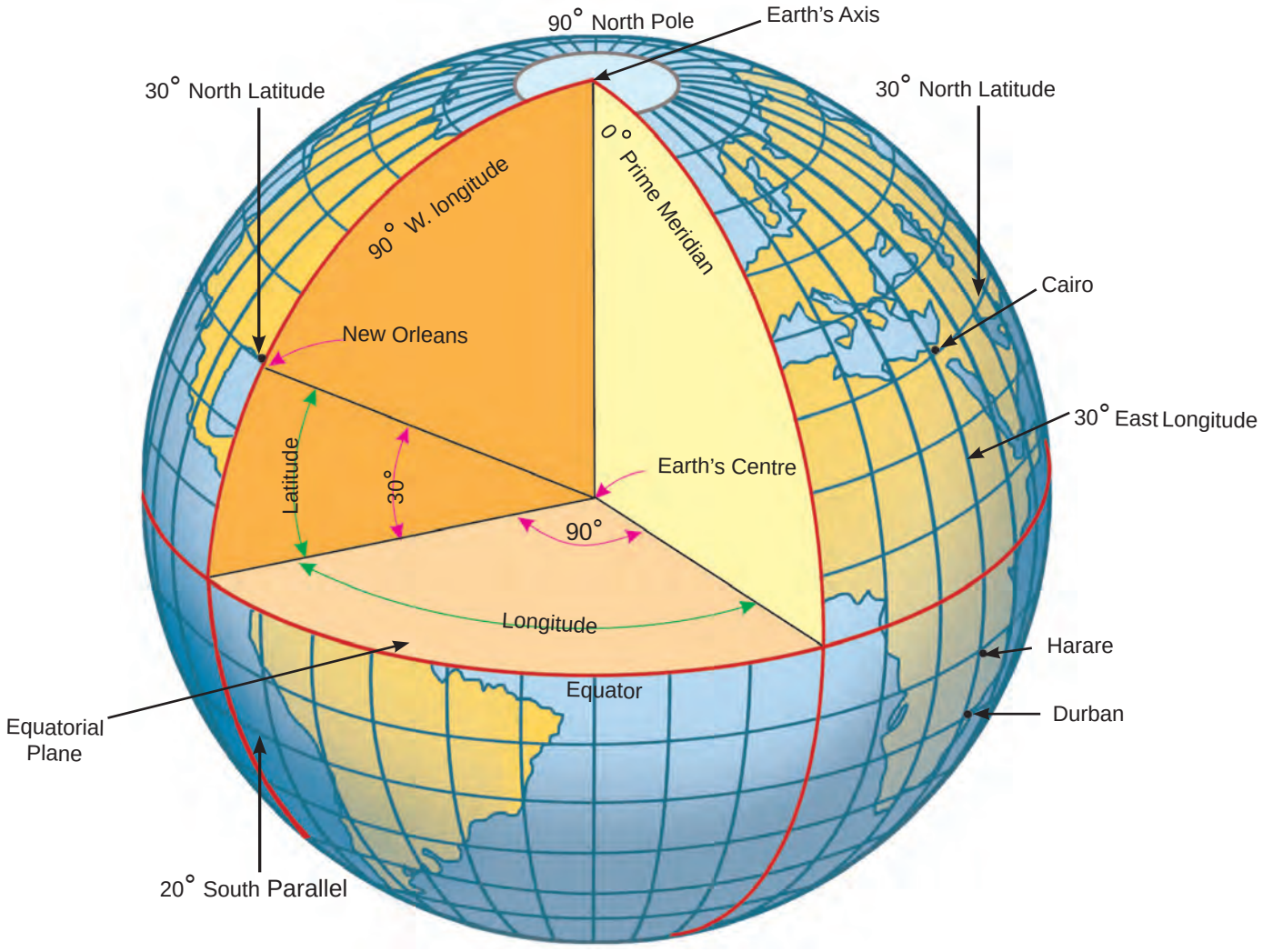


Figure 1.6 : Earth's Angular Measurements

A line joining all the places located to the north of the equator at an angular distance of 30° is 30° north parallel. Hence, all the places on this parallel will be at the same latitude, which is 30°N. New Orleans in North America, Cairo in Africa or Basra and Lhasa in Asia are all located on 30°N parallel. The same concept holds good for all other parallels. See figure 1.6.

One can draw 181 parallels on the earth at the interval of 1°.

- At 0°, that is, the equator.
- 90 parallels in the northern hemisphere –1°N to 90°N.
- 90 parallels in the southern hemisphere –1°S to 90°S.

Do it yourself !

- Take an orange and peel off its skin. You will see the segments inside and thin vertical lines on them.
- Carefully take out one segment. Observe the segment and the gap it has left in the orange. See figure 1.7
- See if the shape of the central and terminal portion of the segment is the same or different.
- See if the angle of the gap is the same at all points.
- Find how many segments are there in an orange.

Figure 1.7

- An orange is spherical, with a circular cross section. There are 360° in a circle. The earth being spherical, we consider 360° with respect to the earth as well.

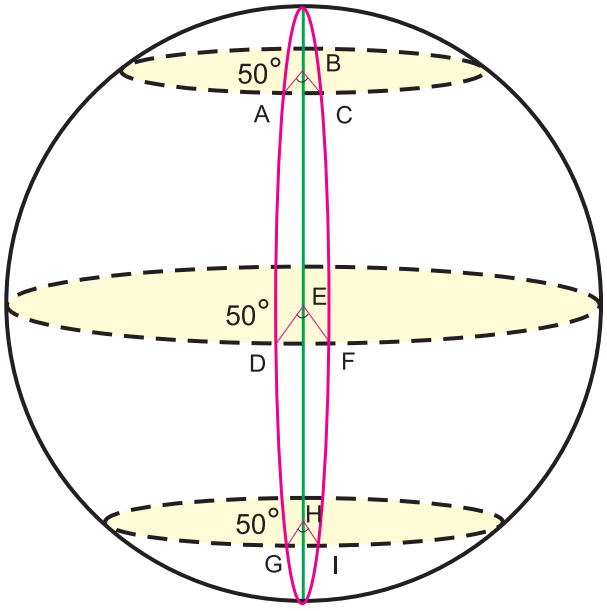


Figure 1.8 : Angular Distance – 2

In figure 1.8, ∠ABC, ∠DEF, ∠GHI have the same measure, 50°. However, the distances between A and C, D and F and G and I, are different when measured on the earth's surface. That is because the earth is spherical in shape.

Do it yourself !

Use figure 1.9 to do the following:

Let the line AM be 0°.

- Draw the line MB. Measure the angle it makes with the line AM and write it near B. Note the semicircle that passes through B and joins the North and South Poles. Trace it.
- Now join MC. Measure ∠AMC and write it next to C. Draw a semicircle that passes through 'C' and joins the North and South Poles.
- Draw a line that passes through point A at 0°, and joins the North and South Poles.

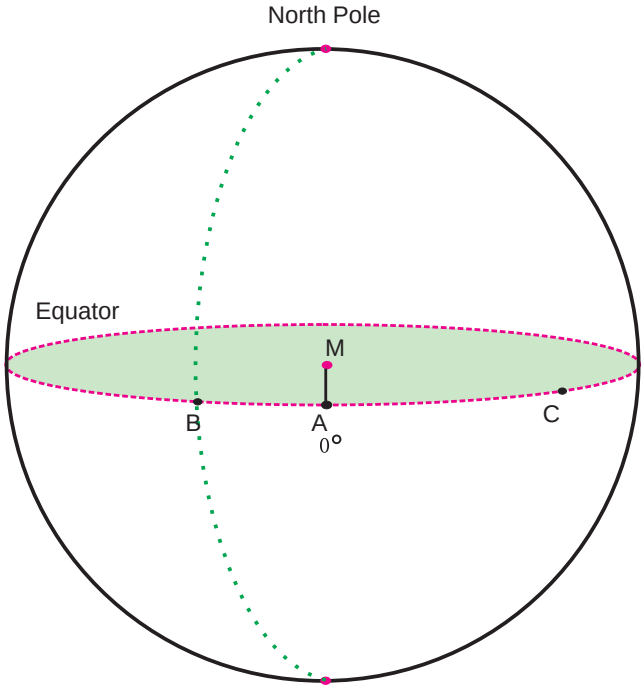


Figure 1.9

Explanation

⁎ Meridians of Longitude

You will realize that the lines drawn from points A, B and C make angles at M, the centre of the earth on the plane of the equator. Through these points, we can draw semicircles joining both the poles. Starting with point A, we can draw similar semicircles through points placed at each degree. These semicircles are known as meridians of longitude.

One of these meridians is considered to be 0°. It is known as the Prime Meridian. The angular distances of the other meridians from the Prime Meridian are measured in degrees and are called longitudes. You have done this in the activity based on figure 1.9. The 0° and 180° meridians lie opposite on the globe, forming a circle. This circle divides the earth in the eastern and western hemispheres. All meridians are equal in size.

Meridians in the eastern hemisphere are labelled as 10° E, 25° E, 135° E, etc. while in the western hemisphere they are labelled as 10° W, 25° W, 135° W etc.

30° E is the semicircle that joins all places at an angular distance of 30° from the Prime Meridian. Some of them are Cairo, Harare and Durban in Africa. See figure 1.6.

Though the earth is huge in size, we can tell the exact location of places on the earth using latitudes and longitudes. Note that the distance between two adjacent parallels is the same everywhere but the distance between two adjacent meridians is not the same everywhere. We can see this even on the segment of an orange. The distance between the meridians is the maximum on the equator and goes on reducing towards the Poles. At the Poles it is zero.

The distance between any two adjacent parallels is 111 km on the surface of the earth. The distance between two adjacent meridians is also 111 km on the equator. To locate the places within this distance of 111 km exactly, we need to divide the unit degree into smaller units. Degrees are divided into minutes, and minutes into seconds. Conventionally, latitudes and longitudes are expressed into degrees, minutes and seconds. Each degree is divided into 60 minutes and a minute into 60 seconds. These values are expressed using the symbols degrees (…°), minutes (…'), seconds (…").

In all, we can draw 360 meridians, each at a distance of 1°.

- 0° Prime Meridian
- 180° meridian
- 1° East to 179° East meridians. Thus, we have 179 meridians in the eastern hemisphere.
- 1° West to 179° West meridians. Thus, 179 meridians in the western hemisphere.

Think a little!

A game of reading the meridians on the world map is going on. Shaheen and Sanket are asking each other to locate places on specific meridians and are making notes of the same. Shaheen asks Sanket to locate Wrangel Island on 180° meridian. Sanket could locate the island in the map but both are confused while making a note of it. They are puzzled whether to write 180°E or 180°W? What would be the precise answer? Please help them. Can we use a similar logic with reference to 0° meridian as well?

Do you know?

The distance between any two consecutive meridians is different on different parallels. It is maximum on the equator and it is zero on both the Poles.

Equator – 111km.
Tropic of Cancer/Capricorn – 102 km.
Polar circles (Arctic / Antarctic) – 44 km
Poles (North / South) – 0 km

✻ The Graticule

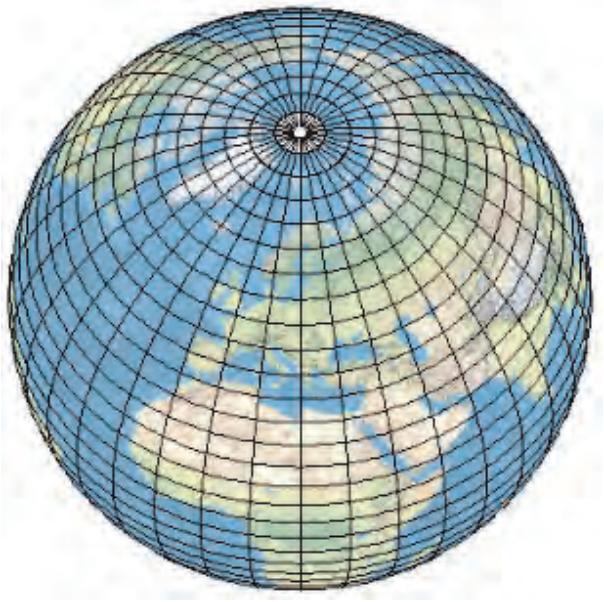


Figure 1.10 : The Graticule

The parallels and meridians on the globe form a net that is called a graticule. This facilitates determining the location of a place. See figure 1.10

Thus we use latitude and longitude for determining the locations on the earth. This method is being used even in today's modern age quite effectively. Geographical Information System (GIS), Global Positioning System (GPS) as also Google Maps, Wikimapia and Bhuvan of ISRO on the internet also make use of latitudes and longitudes. This technology is also available on mobile phones and motor cars.

Figure 1.11 : G.P.S. Instrument

Do you know?

Indian Regional Positioning System:

India has achieved self-reliance in Global Positioning Technology. With the help of IRNSS (Indian Regional Navigation Satellite System), locating any place in the Indian subcontinent is going to be easy. For this, India is launching its own series of 7 satellites. It will then be possible to locate any place in the region of South Asia and the Indian Ocean precisely.

Use your brain power!

How many parallels and meridians can be drawn on a globe at an interval of 10°?

I can do this!

- *Express the angular measures of latitude and longitude on a globe/map.*
- *Read parallels of latitude and meridians of longitude.*
- *Draw a graticule on a spherical object.*

Exercises

(A) Place a tick mark ✓ against the correct option.

(1) What term is used for the imaginary east-west horizontal lines on the earth?

Meridians ☐ International Date Line ☐
Parallels ☐

(2) What is the shape of the meridians?

Circular ☐ Semicircular ☐
Points ☐

(3) What do the parallels of latitude and meridians of longitude together form on the globe?

Angular distance ☐
Hemisphere ☐ Graticule ☐

(4) How many parallels are there in the northern hemisphere?

90 ☐ 89 ☐ 91 ☐

(5) Which circle forms the eastern and western hemispheres?

0° parallel and 180° meridian ☐
0° Prime Meridian and 180° meridian ☐
North and South Polar circles ☐

(6) Which circle appears as a point on the globe?

Equator ☐ North / South Pole ☐
Prime Meridian ☐

(7) How many places on the earth may be located on 45°N parallel?

one ☐ many ☐ two ☐

(B) Observe a globe and examine the following statements. Correct the wrong ones.

(1) Parallels of latitude lie parallel to the Prime Meridian.

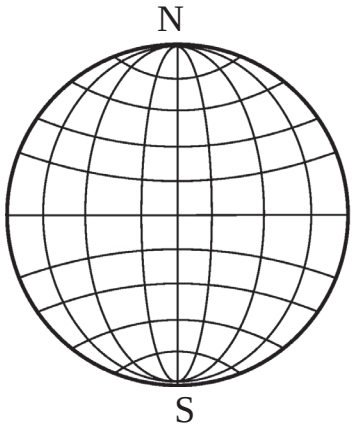
(2) All parallels of latitude converge at the equator.

(3) Parallels and meridians are imaginary lines.

(4) 8° 4' 65" is a north meridians.

(5) Meridians are parallel to each other.

(C) Find the correct graticule out of the following and put a tick mark ✓ against it.



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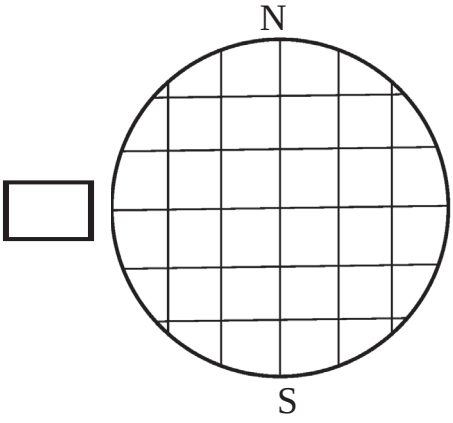

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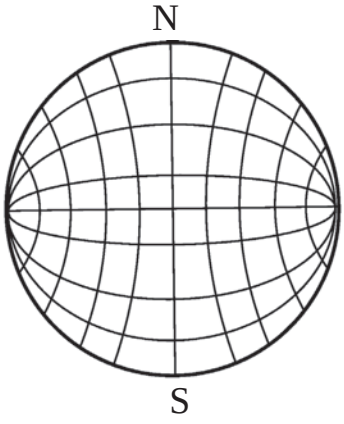

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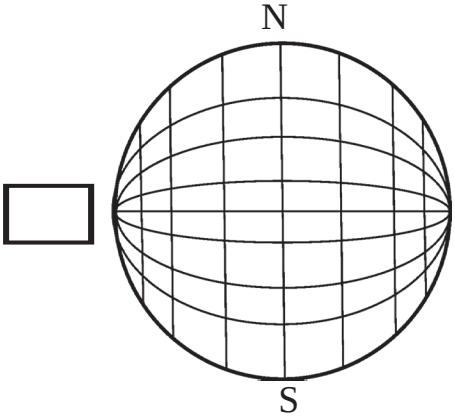


☐

(D) Answer the following :

(1) How will you express the latitude and longitude of the North Pole?

(2) How much is the angular distance between the Tropic of Cancer and Tropic of Capricorn?

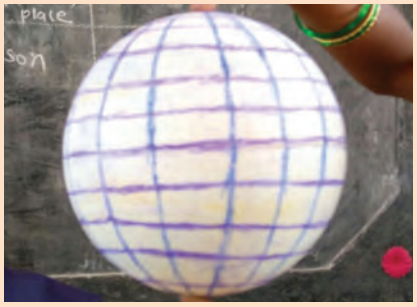
(3) Using a globe, write down the names of the countries through which the equator passes.

(4) Write down the main uses of the graticule.

(E) Complete the following table.

Characteristics	Parallels of latitude	Meridians of longitude
Shape		
Size	Size of each parallel is different.	
Distance		Distance between two meridians is larger on the equator and the same decreases towards the Poles.

Look at the photographs.



❊ Activity

Try to draw a graticule on a ball.

Graticule for special children.

Websites for reference

- http://www.kidsgeog.com
- http://www.youtube.com
- http://www.wikihow.com
- https://earth.google.com

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2. Let us Use the Graticule

Make friends with the globe!

Figure 2.1 : The Globe

Observe the globe and answer the following.

- What are the horizontal lines on the globe called?
- List the continents and oceans through which the equator passes.
- Encircle the intersection of 0° meridian and 0° parallel on the globe.
- Which oceans are spread in all the four hemispheres?
- Which continents are spread in all the four hemispheres?
- At which two parallels do all the meridians converge?

When we talk about various places, regions, rivers, roads, etc. we are actually talking with reference to the earth. The location of a place, the extent of a region and the extent of any linear feature can be described precisely with the help of parallels and meridians. Let us see how to use the graticule for this purpose.

Verify the following description with the help of a world map or a globe in the school.

- While describing the location of a place, we need to consider only one parallel and one

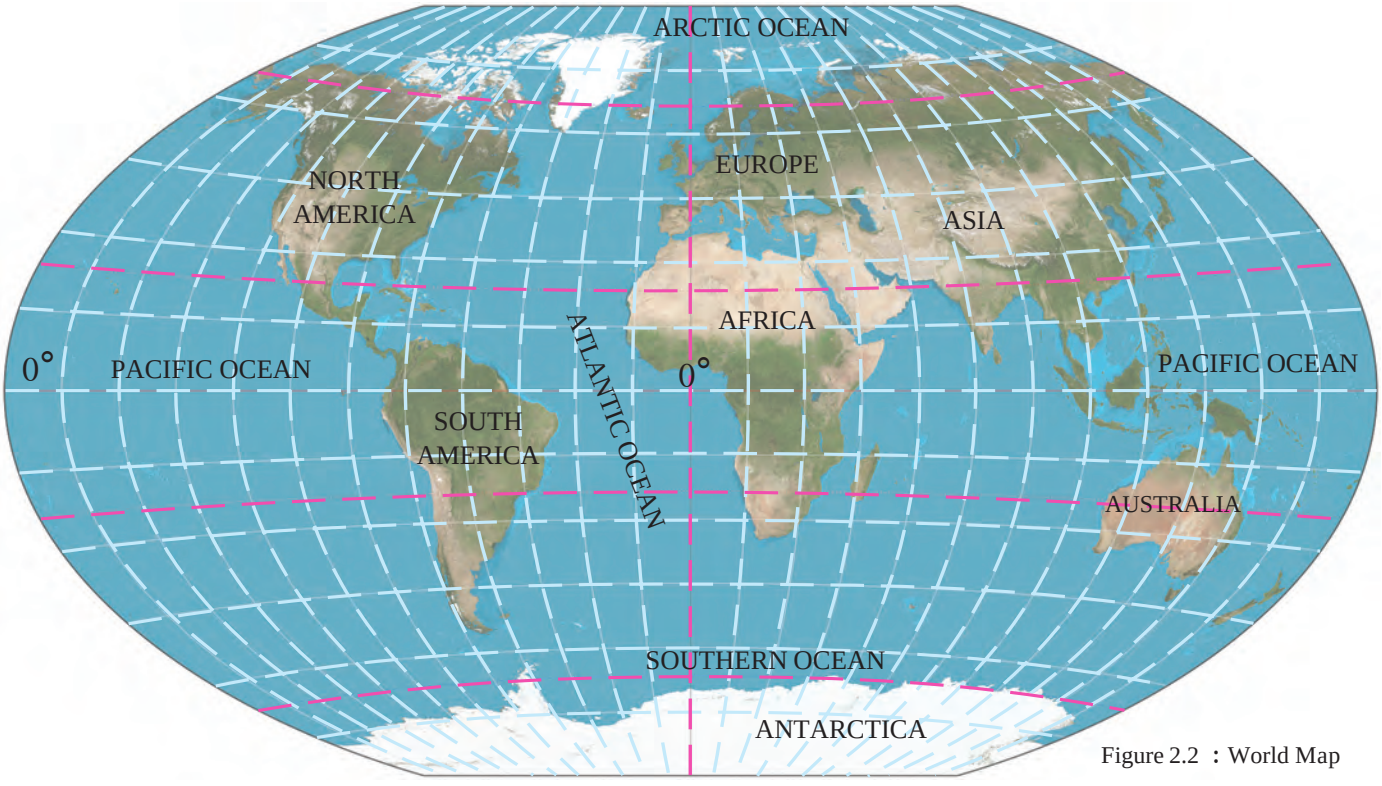


Figure 2.2 : World Map

The Equator and the Prime Meridian are labelled in degrees in figure 2.2. Can you write the values of other meridians and parallels?

meridian, e.g., Delhi is located at 28°36' 50" N latitude and 77°12' 3" E longitude.

- For describing the extent of a region we need to consider two parallels and two meridians at the extreme ends of the region. For example, the extent of Australia is described as 10°30' S to 43°39' S latitude and 113° E to 153° E longitude.
- For describing the extent of linear features like a river, road etc., we need to consider the latitude and longitude of their terminal points. For example, the River Nile in Africa originates in Lake Victoria, flows north and meets the Mediterranean Sea near the city of Alexandria in Egypt. The location of Lake Victoria is 0° 45' 21"S latitude and 33° 26' 18"E longitude. Similarly, the location of Alexandria is 31°12'N latitude and 29° 55'07"E longitude. These latitudes and longitudes are considered to describe the extent of the River Nile. This extent is from 0°45'S latitude and 33°26'E longitude (origin) to 31°12'N latitude and 29°55'E longitude (up to the mouth).

✲ Let's use the graticule.

Answer the following questions about location and extent with the help of figure 2.3.

- Which latitude and longitude define the location of the capital of Brazil – Brasilia?
- What would be the longitudinal extent of Brazil that spreads from 5° 15' N to 33° 45' S latitude?
- In which hemispheres does Brazil extend in the north - south direction?
- In which hemisphere does Brazil extend in the east - west direction?
- Which parallels and meridians should be used to describe the extent of River Sao Francisco?
- Describe the location of Marajo island using the graticule.

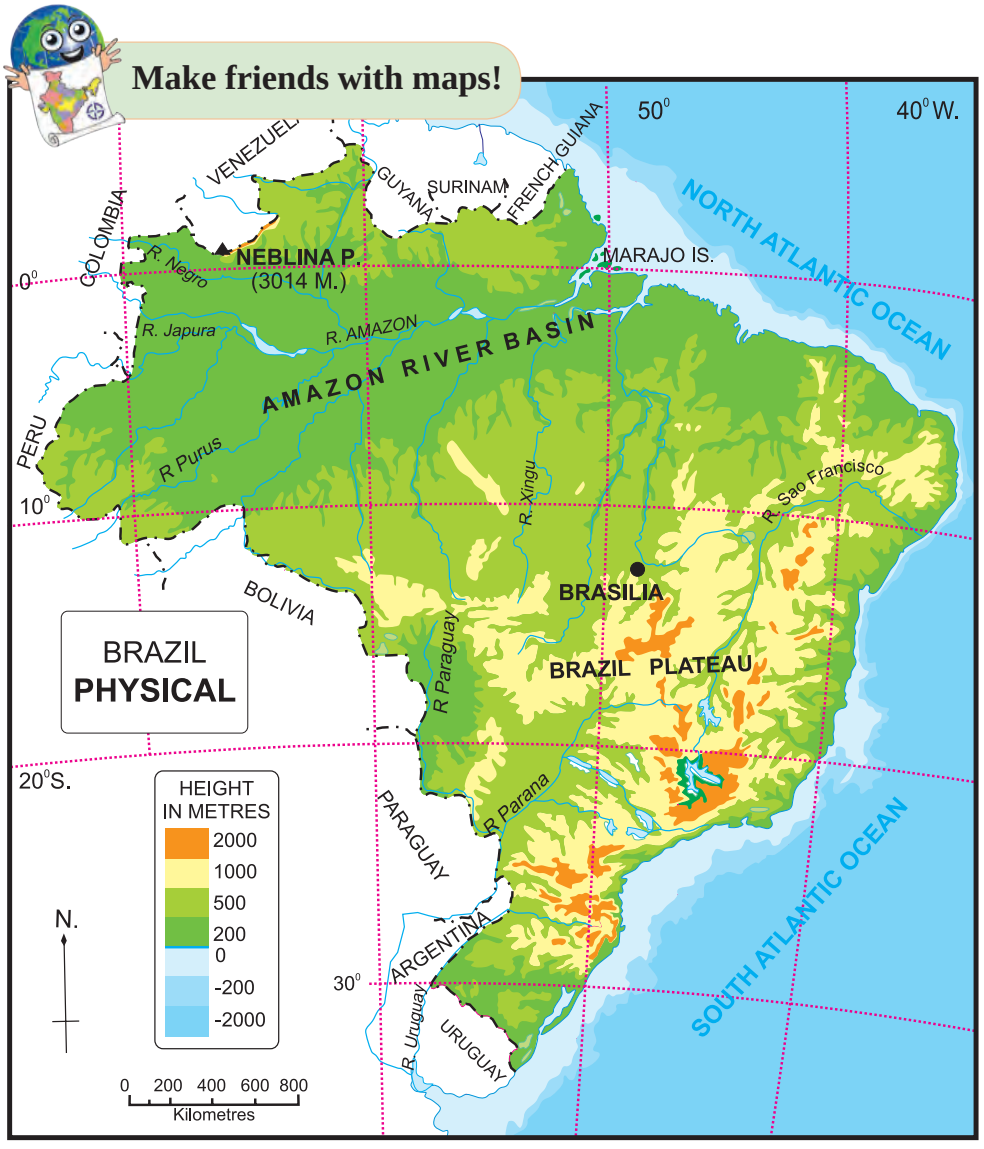


Figure 2.3 : Map of Brazil

⁎ Important Parallels and Meridians

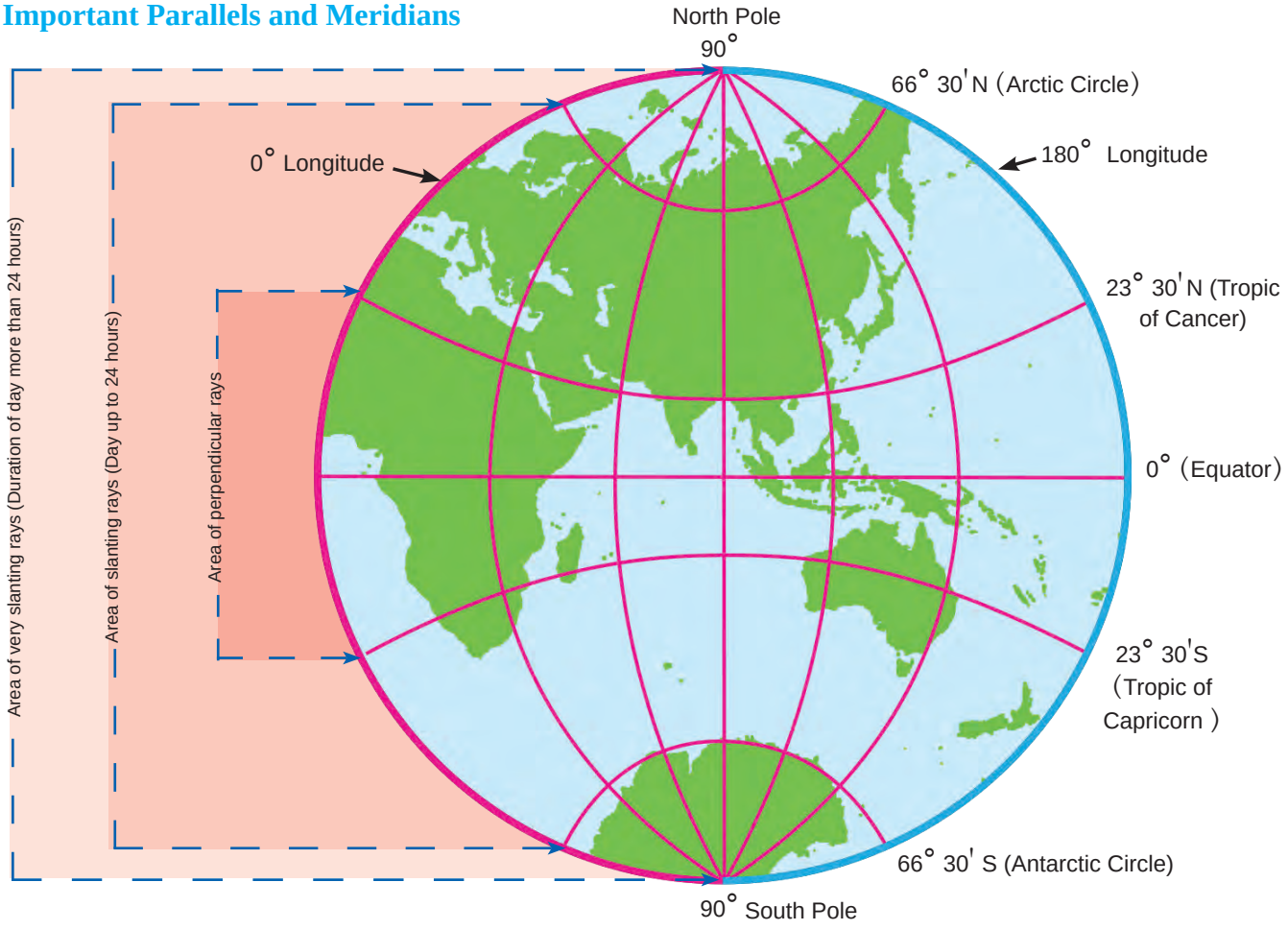


Figure 2.4 : Important Circles

Let us get acquainted with some important parallels and meridians.

- All places between 23° 30' north and south of equator receive perpendicular rays on two days in a year. Other areas of the earth never get perpendicular rays. The parallels at 23° 30' N and 23° 30' S of equator are called Tropic of Cancer and Tropic of Capricorn respectively.
- The parallels at 66° 30' north and south of the equator are also important parallels. In the area between these two parallels, throughout the year, daytime lasts within the limit of 24 hours. These are called the Arctic Circle and the Antarctic Circle respectively.
- Depending on the seasons, daytime (sun being visible in the sky) can be greater than 24 hours in the areas between the polar circles and the Poles. The maximum duration of the sun's appearance in the sky can be of six months at the Poles based on the seasons. During this period, the sun continues to move in a spiral on the horizon.

Think a little!

Which important parallel passes through India? Which areas do not get perpendicular sunrays? Which region receives perpendicular rays on two days in a year? Show these regions by different colours on a map of India.

We have seen in Std V that the earth's axis is inclined. These important parallels arise because of its inclination by 23° 30'.

- Due to the duration and intensity of sunlight,

Do you know?

Vatican City is known as the smallest country in the world. It is spread over an area of 0.44 sq. km. This country is located within Italy on the Italian peninsula. See the latitudinal and longitudinal extent of this country in figure 2.5. From west to east and also from north to south, there is no difference in the degrees or minutes of latitude or longitude but the difference is only in seconds. From this, you will get an idea about the use of the smaller units of minutes and seconds in angular measurements.

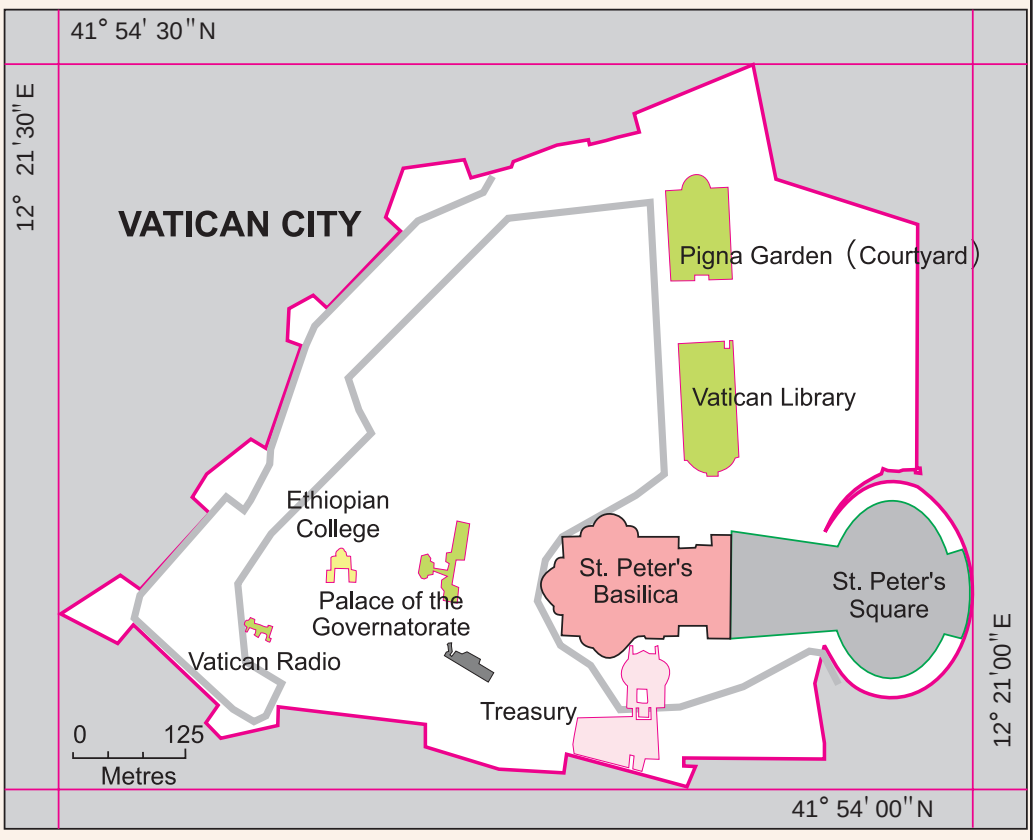


Figure 2.5 : Map of Vatican City

different temperature zones are formed on the earth. These zones give rise to pressure belts.

- Variation in the intensity of sunlight leads to regional diversity in plant and animal life.
- The 0° longitude or Prime Meridian is an important meridian. The main purpose of this is to fix the global standard time and coordinate the standard times of different countries. This meridian is also called as Greenwich Meridian. Global standard time is known as GMT – Greenwich Mean Time.
- The 180° meridian is also important. From the Prime Meridian, other meridians are marked east and west up to 180°. The 180° meridian lies opposite to the Prime Meridian. The International Date Line is marked with reference to this meridian.
- The equator as well as all pairs of opposite meridians form Great Circles. Great Circles are used for finding the minimum distance between any two places on the surface of the earth.

Think a little!

(1) Find on the globe, the meridians opposite to the ones mentioned below:
90° E, 170° W, 30° E, 20° W.

(2) What do you observe?

Use your brain power!

In what direction should an aeroplane fly in order to cover the shortest distance between Kolkata and Chicago?

I can do this!

- *Show the important meridians and parallels on the map.*
- *Identify and make use of the important parallels and meridians.*
- *Describe the location and extent of any place, region, river, road, etc. in the world precisely.*

Exercises

(A) Put a tick mark against the correct option in the space given.

(1) 66° 30' North parallel means

Arctic Circle ☐ Equator ☐
Antarctic Circle ☐

(2) Which parallel bisects the earth?

Tropic of Cancer ☐

Tropic of Capricorn ☐ Equator ☐

(3) What is the angular distance of the Arctic Circle from North Pole?

66° 30' ☐ 90° ☐ 23° 30' ☐

(4) Where do the Prime Meridian and the equator intersect each other?

Southern Ocean ☐

Atlantic Ocean ☐
African Continent ☐

(5) Up to which parallels from the equator can the sun's rays be perpendicular?

Tropic of Cancer and Tropic of Capricorn ☐

Arctic and Antarctic Circles ☐
North and South Poles ☐

(6) What would be the latitude of a place on the South Pole?

90° S ☐

90° N ☐
0° ☐

(B) Read the following statements and correct the wrong ones.

(1) While describing the location of a place mentioning the meridian is sufficient.

(2) For describing the extent of a region, it is necessary to assume the latitude and longitude of the centre of the adjoining region.

(3) Location of a road can be described only with a map.

(4) 0° East meridian and 180° East meridian.

(5) The extent of a road or a river course is described with the help of the latitude of a point in the source and the longitude of a point at the end.

(6) 8° 4'N parallel to 37° 66° N parallel is the correct description of a location.

(C) Find the locations of following cities from a world map, a map of India or a Globe and write down the latitude and longitude of each of them.

(1) Mumbai
(2) Guwahati
(3) Srinagar
(4) Bhopal
(5) Chennai
(6) Ottawa
(7) Tokyo
(8) Johannesburg
(9) New York
(10) London

(D) Find and write down the extent of the following. (Check them on the internet/ mobile).

(1) Maharashtra (State)

(2) Chile (A country)

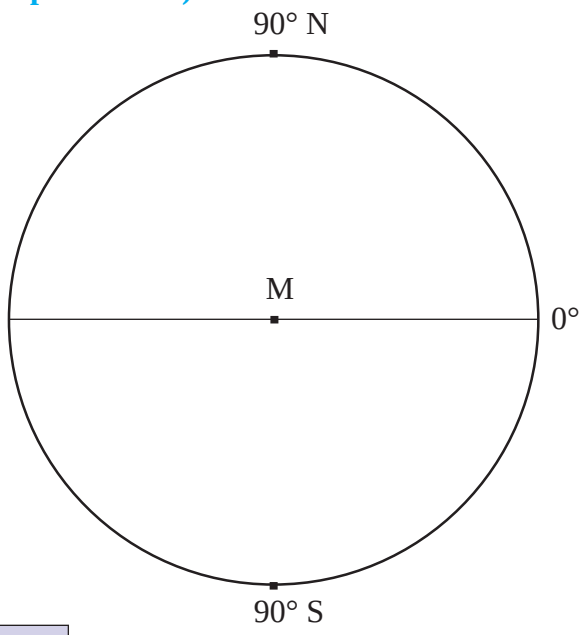
(3) Australia (A continent)

(4) Sri Lanka (An island)

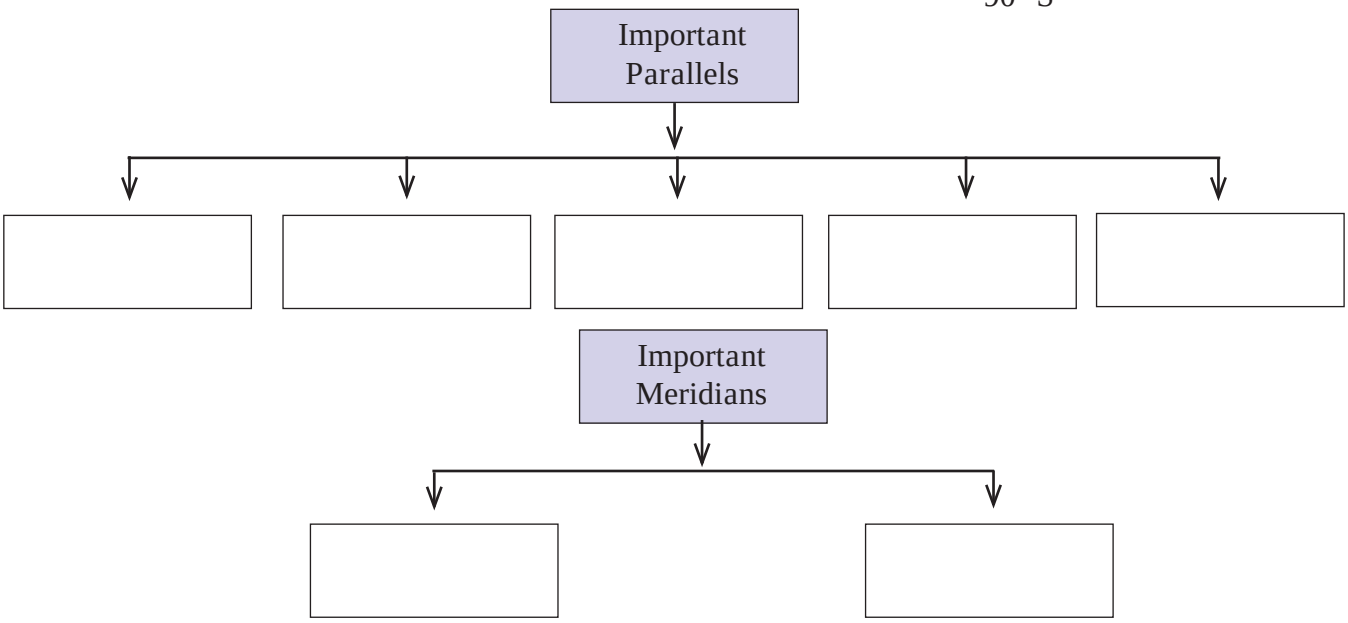
(5) Trans Siberian Railway of Russia

(Starting point - St. Petersburg, Terminal Point -Vladivostok)

(E) Draw important parallels and meridians in the figure given below and label them with appropriate angular measures. (Use the protractor.)



(F) Write the important parallels and meridians in the following table:



*** Activity:**

Find the latitudinal and longitudinal location of your school with the help of your teacher. Display the same on the board at a suitable location in your school.

Websites for reference

- http://www.kidsgeog.com
- http://www.youtube.com
- http://www.wikihow.com
- http://www.latlong.com

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3. Comparing a Globe and a Map ; Field Visits

Friends, we have seen how meridians and parallels are drawn on a globe. We have also learnt how they are used to determine the location.

In this lesson, let us compare a map and a globe and understand the difference between them.

Do it yourself !

Make groups of 5 or 6. Each group should have a world map, a map of India and a globe. Study them and answer the following questions.

(a)

Instruction for Teachers: Please facilitate availability of a globe and maps to each group.

(b)

(c)

Figure 3.1 : (a) World Map, (b) Outline Map of India, (c) A Globe

- Which device is flat?
- Which device is spherical?
- Which of these devices allows you to see the entire area of the earth at the same time?
- Which device allows you to see only one side of the earth at a time?
- Which device can be used for studying a particular region in detail?
- Which device can be called a model of the earth?

Explanation

You must have observed that–

- Maps are two dimensional whereas a globe is three dimensional.
- Two-dimensional objects have length and width. The product of length and width defines area.
- Three-dimensional objects have length, width and height, the product of these provides volume.
- Maps can be used to study the whole world or also regions of limited extent.
- However small or large the globe, it is only a representative model of the entire earth.

Two dimensional – A surface having two dimensions, length and width, is called two dimensional, e. g., paper, blackboard, table top, land, etc.

Three dimensional – An object having three dimensions such as length, width, height (or thickness) is called three–dimensional, e. g., a duster, box, glass, pot, hill, the moon, etc.

✻ Field Visit (Educational trip)

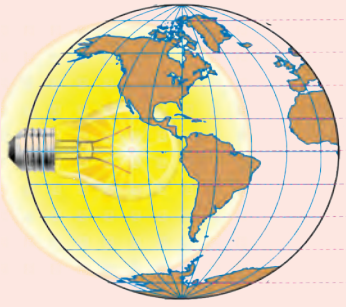
A field visit is an important method of studying geography. Field visits help us to understand the geographical and social conditions of a place. Moreover, it provides an opportunity to directly interact with the local people and understand their problems.

With the help of your teacher(s), visit one of the following places to know the geographical condition of the area – a planetarium, post office, bus station, mall, hill, sea coast, small scale industry, etc. Study places like these to observe and record various features.

Your teacher will guide you at the time of the field visit. Prepare a questionnaire with the help of your teacher and take interviews wherever it is necessary. Note down the responses, make sketches or other notes.

Do you know?

In order to draw a map of the whole world, first a wire globe is prepared. A source of light is placed inside the globe. Then the projection of the wire graticule is obtained on paper. This projection is used to draw maps. Thus, a graticule is essential for drawing the map of the earth or any part of it. That is how a two-dimensional map is obtained on paper from a three-dimensional globe.



Light inside the Globe

A Map

I can do this!

- *Classify different objects including a map and a globe according to their dimensions.*
- *Use a map or a globe as per requirement.*

Geography Museum

'EARTHA' is the largest operational globe in the world. It is housed at Yarmouth in the State of Maine in the United States of America. The rotation and revolution speed of this globe is maintained as per that of the earth.

Figure 3.2 : Eartha

Exercises

(1) What characteristics of two and three dimensional devices did you note?
(2) What features can be shown on a very small globe?
(3) Which device will be suitable for understanding the concept of day and night on the earth?
(4) Which device will be useful to show your village / city?
(5) Which device can be easily carried from one place to another?

❊ Activity

Make two groups. Each group should ask the other group to find the locations of different places on the globe. You may also do this with a map.

Websites for reference

- http://www.kidsgeog.com
- http://www.wikihow.com
- http://www.ecokids.ca

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4. Weather and Climate

Can you tell?

The weather conditions of a few places in India are as follows on 10th June. Use the table to answer the questions.

Sr. No.	Place	State	Time	Weather
1	Kochi	Kerala	12.30 pm	Cloudy
2	Bhopal	M. P.	12.30 pm	Hot and Sunny
3	Mussoorie	Uttarakhand	12.30 pm	Cold weather, mild sun

- In which place will the clothes on a clothesline dry quickly? Why?
- In which place will they dry slowly? Why?
- Will the atmospheric conditions at these places always remain the same or will they change?

Explanation

The weather conditions at each of the places given above are different on 10th June. Kochi has cloudy weather. It means there is little sunlight. The rainy season has started and moisture in the air will be high. Hence, it will take a long time for the clothes to dry. You may have observed a similar situation at your place during the rainy season.

At Bhopal, there is hot sun. The water in the wet clothes gets converted into vapour quickly and the clothes will dry within a short time.

Mussoorie is located to the north of the Tropic of Cancer, hence it receives less solar heat. The air there is cool too due to its location on a mountain. Clothes take longer to dry here because of the medium heat and cool air. Factors like heat, moisture, and wind influence the time taken by the clothes to dry. However, these conditions keep on changing. We always experience such changes.

Can you tell?

Which of the following statements are applicable to the conditions that you have experienced today or yesterday at the place where you live?

Figure 4.1 : Boys warming themselves.

- It was cold in the morning.
- In the afternoon it became sultry.
- It rained suddenly in the afternoon.
- Cool breeze was blowing at dawn.
- Clouds gathered in the evening.
- The night sky was full of stars and a pleasant breeze was blowing.

❊ Weather

We all always experience atmospheric conditions prevailing at a place and at a given time. We often talk about it. But these conditions are short lived. This is what we call weather. For example, we say the weather is hot, cool, dry, sultry, etc.

Can you tell?

Since childhood you have experienced summers, rainy seasons and winters. On the basis of your experience answer the following questions.

- In which months do summer, the rainy season and winter occur in a year from January to December? Show it in a chart.
- Which special clothes do we use if it is raining?
- When do we use woollen clothes?
- In which season do we mainly use thin cotton clothes?

Explanation

⁎ Climate

You must have noticed that each season lasts for a particular period and each season occurs at a particular time of the year. The scientists observe the weather in a region for many years. With the help of such studies, they define the mean weather conditions. The average weather condition of a place observed over a long period of time is the 'climate' of that region. Climate is generally expressed as 'cool and dry' or 'hot and humid' or 'hot and dry', etc.

The weather changes quite often due to changes in temperature, winds, and humidity, etc. We always experience these changes. A sum total of all these elements define 'weather'. These affect our day to day activities and life style. Elements of weather are taken into consideration while describing the climate.

⁎ Elements of Weather

- **Temperature:** The earth's surface gets heat from the sun. As a result, the surface gets heated up. The air close to the surface starts becoming hot and later, one by one, different layers of air at higher elevation receive heat. Therefore, as we move upward from sea-level, the temperature of air decreases. The temperature also goes on decreasing from the equator towards both the poles.
- **Air pressure:** Air has weight. As a result, it creates pressure. It is called air pressure. The lowermost layers of air get subjected to the pressure of the upper layers. Hence, the density of the lower layers of air increases. There is greater air pressure near the surface of the earth and it decreases with increasing height. This is vertical air pressure. These changes also occur in a horizontal manner. This gives rise to winds.
- **Winds:** Air starts moving from high pressure towards low pressure areas in a horizontal direction. This moving air is called wind. Wind blows from high to low pressure areas and its speed depends on the amount of difference in air pressure.
- **Moisture:** The atmosphere contains vapour. The air that has greater amount of vapour is called humid air. The humidity in the atmosphere is called moisture. The proportion of moisture in the atmosphere depends on temperature. Air with higher temperature holds a greater amount of moisture.
- **Precipitation:** Vapour in the atmosphere condenses into water droplets or snow particles. Their showering on the earth is called precipitation. Rainfall, snowfall, hailstorm, etc. are forms of precipitation.

Weather is described on the basis of the conditions prevailing at the given time while climate is described on the basis of conditions prevailing over a longer period of time. Weather keeps changing frequently and we can experience the changes easily. Changes in the climate take place over a long period of time. These are not perceived easily.

Latitudinal position, height above sea level, nearness to ocean, oceanic currents, etc. are the factors that influence climate. Besides these, mountain ranges, types of land, local winds are other factors that influence the climate of a region.

Use your brain power!

1. Which occupations will you practise in cold regions?
2. Which occupations will you practise in hot regions?

In the next chapter, we shall seek more information about temperature.

Always remember.

The weather at a place keeps changing frequently but the climate does not change that often. The climate is different at different locations. Within our country – India – it is cool at some places and hot at some other places. It may be humid in some areas and dry in others.

Do you know?

The climate affects the entire living world in different ways. Life mostly thrives in regions which have a conducive climate. The climate also influences the diet, shelter, etc. of living things. The distribution of water on the earth is also a controlling factor of the climate.

I can do this!

- *Describe the weather of surrounding areas.*
- *Understand the changes taking place in the weather from time to time.*
- *Discuss the changes in climate considering the elements of weather.*
- *Explain the difference between weather and climate.*

Exercises

(A) Who am I?

(1) I keep on changing.
(2) I am not the same at all places.
(3) I am the solid state of water droplets.
(4) I am present in the atmosphere in the form of vapour.

(B) Answer the following:

(1) Why is the climate of Mahabaleshwar cool?
(2) Why is the climate near the sea humid?
(3) What is the difference between weather and climate?
(4) What are the elements of weather?
(5) What effects do nearness to the sea and height above mean sea level have on the climate?

*** Activity**

Understand the climate of your place with the help of your teacher.

(C) For the climatic conditions mentioned in the table, name the representative places known to you. (Use an atlas.)

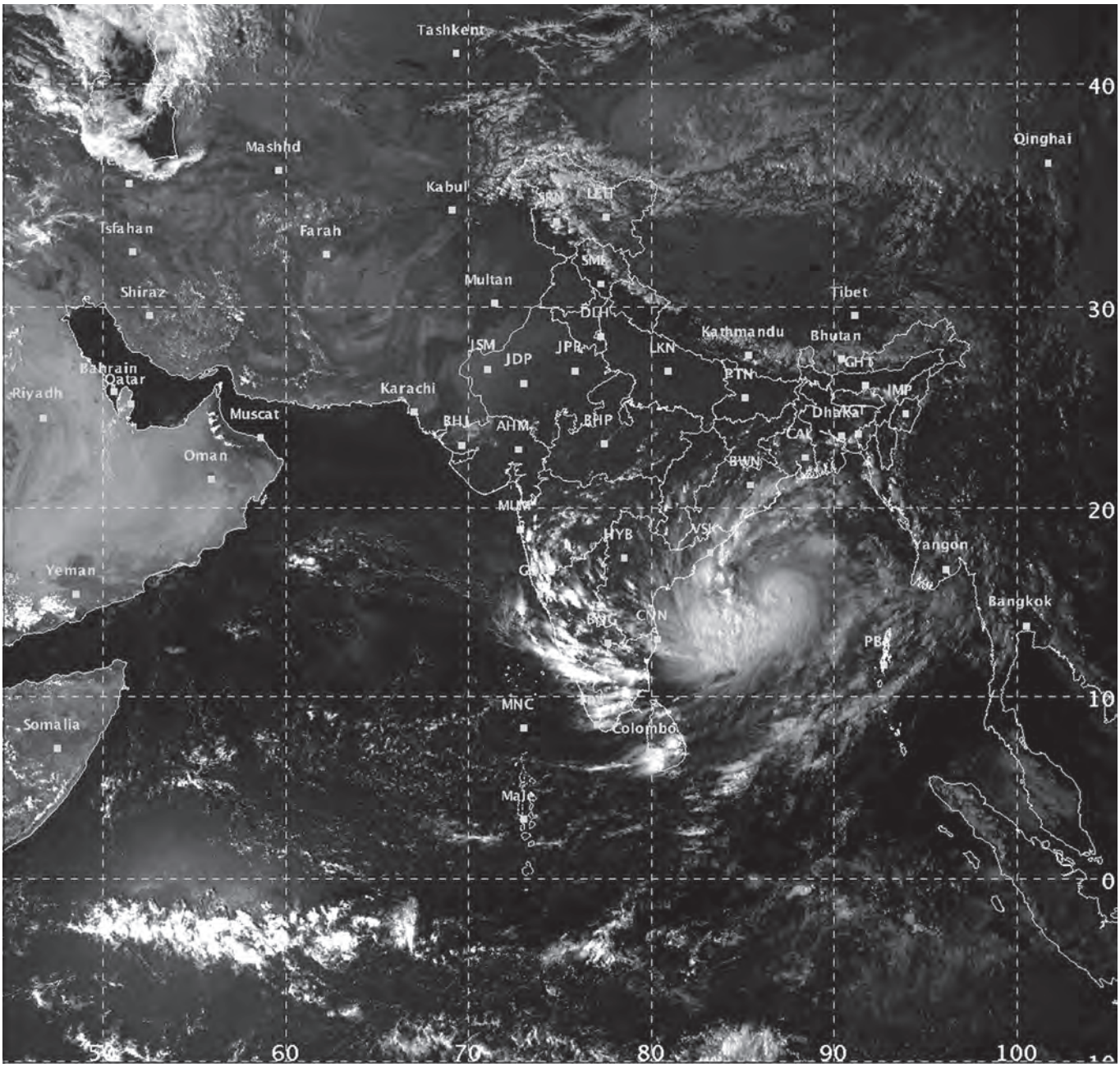
Hot	
Hot and humid	
Cold	
Hot and dry	
Cold and dry	

(D) Complete the following table.

Weather	Climate
Short-lived condition of atmosphere	
	Does not change quickly
Expressed with respect to a specific place	
	Elements of climate: Temperature, pressure, winds, humidity and precipitation

Websites for reference

- http://www.kidsgeog.com
- http://www.ecokids.ca
- http://www.wikihow.com



An Indian Meteorological Department image of the storm that visited in November 2014 is shown above. Tell in which sea the storm was located.

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5. Temperature

Do it yourself !

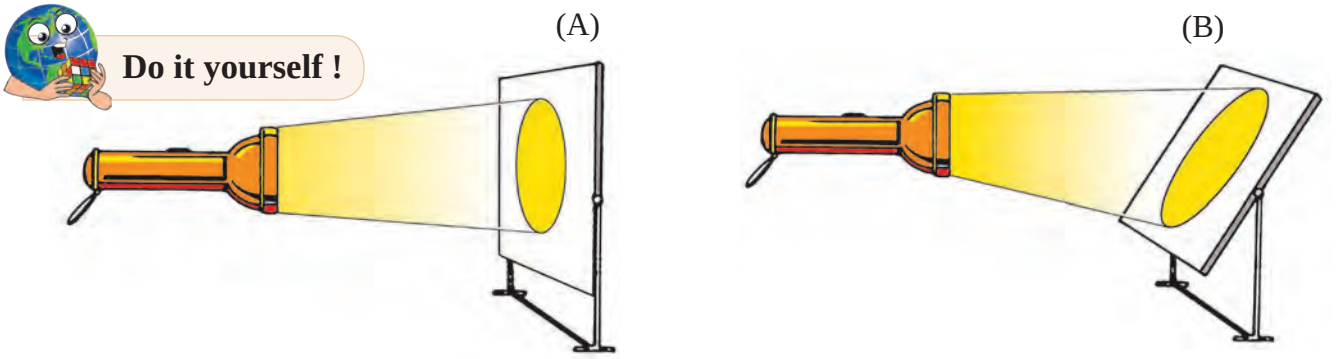

Figure 5.1 : The perpendicular and slanting area occupied by the torchlight rays

- Take a torchlight and keep it stable at one place. Take two large paper sheets large enough to accommodate its entire beam. Paste the papers on two flat boards.
- Hold the board perpendicular to the beam (figure 5.1A).
- Draw the outline of the area lit up by the beam Name the paper 'A'.
- Now use the other paper. Hold it in such a way that it makes an angle of 120° with the beam (figure 5.1B). Draw the outline of the area occupied by the beam. Name the paper 'B'.
- Observe both the papers 'A' and 'B'.

Now tell –

- On which paper does the beam occupy a larger area?
- On which paper is the area smaller?
- Now change the angle between the beam of light and the paper. Observe the changes that occur in the area occupied by the beam of light.
- What is the relation between the angle of the paper and the area occupied by the beam?

Explanation

Sunrays coming towards the earth travel in straight lines. However, as the earth is spherical in shape, these are not perpendicular to all the parts of the earth's surface. In some parts, they are perpendicular whereas in other parts, they are slanting. Let us see what effect it has on the earth.

- The perpendicular rays occupy less area (fig 5.1A). The part where the rays occupy lesser area receives bright sunshine and greater heat. Hence the surface there gets heated more and the air becomes hotter.
- The slant rays occupy a larger area (figure 5.1B). In this area, sunlight appears less bright and there is less heat. Hence the surface there gets less heated and the air too, is less hot.

Do it yourself !

The region marked 'A' in figure 5.2 receives perpendicular rays, while the region marked 'B' receives slant rays and in the region marked 'C' the rays are extremely slanting.

- Using a scale, measure the lengths of the lit up portions on the earth's surface in A, B and C regions.
- Measure the width of the rays shown between the earth and the sun.
- Considering the parallels of latitude marked in the figure, tell the regions where the temperature will be high, moderate and low.
- Discuss this in the class and write the answers in your notebook.

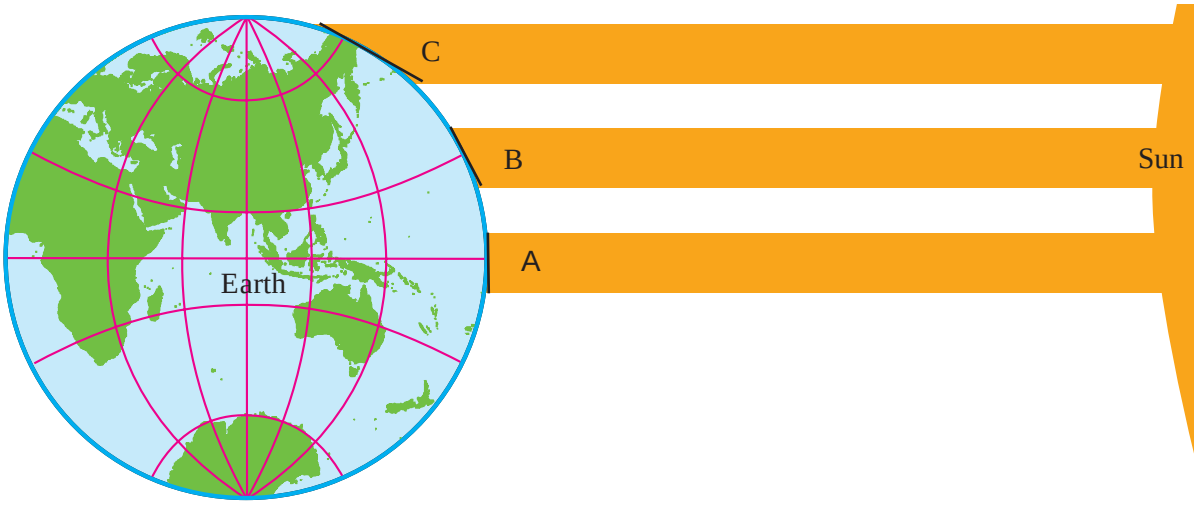

Figure 5.2 : The Earth's Shape and the Distribution of Sunrays

Explanation

Sunrays falling on the earth are straight and parallel to each other. However, we have seen that due to the spherical shape of the earth and the resultant curvature of the surface, they occupy a larger or lesser area. This leads to unequal distribution of the heat received from the sun, resulting in decreasing temperature from the equator to the North and South Poles. Based on the distribution of temperature, the earth can be divided into torrid, temperate and frigid zones or tropical, temperate and polar regions. Try to understand this from figures 2.4 and 5.3.

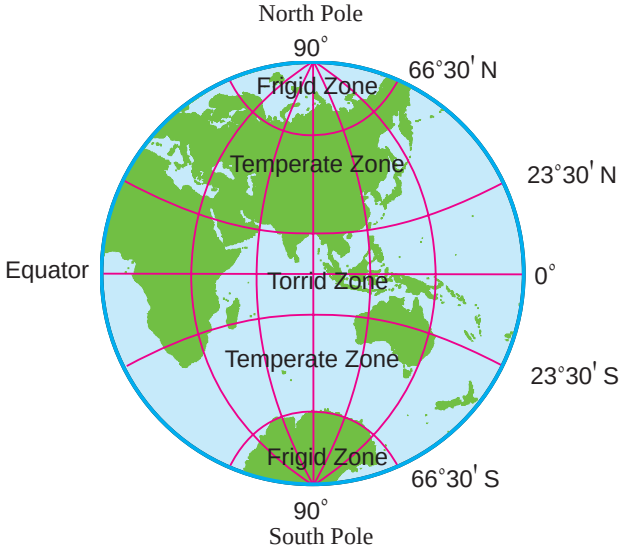

Figure 5.3 : Thermal Zones

Though latitude is the main factor, there are other factors also which influence the distribution of temperature. However, their effects are limited to a particular region. These factors are as follows.

Nearness to the sea, continentality, height above the mean sea-level and physical set-up of a region are factors that lead to diversity in the climate of different regions. Other than these, factors like cloud cover, winds, vegetation cover, urbanization, industrialization, etc. also influence the local climate.

Can you tell?

How will the rays fall between–

0° and 23°30' North and South?

23°30' and 66°30' North and South?

66°30' and 90° North and South?

Use your brain power!

Tell if the following statement is right or wrong. Give reasons.

In order to understand the climate of a region, the latitudinal extent is more useful than the longitudinal extent.

Let us perform an experiment to see that there is a difference in the heating and cooling of land and water.

Do it yourself !

Take two pots of the same size and fill them with water equally. At sunrise, keep one of the pots inside the house and the other one, outside. See that it remains in the sun all the time as shown in figure 5.4 B.

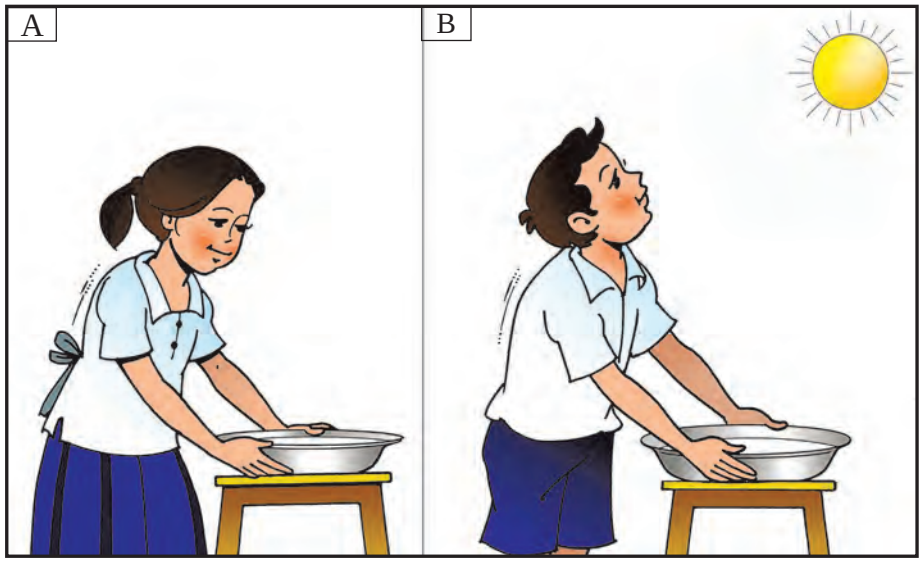

Figure 5.4 : The Heating and Cooling of Water

In the afternoon, walk barefoot on the floor inside the house and feel the temperature of the floor. Feel the temperature of the water in the pot inside.

Perform the same activity outside the house and get the feel of the temperature of land and the water kept in the sun. Write down your observations about the temperatures of land and water.

Do this again, around 7 in the evening. Note your observations again. Now you can remove the pots. Discuss all the observations you have noted in the class.

Always remember.

We normally think that air gets heated due to the sun's rays and because of the hot air, the land and water get heated. But in reality what happens is as follows:

First, land and water get heated due to sunrays. Later, they radiate into the atmosphere, the heat that they have absorbed. As a result, the layer of air close to the surface gets heated. The heat gets transferred vertically to the adjacent upper layers of the air. Hence air closer to the surface is hotter and as one moves higher up from the surface, the temperature of the air decreases. The temperature near the sea-level is higher and it decreases in the mountainous regions.

Explanation

You must have realized that the land cools down earlier than the water. The water kept outside in the sun is still a little warm. Due to this difference in the heating and cooling of land and water, the air over the land gets heated faster and also becomes cooler rapidly. The air over the water gets heated slowly and also looses the heat in a slower manner. In the coastal areas, as compared to continental areas, the temperature of air is lower during the day but warmer at night. Contrary to this, the temperature of air in the continental areas is higher during daytime and lower at night.

In the coastal areas, because of the heating of sea water, water vapour gets mixed in the air. This water vapour holds the heat in the air. As a result, the air in the coastal areas remains moist and warm. Conditions in the continental areas are the opposite. As water vapour is absent, the air remains dry. This leads to sharp differences in the day and night temperatures. The difference in the maximum and minimum temperatures of a day is called diurnal range of temperature.

In short, the difference in the day and night temperatures is less in the coastal areas and more in the continental areas. For example, Mumbai temperatures are even, but at Nagpur they vary

a lot. In the coastal region of Konkan the range of temperature is less but in Vidarbha, the range of temperature is found to be higher. Therefore, coastal areas have an equable climate whereas in continental areas, the climate is extreme. For example, the climate of Mumbai is equable whereas in continental locations like Nagpur it is extreme. The difference in the mean temperatures of summer and winter is called annual range of temperature.

Do you know?

Effect of greenhouse gases: Some gases in the atmosphere like, carbon dioxide and water vapour can hold the heat within themselves for a long period of time. Due to these gases, the temperature of air in the atmosphere increases. The increasing proportion of these gases in the atmosphere leads to climate change. Climate scientists believe that this is the reason for the increasing temperature of the earth. This change in climate is global. This is called global rise in temperature. The gases due to which the temperature increases are called Greenhouse Gases.

Can you tell?

- Find the range of temperature at Mumbai, Nagpur and Srinagar. Draw bar graphs for the same.

What will you do?

You stay at Mhaswad in Maan taluka in Satara district. Your Grandma stays at Vengurla in Sindhudurg district. During Diwali, you often visit Vengurla. You like the sea coast there. The warm air of that region attracts you because you are freed from the dry air and scratching cold of your place. This time Grandma is suffering from asthma. Doctors have advised her to stay at a place which has a drier climate. What should you do?

Do it yourself !

A pot with water is placed on a burner. Drop 4-5 small plastic buttons in it and observe their movement in water (figure 5.5).

Figure 5.5 : Convection and Vertical Flow of Heat

Explanation

Water expands on heating. The hot water from the base moves upwards. With it, the buttons, too, are pushed to the surface. The relatively cooler water in the upper portions moves downwards, taking the buttons with it. This happens repeatedly. In other words, on heating, an upward current sets in the water. In nature, the conditions are slightly different.

Due to temperature differences, both upward and horizontal currents develop in the ocean. Besides temperature differences, factors like winds and differences in the density of water also give rise to horizontal currents. These ocean currents flow from the equator to the polar region and from the polar region to the equator. See figure 5.6.

When an ocean current flows from the frigid to the torrid zone, it reduces the temperature of the coasts in the torrid zone. When a current flows from the torrid to the frigid zone, it increases the temperatures of the coasts in the frigid zone.

Make friends with maps!

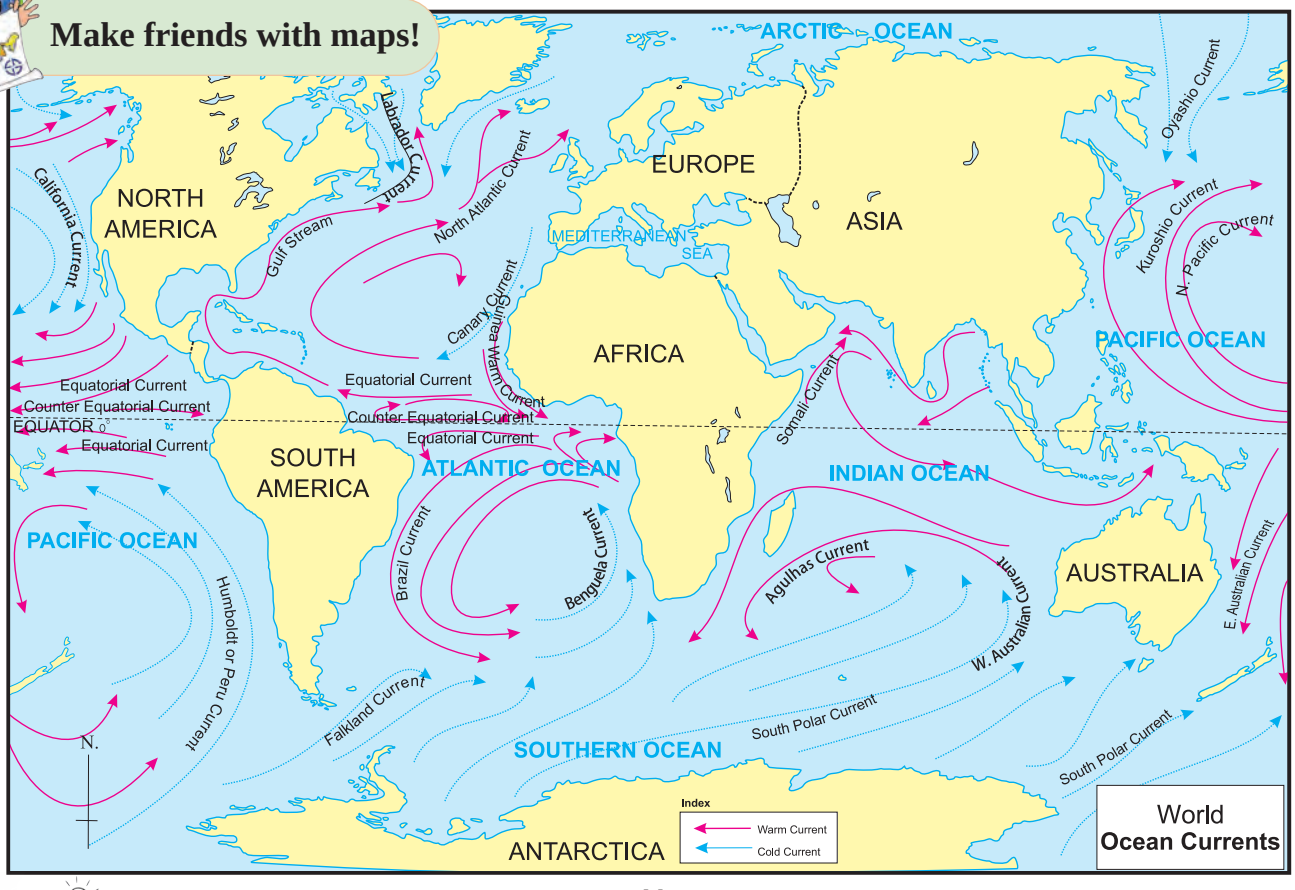

Figure 5.6 : World – Ocean Currents

Use your brain power!

Observe the map. Name the coastal areas that will experience changes in temperature. Give the reason for this.

Do you know?

The regions where warm and cold currents converge are favourable for the growth of planktons. Planktons are the food for fishes. Fish from other areas travel towards these areas in large numbers. They breed in warm waters. Due to high concentration of fish population, fisheries thrive well in these areas. In the map of ocean currents given in 5.6, locate such regions. Find their names from an atlas or the internet. Write these names on the map.

A Type of Plankton

Geography Museum

There are a number of methods of showing distributions on a map. One of these is isolines. Due to this method, the characteristic distribution of a component stands out vividly.

Isolines can be drawn using statistical information about natural factors. These lines are drawn on a map by joining all the points having the same value. The distribution on regional or global levels can be shown using isolines of different factors like height (contours), temperature (isotherms), pressure (isobars), rainfall (isohytes), etc.

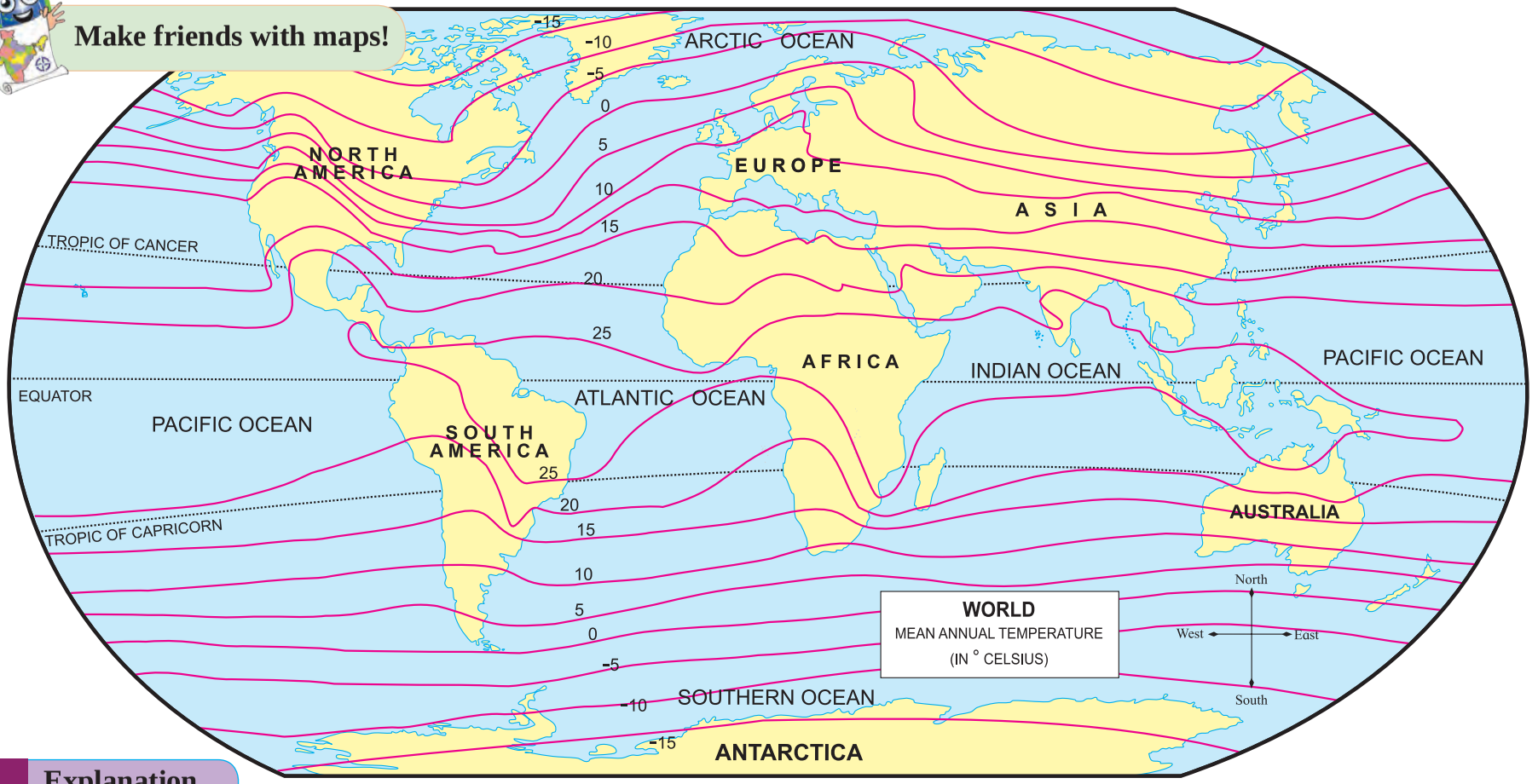

Figure 5.7 : World – Mean Annual Temperature

Explanation

Considering the temperatures of various places on the earth, maps of global distribution are prepared. Figure 5.7 is drawn with the help of isotherms. Isotherms are lines that connect places with the same temperature after avoiding the effect of height. These lines generally appear parallel to the latitudes on a world map.

Observe the isotherm of 25°C in the map. This line occupies areas close to the equator. The shape of this line appears like an ellipse on the map. The north-south spread of this ellipse is greater on the continents as compared to the oceans. The isotherm line occupies some parts of the continents of South America, Africa, Asia and Australia. A very limited portion of the Pacific Ocean is occupied by this isotherm. You will find two isotherms with a label of 0°C. Observe them. The 0°C isotherm from the southern hemisphere is largely straight and is parallel to the line of latitude. Comparatively the line of the same value in the northern hemisphere deviates north and south considerably. In the west, in parts of the Pacific Ocean, it is fairly straight but when it enters the continent of North America it turns somewhat to the north. Then the line proceeds

eastwards. Within a short distance after entering the Atlantic Ocean, it turns towards the north-east. In this part, you will find all the isotherm lines turning towards the north-east. This is because a warm ocean current is located in this area. Further after entering Eurasia while moving eastwards, it turns somewhat to the south-east. Still further in the Pacific Ocean, most of the isotherm lines appear moving eastwards as straight lines.

The isotherms in the southern hemisphere are fairly parallel to the latitudinal lines. From South Pole to the Tropic of Capricorn the distance between these lines is almost equal. As the proportion of land in the southern hemisphere is limited, temperatures in these parts are largely influenced by latitude.

In the northern hemisphere, the distance between these lines varies. In this hemisphere, the proportion of land is comparatively greater. This affects the distribution of temperature. These effects are seen in the form of variations in the distance between the isotherms and curved nature of these lines.

Can you tell?

Answer the following with the help of figure 5.8.

- What is the tube of the thermometer fixed on?
- What substance is used in the thermometer tube?
- What do the figures on the scale indicate?
- In which different units is the temperature measured?
- What season does the temperature in the figure indicate?

Thermometer: Different types of thermometers are used for measuring the temperature of air. Mercury or alcohol is used in the thermometers. The freezing point of mercury is -39°C whereas that of alcohol is -130°C. These materials are highly sensitive to temperature variations. Therefore variations in temperature from -30°C to +55°C can easily be observed with the help of these materials. The units of measuring temperature are degrees Celsius or degrees Fahrenheit. As shown in the figure, these are expressed as °C or °F. The difference in daily temperatures (maximum – minimum) can be observed with the help of a thermometer. Air temperature is measured in Celsius.

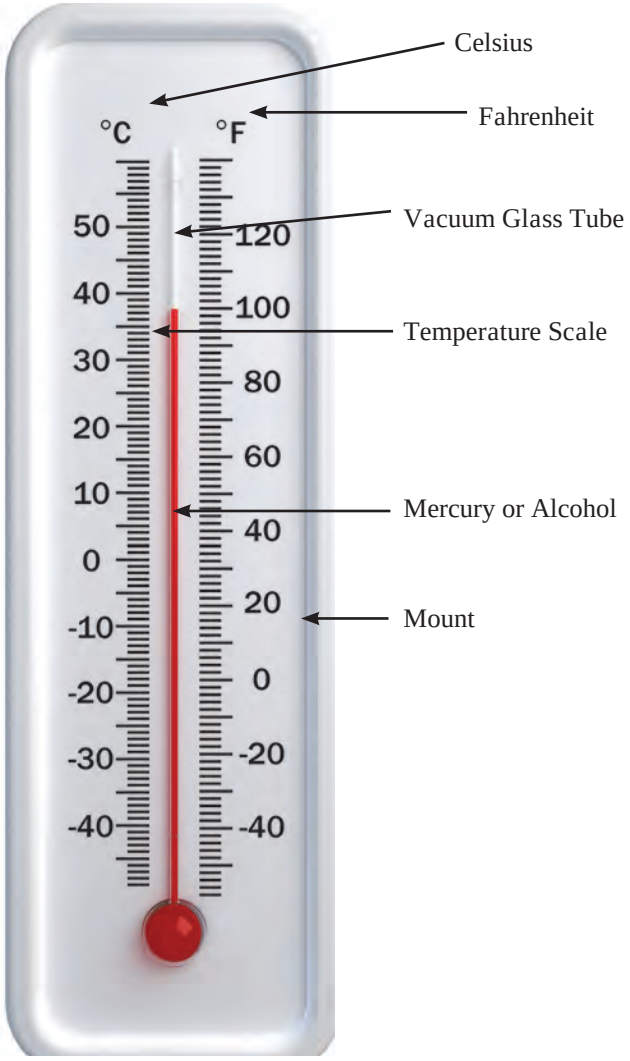

Figure 5.8 : A Simple Thermometer

Use your brain power!

Which season would be the best for visiting the following places, and why? Goa, Chikhaldara, Chennai, Darjiling, Ellora, Agra.

Think a little!

- Will it be alright if water or oil is used in the thermometer?
- Where is the temperature of your district headquarters recorded?

I can do this!

- *Identify the temperature zones.*
- *Tell the factors influencing temperature.*
- *Describe the global distribution of temperature with its characteristics.*
- *Describe the structure of a thermometer.*
- *Handle and use a thermometer.*

47QUKR

Exercises

(A) Where am I?

(1) The isotherm 0°C runs in my surroundings.

(2) The mean annual temperature is 25°C around me.

(3) The mean annual temperature around me is 10°C.

(B) Who am I?

(1) I connect places of equal temperature.

(2) I am useful for measuring the correct temperature.

(3) I get heated due to the land or water near me.

(4) Land and water get heated due to me.

(C) Answer the following.

(1) Explain with a diagram, the effect of the spherical shape of the earth on the temperature at different latitudes.

(2) What is the relation between the latitudinal extent and temperature of a region?

(3) What makes the isotherms run zigzag over continental areas?

Websites for reference

- http://science.nationalgeographic.com
- http://www.ucar.edu
- http://www.bbc.co.uk/schools
- http://www.ecokids.ca

✲ Activity

(1) Use the thermometer in your school and note the daily temperature on a display board.

(2) For two weeks, take down in your notebook, the information regarding weather given in the daily newspapers. Discuss your notes in the classroom.

(See inside the front cover for a specimen.)

6. Importance of Oceans

In the previous standard, we have studied the lithosphere and hydrosphere of the earth, the proportion of land and water on earth, and also the major oceans. Note the area of each ocean given in the following table.

Ocean	Area in sq. km.
Pacific	166,240,977
Atlantic	86,557,402
Indian	73,426,163
Southern	20,327,000
Arctic	13,224,479

The hydrosphere includes all the water bodies that exist on the earth. This covers all the oceans, seas, rivers and their tributaries, lakes, reservoirs and also groundwater. Of the total global waters, 97.7 % is contained in oceans.

Do you know?

We always see the living world around us. There is considerable diversity in the living world on land. The living world in the hydrosphere is many times greater than the living world on land. And it has a much greater diversity. (Figure 6.1)

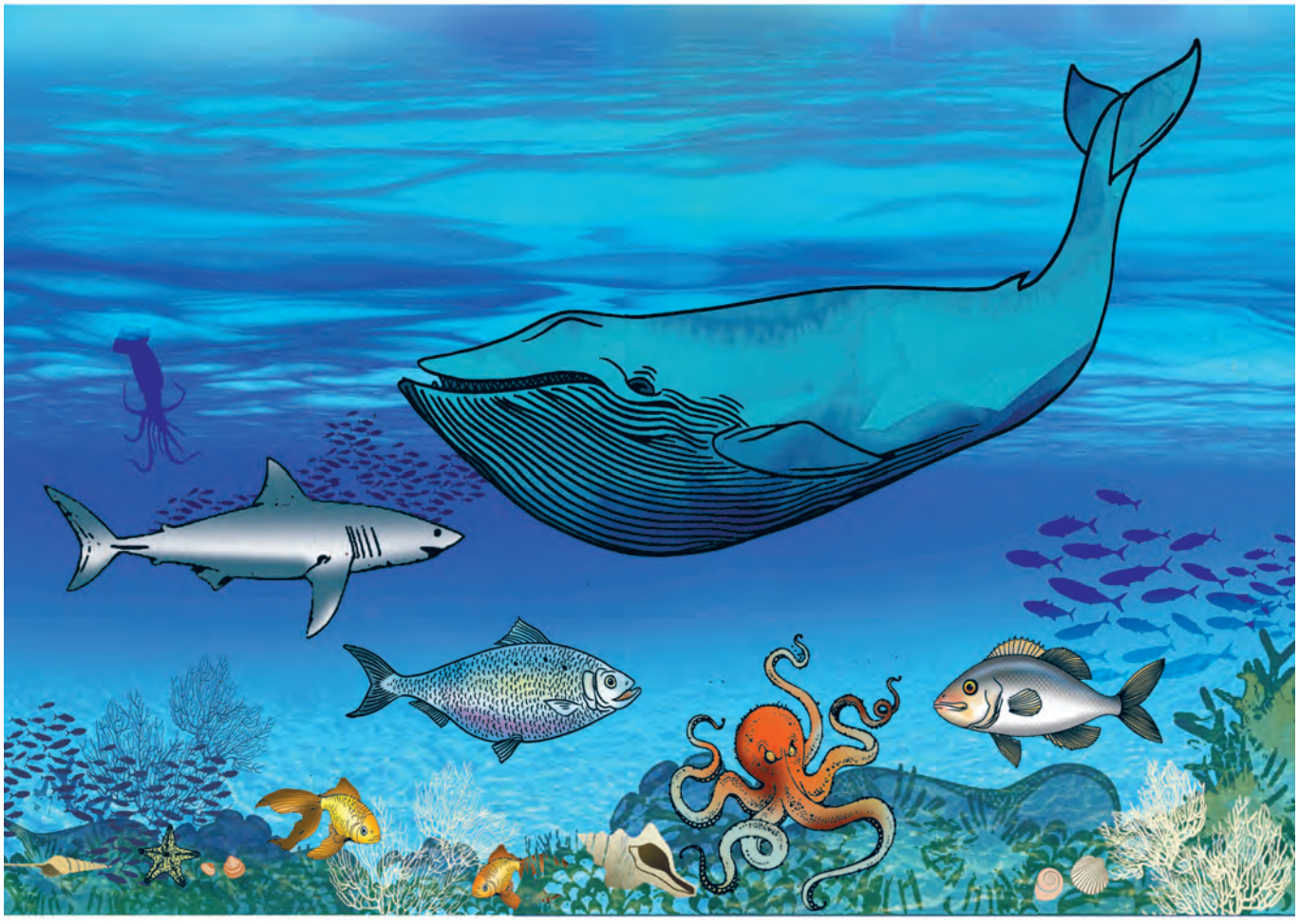

Figure 6.1 : Living Things in the Hydrosphere

Do it yourself !

Use the following ingredients: One bowl of rice flakes (*pohe*). One teaspoon oil. One tomato and a small onion : diced. Chilli powder to taste. Mix all the ingredients well. Give the mixture to all your friends and ask them to taste it. Now add some salt to the mixture and taste it again.

- What difference do you notice in the dish you tasted earlier and later?
- What do you think made the dish really tasty?
- For what other purposes do you use the last ingredient at home?
- Discuss the source of this ingredient.

Do it yourself !

Take some water in a steel dish (figure 6.2). It is better if the water is from a borewell. Keep the water in direct sunlight. Do not remove the dish until all the water gets evaporated. Observe the dish after the water has evaporated completely. What do you see? Taste the substance in the dish.

Figure 6.2

Explanation

You must have noticed that after the water evaporated completely, a whitish layer is left in the dish. If you taste it, you will find that it is salty. You will realize that these are the salts in the water. In drinking water, the proportion of salts is quite low. Water from oceans and seas has a greater amount of salt. Hence it tastes salty.

Think a little!

- Where does the water flowing through the rivers go in the end ?
- Are there volcanic eruptions in the seas?

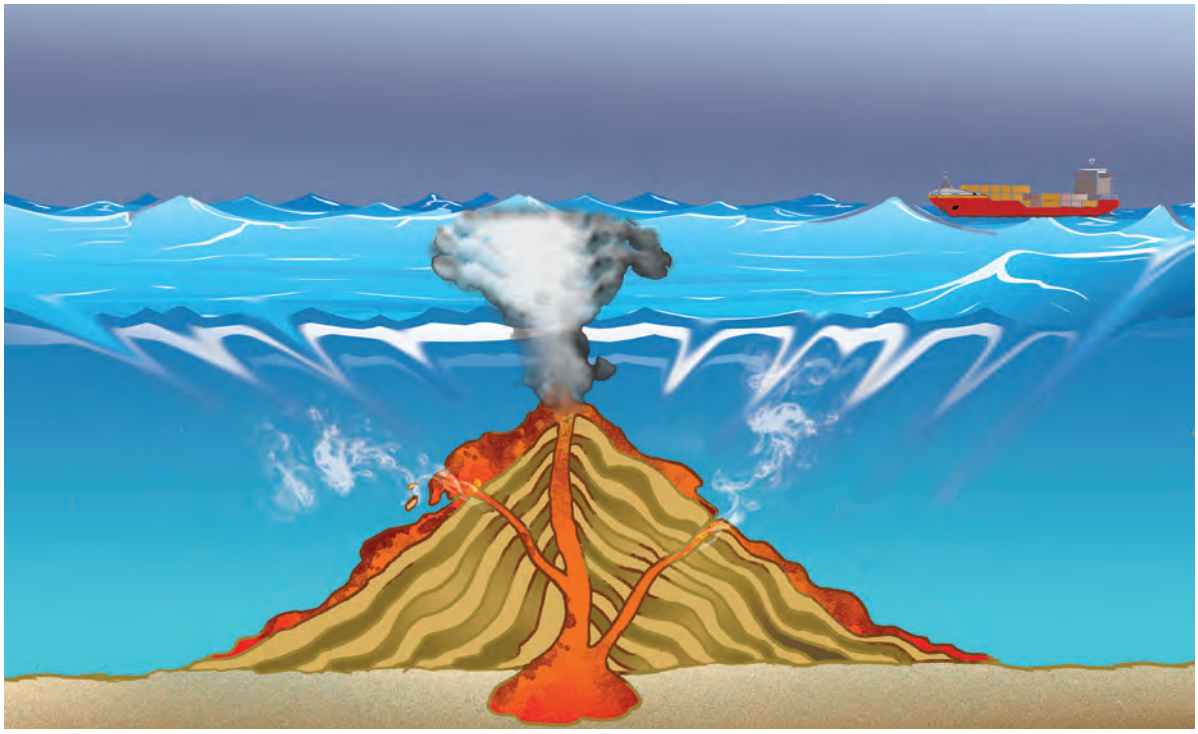

Figure 6.3 : Volcano under the Ocean

Explanation

There is abundant aquatic life in the oceans. From the microscopic planktons to huge whales, different types of living things are found in the oceans. Once they die, their remains accumulate in oceans.

All rivers flowing from mountains or hilly areas finally meet the oceans. Sediments from eroded lands, trees and bushes flowing with the water, dead remains, etc. enter the ocean with this river water.

In both the above processes, the dead remains decompose, releasing various minerals and salts in the ocean water.

Volcanic eruptions occur on land. Similar volcanic eruptions take place in the ocean as well. See figure 6.3. During volcanic eruptions different minerals, ashes, salts and gases are added to the water. This increases the level of salts and minerals in ocean water. Due to the continuous evaporation of oceanic waters, the proportion of salts increases. All these things make the ocean water salty. The salinity of ocean water is different at different places. Salinity is expressed in terms of mils (particles per thousand). The average salinity of oceanic waters is 35 ^{o}/oo. The Dead Sea is known to have the maximum salinity. Its salinity is 332 ^{o}/oo.

We obtain salt from the salty waters. Salt as a substance is obtained by constructing salt pans in the coastal areas. See figure 6.4. Salt is an item in our diet. Many minerals like phosphates, sulfates, iodine, etc. are also obtained from the sea. We depend on oceans to some extent for minerals.

Use your brain power!

Where did all this water on the earth come from?

Figure 6.4 : Salt Pans

Can you tell?

See figure 6.5 and answer the following questions.

- What items are included in our diet?
- Which items amongst those shown come under non-vegetarian food?
- Which of these are prepared from aquatic creatures?

Figure 6.5 : Various Food Items

Explanation

Many of us include fish in our diet. We get fish from rivers, lakes and seas. The proportion of fish in seas is much greater than of those in rivers and lakes. Catching marine animals is a large scale activity the world over. It is one of the ancient occupations of human beings. Though food is the major purpose of this activity, marine animals are also used for the production of fertilizers, pharmaceuticals and also in research. In India, people mainly consume prawns (*kolambi*), clams (*tisre*), crabs, seerfish (*surmai*), mackerel (*bangda*), pomfret (*paplet*), Indian shark (*mori*), Indian salmon (*ravas*), etc.

Many other types of marine animals are consumed in different parts of the world.

The life of people from countries that have a coastline largely depends on the sea, especially if there are few other occupations. Seychelles, Mauritius, Maldives, etc. are some of these.

Do it yourself !

Oceans and Climate

Place	Country	Mean Max. Temp. ^{0}C	Mean Min. Temp. ^{0}C	Range of Temperature
Beijing	China	18.4	08.4	
Istanbul	Turkey	18.0	10.0	
Madrid	Spain	19.0	09.0	
New York	United States	16.3	08.3	
Denver	United States	16.2	02.2	
Kabul	Afghanistan	14.7	05.2	
Baghdad	Iraq	30.4	14.7	

The above table records the maximum and minimum temperatures from some places located between 30° and 40° north parallels. Study the table and do as directed.

- Calculate the difference between the mean maximum and minimum temperatures and write it in the last column.

- Highlight the rows for the places having a range of temperature over 10°C with red colour.
- Colour other rows in blue.
- Find the locations of these places from an atlas.
- Which places are closer to the oceans? Tell whether the range of temperature at these places is less or more.
- What might be the main reason leading to differences in the temperature range of different places?
- In which thermal zone are all these places located?
- Which places are far away from the oceans? Do those places have a greater or smaller temperature range?
- Mention the places having the smallest and greatest temperature ranges.
- Draw a graph for the above data. Use a proper colour scheme.

Explanation

- You must have realized from the above activity that there are differences in the temperature of different places on the earth. Similarly, there is difference in the maximum and minimum temperatures. This difference is less in the coastal regions (nearness to the sea) while it is more in the regions far away from the sea (continentality).

This means that in regions close to the oceans, seas or large reservoirs, there is not much of a difference in the temperature throughout the day. The main reason for this is the mixing of vapour released through evaporation of water from these water bodies into air. This vapour in the air absorbs and stores the heat released from the land. Hence, the temperature in coastal areas remains equable.

- You have studied that the equatorial region receives near perpendicular sunrays. As a result, these areas get more heat whereas the polar regions receive highly slant rays. This differential heating creates imbalance in the temperature of air in different parts. This leads to formation of belts of high and low pressure on the earth. Winds blow due to pressure differences in these belts. These winds are called Planetary Winds. These winds move the oceanic water in the form of currents. These currents are warm currents or cold currents. Warm currents move towards cold regions and cold currents move towards warm regions. This means ocean currents move from the equatorial region to polar regions and from polar regions to the equatorial region. This leads to the redistribution of heat on the earth. The cold currents moving towards the equatorial region make the temperature of coastal areas in that zone milder whereas the warm currents coming in the colder regions cause temperatures in coastal areas to rise. We have seen this in figure 5.6.

The oceans act as the controller of global temperature in the two ways described above. The oceans have a vast expanse, therefore huge amounts of vapour get created. This process goes on continuously. From this vapour, the earth gets rainfall. Oceans are the source of rains. The rainwater flows through rivers and streams and finally flows back into oceans. This makes it clear that the beginning and end of the water cycle takes place in the oceans.

Do you know?

As the regions close to the sea have an equable climate, the density of population is high in these areas. The coastal regions have always attracted man due to its climate, abundance of food and various products obtained from the sea.

Do you know?

- In future, it will be possible to generate electricity with the help of oceanic waves and tides.
- It is possible to convert the saline ocean water into potable drinking water. This will reduce the scarcity of drinking water to some extent. The drinking water in the city of Dubai in United Arab Emirates is being made available through this method.

Figure 6.6 : Mangrove Forest

- In the swampy areas of sea coast, and in the areas of estuaries, the soils are saline and the climate, humid. In such areas, mangrove forests with *tivari* and *sundary* grow well. The wood of mangrove trees is light and oily. It lasts longer. It is used as fuel and also for ship-building. The mangrove forests protect coastal areas from huge waves. These forests also protect the biodiversity in the coastal areas. If these forests are located near coastal towns, they are called the lungs of these towns.

Find out.

Collect information about how a natural pearl is formed. Which oceanic organism develops it? In which sea is it found in India?

Oceans and Resources

We have seen earlier that we obtain salt, fish, shells and other products from the ocean. Besides these, we get minerals like iron, lead, cobalt, sodium, manganese, chromium, zinc, etc. from the ocean floor. We also get mineral oil and natural gas.

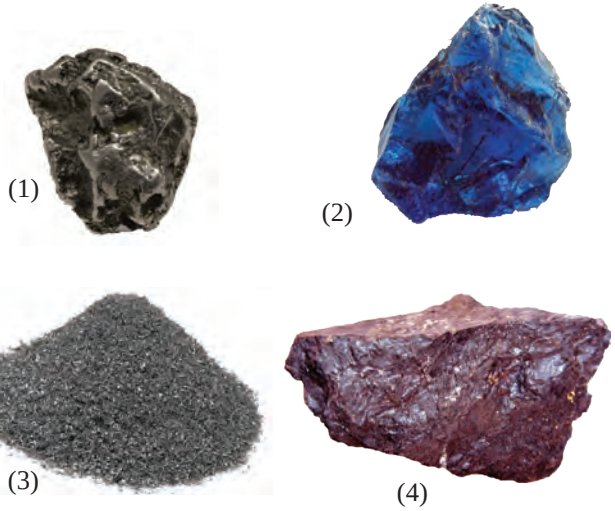

Figure 6.7 : 1. Lead 2. Cobalt 3. Manganese 4. Iron Ore

We get precious items like pearls, corals or ornamental items like shells, as also medicinal plants from the seas.

Oceanic Transport

Oceans have provided us the most economic option of transportation. Large scale transport of goods is carried out with the help of ships, trawlers, boats etc. (figure 6.8). International trade is carried out on a large scale using water-ways. Countries like Spain, Norway, Japan have a good coastline. Due to goods transport by ocean routes, these countries have gained importance.

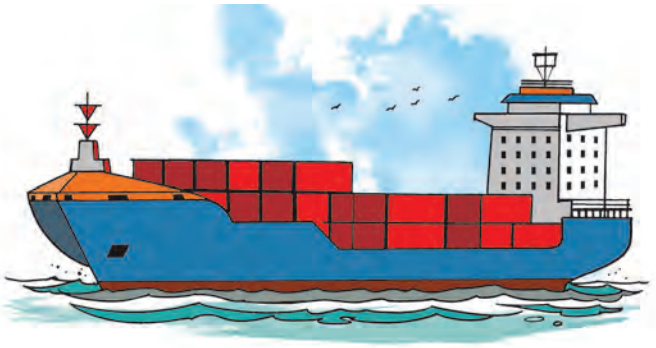

Figure 6.8 : Water Transport

Ocean currents are quite important in water transport. As far as possible water transport is carried out along ocean currents. They accelerate the speed of ships and also save fuel to a considerable extent.

Water transport is conducted on a much higher scale as compared to other modes of transport. Hence, for transport of bulky materials like coal, crude oil, raw materials, metallic minerals, food grains, etc. water transport is given preference.

Figure 6.9 : Oil Spill

Issues Related to Oceans

About 70.8% of the surface of the earth is occupied by water. In order to fulfil his requirements, man undertakes many activities. These lead to the production of huge amounts of different types of waste. These waste materials cause pollution. Pollution of oceanic waters is a major and serious issue that has developed in recent times.

- Oil spills (fig 6.9).
- Releasing the waste produced in the coastal cities into the seas.
- Materials thrown out from ships.
- Exploitative fishing.
- Cutting of mangrove forests in coastal areas.
- Disasters caused by the water mines.
- Sewage released by industries and cities (figure 6.10).
- Excavations carried out in the seas.

All the things listed above lead to large scale pollution of oceanic waters. Some coastal regions are proving to be death traps for aquatic animals. As a result, many aquatic animals are under the threat of being extinct e.g. the blue whale, some types of sea turtles, dolphins, etc.

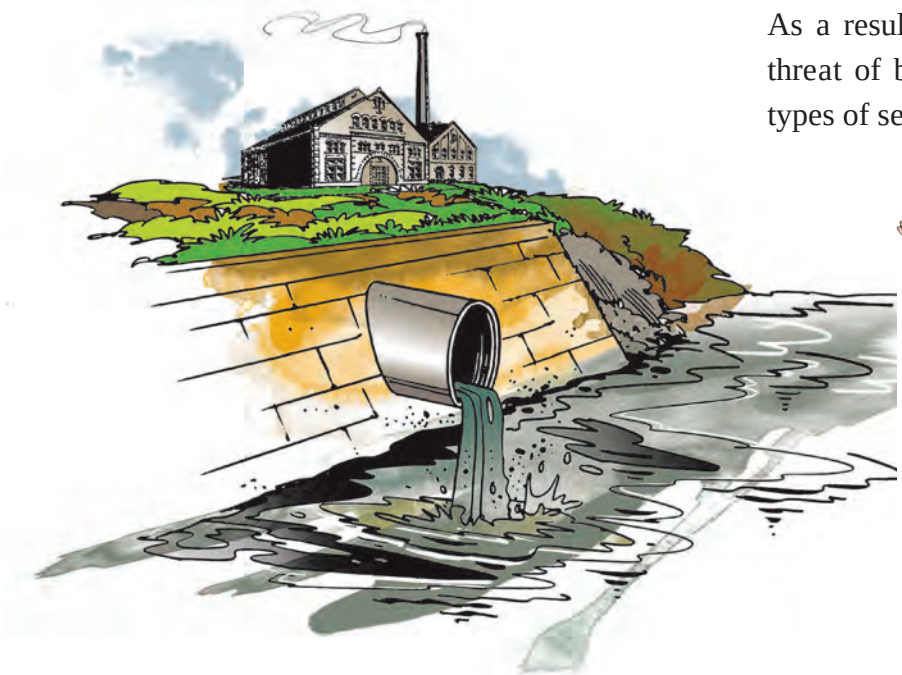

Figure 6.10 : Sewage being Released into the Sea

Always remember.

A larger proportion of the surface of the earth is occupied by water. Most of the water is salty. The living world in this salty water is suffering from the pollution caused by man. We must avoid this.

Can you do it?

Sameer and Sania are playing a game of showing the waterways on a map of the world. Their routes are going in opposite directions. One is following the eastern route while the other is taking a route that takes to the west.

- From Mumbai port some goods are to be taken to London in UK. On a map of the world, show at least two such routes with a pencil. Write down the names of the ports of different nations that fall on the route followed by each.

(1) Ports on the route followed by Sameer.

(2) Ports on the route followed by Sania.

- Which of the routes you feel is shorter? That of Sameer's or Sania's?
- Which oceans does one have to pass through if one follows Sameer's route or Sania's route?
- What are Panama and Suez? For what purpose were they constructed? Have these been used in Sameer's or Sania's routes?
- Find if there can be any route other than the ones that you have marked.

What will you do?

Different marine animals like the blue whale, turtle, starfish, etc. appear before you in your dream and complain to you. They say, "You humans are not allowing us to live properly. You throw the waste and chemicals that you do not want into our house. The youngsters in our house are falling ill due to this. Some are getting killed. You must think about this situation and remove the pollution from the seas." Now tell what you will do.

Think a little!

What would have happened if man had not discovered sea routes?

What will you do?

You live near Mumbai city. In your farm you have produced 1000 quintals of rice. There is a good demand for it in the overseas market than in the local market. A merchant from South Africa is ready to purchase this rice at a good price but he wants the import at Cape Town port within four months. Tell what you will do, as a good trader.

Always remember.

The proportion of water being greater than that of land, the earth is known as the water planet. Water in any form is a boon for the living world. Of all the planets known to man, the earth is the only one which has a living world.

Southern Ocean: The water body that extends from 60° S parallel to the coast of the Antarctic Continent is named as the Southern Ocean.

I can do this!

- *Tell about the items that can be obtained from the oceans.*
- *Tell the importance of oceans.*
- *Tell issues related to oceans.*

Exercises

(A) Find the odd man out.

(1) Shell, fish, crab, ship
(2) Arabian Sea, Mediterranean Sea, Dead Sea, Caspian Sea
(3) Sri Lanka, India, Norway, Peru
(4) Southern Ocean, Indian Ocean, Pacific Ocean, Bay of Bengal
(5) Natural gas, salt, gold, manganese

(B) Write the answers.

(1) Which items does man get from the oceans?
(2) Why is it economic to carry out transport by waterways?
(3) Why is there a difference in the climates of regions close to the oceans and regions far away from the oceans?
(4) Which continents are located along the coast of the Pacific Ocean?

Activity:
Colour the different oceans on an outline map of the world and prepare an index for the map. **(See inside front cover, figure B.)**

Project:
Group work: Make five groups. Each group should collect some information and pictures of one ocean. With the help of the information collected, each group should make a poster and make presentation.

Websites for reference

- http://en.wikipedia.org
- http://www.kidsgrog.com
- http://ocanservice.noaa.gov
- http://earthguid.ucsd.edu

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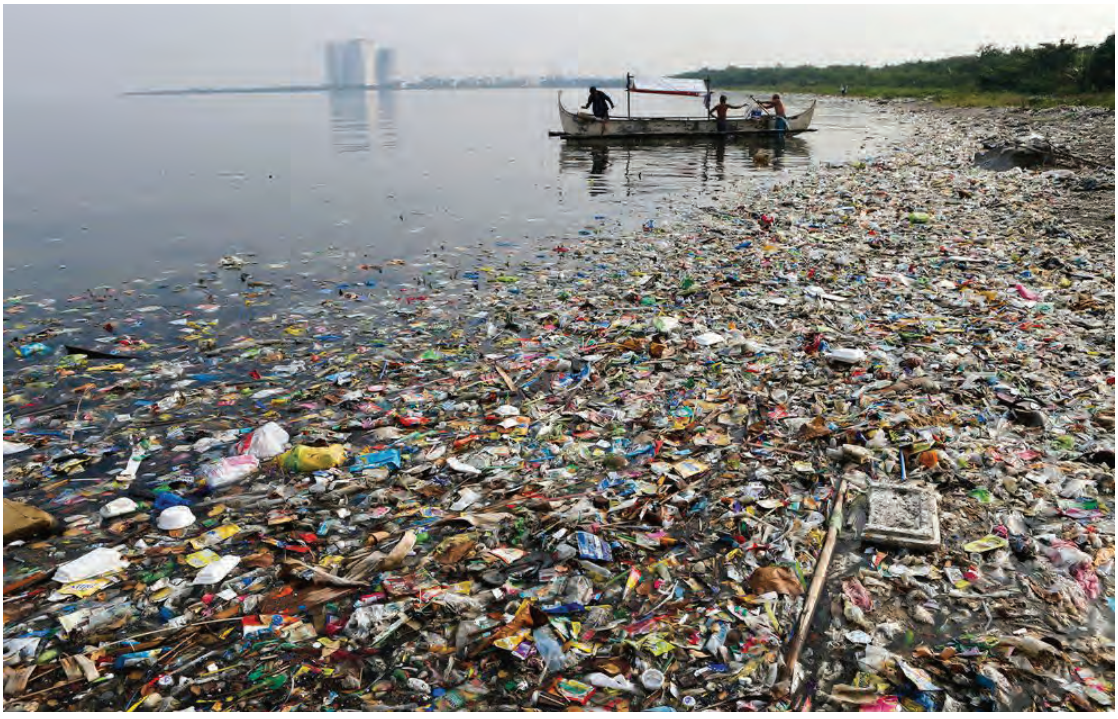


Which issue is indicated in this picture? What measures will you suggest to counter the issue?

7. Rocks and Rock Types

Do it yourself !

Figure 7.1

Observe the pictures in figure 7.1 and answer the following questions.

- What is the hill in 'A' made up of ?
- What is being done in 'B'?
- What do we see in 'C'?
- Is there any relationship between the three things shown above?
- For what purpose do we use the things shown in A and C?

Do it yourself !

From the hills, river-beds or the land in your vicinity, collect rock specimens of different types, shapes, colours, etc. Observe the rock specimens and note down the following.

- Place where the rock was found.
- Colour of the rock.
- Spots on the rock and their colour.
- Weight of the rock (estimated; heavy / light).
- Hardness of the rock (hard / brittle / medium).
- Structure of the rock (Uniform grains/ layers / hollowness).
- Porosity of the rock (porous / non-porous).

Show the rock specimens and your notes to the teacher. Discuss them.

Explanation

We have seen last year that the earth's crust is hard. It is made of rocks and soil.

Rocks are found on land surface and also below it. Rocks are a mixture of different minerals formed by natural processes in the lithosphere.

The properties of rocks depend on the constituent minerals and their proportion, as well as on the formation process. Silica, aluminium, magnesium and iron are the major rock-forming minerals . There are other minerals, too, in different rocks.

✻ Types of rocks

There are three types of rocks according to their formation process:

- Igneous Rocks / Primary Rocks
- Sedimentary Rocks
- Metamorphic Rocks.

Do you know?

The interior of the earth has very high temperature. As a result, the material in this part is in the molten state. Sometimes this material gets released through the fissures in the crust. This is called a volcano. Lava, gases, dust, ashes, etc. are thrown out during volcanic eruptions.

✻ Igneous Rocks

When the molten material, known as magma within the crust and lava on the surface, cools down, it solidifies giving rise to rocks. These are known as igneous rocks.

As these rocks are formed out of the material from the interior of the earth, these are also referred to as primary rocks. Mostly these rocks appear hard and homogeneous. These are heavy as well. We do not get fossils in these rocks.

The Maharashtra Plateau and the Sahyadris are formed out of igneous rocks. Basalt is a major example of igneous rock. See figure 7.5.

Do you know?

Pumice is an example of igneous rock. This is formed out of volcanic froth. It is a porous rock. As its density is quite low, it can float on water.

Figure 7.2 : Pumice Stone

Most of the hill forts in Maharashtra have lakes or elephant yards. Actually, these are old quarry sites. Rock was extracted from these sites and used for the construction of the fort and other buildings. In the pits and dugouts left behind after rock extraction, water was allowed to accumulate and these lakes, tanks etc. were created.

Figure 7.3 : Reservoir on a Fort

Use your brain power!

What rock was used for building the forts in Maharashtra ? Why ?

✻ Sedimentary rocks

Due to continuous variations in the temperature, rocks develop cracks. Similarly, the water percolating through rocks dissolves the soluble minerals. This leads to the weathering of rocks. They get disintegrated or decomposed. That is, they get reduced to pieces. These rock particles get transported by rivers, glaciers, wind, etc. towards low lying areas and are deposited there. One after the other, layers of sediments get deposited in this way. The upper layers exert heavy pressure on the lower layers. This leads to compaction of material and development of sedimentary rocks.

One can easily see layers in the sedimentary rocks. While layers are getting deposited the remains of dead animals or plants get buried in these layers at times. Therefore, one may find fossils in sedimentary rocks. Sedimentary rocks are generally brittle and lightweight. Most of them are porous.

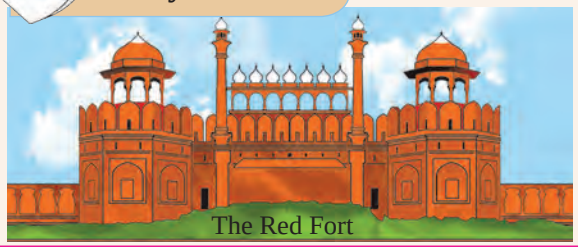
Sandstone, limestone, shale, corals, etc. are sedimentary rocks. One may find coal seams in sedimentary rocks.

Fossils

The buried remains of dead animals or plants become subject to heavy pressure. As a result their impressions get marked in the rocks. At times the buried animals or plants get petrified. These are called fossils. The study of fossils provides information about the life in that period.

Figure 7.4 : Fossils

Do you know?

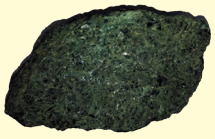


The Red Fort

Near Jaipur city in Rajasthan, red sandstone is found. This is a type of sedimentary rock. This rock was used for the construction of the Red Fort at Delhi. As sandstone is relatively soft, it is easy to carve in it.

✻ Metamorphic Rocks

Volcanic activity and other earth movements constantly take place on the earth. While these are occurring, the igneous or sedimentary rocks in that region are subjected to tremendous pressure and heat. This leads to changes in the nature as well as the chemical composition of the original rocks. The crystals in the original rocks get re-crystallized. This means, the rocks get metamorphosed. The rocks formed through such a process are called metamorphic rocks. These rocks do not contain fossils. These rocks are heavy and hard. Study the table given below and try to understand the metamorphosis.

Type of Rock	Original Rock	Photograph (Specimens)	Metamorphosed Rock	Photograph (Specimens)
Igneous	Granite		Gneiss	
Igneous	Basalt		Amphibolite	
Sedimentary	Limestone		Marble	
Sedimentary	Coal		Diamond	
Sedimentary	Sandstone		Quartzite	
Sedimentary	Shale		Slate	

Coal gets metamorphosed when it undergoes heavy pressure and intense heat. After coal gets metamorphosed into diamond, its price increases. We burn coal while we use diamonds as ornaments.

Do you know?

Bhedaghat

- The Taj Mahal at Agra is built in marble. Marble is a metamorphic rock. This rock was brought from mines in Makrana in Rajasthan.
- One realizes while taking a boat ride in River Narmada through Bhedaghat gorge in Madhya Pradesh that the river has cut its gorge through marble rock. At sunrise, sunset and during full moon nights, these river banks present an enchanting scene.

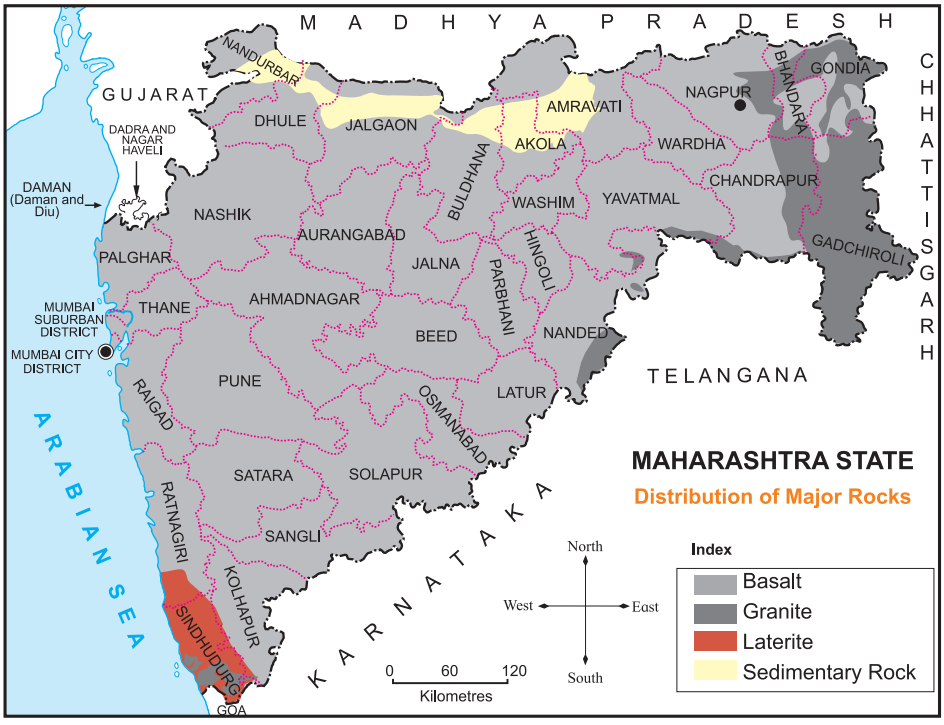


Figure 7.5 : Distribution of Major Rock Types in Maharashtra

Figure 7.5 shows the distribution of major rocks in Maharashtra. List the districts in Maharashtra where rocks other than basalt are found. The basalt rock formed out of volcanic eruption has spread over a vast region of our State. Granite rock is found in the eastern parts and in South Konkan. Laterite is found in South Konkan.

Because of thick and extensive layers of basalt, Maharashtra does not have large reserves of mineral wealth. Therefore, mining activity is concentrated in South Konkan and in eastern Maharashtra.

Use your brain power!

Find the meaning of this line from a famous marathi poem:

'राकट देशा, कणखर देशा, दगडांच्या देशा ।'

✻ Laterite

In the coastal region of Konkan in Maharashtra, we find laterite rock. It is found specially in Ratnagiri and Sindhudurg districts.

What will you do!

Ajit is interested in sculpting. He wants to prepare a sculpture of Dr. A. P. J. Abdul Kalam. He cannot decide which rock he should use for this, igneous, sedimentary or metamorphic? What will be your advice ?

I can do this!

- *Understand the type of rocks.*
- *Tell the use of rocks.*
- *Tell the distribution of rocks in Maharashtra.*
- *Compare rock types.*

Exercises

(A) How is sand that flows in a river formed? Collect some information about where the sand comes from.

(B) Which of the following monuments are built in igneous rock?

(1) The Taj Mahal (2) Fort Raigad
(3) The Red Fort (4) Ellora Sculpture

(C) Find the differences between–

(1) Igneous and sedimentary rocks
(2) Sedimentary and metamorphic rocks
(3) Igneous and metamorphic rocks

(D) Which types of rocks are predominantly found at the following locations?

(1) Central Maharashtra (2) South Konkan
(3) Vidarbha

✻ Activity

- Collect rock specimens from your surroundings and also during your travels. Classify them with the help of your teacher. Make a small museum of rocks for your school and place your specimens there. Keep a note of the place from where you have collected them. (See a specimen display on page 65.)
- Visit the historical sites in your surroundings, e.g., hill forts, masonry dams, land forts, bastions, *wadas*, temples, mosques, etc. and observe with the help of your teacher, the rock used for their construction.

Websites for reference

- http://www.geography4kids.com
- http://www.rocksforkids.com
- http://www.science.nationalgeographic.com
- http://www.classzone.com

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8. Natural Resources

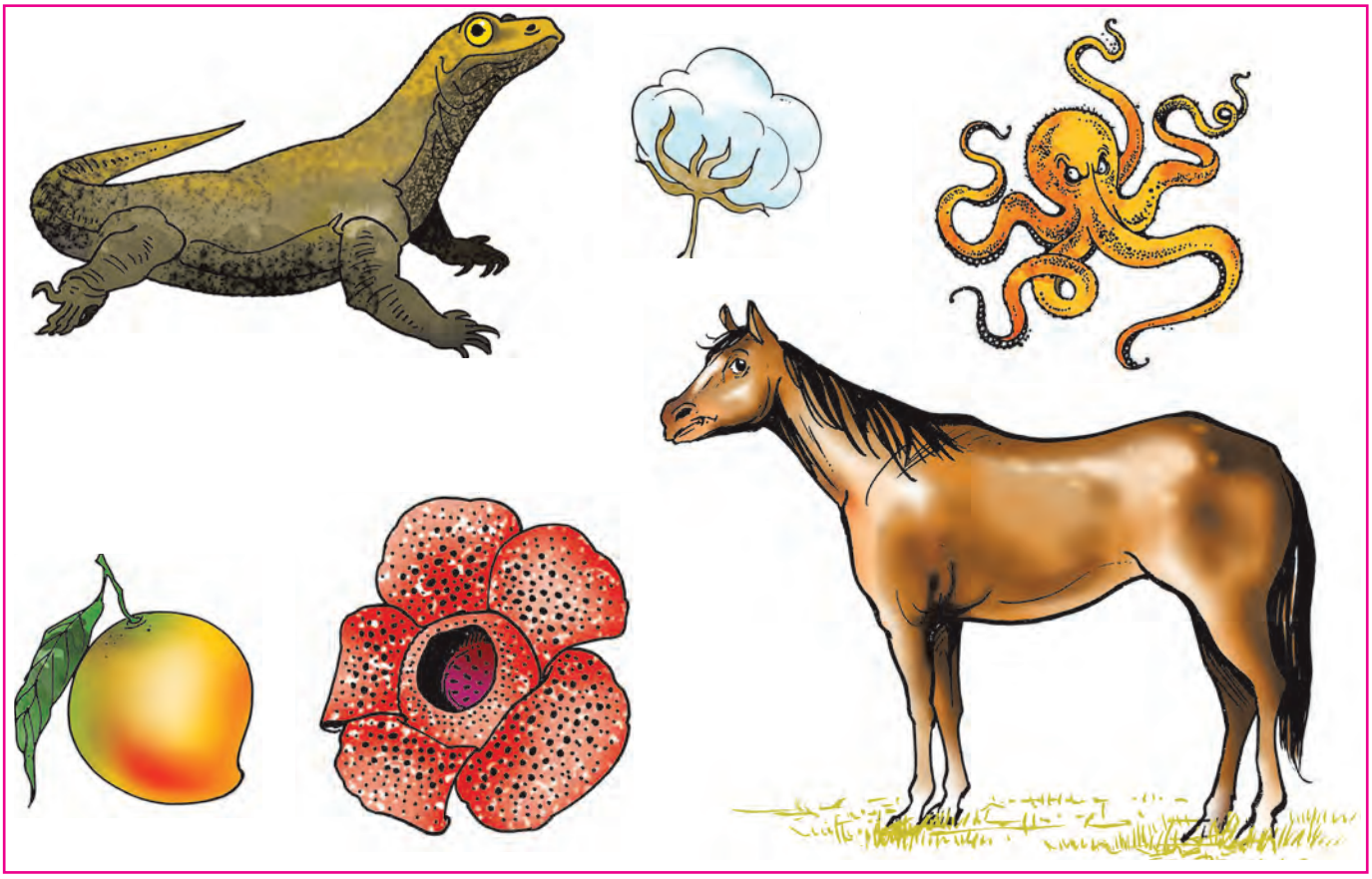


Figure 8.1

Observe and think about the pictures given in figure 8.1 and answer the following questions:

- What do you see in the pictures?
- How many of these animals or plants do you know?
- Which of these things have you seen in reality?
- Have you ever used these things or seen them being used ?
- Which of our needs do some of these fulfil?
- What probable use of the unused things can you think of?

Find more information about the things you could not identify.

Explanation

We see many things on the earth. Some of these are quite familiar to us. However, we do not necessarily use all of them. We have learnt to use some of the things that are available in nature, for example, water. The natural things that man uses are called natural resources. Man fulfils his needs using these natural resources. Air, water, soils, land, minerals, plants and animals are all natural resources. Most of the natural resources are limited in nature. Therefore they are invaluable.

Of these, 'air' is such a resource that it is available in plenty. This resource never depletes. However, its quality can change. We need air for various purposes right from breathing to burning.

Figures 8.2 to 8.13 give us an idea about how we use some of the natural resources.

Figure 8.2: Agriculture

Figure 8.7 : Mining

Figure 8.3: Fishing

Figure 8.8 : A Mason at Work

Figure 8.4: Collection of Honey

Figure 8.9 : Extraction of Salt

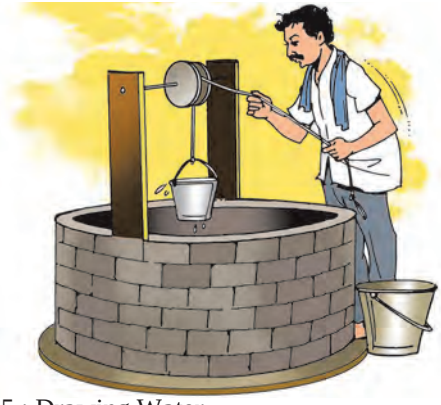


Figure 8.5 : Drawing Water

Figure 8.10 : Collection of Rubber Latex

Figure 8.6 : Gathering Wood

Figure 8.12 : Windmill

Figure 8.11 : Gathering of Resin from Trees

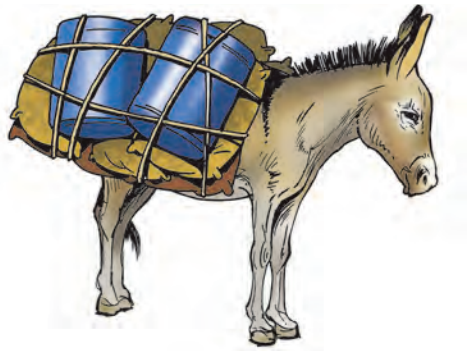


Figure 8.13 : Transportation by a Pack Animal

Can you tell?

Observe all the figures from 8.2 to 8.13 and discuss them in the class. It is necessary that each of the things shown is considered. For this, use the following points.

- What different activities are the individuals in the pictures engaged in?
- What things will they obtain through these activities?
- What are the animals in the pictures doing?
- What is the use of the tall device in figure 8.12 raised on the ground?
- What is being loaded in the truck? What are we going to get from it?
- Where are all these human activities being performed other than fishing?

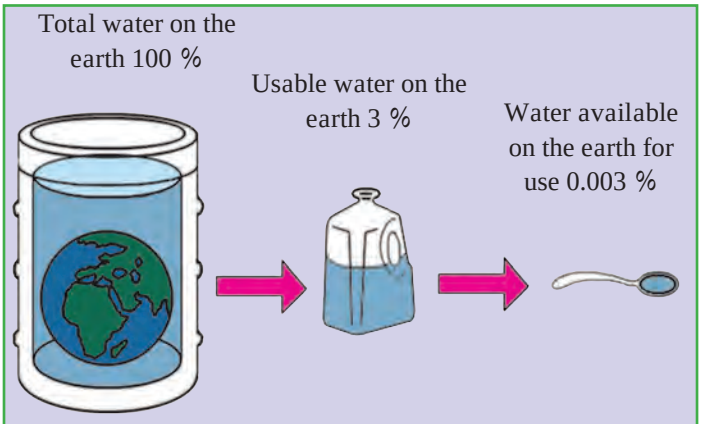
Explanation

In some of the figures man is shown doing different tasks. Each of the tasks is related to some resource. Let us consider each of these resources.

- In figure 8.2, man is seen ploughing the land. The farmer ploughs the soil layer and makes the land cultivable. In this cultivable land, he grows various crops and fulfils his own and others' need for food. For this purpose, he uses the 'soil' that is naturally available on land as a resource. Soil is used all over the world and therefore, soil is a very important resource for agriculture.

Soil formation mainly depends on the original rock, climate, organic components, slope of the land and time. According to the types of rocks and climates in different regions, different types of soil are formed. A long period is required for the formation of mature soil, as it is a very slow process. A period of about a thousand years may be required for development of a 2.5 cm thick layer of soil.

- Figures 8.3 and 8.5 show a man catching fish and another drawing water from a well. In these pictures, man is seen using the natural resource water for fulfilling his needs. Right from the time we get up in the morning, we keep on using water till we go to bed at night. This shows how important water is as a natural resource. The entire living world depends on this resource. See figure 8.9. It shows how we obtain salt from sea water. We make use of salt in our day-to-day life.



Water is available in huge quantities on earth. Of this, a large quantity is salty. Only some quantity of the total water is usable. A very meagre quantity (0.003%) of water is available for use. However, even this much water is sufficient for all of us.

Figure 8.14 : Global Water Reserve and Availability

• Figure 8.6 shows some individuals collecting wood from the forest. Similarly, some people are shown collecting different items in the forest like honey (figure 8.4), resin (figure 8.10), rubber latex (figure 8.11), etc. In order to fulfil our needs, we collect various products from plants in nature. There are various plants on land surface. Plants are broadly classified as grass, herbs, shrubs, and trees. Man has successfully experimented with some grasses to obtain food grains. This helped him to avoid painful wandering for gathering food. He began to live a settled life. The basins of the Huang He, Sindhu (Indus), Nile and Euphrates are some of the areas where such settlements flourished in the past. You have studied this in Standard V. See figure 8.15.

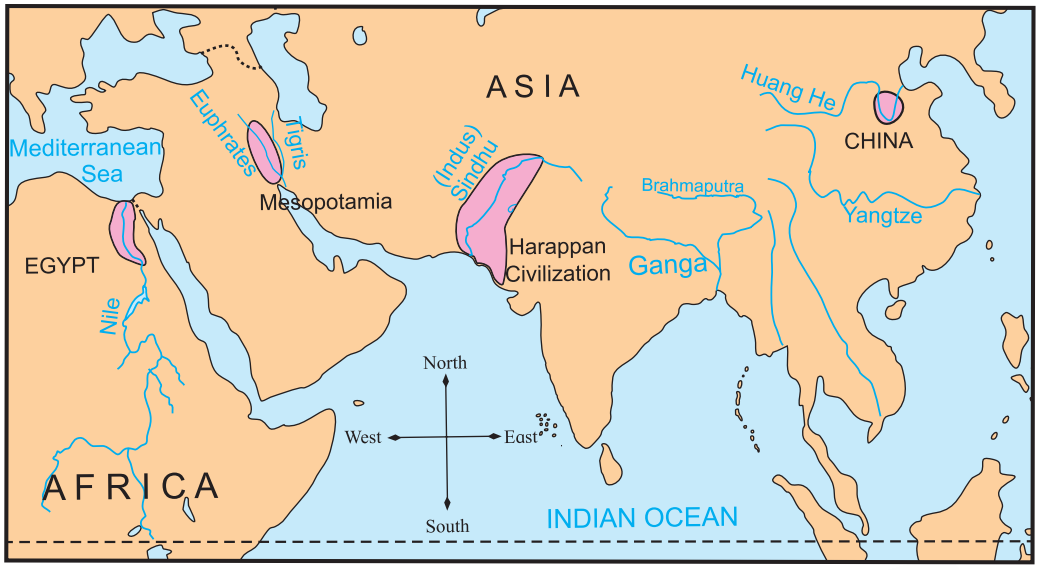


Figure 8.15 : Ancient Civilizations in River Valleys

We obtain products like wood, rubber, resin, fruits, medicinal plants, etc. from forests. If we consider the region from the equator to the Poles, as per the temperature zones, we find the following types of natural vegetation – equatorial evergreen, deciduous, tropical grasslands, thorny scrubs, temperate grasslands, mixed forests, broadleaved, coniferous, and Tundra. (See figure 8.16). Many animals make these forests their habitat. Animals who prey on the plant-eating animals also live in the forests. Thus, many food chains develop in the forests. Forests or grasslands are the habitats for many animals. It is basically due to plants that we have got animals as a natural resource. Plants also grow in water. It is very likely that in future we

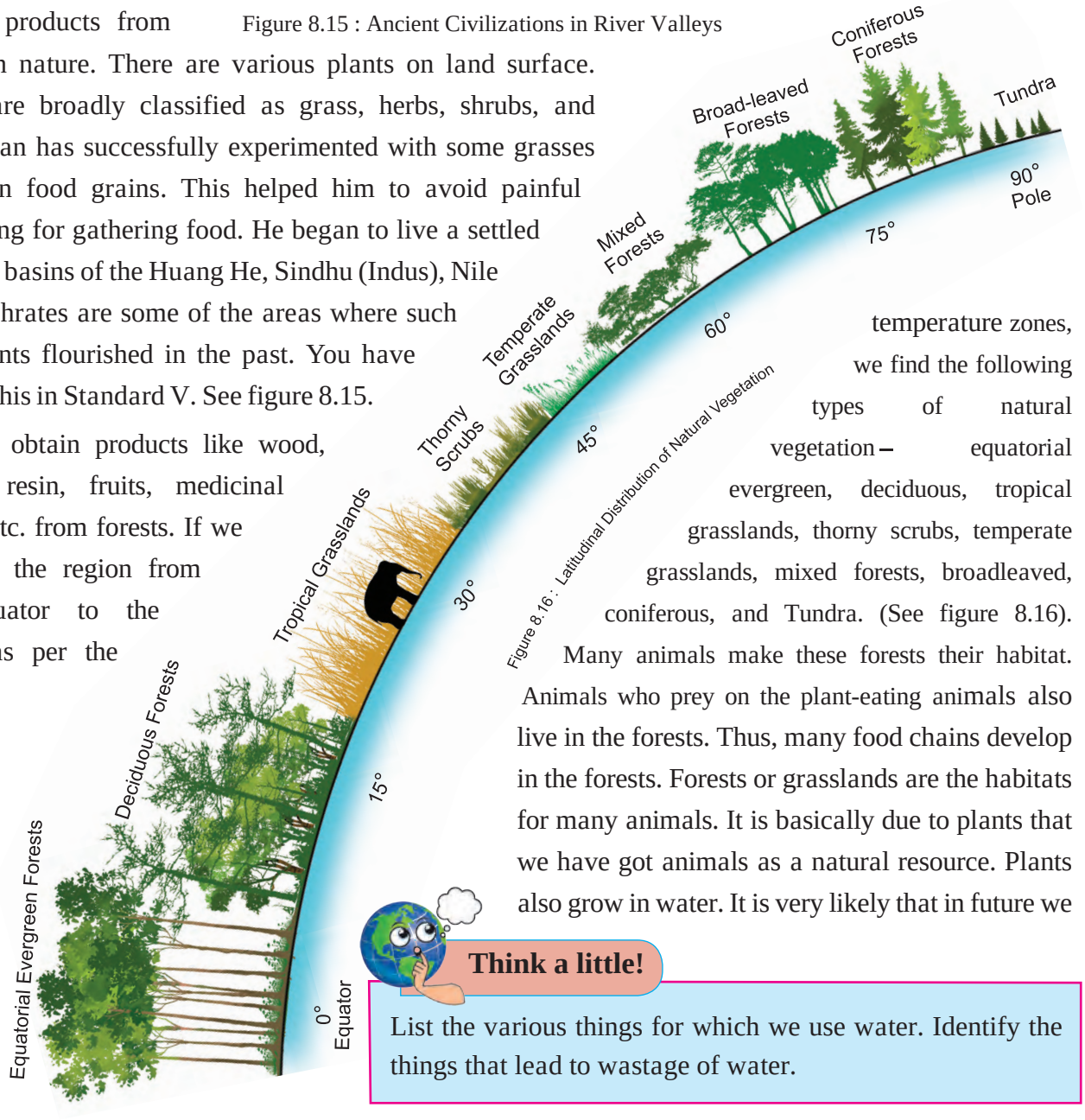


Figure 8.16 : Latitudinal Distribution of Natural Vegetation

Think a little!

List the various things for which we use water. Identify the things that lead to wastage of water.

shall have to depend on aquatic plants for fulfilling the needs of the growing human population. (See figure 8.17).

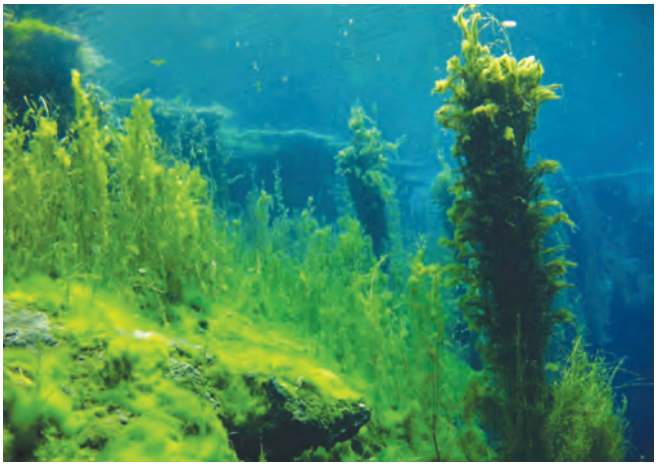


Figure 8.17 : Marine Vegetation

- Figure 8.13 shows an ass carrying a load. Man makes use of animals for a variety of reasons. Horse, oxen, camel, asses, etc. are the animals employed for ploughing, riding, transporting goods etc. Goats, cows, buffalos are used as milk animals. Meat, eggs, bone powder, hide, etc. are other products we get from animals.
- Figure 8.7 shows that rock is being loaded into a truck from the mining area. We have seen earlier that rock is a mixture of minerals. Minerals are inorganic substances that form in naturally occurring chemical processes.

We get different metals and chemicals from the minerals. Some chemicals are used in preparing different medicines. Minerals are generally classified as metallic and non-metallic minerals. Metallic minerals are used for obtaining different metals such as iron, bauxite, etc. and non-metallic minerals are used in obtaining various chemicals like gypsum, rock salt, calcite, etc.

Think a little!

(1) Name the different metals from which the things in your house are made. Make a chart of things and metals.

(2) List the occupations carried out on land.

- In all the figures except for fishing, all the activities of obtaining natural resources are being carried out on land.

This means that land is also a natural resource. Living things that are born on land grow, live and die on land itself. Land is an invaluable resource. That is why it is sold or bought. Obtaining land at strategic locations, using it for construction as well as trade are some other uses of this resource.

Depending on the characteristics like physiography, soil, climate, minerals, and availability of water in different regions of the world, land is used for various purposes. The proportion of land on earth is 29.20%. Depending on the characteristics of land and climate, various living things are found on the land in different proportions. The distribution of these living organisms, including humans, is not uniform. All living things try to adapt to the various geographical conditions like a rocky terrain, steep slopes, flat plains, mountainous regions, forest covered areas, river basins etc. Man alone attempts to make changes in the prevailing conditions to suit his needs.

Every living thing makes use of natural resources according to its need. However, man started using many of these resources for himself alone with the help of his intellectual power. Later, the increase in population and the greed of humans led to exploitative use of resources. This began to upset the balance in nature. This means that it is necessary that man also must use the natural resources only according to his needs and in a judicious manner.

What will you do?

Consider that you have gone for a stay at Manglu's hamlet. You observe that the conditions of people who live there is not good. Many people take food only once in a day. Most of the people in the hamlet are engaged in the work of dressing stones. There is a vast forest around Manglu's hamlet. A number of streams, brooks, waterfalls, hills, etc. have made the region beautiful. There is good potential for tourism. What can you do to change the conditions of the people in Manglu's hamlet?

Always remember.

Man has to depend on nature for many things, whatever the extent of his progress. Nature is not for man alone. It belongs to other living things too. Therefore we should always use natural resources, judiciously.

I can do this!

- *Identify the natural resources.*
- *Remember that the natural resources have to be used in a judicious manner.*
- *Tell the use of different natural resources.*

Exercises

(A) What is the use of the following resources?

(1) Water

(2) Forests

(3) Animals

(4) Minerals

(5) Land.

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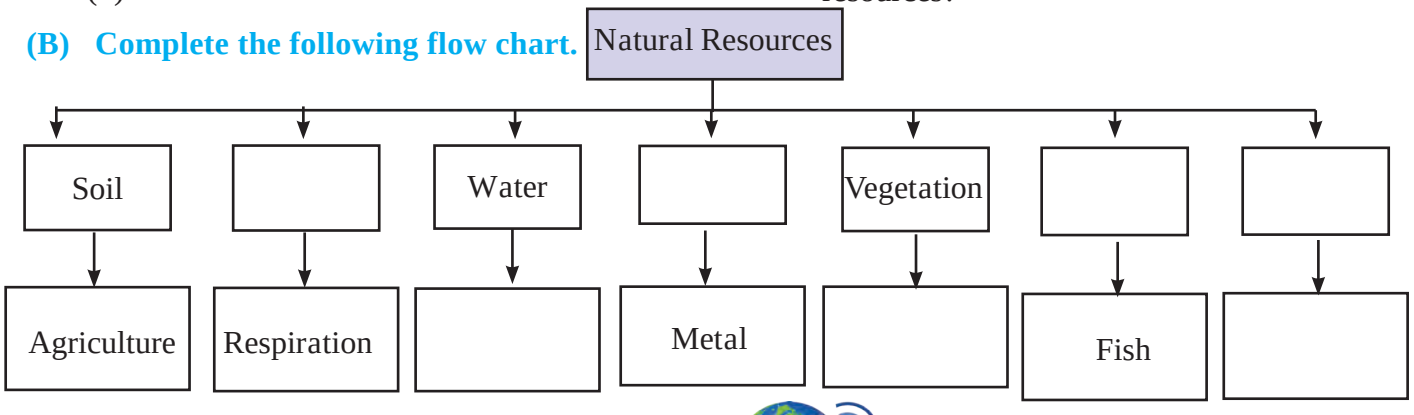
(B) Complete the following flow chart.



(C) Answer the following questions.

(1) What factors influence the formation of soil?

(2) Which products are obtained from forests?

(3) What are the uses of minerals?

(4) What are the purposes for which land is used?

(5) Why is it necessary to conserve the natural resources?

❊ Activity

Collect the pictures and write information about the sources of fresh water.

Websites for reference

- http://kids.mongaby.com
- http://www.nakedeyeplanets.com

9. Energy Resources

Can you tell? Observe the pictures and answer the questions.

Figure 9.1 : Studying in the Light of a Lantern

Figure 9.2 : Use of Mineral Oil

Figure 9.3 : A Pinwheel, Winnowing

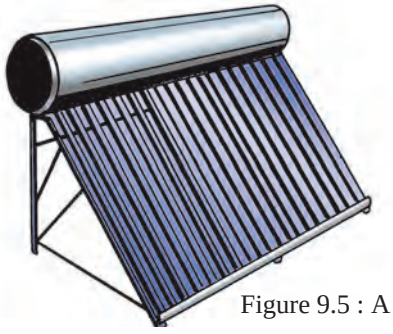


Figure 9.5 : A Solar Energy Panel

Figure 9.4 : Using Natural Gas as Fuel

- Which energy resource is used in figure 9.1 to obtain light?
- Where did this resource come from?
- Figure 9.2 shows fuel being filled in a motorcar. From where was this energy resource brought to the pump?
- Figure 9.3 shows Malati with her pinwheel and her father winnowing grain. Who is helping both of them?
- Which energy resource is used for lighting a lamp, running a rickshaw and heating oil as shown in figure 9.4?
- What are the various purposes for which man can use sunlight?
- For which of the above energy resources do we have to spend money?

- Which of these energy resources are available free of cost?

Explanation

We engage in various activities to fulfil our needs, for which we need energy. In the past, human labour and animals were used for many tasks. Gradually, man's needs increased and with it, several changes took place in the use of energy resources and devices. Still, man mainly obtains this energy from nature. You must have realized this while answering the above questions. We use petrol, wind, natural gas, sunlight, etc. besides other resources.

Energy resources can be classified in many ways such as conventional–non-conventional, biotic-abiotic, renewable – non-renewable, substance-based – process-based, etc. Let us consider the last classification. The following table shows the characteristics of the energy resources through their classification.

Substance-based Energy Resources	Process-based Energy Resources
Examples - Wood, coal, mineral oil, natural gas, waste matter, atoms.	Examples - The sun, wind, water, tides, and heat from the earth's interior.
Substances do not last perpetually.	Natural processes are perpetual.
Substances get used up.	Processes are always available.
Reuse is not possible.	Reuse is possible.
Availablity is limited.	Availablity is unlimited.
Takes thousands of years to replenish them.	These are easily available in nature.
Except for atomic energy, all other resources are biotic.	All processes are natural.
Generation of energy leads to pollution.	Generation of energy is pollution-free.
Except for atomic energy, all other resources are conventional.	All these resources are non-conventional.
Generation of energy is relatively cheap.	Developing the technology for the use of these resources is expensive.
Being inflammable, these resources cause damage to the environment.	In the long run, these energy resources are environment-friendly.
Type of power generation: Thermal and atomic.	Type of power generation: Thermal and kinetic.

Figure 9.6 : Cooking on a Stove

Figure 9.7 : Roasting on a Coal Burner

Figure 9.8 : Cooking on a Kerosene Stove

Figure 9.9 : Removing Baked Items from an Oven

Figure 9.10 : Cooking on a Gas Stove

Using these energy resources, we can undertake the following kinds of power generation – hydel power, thermal power, atomic power, geo-thermal power, etc. In thermal power stations, it is necessary to burn the energy resources directly to generate electricity. Kinetic energy can also be used to generate power or electricity.

Do it yourself !

Figures 9.6 to 9.10 show that various energy resources are used for cooking food. List them. Now classify them using the chart we have studied. Discuss whether we can use alternate energy resources for cooking.

Do you know?

The demand for energy is constantly on the rise due to the growing needs of human beings. Solar energy and wind energy are easily available to us. But the power generated using these resources has to be stored in sufficient quantities to ensure continuous power supply. At present, it is very expensive to store this energy. Effects are on to make these resources affordable through research.

Explanation

✲ Substance-based Energy Resources

- **Wood:** In villages, wood is used on a large scale for cooking on earthen stoves.

Figure 9.11 : Cooking on an Earthen Stove

- **Coal:** Long ago, plant and animal remains got buried due to earth movements. They were then decomposed due to pressure and heat, leaving behind the element, carbon. That is how coal was formed.

Coal is used for different purposes according to its quality. Low-quality coal is used for cooking, and coke and high-quality coal is used in industries, as also in thermal power stations.

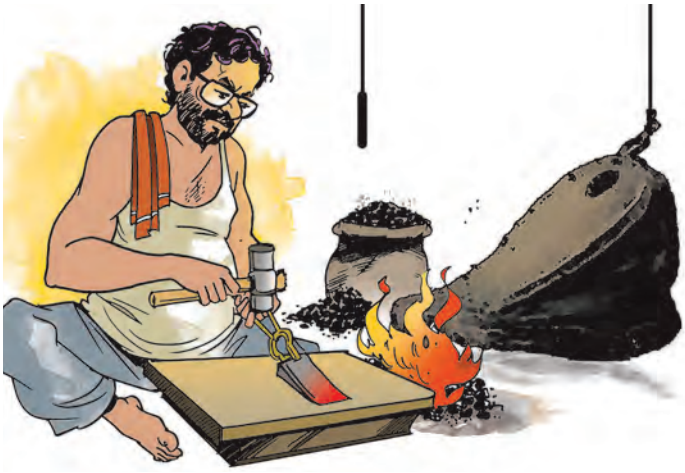


Figure 9.12 : A Blacksmith at Work

- **Mineral oil and natural gas:** Like coal, these were also produced due to earth movements. Mineral oil is found under land surface and also below the ocean floor.

Figure 9.13 : Oil Rig

In most of the mineral oil wells, reserves of natural gas are also found. Mineral oil reserves are limited in nature. However, this oil is in great demand. Hence, its cost is very high. It is called 'black gold' because it has a blackish colour and it is costly. These energy resources are used in thermal power generation. Study the distribution of mineral oil and coal fields in India as shown in figure 9.14.

Make friends with maps!

❇ Use the map to answer the questions given below it.

Figure 9.14

- Name the States which have coal fields.
- Name the mineral oil field in the Arabian Sea.
- Name two States which have coal fields on a large scale.
- Which mineral oil fields are located in North-east India?
- The reserves of which mineral are found in the Godavari basin?
- Which of the States have mineral reserves in the Godavari basin?

- **Biogas** : Biogas can be generated from biotic waste material such as faeces of animals, and dead leaves, shells etc. This energy can be used for domestic needs such as cooking, heating water, lighting lamps, etc. Some farmers have raised biogas plants in their own yards to cater to their domestic needs.

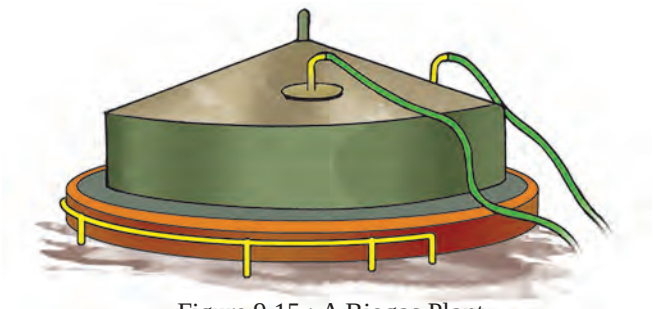


Figure 9.15 : A Biogas Plant

- **Energy from Waste Material :** Waste is generated daily on a very large scale in big, metropolitan cities. Waste disposal is a major problem in such places. This waste can be segregated to use the biotic component to generate gas. This gas can then be used to generate power. In future, this may help to solve the problem of waste disposal in cities. Also, the cities can become self-reliant in terms of their power requirement.

Figure 9.16 : A Plant for the Generation of Energy from Waste

The above energy resources are known as bio-fuels because they originate from the remains of dead plants and animals.

- **Atomic Energy:** Splitting of the atoms of minerals like uranium and thorium can be used for power generation. In this process, using very small quantities of minerals, energy can be generated on a very large scale. Only a few countries in the world like India, U.S.A., Russia, France, Japan use atomic energy.

Figure 9.17 : An Atomic Power Generation Plant

✻ Process-based Energy Resources

- **Hydel Power** : Hydel power is the power obtained from the kinetic energy of running water. Hydel power does not cause any degradation of the environment. Also, the water used in generating power can still be used again. Bhakra-Nangal in the Punjab and Koyna in Maharashtra are examples of this.

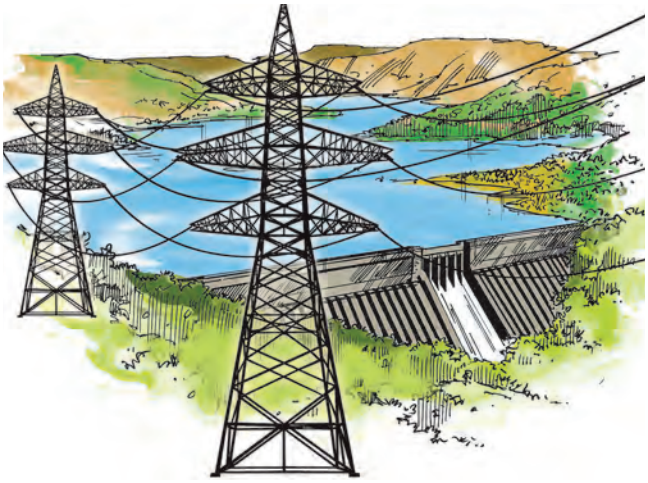


Figure 9.18 : Hydel Power

Name four hydel power stations in our State.

Do you know?

- Nowadays, electricity can be transmitted up to a distance of 800 km from the power generation centre without any transmission loss. Beyond this distance, it cannot be transmitted without loss.
- The power obtained from 1 kg of uranium is equivalent to the power obtained from 10,000 tonnes of coal.
  (One tonne = 1000 kilograms).

- **Wind Energy**: Man has been using this resource since hundreds of years, for example, in sailboats. But nowadays, wind energy is being utilized for power generation. For power generation, a wind speed of 40 to 50 kmph is required. Due to this wind speed, the blades of the windmills turn, generating kinetic energy. This kinetic energy is further converted into electricity.

Figure 9.19 : Wind Energy

This electricity can be used for agriculture, domestic use and industries. In the States of Maharashtra, Karnataka, Tamil Nadu, etc. windmills have been erected at many places.

- **Solar Energy** : We get light and heat from the sun. We have seen that the intensity of solar energy is the maximum in the torrid zone. In a country like India which is in the torrid zone, there is a lot of scope for using this energy. There is a solar power plant at Sakri in Dhule district of Maharashtra. Devices like cookers, lamps, heaters, vehicles can be run on solar power. The generation of solar power depends on the intensity of sunrays and the duration of sunshine.

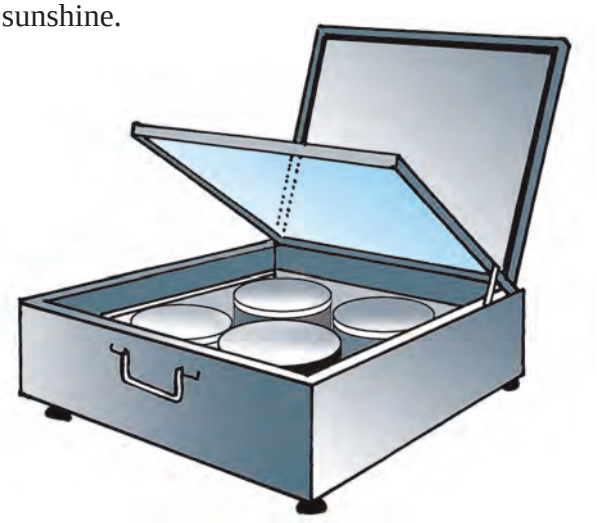


Figure 9.20 : A Solar Cooker

- **Tidal Energy :** Sea waves and tides are movements of ocean water that go on continuously. A technology has now been developed to generate power with the help of the speed and force of waves. Here, too, electricity is obtained from kinetic energy. This energy is pollution-free and everlasting. It can be used on a large scale in a country like India. Efforts are on to start such projects in India.

Figure 9.21 : Energy from Oceanic Water

Do you know?

There are some large-scale solar energy projects –

- Agua Caliente Solar Project (Arizona, U.S.A.)
- California Valley Solar Unit (California, U.S.A.)
- Golmud Solar Park (China)
- Charanka Solar Park (Patan, Gujarat)
- Welspun Energy Project (Madhya Pradesh)

- **Geo-thermal Energy** : Hot water springs have always been an object of curiosity for man. They can be seen at Unapdeo, Vajreshwari, Manikaran, etc.

The temperature in the earth's interior increases by one degree Celsius (1°C) at a depth of every 32 metres. Man has now developed a process whereby this underground heat can be utilized to generate power. One such project is located at Manikaran, Himachal Pradesh in India.

All the above energy resources are abiotic. They cause minimum pollution. They are also known as inexhaustible energy resources.

Figure 9.22 : A Geo-thermal Power Generation Centre

Do you know?

The distance from the earth's surface to its centre is 6373 km. The temperature at the centre is around 4000°C.

Do it yourself !

Form groups of five to eight. Each group should select one or two energy resources. They should use the following points to collect information about the resource they have selected. Collect it from the internet, reference books, newspapers, TV programmes, etc. and also through group discussions.

- Name of the energy resource
- Use of the energy resource
- Estimated cost of power generation
- Advantages and drawbacks in using the energy resource
- Cuttings, pictures, and other available data about the energy resource.
- Environment-friendliness of the energy resource.
- Other alternatives to the energy resource.

Compile the information and present it in the classroom. Choose the best and the most environment-friendly energy resource with the help of all the presentations.

Energy resources must be used very carefully. The demand for energy is increasing all the time due to growing population, urbanization and growing needs of man. It is necessary to use alternative and non-conventional energy resources to meet these needs. It is also necessary to use energy frugally. We must always avoid unnecessary use of electricity. It is easily possible for us to do so.

What will you do?

The whole family has decided that every week, a whole day's electricity is to be saved. What preparation will you make for this purpose?

I can do this!

- *Identify the energy resources among natural resources.*
- *Tell the use of energy resources.*
- *Use energy resources judiciously.*
- *Give information about energy resources in India.*
- *Identify environment-friendly energy resources.*

Exercises

(A) What resource will have to be used for the following work –

(1) Rohan wants to fly a kite.
(2) People in an Adivasi hamlet have to be protected from the cold.
(3) Cooking on a picnic.
(4) Salma wants to iron her clothes.
(5) Starting a railway-engine.
(6) Heating water for a bath.
(7) After sunset, making light available inside the house.

(B) Answer the following questions.

(1) Which energy resource does man use the most? Why?
(2) Why are energy resources needed?
(3) Why do we need to use environment-friendly energy resources?

(C) Explain the differences using the points in the brackets.

(availability, environment-friendliness, advantages and drawbacks)

(1) Mineral oil and solar energy
(2) Hydel power and power from geo-thermal source

*** Activity**

Show the power generation centres on an outline map of India. Write about one of them. Supplement the information with pictures.

Websites for reference

- http://en.wikipedia.org
- http://www. sesky.org
- http://www.globalsecurity.org
- http://geography.about.com

What kind of energy is produced with the help of the devices shown in the photograph?

48SDSC

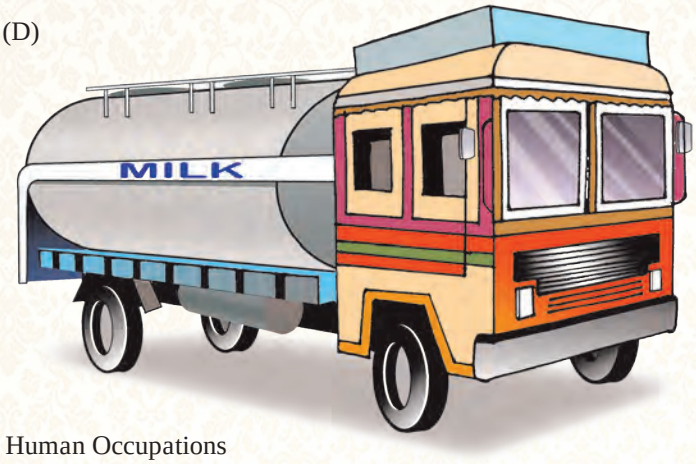
10. Human Occupations

(A)

(B)

(C)

(D)



Answer the following questions after observing the pictures in figure 10.1.

- What are the cows and the buffalo in picture A doing?
- What is being obtained in picture B?
- What is happening at the Milk Collection Centre in picture C?
- In picture D, what is being transported? Where could the tanker be going?
- Which products are seen in picture E? From what have these products been made?
- What else is happening in picture E?
- Out of the products shown in picture F, which products do you use?
- What would be the main difference between milk and milk products?
- Do these products perish quickly like milk?

Explanation

All the above pictures are related to the rearing of domestic animals, obtaining milk from them, selling milk, processing milk at milk processing centres, making ghee, butter, cheese, *shrikhand*, paneer, milk powder, etc. from milk, selling them in the market, etc. This work is carried out at different levels. Man undertakes all these activities to satisfy his own needs. We classify these activities on the

Figure 10.1 : Human Occupations

basis of their nature and the products they yield.

Now look at the pictures again and answer the following questions.

- Which of these activities is undertaken to obtain a product from nature?
- Which product is obtained through it?
- How long does this product last?
- In which picture is the product obtained from nature being collected?
- Which service did the milk producer get through this activity?
- Where is the milk being taken? What happens to the milk thereafter?
- What milk products are seen in the picture?
- Who inspects these products?
- What does the shopkeeper do with these products?
- Which of these products are perishable and which are non-perishable?
- Will the price and weight of these products be same as that of the milk?

The teacher should have a detailed discussion about this with students.

Use your brain power!

Milk is available at Rs 40 per litre while *dahi* at Rs 60 per kg and paneer at Rs 200 per kg. If both are obtained from milk, why is there so much difference in their prices?

- We carry out many activities to fulfil our needs. We have many occupations, industries, trades, etc. Some of these activities are directly dependent on nature. It means that the products obtained in these activities are obtained directly from nature. Cows and buffaloes are animals. We domesticate them. See picture A. We get milk from them. Therefore, this occupation is directly dependent on nature. Such occupations which are dependent on nature are called primary occupations, e.g. animal husbandry, fishing, etc.
- Some products obtained in primary occupations are used directly while others are used after making some changes in them. Now see picture E. In this picture, the milk is being processed after bringing it to the dairy, that is, the product obtained from nature is processed and made into different products. These products are more durable. Their quality has enhanced too. And, therefore, their price is also higher. For example, *shrikhand*, butter, cheese and milk powder are processed from milk. This processing is an industrial activity. Industries are based on raw materials. More durable goods are produced in an industry. The raw material supplied to the industries is often obtained from nature, i.e., from primary occupations. Occupations dependent on primary occupations

(E)

(F)

are called secondary occupations.

- Now look at pictures C, D and F. You will see milk collection and sale of milk, transport of milk and sale of milk products respectively. All these activities are related to the products of primary and secondary occupations. Many a times, these occupations provide complementary services to the other two occupations. Such occupations are called tertiary occupations. These occupations are complementary to all other occupations. These occupations are also called 'service occupations'. These include transport of goods, loading and unloading of goods and sale of goods, etc.
- Now look at picture E. Here you can see a person testing the prepared milk products. This person is testing the 'quality' of the products. To do this work, the person must have some special skills. This is also a type of service. But this service is not an ordinary one. It requires special expertise and therefore such services are called quaternary occupations.

Not all the services are directly related to primary or secondary occupations, for example, those of a driver, knife grinder, policeman, the postal service, etc.

Think a little!

- Who examines us when we fall ill?
- Who checks our examination papers?
- Who prepares the designs of buildings?
- Who produces machines and looks after their maintenance and repairs?

Look at the pictures in figure 10.2 carefully. We are learning the classification of occupations. See if you can answer the following questions related to sugar production.

- Classify the occupations from primary to quaternary.
- Which raw material is used in the secondary occupation?
- Which is the finished product obtained in the secondary occupation?
- Which are the services in tertiary occupations?
- Which picture is related to a quaternary occupation? Can you name that occupation?

Try this activity.

Think of more such chains of occupations. Draw their pictures and classify them from primary to quaternary as above.

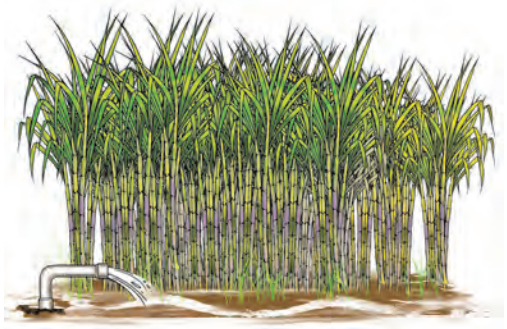
Think and Discuss

What effect does nature have on our occupations? Think a little. Give a thought to the following issues. Discuss them in the class. Write two paragraphs about it.

- There have been no rains at all (drought).
- A storm strikes.
- There was an earthquake.
- Untimely rains.
- Good rains.
- Excessive rains and floods.
- All of a sudden, a volcano erupts.
- A tsunami hits.

Do it yourself !

- Which occupations are found in your area?
- Which occupation is practised on a large scale?
- Find the reasons behind it.
- Discuss and find the reasons behind a particular industry being located in your area.
- Both human and natural factors affect occupations. Can you find those factors?
- Obtain information about the damage caused to the environment through different occupations.

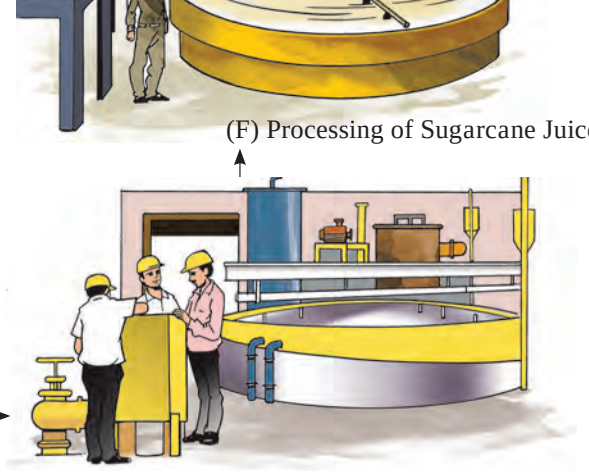


(A) Sugarcane Field

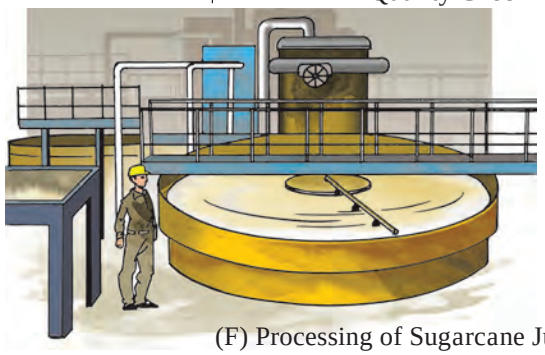
(B) Harvesting of Sugarcane

(C) Transport of Sugarcane

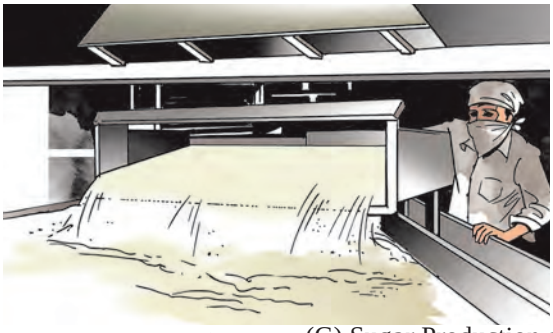
(D) Sugarcane being Collected at the Factory



(E) Inspection and Maintenance of Machinery in the Factory



(F) Processing of Sugarcane Juice



(G) Sugar Production and Quality Check

(H) Sacks of Sugar being Carried

(I) Sale of Sugar

Figure 10.2

This is how we classify the human occupations. Different occupations are practised in different countries of the world. Through these occupations, economic transactions occur within a country and between various countries. These transactions decide the country's production of various goods and their annual income. This, in turn, is used to decide the extent of the country's development.

Observe figure 10.3. These pie charts show the percentage of manpower engaged in various occupations in the countries of Bangladesh, United Arab Emirates (UAE) and Turkey. Each pie chart shows the percentage of primary to tertiary occupations. Answer the following questions on the basis of the pie charts.

- Which country has more manpower engaged in primary occupations?
- Which country has more manpower engaged in secondary occupations?
- Which country has more manpower engaged in tertiary occupations?
- Which country has almost equal manpower engaged in all the occupations?

Countries which have more manpower engaged in tertiary activities are considered to be developed countries while countries which have more manpower engaged in primary activities are considered to be developing countries.

Now rank the countries above from developed to developing.

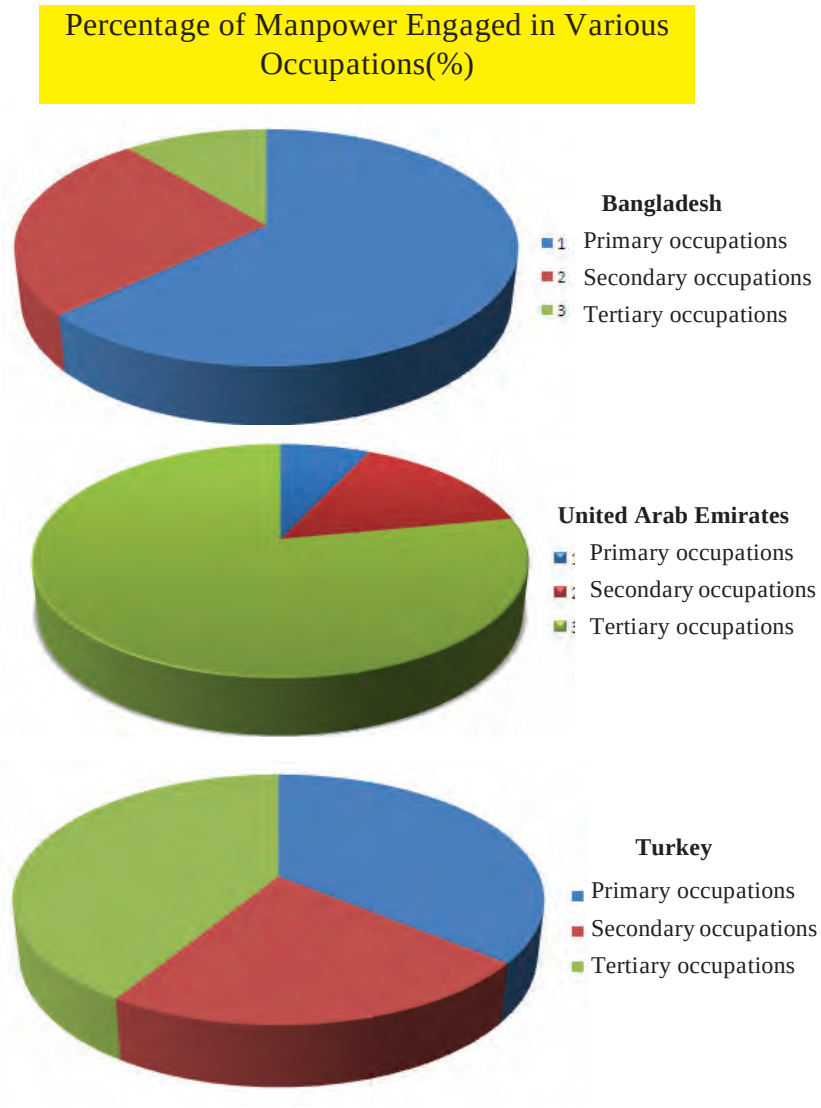


Figure 10.3 : Percentage of Manpower Engaged in Various Occupations in Some Countries

I can do this!

- *Name different occupations.*
- *Tell the difference between various occupations.*
- *Classify the occupations from primary to quaternary.*
- *Identify the factors that affect the various occupations.*

Exercises

(A) Select the correct option :

(1) Serving as a ..... is a tertiary type of occupation.

(a) bus conductor (b) veterinary doctor

(c) brick kiln worker

(2) In the tropical areas, we mainly see ..... occupations.

(a) primary (b) secondary

(c) tertiary

(3) Amol's Granny sells *papads* and pickles. Which type of occupation is it?

(a) primary (b) secondary

(c) tertiary

(B) Give reasons :

(1) The type of occupation determines a person's income.

(2) Primary occupations are associated with developing countries while tertiary, with developed countries.

(3) Quaternary occupations are not commonly seen.

❊ Activity

Visit a secondary occupation in your area. Gather information related to that occupation using the following points and note it down.

- Name of the occupation
- Raw material used
- Source of raw material
- Finished product
- Market for finished product
- Tertiary occupations required in it.

4929TZ

Websites for reference

- http://en.wikipedia.org
- http://geography.about.com
- http://www.fourmilab.ch

Specimen picture of a student's collection

Glossary

Geographical Terms and their Meaning

- **abiotic:** non-living components in the environment, e.g., air, water, minerals, etc.
- **Antarctic Circle:** the parallel of latitude in the southern hemisphere having an angular distance of 66°30' from the equator. This parallel demarcates the limit of sunshine duration. The maximum duration of sunshine to the north of this latitude is up to 24 hours whereas it goes on increasing towards its south and becomes 6 months at the South Pole.
- **Arctic Circle:** the parallel of latitude in the northern hemisphere having an angular distance of 66°30' from the equator. This parallel demarcates the limit of sunshine duration. The maximum duration of sunshine to the south of this latitude is up to 24 hours whereas it goes on increasing towards its north and becomes 6 months at the North Pole.
- **atomic energy:** the energy that gets generated through the splitting of an atom. This energy is obtained by using some specific minerals like uranium, radium, thorium, etc. that are available in nature.
- **basalt:** a type of igneous rock. It is formed after the cooling of the lava that is ejected out during a volcanic eruption. Basalt is impervious, heavy and compact. This rock has a high proportion of iron.
- **Bhuvan:** the database created by the Indian Government with the help of indigenous remote sensing information and computer technology. It works in the same way as Google Maps or Wikimapia. This technology is totally of an Indian origin. It can be used for preparing maps and fixing the location of places.
- **biogas:** gas released by bio-waste. Biogas can be produced from litter, animal excreta, etc. Biogas is inflammable and hence it is used as an energy resource for domestic use.
- **biotic:** the living component of the environment. It includes plants, animals and micro-organisms.
- **cloud:** a floating cluster of microscopic water droplets and snow particles in the atmosphere.
- **continentality:** a condition of being in the interior part of a continent. As there is less moisture in these regions, the air is generally dry. Hence the climate becomes extreme. The difference in the day and night temperatures (range of temperature) is high. The difference in the temperatures of the summer and winter seasons is also pronounced.
- **conventional:** the things that are followed for a long period of time. We have been using energy resources like wood, coal, mineral oil, etc. since centuries. Hence these energy resources are called conventional resources.
- **economic transactions:** the exchange of money, or of money and articles. Such exchanges take place at places like the share market, banks, markets, etc.
- **energy resources:** such resources from which energy can be generated, e.g., coal, mineral oil, wind, running water, etc.
- **equator:** 0° parallel of latitude. It bisects the earth into the northern and southern hemispheres. It is the largest parallel (a great circle).
- **forest cover:** land occupied by forests. Mostly, the forest cover develops in a region through the natural growth of plants. It takes many years for a forest cover to develop. Forests mainly house indigenous plants that grow naturally.
- **Geographical Information System (GIS):** The database of geographical information created through statistical methods. This can be used for discovering new characteristics of the planet earth. This has been mainly used in remote sensing technologies.
- **Global Positioning System (GPS):** a technique for determining the location of any place on the earth with the help of satellites and computers. The GIS program is used in this technology.
- **globe:** a spherical model of the earth.
- **graticule:** an imaginary network formed on the

surface of the earth by parallels of latitude and meridians of longitude intersecting one another.

- **green house gases (GHG):** such gases in the atmosphere which retain the heat. Due to these gases, air temperature increases. These gases include carbon dioxide, chlorofluorocarbon (CFC), water vapour, etc. Due to the increase in the radiation of these gases in the earth's atmosphere, the temperature of the earth is increasing.
- **hemisphere:** half part of a sphere. The northern and southern hemispheres of the earth get defined by the equator. Similarly, considering 0° and 180° together, the eastern and western hemisphere get defined.
- **humidity:** the measure of the vapour in the air. It is expressed as a percentage.
- **humus:** decomposed biotic material in the soil. It includes roots of plants, litter, etc. Completely as well as partially decomposed biotic materials are both part of humus.
- **igneous rock:** a rock formed after the cooling of lava. This gets formed on the surface of the earth or below it. Its types are identified by the chemical constituents in the rock. The types are granite, basalt, dolomite, etc.
- **industrialization:** development and concentration of various types of manufacturing or assembly units in a region. Growth of industries is a measure of the economic prosperity and rise in the standard of living. However, industrialisation also leads to issues like pollution and environmental degradation.
- **isotherm:** a line on the map joining places of equal temperature is called an isotherm.
- **latitude:** the angular distance of a place from the equator. This distance is measured at the centre of the earth on either side of the equator. (north and south)
- **lava:** the hot and semi-fluvial material that is poured out during a volcanic eruption. Extrusive igneous rocks are formed out of lava.
- **longitude:** the angular distance of a place from the Prime Meridian.
- **magma:** the molten material located below the crust of the earth. It is mostly semi-fluvial in nature. The magma at times gets cooled and solidified in the crustal portion. Such solidified magma gives rise to intrusive igneous rocks.
- **metamorphic rock:** a rock formed out of igneous or sedimentary rocks through the process of re-crystallization of the minerals, caused by intense heat and excessive pressure.
- **minerals:** compounds formed naturally through inorganic processes. However, some minerals like diamond or graphite are in the form of singular elements. Minerals have a definite chemical composition.
- **natural resources:** items / things that are available in nature, and are used by humans, e.g., wood, minerals, etc. Humans satisfy their needs with the help of natural resources.
- **nearness to the sea:** The temperatures of coastal regions are influenced by the nearness of sea waters. Evaporation of sea water reduces the difference between the minimum and maximum temperatures in the coastal region. Hence, the climate here becomes equable.
- **North Pole:** The end of the earth's axis that points towards the Pole Star.
- **northern hemisphere:** half of the earth's sphere extending from the equator to the North Pole.
- **ocean current:** the oceanic water that travels with a greater speed. These currents move in a curved manner in the areas between the equator and the North or South Poles. Ocean currents are of two types–warm and cold currents. While the warm currents move from the equator to the North and South Poles, the cold currents move from the North and South Poles towards the equator. They perform a major role in maintaining the balance in the distribution of heat over the earth. Wind speed, differences in temperature and density of oceanic water are the major reasons for these currents.

- **parallel of latitude:** an imaginary circular line on the surface of the earth. The plane of its circle intersects the axis of the earth at a right angle. These circles are parallel to each other.
- **physiography:** the physical set-up of land in a region. It gets defined due to landforms like a plain, hill, valley, mountain, spurs etc. The elevation of land and steepness of slope vividly bring out the differences in the physiography.
- **planetary winds:** the winds that blow from high pressure belts towards low pressure belts occupying vast areas of the planet. They blow regularly. These include the easterlies (trade winds), westerlies and polar winds.
- **plankton:** the plant or animal micro-organisms floating in sea waters, or moving at a very slow speed. These are the feed for fishes. Hence, the areas of sea where planktons are abundantly found are the areas where fish population is always high.
- **precipitation:** the showering of water droplets or snow particles from the atmosphere on to the surface of the earth. Rainfall, snowfall, hailstones, etc. are forms of precipitation.
- **pressure belts:** These are high and low pressure areas over the globe. Pressure belts are the result of temperature differences across the latitudes. In the hot torrid zone, air expands, becomes lighter and moves upward. This gives rise to a low pressure belt. In the cold frigid zone near the Poles, temperatures are very low, air is dense. This gives rise to a high pressure belt. Besides these two, there exists a high pressure area around 350 north and south parallels, and a low pressure belt near the Arctic and Antarctic circles.
- **primary occupations:** Occupations that are directly related to and dependent on natural resources. In these occupations, natural resources are used or collected without any processing. In these occupations, the produce is a result of natural processes. Activities like agriculture, animal husbandry, mining, collection of forest produce etc. are included in this category.
- **Prime Meridian:** the meridian that passes through Greenwich city. This meridian is considered as zero degree meridian.
- **production:** (1) total quantity of products obtained from the raw material through a process or assemblage or manufacture of altogether different items, e.g., jaggery from sugarcane; steel from iron ore; automobile engine from spare parts. (2) the farm produce obtained from investment in agriculture
- **quaternary occupations:** a special group of service sector. These services require more specialized skills than the tertiary services. They require highly educated personnel. These services yield high returns. This group includes doctors, engineers, teachers, software engineers, etc.
- **range of temperature:** the difference between the mean maximum and mean minimum temperature of a place. The difference between daily max – min temperatures is called the diurnal range of temperature. The difference between the mean maximum and mean minimum temperatures in a year is called the annual range of temperature.
- **rock:** a homogeneous mixture of different minerals.
- **salt pan:** a shallow depression in the ground in which sea water evaporates to leave a deposit of salt.
- **secondary occupations:** occupations in which the raw material obtained or collected through primary occupations is processed to make new and more useful objects. Occupations like obtaining pure metals from metal ores, making furniture from wood are included in this category. Assembly industry is also included in this group.
- **soil:** the thin uppermost layer on the earth's surface. Its thickness is generally less than one metre. It contains minerals and biotic materials. The sand and finer particles in the soil are formed through the process of weathering and erosion, whereas the humus is created through the decomposition of biotic materials. The process of

soil formation is very slow. Soils are essential for the growth of plants. The climate of the region and the parent rock influence the type of soil.

- **South Pole:** the end of the earth's axis that is opposite to the North Pole.
- **southern hemisphere:** half part of the earth extending from the equator to the South Pole.
- **temperature:** a measure of the heat of an entity or a place.
- **tertiary occupations:** occupations supplementary to the primary and secondary occupations. Through these occupations, no production of objects takes place but they provide various services to the society. For example, tinning utensils, sharpening knives and scissors.
- **thermal belts:** the belts of high, moderate and low temperature formed on the surface of the earth due to its spherical shape and uneven distribution of heat received from the sun. Accordingly, tropical (torrid), temperate and polar (frigid) belts are identified. These belts influence the air pressure, winds and rainfall.
- **tides:** the periodic raising or lowering of sea-level caused by the combined effect of gravitational attraction by the sun and the moon, and the centrifugal force of the earth. The increase in the sea-level is called as high tide whereas the lowering of sea-level is called low tide.
- **Tropic of Cancer:** a parallel in the northern hemisphere at an angular distance of 23°30' from the equator. All the places located in the area between the equator and this parallel experience perpendicular sun rays twice a year. This parallel forms the northern limit of the apparent movement of the sun observed from the earth. After reaching this parallel, the sun appears to be moving towards the south.
- **Tropic of Capricorn:** the 23°30' parallel in the southern hemisphere. Up to this parallel, the sunrays can be perpendicular. All places located between the Equator and the Tropic of Capricorn experience perpendicular sunrays twice in a year. It defines the southern limit of the apparent movement of the sun. After reaching this latitude, the sun appears to move in a northward direction.
- **urbanization:** the transformation of a settlement or village into a town. This change involves changes in the area and population of the region. Urbanization includes increase in secondary and tertiary occupations, and spread of modern thinking. Smaller settlements / villages becoming part of larger cities is also called urbanization.
- **wave:** a wave is defined as a transfer of energy. Ocean waves travel through the medium of water. The water doesn't actually travel with the wave, but only moves up and down. It's the energy that travels with the wave. Ocean waves are usually generated by wind on the ocean's surface.
- **yield:** the production in comparison with the investment, e.g., production per hectare of wheat, or production per man hour.

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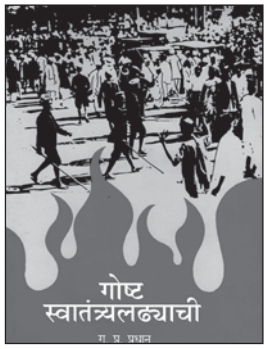

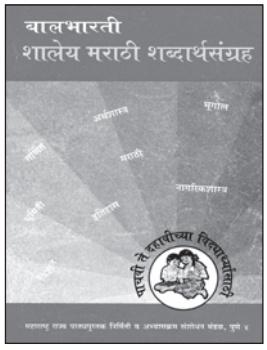

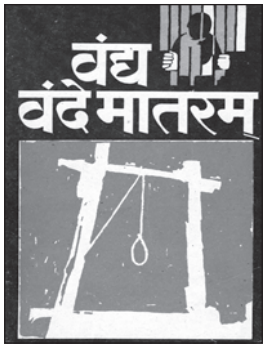

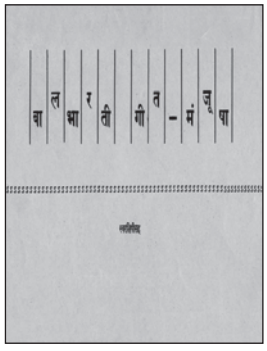

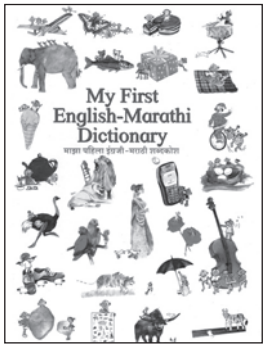

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