GOVERNMENT OF TAMILNADU

STANDARD SIX

TERM - III

VOLUME - 3

SCIENCE
SOCIAL SCIENCE

A publication under Free Textbook Programme of Government of Tamil Nadu

Department of School Education

Untouchability is Inhuman and a Crime

6th Science_IIIrd Term English Book_Unit_1.indd 1 27-09-2023 19:59:08

Government of Tamil Nadu

First Edition - 2018

Revised Edition - 2019, 2022, 2023

Reprint - 2020, 2021, 2024

(Published under New Syllabus
in Trimester Pattern)

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Content Creation

State Council of Educational Research
and Training

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Printing & Publishing

Tamil NaduTextbook and Educational
Services Corporation

www.textbooksonline.tn.nic.in

6th Science_IIIrd Term English Book_Unit_1.indd 2 27-09-2023 19:59:08

PREFACE

The Science textbook for standard six has been prepared following the guidelines given in the National Curriculum Framework 2005. The book is designed to maintain the paradigm shift from the primary General Science to branches as Physics, Chemistry, Botany and Zoology.

The book enables the reader to read the text, comprehend and perform the learning experiences with the help of teacher. The Students explore the concepts through activities and by the teacher demonstration. Thus the book is learner centric with simple activities that can be performed by the students under the supervision of teachers.

HOW TO USE THE BOOK?

- The Third term VI science book has six units.
- Two units planned for every month including computer science chapter has been introduced.
- Each unit comprises of simple activities and experiments that can be done by the teacher through demonstration if necessary student's can perform them.
- Colorful info-graphics and info-bits enhance the visual learning.
- Glossary has been introduced to learn scientific terms.
- The "Do you know?" box can be used to enrich the knowledge of general science around the world.
- ICT Corner and QR code has been introduced in each unit for the first time to enhance digital science skills.

Lets use the QR code in the text books ! How ?

- Download the QR code scanner from the Google play store/ Apple App Store into your Smart phone.
- Open the QR code scanner application
- Once the scanner button in the application is clicked, camera opens and then bring it closer to the QR code in the text book.
- Once the camera detects the QR code, a URL appears in the screen.
- Click the URL and go to the content page.

6th Science_IIIrd Term English Book_Unit_1.indd 3 27-09-2023 19:59:08

Table of Contents



Unit	Titles	Page No.	Month
1.	Magnetism	1	January
2.	Water	14	January February
3.	Chemistry in Everyday Life	32	March
4.	Our Environment	46	February
5.	Plants in Daily Life	66	March
6.	Hardware and Software	79	April

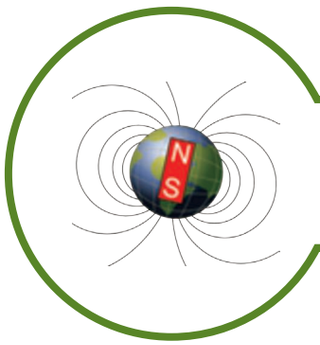
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Assessment

6th Science_IIIrd Term English Book_Unit_1.indd 4 27-09-2023 19:59:10



Unit 1 Magnetism



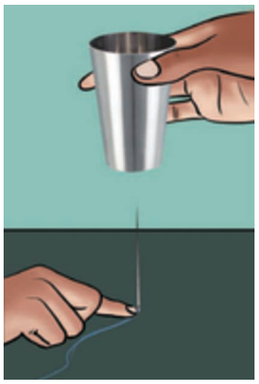
Learning Objectives

- To know about the discovery of magnets
- To identify Magnetic and Non Magnetic Materials
- To distinguish between north and south poles
- To list out the properties of magnets
- To explain the principle of Maglev Train

6th Science_IIIrd Term English Book_Unit_1.indd 1 27-09-2023 19:59:10

Introduction

You might have seen magnets. Have you ever enjoyed playing with them?



Take a steel glass with a small magnet in it. Take a needle through which thread is passed. Press the thread with a finger near the hole of the needle as shown in the figure and raise the glass upward slowly.

What happens?

_____

Observe the same activity performed by your teacher and note it.

_____

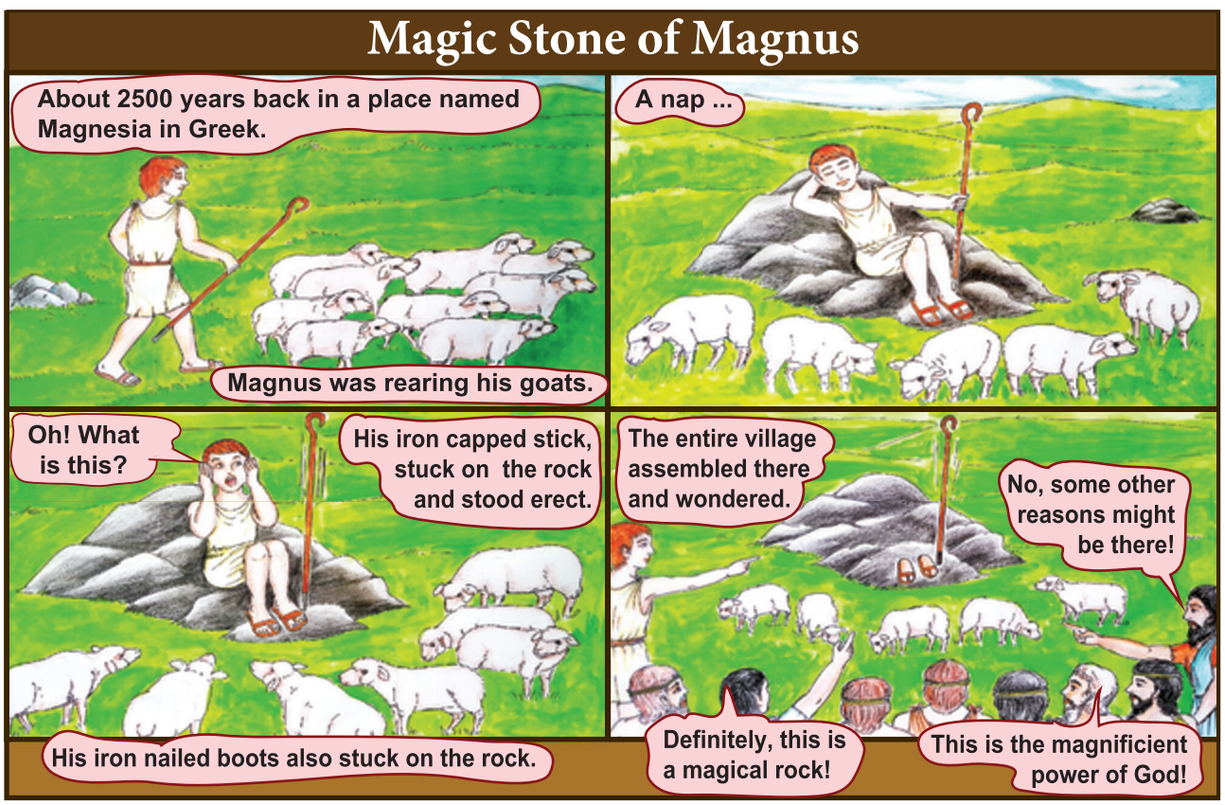
_____

Does the needle stand vertically up without touching the glass? Why does this happen?

_____

_____

1.1 Discovery of Magnets



People wondered about this incident. Each and everyone expressed their views. What might be the reason for the stick, to get stuck on the rock?

_____

Yes, you are right. That is a magnetic rock. People found it attracting not only for the stick of Magnus, but also for all the materials made of iron. The more rocks of these kinds were found worldwide. These magnetic rocks were named **'Magnets'** and the ore is called as

6th Science_IIIrd Term English Book_Unit_1.indd 2 27-09-2023 19:59:12

'Magnetite' after the name of the boy Magnus. The name is also supposed to come after the name of the place (Magnesia) in which it was found.

Magnetite, the ore with attracting property was found in that region. Magnetites are **natural magnets**. They are called magnetic stones.



Magnetite

Natural magnets do not have a definite shape. Since, they are used for finding direction, they are also called **'leading stones'** or **'lode stones'.**

1.2 Magnet of different shapes

After learning the method of changing the piece of iron into magnet (magnetization) we have been making and using several kinds of magnets. Such man-made magnets are called **artificial magnets**.

Bar-magnet, Horseshoe magnet, Ring magnet and Needle magnet are generally used artificial magnets.



Bar-magnet



Horseshoe magnet



Ring magnet

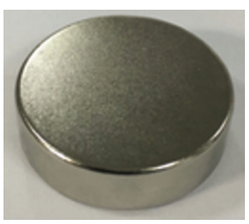


Needle magnet

Oval-shape, Disc shape, Cylindrical magnets are also available.



Oval-shape



Disc shape



Cylindrical shape

Activity 1: Take a magnet. Take the magnet closer to the objects surrounding you.

What happens? Observe and note.

The objects attracted by the magnet : _____

The objects, not attracted by the magnet : _____

Which substances are used to make the objects attracted by the magnet?

_____

6th Science_IIIrd Term English Book_Unit_1.indd 3 27-09-2023 19:59:14

1.3 Magnetic and Non Magnetic Materials

Substances which are attracted by magnet are called **magnetic substances**. Iron, cobalt, nickel are magnetic substances.

Substances which are not attracted by magnet are called **non-magnetic substances.** Paper, plastic are called non-magnetic substances.

1.4 Magnetic Poles

Place some iron filings on a paper. Place a bar magnet horizontally in the filings and turn it over a few times. Now lift the magnet. What do you see? Which part of the magnet has more iron filings sticking to it?



Which part of the magnet has almost no filings sticking to it?

The parts of the magnet those attract the largest amount of iron filings are called as its poles. **The attractive force of the magnet is very large near the two ends. These two ends are called its poles.**



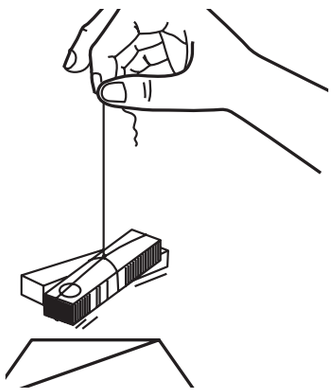
In experiments with magnets you will need to use iron filings again and again. You can do this by placing a magnet in a pile of sand and turning it around in the sand. The small pieces of iron present in the sand will stick to the magnet. If you cannot find sand you can look for iron pieces in clayey soil as well.

If you don't have iron filings, you can collect small pieces of iron and they will serve the purpose as well.

If you have a horseshoe magnet, or any other type of magnet at home, find the position of its poles by this experiment.

1.5 Finding directions with a magnet

Tie a piece of thread to the centre of a bar magnet and suspend it. Note, in which direction the magnet stops. Draw a line on a sheet of cardboard or the table along the direction in which the bar magnet stops



6th Science_IIIrd Term English Book_Unit_1.indd 4 27-09-2023 19:59:14

(i.e) a line parallel to the bar magnet). Turn the magnet gently and let it come to stop again. Repeat it three or four times.

Does the bar magnet stop in the same direction each time? _____

In which direction does the magnet stop every time? _____

This is roughly the north-south direction. The end of the magnet that points to the north is called the **North Pole.** The end that points to the south is called the **South Pole.**

A freely suspended magnet always comes to rest in north-south direction.



The directive property of magnets has been used for centuries to find directions. Around 800 years ago, the Chinese discovered that a suspended lode stone stops in the north-south direction. Chinese used these lode stones to find directions.

The navigators of that country used to keep a piece of lode stone suspended in their boats and during a storm or mist, they used the lode stone to locate directions.



1.6 Magnetic compass

A compass is an instrument which is used to find directions. It is mostly used in ships and airplanes. As a rule, mountaineers also carry a compass with them so that they do not lose their way in unknown places.

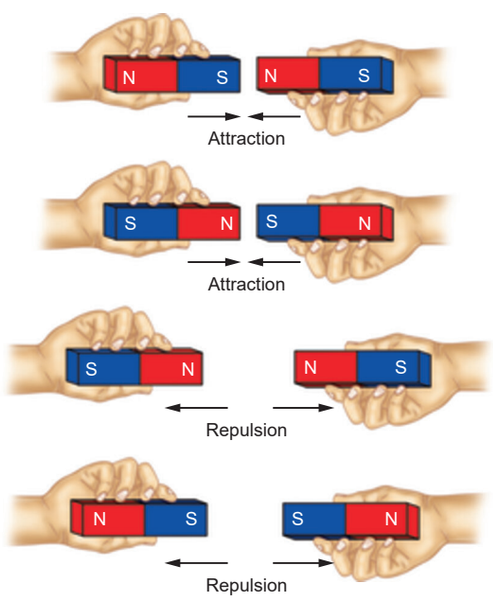


The compass has a magnetic needle that can rotate easily. The marked end of the needle is the North Pole of the magnet. **Can you use magnetic compass to find west direction?** Ask your teacher to help you in using magnetic compass.

1.7 Properties of Magnets

Attraction or Repulsion

Take two similar magnets, place them in four different ways as shown in Figure.



6th Science_IIIrd Term English Book_Unit_1.indd 5 27-09-2023 19:59:15

What do you observe? When do the magnets attract each other?

_____

_____

When do the magnets repel each other?

_____

_____

Unlike poles (S-N, N-S) attract each other. Like Poles (N-N, S-S) repel each other.

Activity 2: **LET US MAKE MAGNETS**

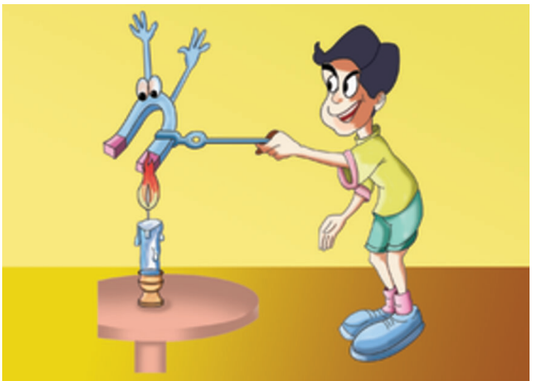
Take a nail / a piece of Iron and place it on a table. Now take a bar magnet and place one of its poles near one edge of the nail / piece of Iron and rub from one end to another end without changing the direction of the pole of the magnet. Repeat the process for 30 to 40 times.



Bring a pin or some iron filings near the nail / piece of Iron to check whether it has become a magnet. Does the nail/ piece of iron attract the pin / iron filings? If not, continue the same process for some more time.

1.8 Do magnets lose their properties ? When?

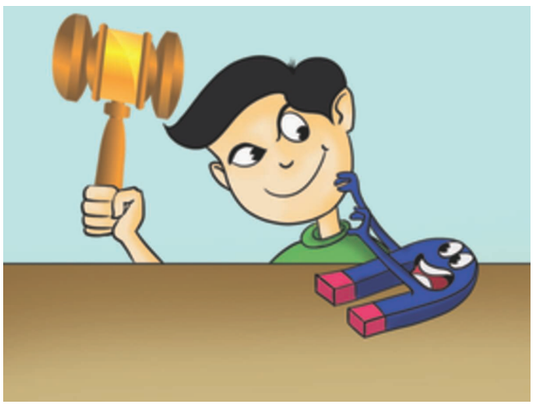
Magnets lose their properties if they are heated or dropped from a height or hit with a hammer.



When heated



When dropped



When hammered

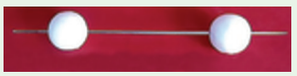


Magnets lose their properties when they are placed near Cellphone, Computer, DVDs. These objects will also get affected by magnetic field.

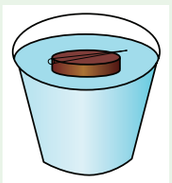
6th Science_IIIrd Term English Book_Unit_1.indd 6 27-09-2023 19:59:16

Activity 3: **Make your own magnetic compass**

Insert the magnetized needle, that you made in the activity 2, in to two styrofoam balls (Thermocol balls) and place the needle in bowl of water. Test whether the floating needle is always turned in rest on north - south direction.





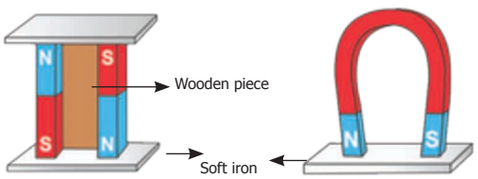




Note: If you don't have styrofoam balls you can use dry leaf or a cork piece.

1.9 Storage of Magnets

Improper storage can also cause magnets to lose their properties. To keep them safe, bar magnets should be kept in pairs with their unlike poles on the same side. They must be separated by a piece of wood and two pieces of soft iron should be placed across their ends.



For a horse-shoe magnet a single piece of soft iron can be used as a magnetic keeper across the poles.

1.10 Usage of Magnets

We use various equipment with magnets in day to day life.

Discuss with your friends about the usage of the magnets in the following instances.


In speakers


In small electric motors


In some door locks


Bags


In some toys


In compasses


In pencil boxes


Stickers on refrigerators


Phone covers

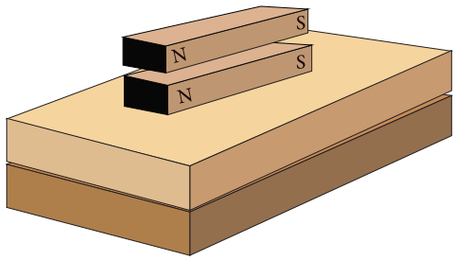

Pin holders


Magnetic crane

6th Science_IIIrd Term English Book_Unit_1.indd 7 27-09-2023 19:59:23

1.11 Science Today – Bullet Trains

We Know that Like poles of the magnet repel each other. Keep two Bar magnets as shown in the Figure.



What do you observe? _____

By using repulsion we can levitate a magnetic object. Let us make a toy and enjoy magnetic levitation.

Levitating propeller


Ring magnets

Bottle propeller




Plastic bottle filled with sand


Tape


Scissors


Stiff plastic straw

1 Make a propeller from a 500-ml plastic bottle. Make a hole in the bottle lid.



2 Screw the lid with the hole on a bottle half filled with sand. Press fit a stiff straw in the lid. Embed the straw in the sand to make it stand erect.







Place a few ring magnets in the straw. Similar poles will repel each other.

4 Like poles repel and this levitates the bottle fan. The ceiling fan makes it spin.





3 Place two magnets each inside and outside the propellor lid.These magnets will automatically stick to each other.



5 Place the propeller on the stiff straw.Ther magnets in the straw and the propeller should repel each other. This will make the propeller levitate. On placing it under a ceiling fan the propeller will spin very fast!



Have you enjoyed with this toy? Electromagnetic train is working in the same principle. Have you heard about it?

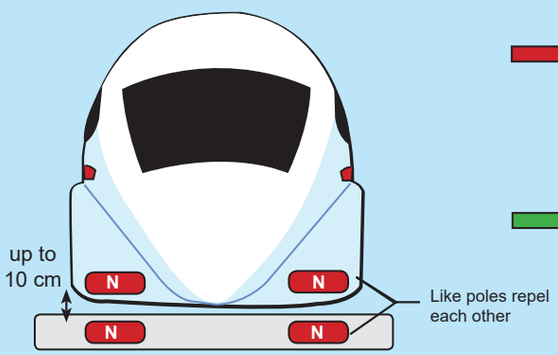
Electromagnetic train is called as suspension train and also called as flying train. It does not require diesel or petrol. This technology uses the property of magnetic attraction and repulsion to run these super fast electromagnetic trains.

6th Science_IIIrd Term English Book_Unit_1.indd 8 27-09-2023 19:59:24

Maglev Train

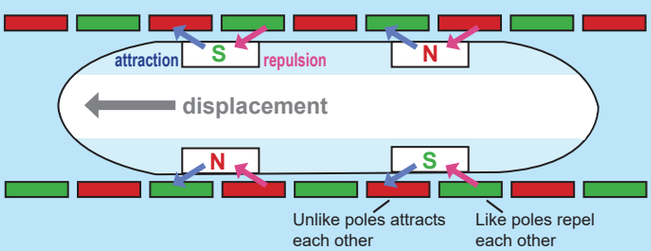


Levitation



Propulsion

- By using attraction and repulsion at the same time the train move forward. The magnets are controlled by electricity.



Key features



No friction	High speed	No noise

Which Countries?

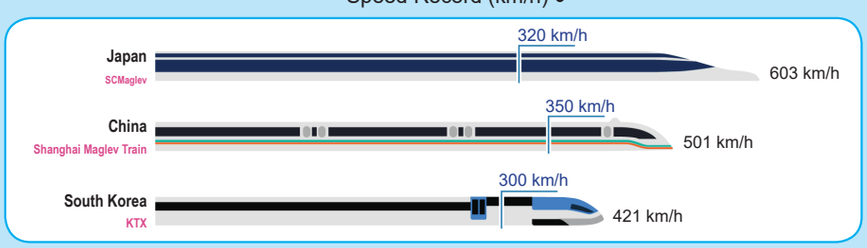
China Japan South Korea

These three countries are currently using Maglev Trains for public transport. Many countries explore possibilites to use it.

In India

Mumbai-Delhi, Mumbai-Nagpur, Chennai-Bengaluru-Mysuru routes are considered for proposal.

How much Speed?



6th Science_IIIrd Term English Book_Unit_1.indd 9 27-09-2023 19:59:25

How does the electromagnetic train work?



Electromagnets are used in Electromagnetic train. Electromagnets are magnetised only when current flows through them. When the direction of current is changed the poles of the electromagnets are also changed. Like poles of the magnets which are attached at the bottom of the train and rail track repel each other. So, the train is lifted from the track up to a height of 10 cm.

We know that we can move any magnetic object with the force of attraction or repulsion properties of magnets. This train also moves with the help of the magnets attached on the sides of track and the magnets fitted at the bottom sideway of the train. By controlling the current we can control the magnets and movement of the train.

As there are no moving parts, there is no friction. So, the train can easily attain a speed of 300 km per hour. These trains are capable of running up to 600 km/hour. They do not make any noise. They require less energy and they are eco-friendly.

Many countries have taken effort to use these trains. Such trains are used for public transport only in China, Japan and South Korea. In India the possibilities of introducing these trains are under consideration.

Write the differences between a normal train and an electromagnetic train.

_____

_____

_____

Points to remember

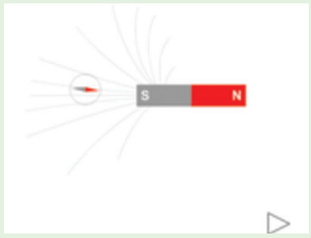
- Magnetites are natural magnets. They are called magnetic stones.
- Man-made magnets are called artificial magnets.
- Substances which are attracted by magnet are called as magnetic substances.
- Substances which are not attracted by magnet are called non-magnetic substances.
- A freely suspended magnet always comes to rest in north-south direction.
- The end of the magnet that points to the north is called the North Pole. The end that points to the south is called the South Pole.
- A compass is an instrument which is used to find directions.
- Like Poles (N-N, S-S) repel each other and unlike poles (N-S, S-N) attract each other.
- Magnets lose their properties if they are heated or dropped from a height or hit with a hammer.

6th Science_IIIrd Term English Book_Unit_1.indd 10 27-09-2023 19:59:25



ICT Corner

Magnet



Through this activity you'll be able to understand the properties of magnetic poles and magnetic field lines.

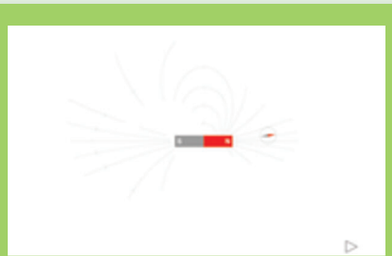
Step 1: Type the URL given or scan the QR code to launch the activity page.

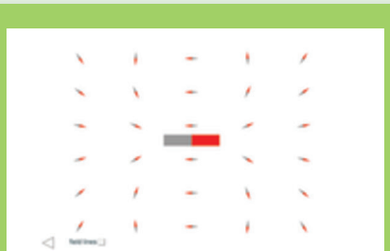
Step 2: A diagram of a bar magnet and a magnetic needle are there. Click and drag the magnetic needle with the use of mouse, around the bar magnet. Observe the position of the magnetic field lines and how the needle rotates according the poles.

Step 3: Click the 'Next navigation icon'. A grid of magnetic needles around a bar magnet will appear. Click and drag the bar magnet. Observe the changes of the needles.

Step 4: Click the 'field lines' check box at the bottom of the activity window to see the magnetic field lines.

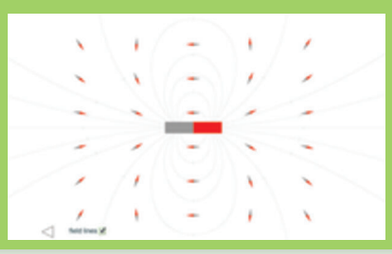
Step 1





Step 2

Step 3





Step 4

Magnet URL:

http://www.physics-chemistry-interactive-flash-animation.com/electricity_electromagnetism_interactive/bar_magnet_magnetic_field_lines.htm

*Pictures are indicative only

6th Science_IIIrd Term English Book_Unit_1.indd 11 27-09-2023 19:59:27

Evaluation

I. Choose the appropriate answer

1. An object that is attracted by magnet.

   a. wooden piece b. plain pins

   c. eraser d. a piece of paper

2. People who made mariner's compass for the first time.

   a. Indians b. Europeans

   c. Chinese d. Egyptians

3. A freely suspended magnet always comes to rest in the _____ direction

   a. North - East b. South - West

   c. East - West d. North - South

4. Magnets lose their properties when they are

   a. used b. stored

   c. hit with a hammer d. cleaned

5. Mariner's compass is used to find the

   a. speed b. displacement

   c. direction d. motion

II. Fill in the Blanks

1. Artificial magnets are made in different shapes such as _____, _____ and _____.
2. The Materials which are attracted towards the magnet are called_____.
3. Paper is not a _____ material.
4. In olden days, sailors used to find direction by suspending a piece of _____.
5. A magnet always has _____ poles.

III. True or False. If False, give the correct statement

1. A cylindrical magnet has only one pole.
2. Similar poles of a magnet repel each other.
3. Maximum iron filings stick in the middle of a bar magnet when it is brought near them.
4. A compass can be used to find East-West direction at any place.
5. Rubber is a magnetic material.

IV. Match the following

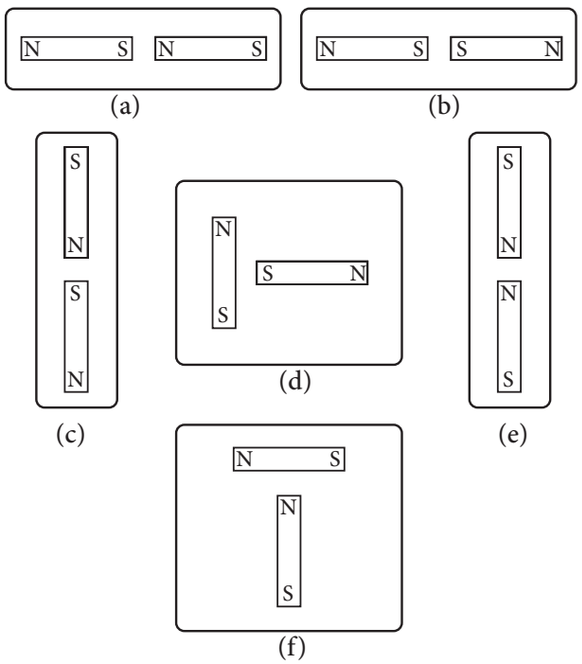
1.	Compass	-	Maximum magnetic strength
2.	Attraction	-	Like poles
3.	Repulsion	-	Opposite poles
4.	Magnetic poles	-	Magnetic needle

V. Circle the odd ones and give reasons

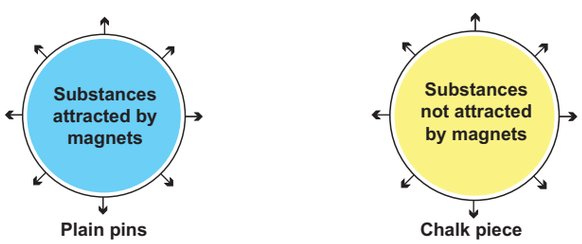
1. Iron nail, pins, rubber tube, needle.
2. Lift, escalator, electromagnetic train, electric bulb.
3. Attraction, repulsion, pointing direction, illumination.

6th Science_IIIrd Term English Book_Unit_1.indd 12 27-09-2023 19:59:27

VI. The following diagrams show two magnets near one another. Use the words, 'Attract, Repel, Turn around' to describe what happens in each case.



VII. Write down the names of substances.



VIII. Give short answer

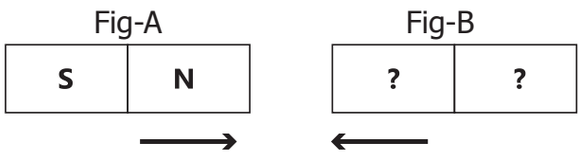
1. Explain the attraction and repulsion between magnetic poles.
2. A student who checked some magnets in the school laboratory found out that their magnetic force is worn out. Give three reasons for that?

IX. Answer in detail

1. You are provided with an iron needle. How will you magnetize it ?
2. How does the electromagnetic train work?

X. Questions based on Higher Order Thinking Skills

1. You are provided with iron filings and a bar magnet without labelling the poles of the magnet. Using this...
   a. How will you identify the poles of the magnet?
   b. Which part of the bar magnet attracts more iron filings? Why?
2. Two bar magnets are given in the figure A and B. By the property of attraction, identify the North pole and the South pole in the bar magnet (B)



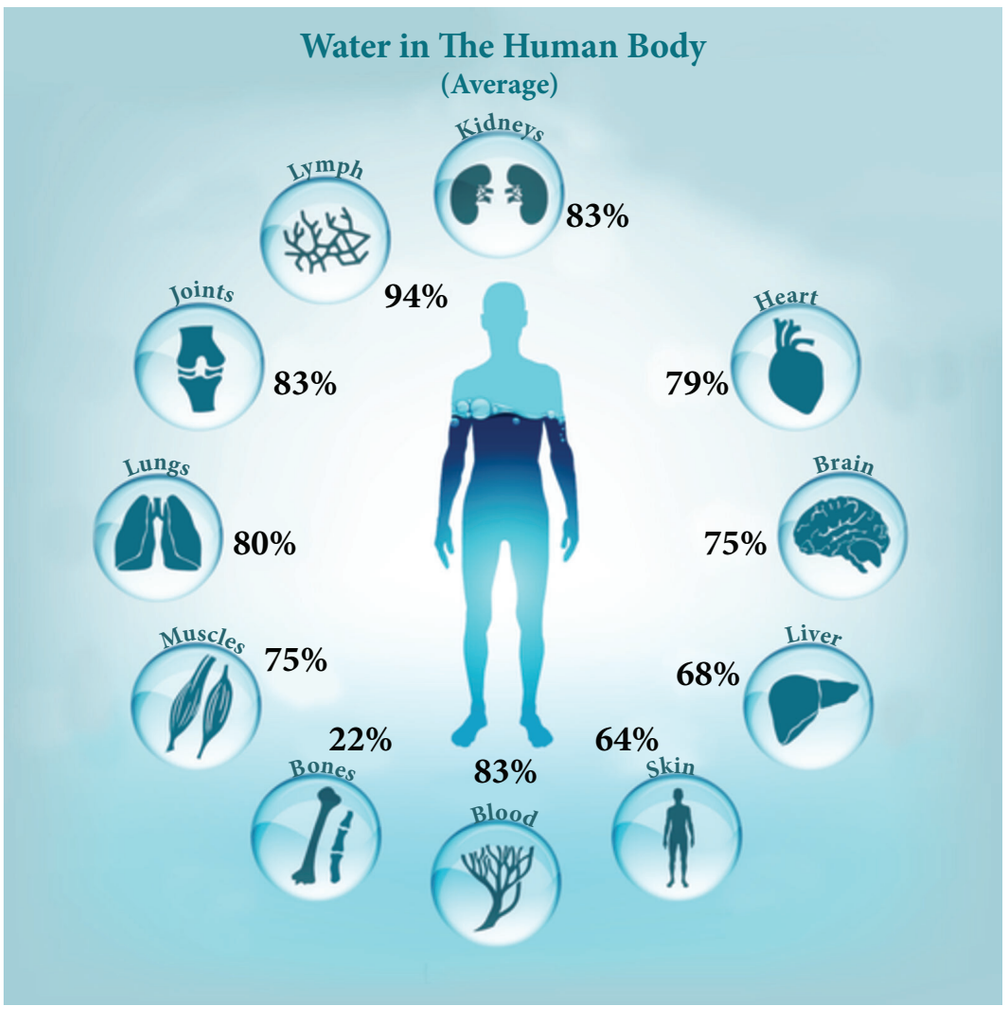
3. Take a glass of water with a few pins inside. How will you take out the pins without dipping your hands into water?

6th Science_IIIrd Term English Book_Unit_1.indd 13 27-09-2023 19:59:28



Unit 2 Water

79WCT



Learning Objectives

- To recognize the sources and availability of water
- To clarify the composition of water and the process of water cycle
- To develop skills in suggesting ways to conserve water
- To realize the importance of water for life on earth
- To appreciate the efforts made to conserve water

6th Science_IIIrd Term English Book_Unit_2.indd 14 27-09-2023 20:00:49

Introduction

Water is one of the basic substance present in the earth. It plays a vital role in the evolution and survival of life. It is impossible to imagine life on the earth without water. Water helps to regulate the temperature of our planet. It also helps to maintain the temperature in organisms.

2.1 Where do we get water from?

We need water to perform several day to day activities like cooking food, washing clothes, cleaning utensils etc.

We get water from different water sources in our surroundings. In villages / towns wells, canals, tanks, ponds, rivers, water tanks, hand pipes are the main sources of water.

List out the sources from where you get water in your village/town.

For example Ramu says he and his family get water from the pipes in washrooms and kitchens. Sankar says he has to use handpump daily both in the morning and evening to collect the water. Raja says his mother used to get up early and walks to pond to get water.

Where do you get water for your household uses?

2.2 Where and how water is found on the earth?

Water is available in nature in three forms – Solid, Liquid , Vapour.

- **Solid form of water - Ice** - It is present in ice bergs and ice caps on top of tall mountains, galaciers and polar regions.
- **Liquid form of water – Water** – It is present in oceans, seas, lakes, rivers and even underground.
- **Gaseous form of water – Vapour** – It is present in the air around us.

2.3 Availability of water

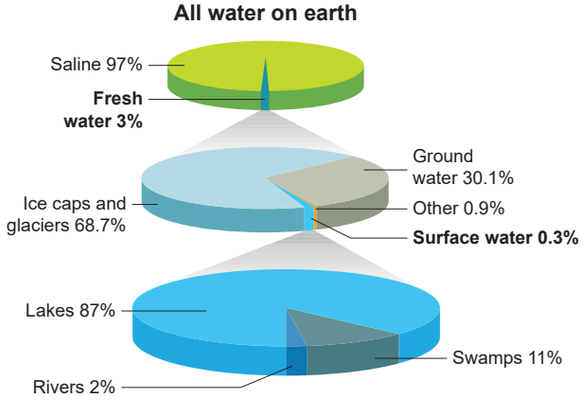
We know that nearly $\frac{3}{4}^{th}$ of the surface of the earth is covered by water. Most of the water, that is 97% of the total amount of water that exits on earth is found in seas and oceans.

Can we drink the water available in the sea?

Sea water is salty. But water used for our daily purposes is not salty. It is known as fresh water. Water obtained from ponds, puddles, river, tube-wells and taps at home is usually fresh water.

If the total water on earth be 100%, let's see what percent would be the availability of fresh water.

Look at the pie chart given below.



6th Science_IIIrd Term English Book_Unit_2.indd 15 27-09-2023 20:00:49

From the pie chart, it can also be noted that 97% water is saline water. Only 3% found is the freshwater and that too in polar ice caps and glaciers. So this portion of water is not readily available for drinking.

The distribution of the totally available freshwater is as follows:

Polar ice caps and glaciers	68.7%
Ground water	30.1%
Other sources of water	0.9%
Surface water	0.3 %

The distribution of total surface water is as follows:

Lakes	87%
Rivers	2%
Swamps	11%

Thus the above pie chart explains that we have a very small amount of fresh water available for human usage and so maintaining the water table and the conservation of water is very essential. Isn't it?



Water while passing through layers of soil dissolves salts and minerals to a maximum extent. These salts and minerals have been deposited in seas and oceans for millions of years and are still being deposited. In addition, the oceanic volcanoes which are present inside, also add salts to the sea. Water with large amounts of dissolved solids is not potable or suitable for drinking. Such water is called saline water.

Activity 1: Relative amount of water at various sources



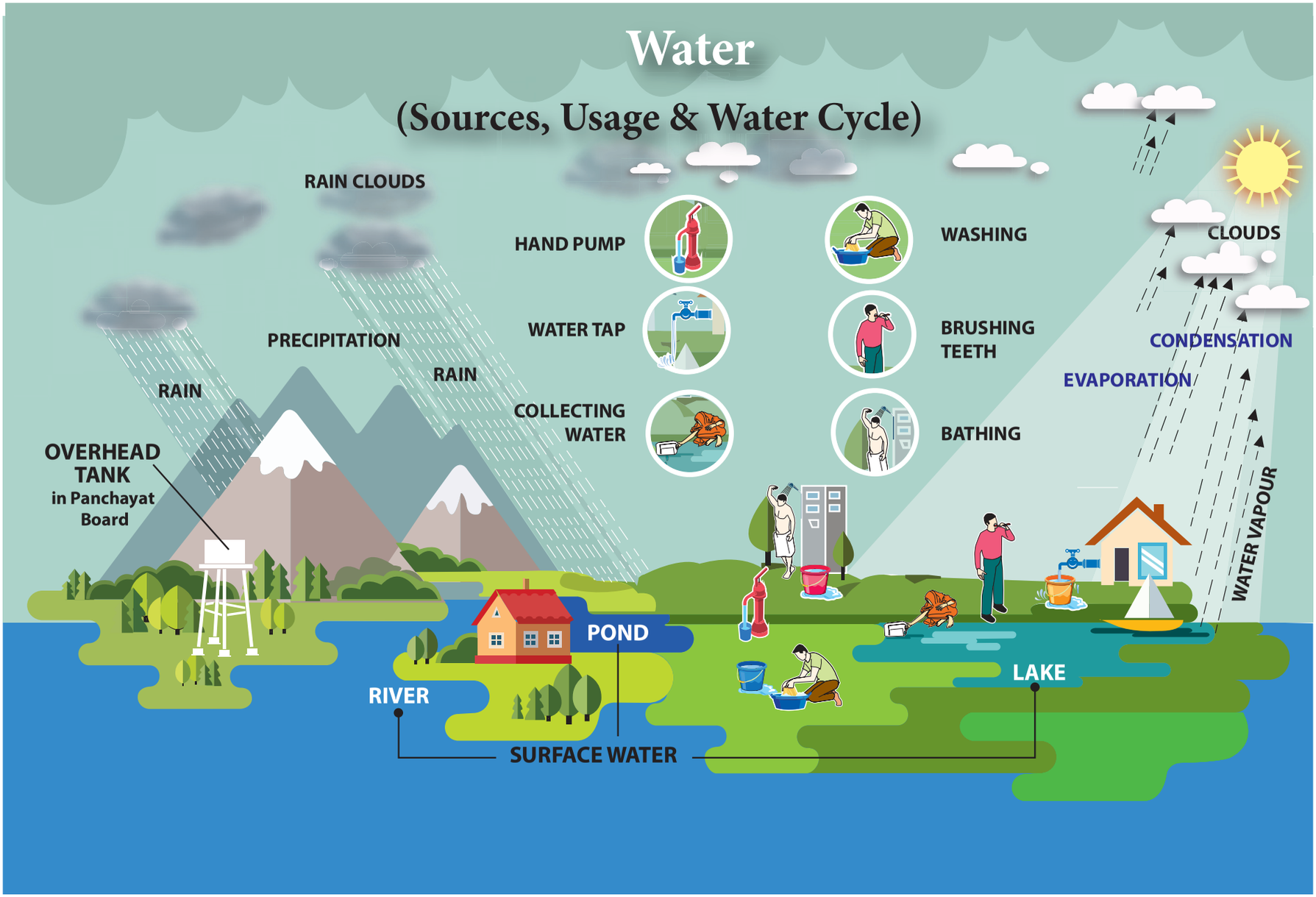
Take 20 litres of water in a bucket, a 500 ml mug, a 150 ml tumbler and a 1 ml spoon. If the capacity of the bucket is 20 litre, then it represents the total amount of water present on the Earth. Now, transfer a mug of water from the bucket and it is 500 ml and then it represents the total amount of fresh water present in the Earth. The water left in the bucket represents seas and oceans. This water is not fit for human use.

The water present in the mug represents the freshwater which is present in frozen form on snow-covered mountains, glaciers and polar ice caps. This water is also not readily available for human use. Next, transfer 150 ml of water to the tumbler from the 500ml mug, then it represents the total amount of ground water. Finally, take one-fourth spoonful of water while the capacity of the spoon is 1 ml, then it represents the total amount of surface water (i.e) water in all the rivers, lakes and ponds of the world. It can be taken as potable water.

When such a small amount of potable water is available, then we should be more economic in using water. Is it not?

6th Science_IIIrd Term English Book_Unit_2.indd 16 27-09-2023 20:00:50

6th Science_IIIrd Term English Book_Unit_2.indd 17



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Activity 2: Conduct the activity with common salt,sand, chalk powder, charcoal powder and copper sulphate.

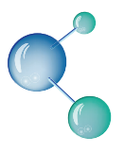
Fill up the following table.

Substance	Dissolves in water	Does not dissolve in water
common salt		
sand		
chalk powder		
charcoal powder		
copper sulphate		

From the above activity we could observe that common salt and copper sulphate dissolve in water and contribute their properties like colour and other properties to water but sand, chalk powder and charcoal powder do not dissolve in water.

2.4 Composition of water

Water is a transparent, tasteless, odourless and nearly colourless chemical substance. It is composed of two atoms of hydrogen combined with one atom of oxygen. The molecular formula of water is H_2O.



However, the physical composition of water changes from place to place. It can be clear or cloudy, oxygenated or not very oxygenated and it can be fresh or salty. The amount of salt in water is termed as salinity. Based on its salinity water is classified into three main categories such as freshwater, brackish water and sea water. Fresh water contains 0.05% to 1% of salt. Brackish water contains upto 3% of salt and seawater contains more than 3% of salt. Ocean water is composed of many substances. The salts include sodium chloride, magnesium chloride and calcium chloride.



Water freeze at 0° Celsius at normal pressure.

Every year march 22nd is observed as the world water day.

Activity 3: Water contains dissolved salts

Take some tap water in a china dish and heat it. Continue heating till all the water gets dried up. Stop the heating and look at the china dish. What do you observe inside the china dish?

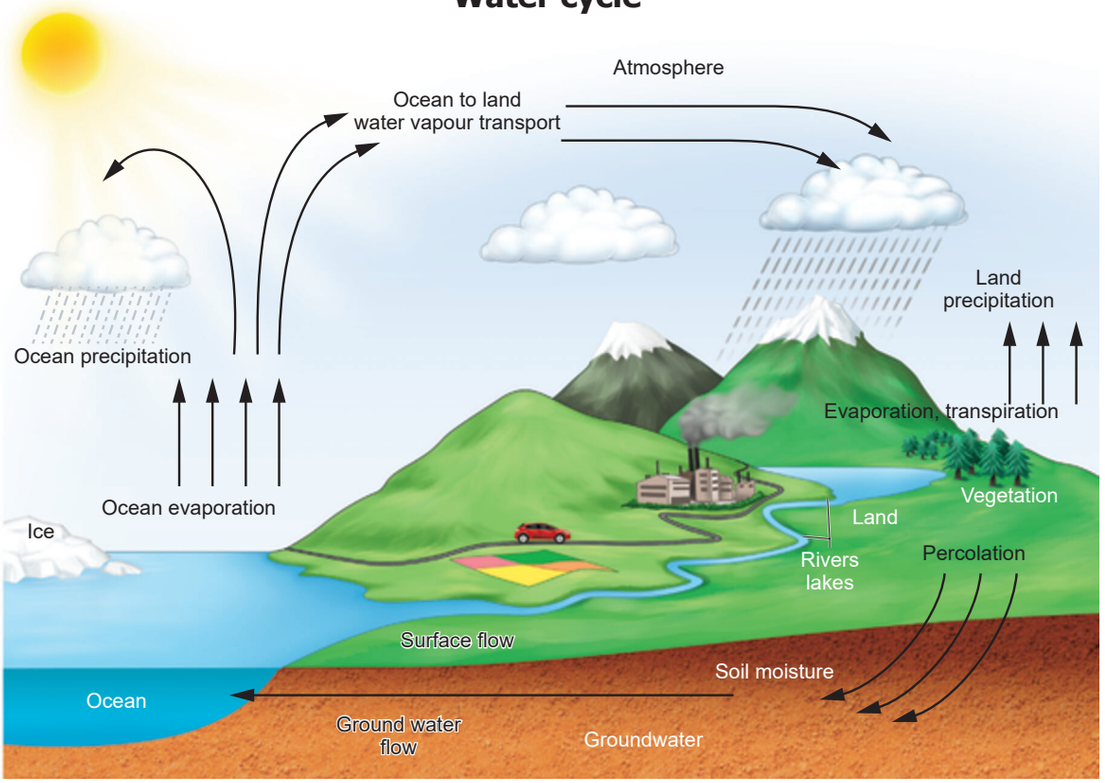


Deposits of some solid particles on the surface of china dish can be observed. The deposit is of salts that are dissolved in water. This shows that water has dissolved salts in it.

Note: Do not use distilled water or water from purifier or R.O. (Reverse Osmosis) unit and the like for this activity.

6th Science_IIIrd Term English Book_Unit_2.indd 18 27-09-2023 20:00:53

Water cycle



2.5 Water cycle

The water on the earth evaporates into the atmosphere due to the heat of the sun. The water vapour in the atmosphere forms clouds. From the clouds water falls on the earth in the form of rain or snow. By this natural process, water gets renewed. This is called **water cycle.**

Water cycle is a continuous process. It involves three stages - **evaporation, condensation and precipitation.** It is also called the **hydrological cycle.**

Evaporation : Water from oceans, lakes,ponds and rivers evaporates due to the heat of the sun.

Condensation : Water vapour which enters into the atmosphere by evaporation moves upward with air, gets cooled and changes into tiny water droplets that form clouds in the sky.

Precipitation : The millions of tiny droplets collide with one another to form larger droplets. When the air around the clouds is cool these drops of water fall in the form of snow or rain.

Activity 4: Spread a piece of wet cloth in the sunlight. Observe after some time. Where has the water in the wet cloth gone?



The water evaporates into the atmosphere due to the heat of the sun.

6th Science_IIIrd Term English Book_Unit_2.indd 19 27-09-2023 20:00:54

Have you heard of transpiration?

It is the process of loss of water from the aerial parts of a plant in vapour form.

There is a continuous cycling of water and it exists in three forms in nature.

Water evaporating from lakes, rivers and oceans forms the gaseous state. Rain water forms the liquid state. Snow on mountains and polar ice caps forms the solid state.

These three states occur in nature, keep the total amount of water on the earth constant even when the whole world is using it!

How do you know that atmosphere has water vapour?

Let us do the following activity...

Activity 5: Condensation of water vapour.

Take a glass half filled with water. Wipe the outer surface of the glass with a clean piece of cloth. Add some ice into the water. Wait for one or two minutes. Observe the changes that take place on the outer surface of the glass.

From where do water drops appear on the outer side of the glass?

The cold surface of the glass containing icy water cools the air around it and the water vapour of the air condenses on the surface of the glass. This process is also the result of condensation of water vapour.

2.6 Natural Sources of fresh water

Three types of natural sources of fresh water are available on the earth.

Surface water



Water present on the surface of the earth such as river,lake,ponds, streams or fresh water wetland is called surface water.

Frozen water



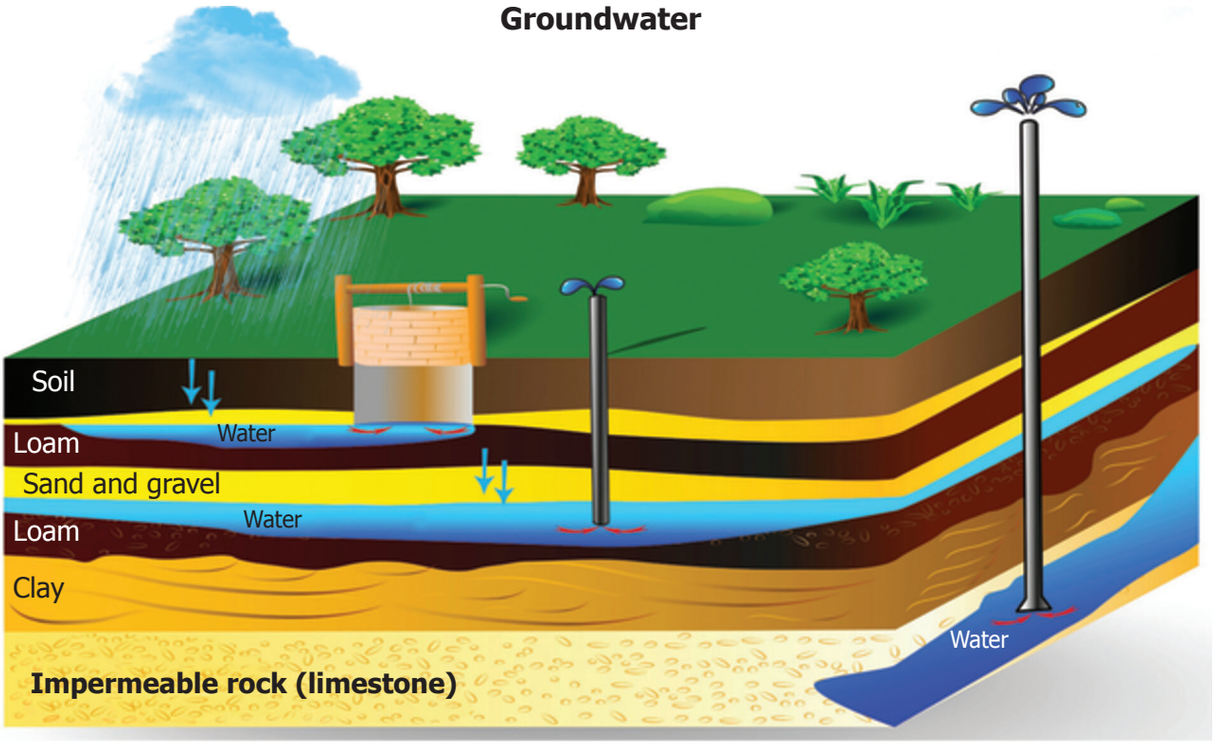
Water that is present in the frozen form as polar ice-caps and glaciers are called frozen water. A larger portion of water is 68.7% of the total available fresh water is in frozen state.

Ground water

Ground water is the water present beneath Earth's surface in soil. This water is

6th Science_IIIrd Term English Book_Unit_2.indd 20 27-09-2023 20:00:55

Groundwater



obtained through springs, open wells, tube wells, or hand pumps etc.,

The Himalayas

The Himalayas, contain ice caps, ice bergs and glaciers. Ten of Asia's largest rivers flow from the Himalayas and more than a billion people's livelihoods depend on those rivers.



More to know: Water, is measured in litre and millilitre. Gallon is also a measure of volume of liquids.

1 Gallon = 3.785 litre. Water level in the reservoirs is measured in TMC (One thousand million cubic feet). Water released from dams is measured in cusec (cubic feet/sec).

Aquatic animals

During winter, water in lakes and ponds in the cold countries will be frozen and a solid layer of ice is formed on the surface of water. Still aquatic animals living under the ice do not die. This is because the floating layer of ice acts as a protective coat, and doesn't permit heat to escape from water. So as the water at the surface alone turns to ice, lets the existence of aquatic animals.

6th Science_IIIrd Term English Book_Unit_2.indd 21 27-09-2023 20:00:56

2.7 Conservation of water

There is no change in the total quantity of water available on the earth. It remains the same. But the water useful for plants, animals and man is decreasing day by day. It is called scarcity of water.

What are the reasons for scarcity of water?

The main reasons for water scarcity

1. Population explosion
2. Uneven distribution of rainfall
3. Decline of ground watertable
4. Pollution of water
5. Careless use of water

We should take care to prevent scarcity of water. Otherwise,it is impossible for organisms to live on the earth. The only method of preventing scarcity of water is conservation of water. Saving water for the future generations by using water carefully and in a limited way is conservation of water.

Methods of water conservation:

Mainly, two methods can be followed for the conservation of water.

1. Water management

Water management consists of the following factors:

a. Bringing awareness about the bad effects of throwing wastes into the water bodies

b. Recycling of water by separating pollutants.

c. Minimizing the use of chemical fertilizers in agriculture. It reduces the pollution of underground water.

d. Controlling deforestation

e. Adopting drip irrigation and sprinkler irrigation in agriculture. By this way lesser amount of water can be used for the irrigation

2. Rainwater harvesting

Direct collection and use of rain water is called rainwater harvesting.

There are two types of rainwater harvesting.

a. Collecting water from where it falls.

(e.g): Collecting water from the roof tops of the houses or buildings (Roof water harvesting).

b. Collecting flowing rain water

(e.g): Collecting rainwater by constructing ponds with bund.



Coovam is an estuary!

Estuaries are wetlands where water bodies meet the sea. It is a combination of fresh water from land meeting the salty seawater. **Estuaries** are home to unique plants and animal species.



6th Science_IIIrd Term English Book_Unit_2.indd 22 27-09-2023 20:00:56

2.8 Importance of water

In human body: Water in all cells, organs and tissues helps to regulate body temperature and maintain other functions. On an average, the human body requires 2 – 3 litres of water per day for proper functioning. Water helps in digestion of food and removal of toxins from the body.

Domestic uses: Apart from drinking, people use water for many other purposes. These include: cooking, bathing, washing clothes, washing utensils, keeping houses and common places clean, watering plants, etc.



Swamps are wetlands that are forested. They occur along large rivers or on the shores of large lakes. The water of a swamp may be freshwater, brackish water or seawater. Swamps are important for providing fresh water and oxygen to all life. Pichavaram Mangroves in Chidambaram, Muthupet mangrove wetland. Pallikkaranai wetland in Chennai, Chembarambakkam in Kancheepuram are a few examples of swamps in Tamilnadu.



Agriculture: Water is also essential for the healthy growth of farm crops and farm stock and is used in the manufacture of many products.

Industry: Industry depends on water at all levels of production. It is used as a material, a solvent and for generating electricity.

Activity 6: Estimation of water consumed by a family on a day

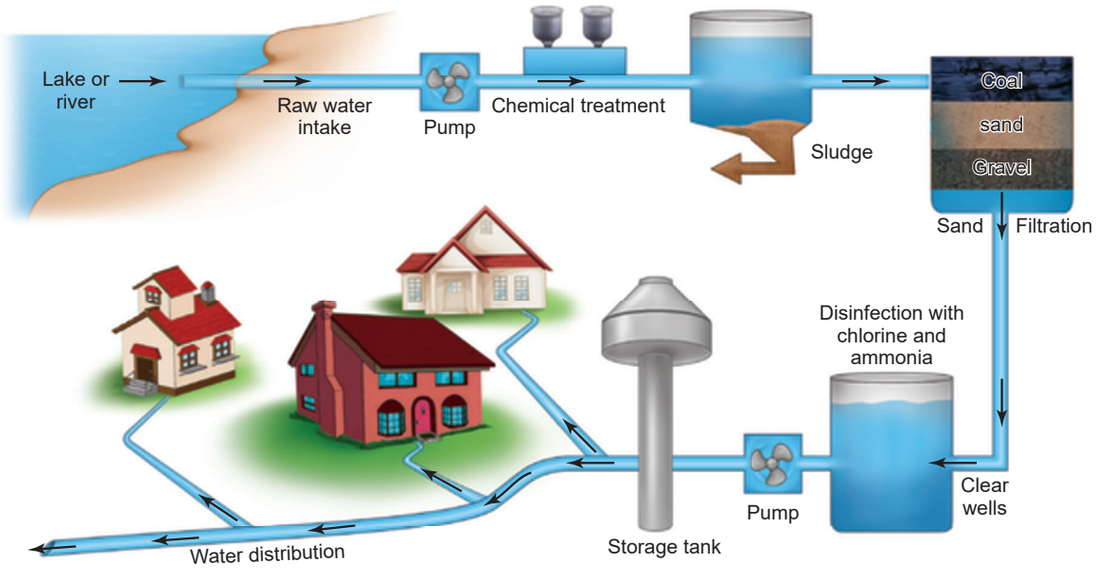
Activity	Amount of water used (in litres)
Brushing	
Bathing	
Washing clothes	
Toilets	
Cooking	
Washing utensils	
Cleaning floor	
Any other purpose	
Total amount of water used by a family in a day	

2.9 Water distribution and treatment system

We know that water is distributed by local bodies. In some areas which water is obtained from river, lake and ground water is treated and distributed. Model of water distribution and treatment plant is shown in figures.

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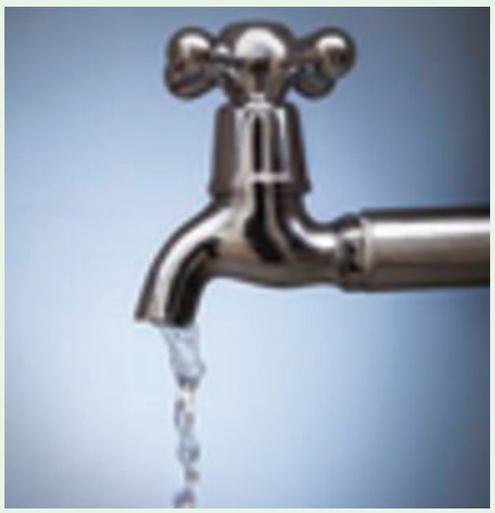
The Water distribution and water treatment system



Let us avoid wasting water

When you happen to see any leaking tap in your school or home, keep a bucket to collect the water that is leaking and measure the amount of water and the time taken to fill the bucket. After noting the time taken to fill a bucket, you can estimate the amount of water getting wasted on a day.

Can you please think over the amount of water getting wasted all around the world from the leaking taps?



Points to remember

- Water is one of the most important components that all animals including human beings and plants depend on for their livelihood.
- To an extent of 97% of the total water that exists on Earth is found in seas and oceans.
- Only 3% of the freshwater is available in polar ice caps and glaciers.
- Lakes, rivers, swamps constitute only 0.3% of the surface water.
- The moisture in the soil indicates the presence of underground water.
- The continuous circulation of water in nature is called the water cycle. It is effected by evaporation, condensation, precipitation and transpiration.
- Ground water is the water present beneath Earth's surface in soil.

6th Science_IIIrd Term English Book_Unit_2.indd 24 27-09-2023 20:01:01

ICT Corner

Water



Through this activity you will be able to know what happens to water when it is taken out of nature, into our house and once it leaves our houses.

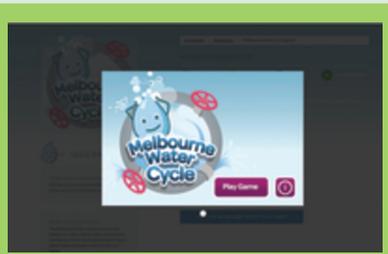
Step 1: Type the URL or scan the QR code to launch the activity.

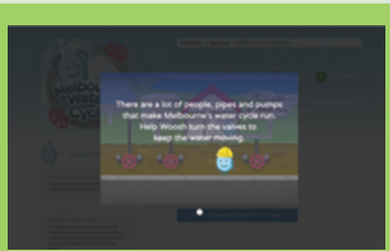
Step 2 : A page of 3 games will open, click on the first game 'Melbourne water cycle', and click the "Play the Melbourne water game" button to start the game.

Step 3: Play the game by following the instructions and using the navigation keys. Observe the steps of water usage and the process of recycling the used water.

Step 4: Play the other two games to know about the Natural water cycle and Sources of water.

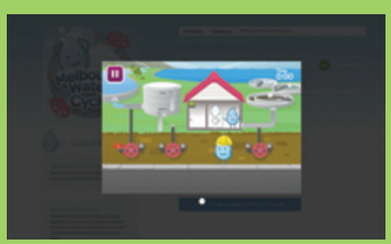
Step 1

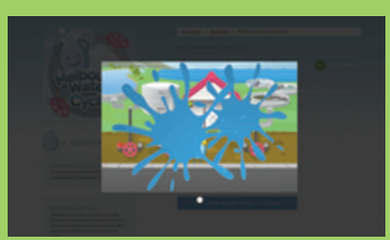




Step 2

Step 3





Step 4

Simple Circuit's URL:

https://www.educationsoutheastwater.com.au/resources?audience=&keywords=&topic=&yearLevel=&type=online-game

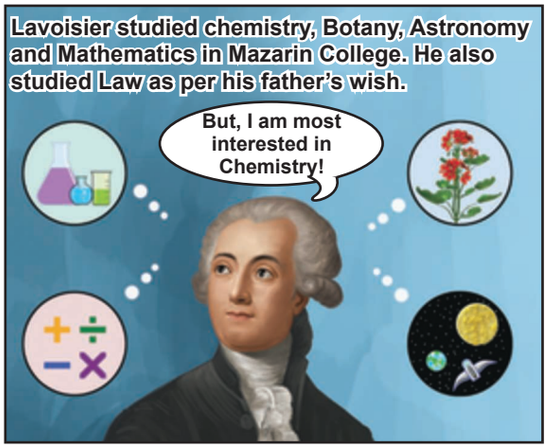
*Pictures are indicative only

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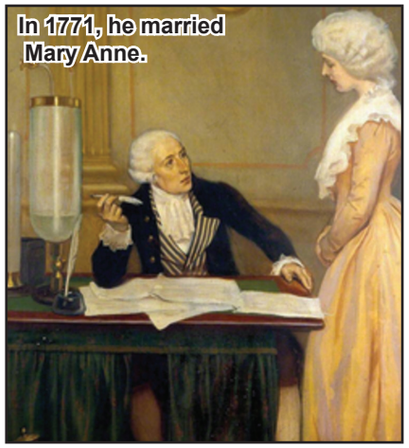
The Revolution in Chemistry



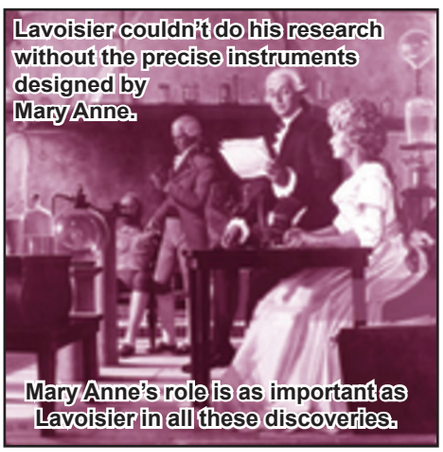
Lavoisier studied chemistry, Botany, Astronomy and Mathematics in Mazarin College. He also studied Law as per his father's wish.



In 1771, he married Mary Anne.



Lavoisier couldn't do his research without the precise instruments designed by Mary Anne.

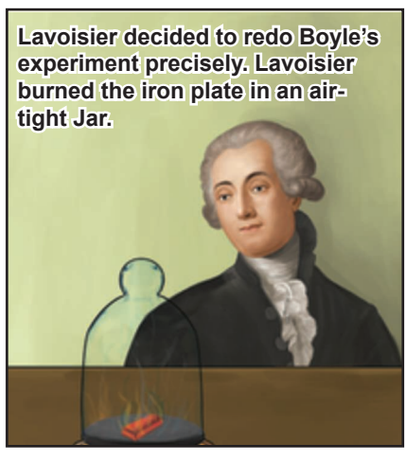


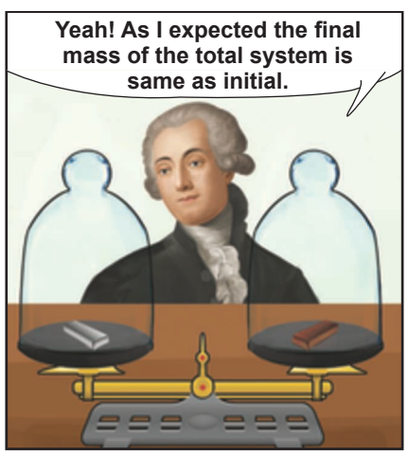
Mary Anne's role is as important as Lavoisier in all these discoveries.

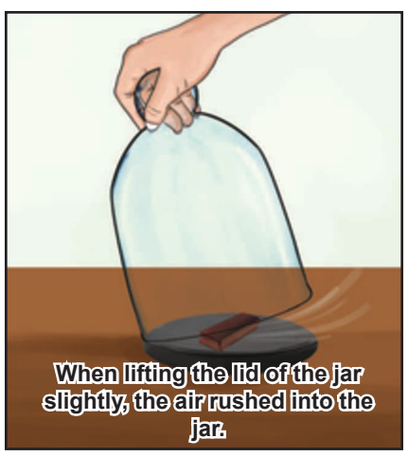


After burning an iron plate, there is a raise in its mass.

Lavoisier decided to redo Boyle's experiment precisely. Lavoisier burned the iron plate in an air-tight Jar.

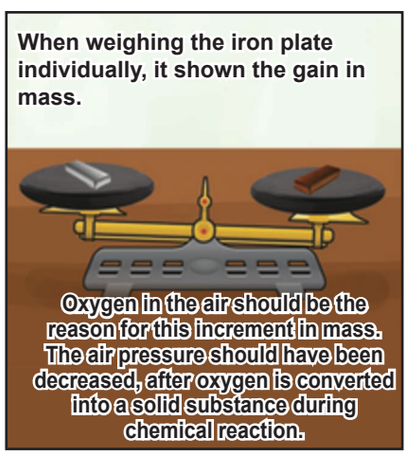






When lifting the lid of the jar slightly, the air rushed into the jar.

When weighing the iron plate individually, it shown the gain in mass.

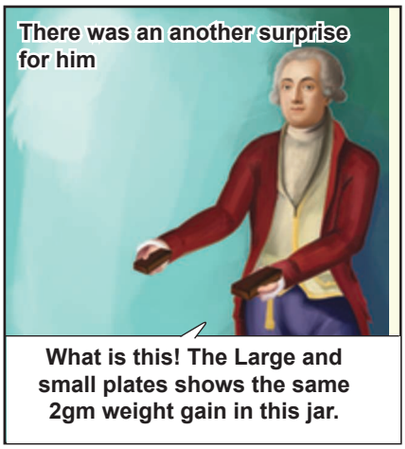


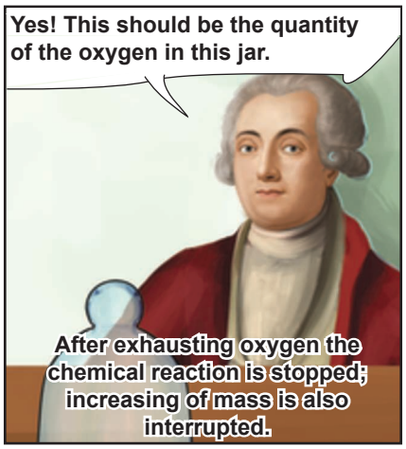
Oxygen in the air should be the reason for this increment in mass. The air pressure should have been decreased, after oxygen is converted into a solid substance during chemical reaction.

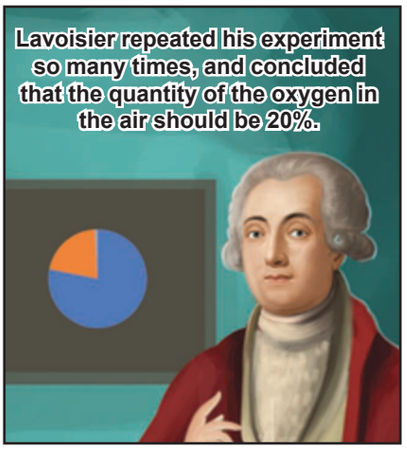
In a chemical reaction, the initial and final mass should be same. so matter can never be created nor destroyed. With a chemical reaction, chemical compound may be changed. We can change the chemical composition of substances by chemical reaction

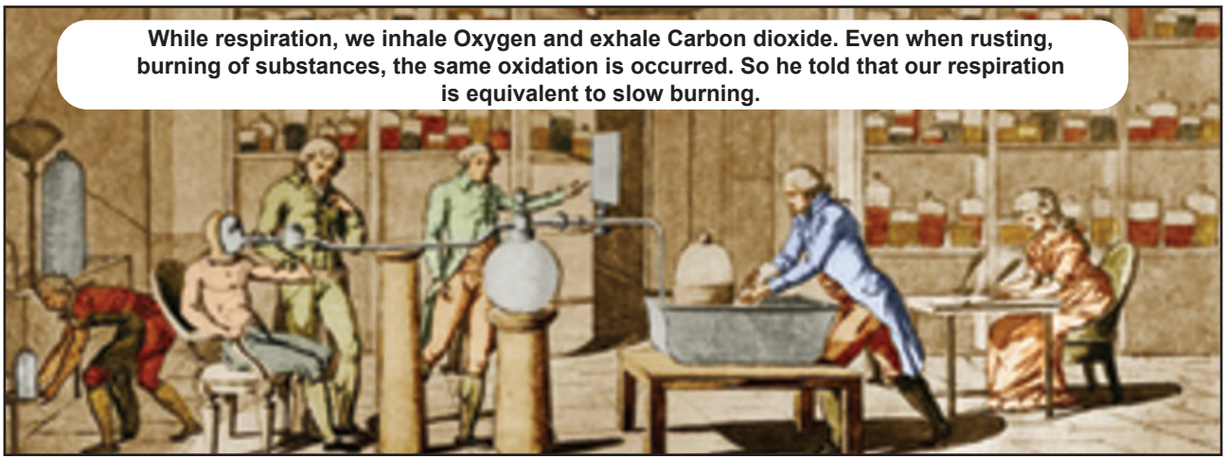


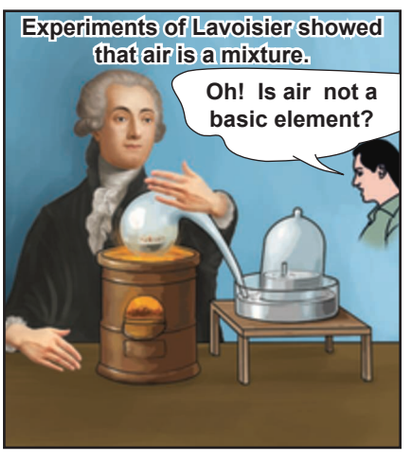
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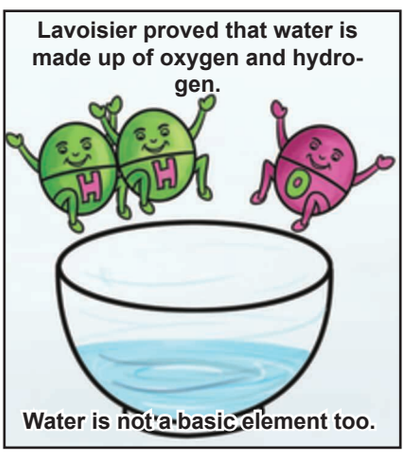


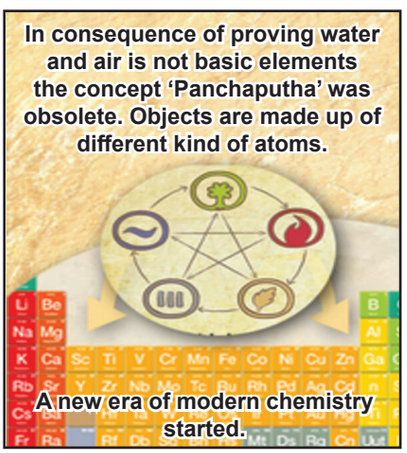


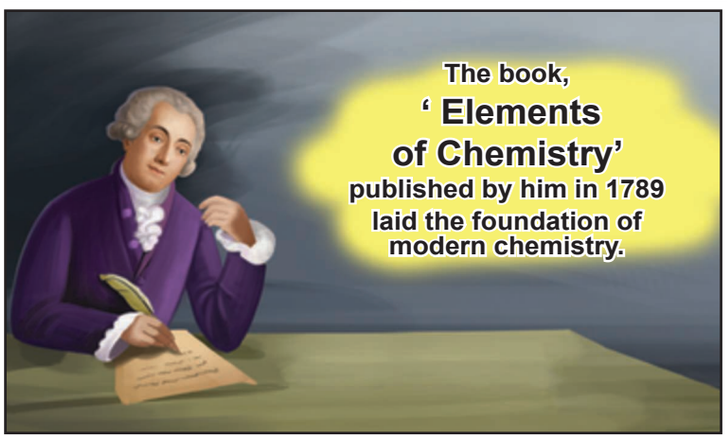


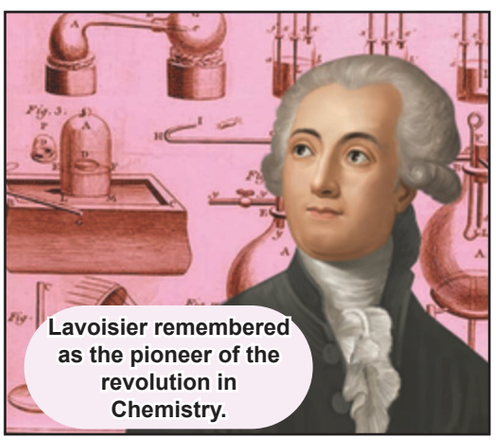












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Evaluation



I. Choose the appropriate answer

1. Around 97% of water available on earth is _____ water.

   a. fresh b. pure

   c. salty d. polluted

2. Which of the following is not a part of water cycle?

   a. evaporation b. condensation

   c. rain d. distillation

3. Which of the following processes add water vapour to the atmosphere?

   i. Transpiration ii. Precipitation

   iii. Condensation iv. Evaporation

   a. ii and iii b. ii and iv

   c. i and iv d. i and ii

4. About 30% of the fresh water is found in?

   a. glaciers
   b. ground water
   c. other sources of water
   d. Surface water

5. Using R.O. (Reverse Osmosis) plant at home eliminates lot of non-potable water. The best way to effectively use the expelled water of R.O. plant is _____.

   a. make the expelled water go and seep near the bore well

   b. use it for watering plants

   c. to drink the expelled water after boiling and cooling

   d. to use for cooking as the water is full of many nutrients

II. Fill in the blanks

1. Only _____ percent of natural water is available for human consumption.
2. The process of changing water into its vapour is called _____.
3. _____ is built on rivers to regulate water flow and distribute water.
4. Water levels in rivers increase greatly during _____.
5. Water cycle is also called as _____ .

III. True or False. If False, give the correct statement

1. Water present in rivers, lakes and ponds is unfit for use by human beings.
2. Seas are formed when the water table meets the land surface.
3. The evaporation of water takes place only in sunlight.
4. Condensation results in the formation of dew on grass.
5. Sea water can be used for irrigation as such.

IV. Match the following

1.	Flood	-	Lake
2.	Surface water	-	Evaporation
3.	Sun light	-	Water vapour
4.	Cloud	-	Pole
5.	Frozen water	-	Increased rain fall

6th Science_IIIrd Term English Book_Unit_2.indd 28 27-09-2023 20:01:29

V. Arrange the following statements in correct sequence

1. These vapours condense to form tiny droplets of water.
2. The water droplets come together to form large water droplets.
3. The heat of the sun causes evaporation of water from the surface of the earth, oceans, lakes, rivers and other water bodies.
4. The large water droplets become heavy and the air cannot hold them, therefore, they fall as rains.
5. Water vapour is also continuously added to the atmosphere through transpiration from the surface of the leaves of trees.
6. Warm air carrying clouds rises up.
7. Higher up in the atmosphere, the air is cool.
8. These droplets floating in the air along with the dust particles form clouds.

VI. Analogy

1. Population explosion : Water scarcity :: Recycle : _____
2. Ground water : _____ :: Surface water : lakes

VII. Give very short answer

1. Name four different sources of water
2. How do people in cities and rural areas get water for various purposes?
3. Take out of cooled bottle of water from refrigerator and keep it on a table. After some time you notice a puddle of water around it. Why?
4. We could see clouds almost every day. Why doesn't it rain daily?
5. Name the places where water is found as ice.
6. How do aquatic animals manage to live in Arctic and Antarctic Circle?
7. What are the types of rain water harvesting?

VIII. Give short answer

1. Differentiate between surface water and ground water.
2. Write a few slogans of your own on the topic "Save Water".
3. About 71% of earth's surface is covered with water, then why do we face scarcity of water?
4. Give reason for the following statement – Sewage should not be disposed of in rivers or oceans before treatment.
5. Give the reasons, why water scarcity is in India? Explain.

IX . Answer in detail

1. What is potable water? List down its characteristics.
2. Who is known as waterman of India? Browse the net and find the details about the award, the waterman received for water management. State the findings by drafting a report.

6th Science_IIIrd Term English Book_Unit_2.indd 29 27-09-2023 20:01:29

3. What is rainwater harvesting? Explain in a few sentences how it can be used in houses.

X. Question based on Higher Order Thinking Skills

1. When there is no pond or lake in an area, will there be formation of clouds possible in that area?

2. To clean the spectacles, people often breathe out on glasses to make them wet. Explain why do the glasses become wet.

XI. CROSSWORD

DOWN

1. A method of water conservation.

2. Process of getting water vapour from sea water.

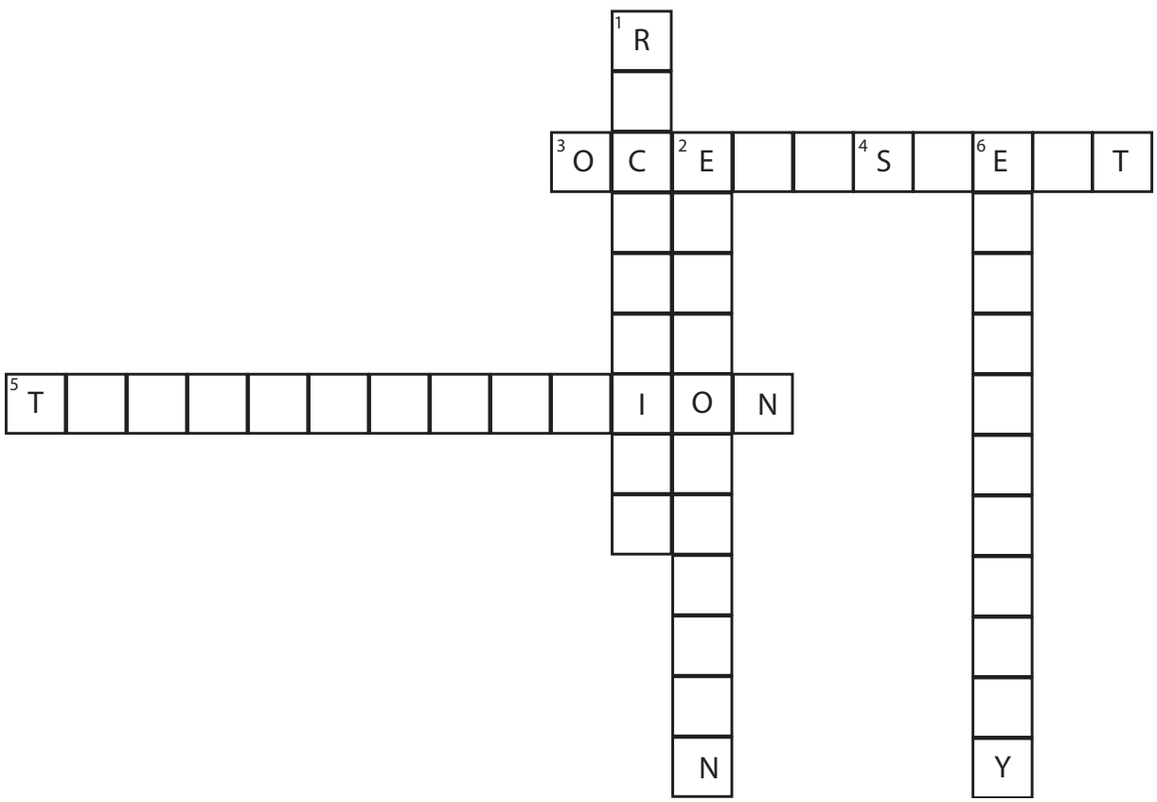
6. Water stored in dams is used for generation of _____.

ACROSS

3. _____ is a large body of non-potable water found in nature.

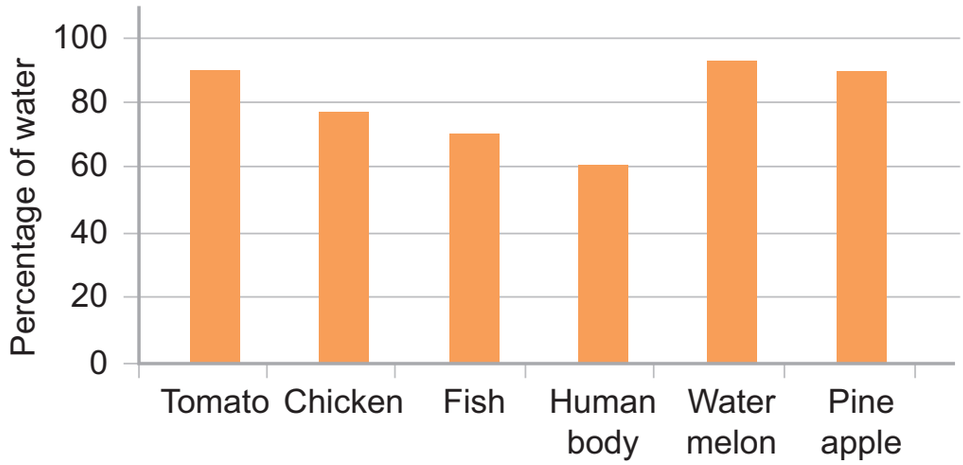
4. In summer, the body loses water as _____.

5. Plants undergo _____ and contribute to water cycle.



6th Science_IIIrd Term English Book_Unit_2.indd 30 27-09-2023 20:01:29

XII. (1). Observe the given graph carefully and answer the questions.



a. What percentage of water is seen in fish?

b. Name the food item that has maximum amount of water in its content.

c. Name the food item that has minimum amount of water in its content.

d. Human body consists of about _____ percentage of water.

e. Specify the food item that can be consumed by a person when he / she is suffering from dehydration.

(2) Look at the map of Tamilnadu showing annual rainfall and answer the questions given below

a. Identify the districts that get only low annual rainfall in Tamilnadu.

b. Identify the districts that get a medium annual rainfall in Tamilnadu.

c. State the districts that enjoy high annual rainfall in Tamilnadu.



6th Science_IIIrd Term English Book_Unit_2.indd 31 27-09-2023 20:01:29



Unit 3 Chemistry in Everyday life



Learning Objectives

- To understand the importance of science in everyday life
- To understand the preparation of soaps and detergents
- To know about kinds of fertilizers and its uses
- To know about uses of cement, gypsum, Epsom, and plaster of paris
- To know about uses of phenols and adhesives in day to day life

C7VW1

6th Science_IIIrd Term English Book_Unit_3.indd 32 27-09-2023 20:02:19

Introduction

We have studied earlier about the physical changes and chemical changes. Can you identify, from the following list which are physical changes and which are chemical changes?

- ❖ breaking of a stick into two pieces
- ❖ burning of a paper
- ❖ tearing paper into small pieces
- ❖ dissolving sugar in water
- ❖ burning of petrol or LPG gas
- ❖ Preparation of tea
- ❖ water boiling into water vapour
- ❖ coconut oil becoming solid during winter

Can you see the important difference between the chemical change and physical change? When you cut a paper into two, both are still paper pieces, but once you burn it, there is no longer the paper, only some ash and the smoke are left.

Chemical change results in the change of the substance; In **physical change** only the shape, size or volume changes; the state of the matter may also change, from liquid to gas or from liquid to solid, however the substance remains, chemically as it is.

Let us do the following experiment. Add a pinch of turmeric powder to water; water turns yellow. Take a small quantity of soap water in a beaker and add a pinch of turmeric powder to it. Now, What happens? Is there any change in colour of the solution? Is it also turning to yellow or to some other colour?



Try adding turmeric powder to various household liquids and observe the result. Try it on, say, tamarind extract. Try it on with cleaning liquids in the house. Does it change the colour?

Chemists identify turmeric powder as a **'natural indicator'.** The change in colour indicates that the material is either acid or base medium.

Find answer for the following questions with the help of your teacher. This will help you to understand how chemistry plays vital role in our life.

- ❖ How does milk change into curd?
- ❖ How can you remove stain on the copper vessels?
- ❖ Idli is a little bit hard while we cook by using newly grinded idli dough but it is soft with old dough. Why?
- ❖ How does rusting of iron happen?
- ❖ Why does white sugar change into black when heating?

We can understand the chemical changes that happen around us by knowing the answers for the above questions.

6th Science_IIIrd Term English Book_Unit_3.indd 33 27-09-2023 20:02:19

We use chemical changes in various forms in our daily life. **Chemistry** is the branch of science which deals with the study of particles around us. The beauty of chemistry is that, it explains the properties of the basic components of particles such as atoms and molecules and the effects of their combination.

We can consider all the particles around us as chemicals. The water (H_2O) we drink is the combination of hydrogen and oxygen. The salt (NaCl) we use in our kitchen is a combination of the chemicals, sodium and chlorine. Even our body is made up of a lot of chemical particles.

We could prepare soft idly as a result of a chemical change named fermentation takes place in the idly batter. During fermentation the idly batter undergoes a chemical change by bacteria. While cooking, the food products undergo so many chemical changes. As a result there are favourable changes in colour, flavour and taste in the food.

We can use chemical changes to produce certain materials. For example, some of the objects such as soaps, fertilizers, plastics and cement which we use in our daily life can be prepared by making chemical changes in some naturally occurring objects.

Activity 1: Discuss with your group and list out few chemicals which we use in our home and school.

_____

_____

_____

We can study about the manufacturing processes and usages of certain materials we use in our daily life such as **soaps, fertilizers, cement, gypsum, Epsom, plaster of paris, phenol** and adhesives in this lesson.

3.1 Soaps and Detergents

Bathing soap and washing detergents are kinds of soaps which we use in our daily life. In addition to this, we are



DO YOU KNOW?

When we cut onion, we get tears in the eyes with irritation, because of the presence of a chemical, propanethial s-oxide in onion. This is easily volatile. When we cut onion some of the cells are damaged and this chemical comes out. It becomes vapour and reach our eyes result in irritation and tears in eyes. When we crush the onion, more cells will be damaged and more chemicals come out. Why the tears are less produced when onion is cut after soaking in water?

6th Science_IIIrd Term English Book_Unit_3.indd 34 27-09-2023 20:02:20

using washing powder to remove strong stains on the clothes.

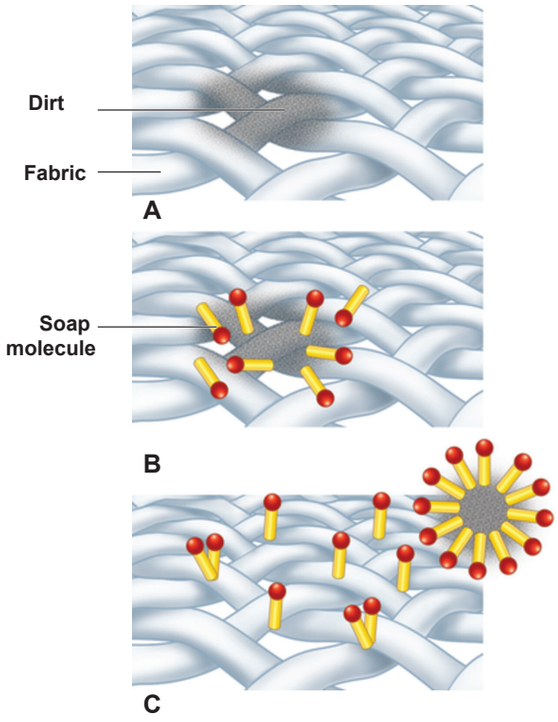




The detergent molecules have two sides, one side **water loving**, other **water hating**. Water hating goes and joins with dirt and oil in the cloth while the water loving joins with the water molecules.

When you agitate the cloth the dirt is surrounded by many molecules and is taken away from the cloth. The cloth becomes clean, and the dirt surrounded by the detergent molecules float in the water making it dirty.

How soaps clean clothes?



We can prepare our own soap by the following activity.

Activity 2: Preparation of Soap

Materials Required: 35 ml of water

10 g. of Lye (Sodium hydroxide) 60 ml of coconut oil.

Process : Cover your work area with old newspaper. Take 35 ml of water in a jar. Add 10 gram of concentrated sodium hydroxide and allow it to cool.

Then add 60 ml of coconut oil drop by drop and stir it well. Pour that solution into an empty match box, soap can be obtained after getting dried.

Try this soap to wash your handkerchief.

Different soaps for different purposes are prepared with various raw materials. We can understand this by doing the following activity.

Activity 3: Collect various kinds of soap's wrapper. Complete the following table based on the information provided in the wrapper.

S. No	Name of the Soap	Ingredients
1.	Bathing soap	
2.	Washing soap	
3.	Bathing soap for kids	
4.	Toilet cleaners	
5.	House floor cleaner liquid	

Inference: Nature of the soaps varies according to its constituents.

6th Science_IIIrd Term English Book_Unit_3.indd 35 27-09-2023 20:02:21



6th Science_IIIrd Term English Book_Unit_3.indd 36 27-09-2023 20:02:23

3.2 Fertilizers

Apart from water, sunlight and air, certain nutrients are also needed for the growth of plants. We know that the plants get their nutrients from the soil.

Nitrogen (N), Phosphorous (P) and Potassium (K) are the three important nutrients among the various nutrients needed for the growth of plants. These three are called as **Principal Nutrients.**

The table given below depicts the quantity of elements absorbed by certain common plants.

Crop	Yield per hectare (kg) (Approxi-mate)	Nitrogen (kg)	Phosphorous (kg)	Potassium (kg)
Rice	2,240	34	22	67
Corn	2,016	36	20	39
Sugarcane	67,200	90	17	202
Groundnut	1,904	78	22	45

❖ What would happen to the nutrient content of the soil, if the field is farmed continuously?

_____

❖ How could we resend these nutrients back to the soil?

_____

Fertilizers are organic or inorganic materials that we add to the soil to provide one or more nutrients to the soil.

Fertilizers given to plants can be classified into two. They are organic and inorganic fertilizers.

Organic fertilizers



Fertilizers containing only plant or animal-based materials or those synthesized by micro-organisms are called organic fertilizers.

These fertilizers can be prepared easily. This type of fertilizers are economical. **(e.g) Vermi compost, compost.**

Inorganic fertilizers

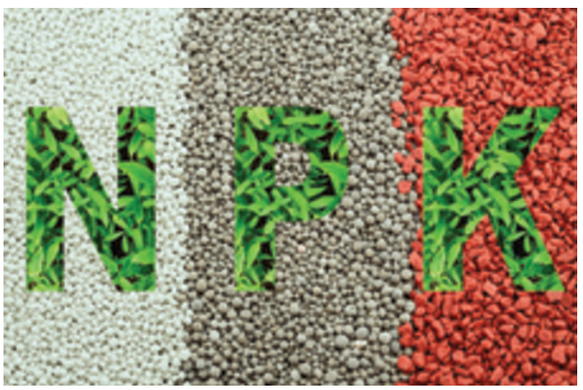
The fertilizers prepared by using natural elements by making them undergo chemical changes in the factories are called inorganic fertilizers. **(e.g) Urea, Ammonium sulphate, Super phosphate and Potassium nitrate**

6th Science_IIIrd Term English Book_Unit_3.indd 37 27-09-2023 20:02:25

The table given below lists the nutrients in inorganic fertilizers

Name of fertilizer	Nitrogen(%)	Phosphorus(%)	Potassium (%)
Urea	46	0	0
Super phosphate	0	8-9	0
Ammonium sulphate	21	0	0
Potassium nitrate	13	0	44

If we use 50 kg of urea, then according to the table, 23 kg of nitrogen (46 percent) will be added to the soil.



- The percentage of nitrogen in ammonium sulphate is _____
- If 50 kg of potassium nitrate is added to soil, how much potassium would the soil get? _____



Earthworms take organic wastes as food and produce compost castings. So earthworms are known as **Farmer's friends** because of the multitude of services they provide to improve soil health and consequently plant health.



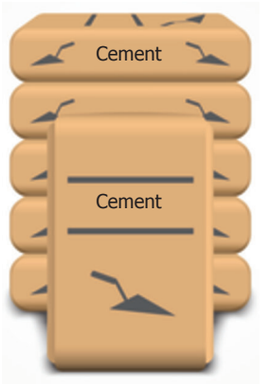
Activity 4: Make a visit to agriculture field in your area. List out the various crops and type of fertilizers used there.

S. No.	Name of the Crop	Name of the Fertilizer
1.		
2.		
3.		

3.3 Cement

In ancient period, the houses were constructed by using the mixture of lime, sand and wood. At present, the people are widely use the cement for construction of houses, dams and bridges. **The cement is manufactured by crushing of naturally occurring minerals such as lime, clay and gypsum through milling process.**

6th Science_IIIrd Term English Book_Unit_3.indd 38 27-09-2023 20:02:26



Cement becomes hardened when it is mixed with water. Gypsum plays a very important role in controlling the rate of hardening of the cement. During the cement manufacturing process, a small amount of gypsum is added at the final grinding process. Gypsum is added to control the "setting of cement".



In 1824, Joseph Aspdin invented Portland cement by burning finely ground chalk and clay in a kiln. It was named "Portland" cement because it resembled the high-quality building stones found in Portland, England.

Uses of cement

Cement is used as **mortar, concrete and reinforced cement concrete.**

Mortar

Mortar is a paste of cement and sand mixed with water. In houses, mortar is used to bind building blocks for constructing walls, to apply coating over them and to lay floor.

Concrete

Concrete is a mixture of cement, sand and gravel. It is used in the construction of buildings, bridges and dams.

Reinforced Cement Concrete

Reinforced cement concrete is a composite material by mixing iron mesh with cement. This is very strong and firm. It is used in the construction of dams, bridges, centering works in houses and construction of pillars. Huge water tanks, water pipes and drainages are built with this.



Activity 5: Take three empty tumblers of same size and name them as A, B and C. Add two tea spoonful of cement in each of the container. Then pour one tea spoonful of water in container A and two spoonful of water in B and three spoonful of water in C.

After an hour, observe which container of the cement set fast? Touch the containers and see if they are warm or cool. From this experiment, we understand that water and cement should be mixed in a certain ratio for fast setting.

3.4 Gypsum

Gypsum is a soft white or grey, naturally available mineral. The chemical name of gypsum is **calcium sulphate dihydrate.**

6th Science_IIIrd Term English Book_Unit_3.indd 39 27-09-2023 20:02:30



The molecular formula of gypsum is $CaSO_4 \cdot 2H_2O$.

Uses

- Used as fertilizers.
- Used in the process of making cement.
- In the process of making Plaster of Paris.

3.5 Epsom



Epsom salt is **magnesium sulphate hepta hydrate.**

The molecular formula of Epsom is $MgSO_4 . 7H_2O$. It offers a wide range of uses.

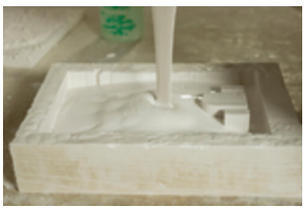
Uses

- Eases stress and relaxes the body.
- Helps muscles and nerves function properly.
- Medicine for skin problems.
- Improving plant growth in agriculture.

3.6 Plaster of Paris

Plaster of Paris consists of fine white powder **(calcium sulphate hemihydrate)** The molecular formula of Plaster of Paris is $CaSO_4 . 1/2H_2O$. Known since ancient times, plaster of paris is so called because of its preparation from the abundant gypsum found near Paris, capital of France. Plaster of paris is prepared by heating gypsum, where it gets partially dehydrated.





Uses

- In making black board chalks.
- In surgery for setting fractured bones.
- For making casts for statues and toys etc.
- In construction industry.

3.7 Phenol

Have you ever observed the oily material which is used to clean your house? Do you know what it is? It is a chemical, named as Phenol.



Phenol is a **carbolic acid** of an organic compound. It is a necessary ingredient for preparing variety of phenol products. The molecular formula of phenol is C_6H_5OH, it is a weak acid. It is a volatile, white crystalline powder.

6th Science_IIIrd Term English Book_Unit_3.indd 40 27-09-2023 20:02:35

It is a colorless solution, but changes into red in the presence of dust.

It irritates when exposed on human skin. It is widely used for industrial purposes.

Phenol itself is used (in low concentrations) in mouthwash and as a disinfectant in household cleaners. Phenol used as surgical antiseptic since it kills micro organisms.

3.8 Adhesives

What will you do when a page of your book is torn accidentally? It can be fixed by using a cello tape. How cello tape works? There is a paste like material in one surface of the cello tape. Have you ever discussed about this material? The paste like substance is called adhesive. It is commonly known as glue, mucilage, or paste. The substances applied to one surface, or both the surfaces of two separate items that binds them together and resists their separation are called **adhesives**.





Adhesives are substances that are used to join two or more components together through attractive forces acting across the interfaces.

A practical experience

Do you notice how puncture of your bicycle is repaired by the shop keeper? He ensures the punctured surfaces are clean, dry and free of dust, and roughens the area around the hole using a metal scraper. He takes an appropriate patch of tyre-tube and applies a suitable adhesive to both the roughened area and to the underside of the patch, apply firm pressure and allows drying completely. Why does he apply pressure? This increases the adhesive capacity at both the surfaces and ensures proper binding.



Types of adhesives

There are two kinds of adhesives, one is natural made from starch and another one is artificial made from chemicals. The one used in puncture shop is an artificial adhesive.

Artificial adhesives may be classified in a variety of ways depending on their utilities. Their forms are paste, liquid, film, pellets, tape.

It is used in various conditions such as hot melt, reactive hot melt, thermo setting, pressure sensitive, and contact.

6th Science_IIIrd Term English Book_Unit_3.indd 41 27-09-2023 20:02:40

Points to Remember

- Soaps are prepared by heating the mixture of olive oil, animal fat and concentrated sodium hydroxide solutions.
- Fertilizer facilitates growth of plants.
- Vermi compost has high nutrient benefits and it is useful for sustaining the land fertility.
- Cement is manufactured by using lime, clay and gypsum.
- Plaster of Paris is used to fix bone fractures.
- Diluted phenol is used as a cleaner, disinfectant and mouthwash.
- Adhesives are substances that are used to join two or more components together.

6th Science_IIIrd Term English Book_Unit_3.indd 42 27-09-2023 20:02:40



ICT Corner

Nutrients for life



Through this activity you will be able to learn about the 4Rs of crop nutrients and their importance.

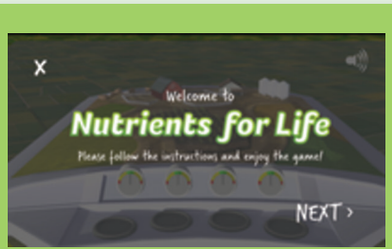
Step 1: Type the following URL in the browser. 'NUTRIENTS FOR LIFE' activity page will open.

Step 2: Click the ' X ' icon on the top left of the activity window to close the welcome note and start the activity or click on 'Next' on the bottom to read the instructions.

Step 3: A corn field , 4 cubes and 4 dials are shown, Using the mouse grab the cubes at the bottom which are labelled WATER , N, P, K and drop them over the crop.

Step 4: Each time you apply water or nutrients on the crop it will rise the dial. Keep all the dials in the green. Repeat the same process till the crop is fully grown.

Step 1



Step 2



Step 3



Step 4



Nutrients for life URL:

http://seedsurvivor.com/agrium-games/Feeding%20the%20Future/

*Pictures are indicative only

6th Science_IIIrd Term English Book_Unit_3.indd 43 27-09-2023 20:02:47

Evaluation



I. Choose the appropriate answer

1. Soaps were originally made from _____ .

   a. proteins

   b. animal fats and vegetable oils

   c. chemicals extracted from the soil

   d. foam booster

2. The saponification of a fat or oil is done using _____ solution for hot process.

   a. Ammonium hydroxide
   b. Sodium hydroxide
   c. Hydrochloric acid
   d. Sodium chloride

3. Gypsum is added to the cement for _____.

   a. fast setting b. delayed setting

   c. hardening d. making paste

4. Phenol is _____.

   a. carbolic acid b. acetic acid

   c. benzoic acid d. hydrochloric acid

5. Natural adhesives are made from _____.

   a. Protein b. fat

   c. starch d. vitamins

II. Fill in the Blanks

1. _____ gas causes tears in our eyes while cutting onions.
2. Water, coconut oil and _____ are necessary for soap preparation.
3. _____ is called as farmer's best friend.
4. _____ fertilizer is ecofriendly.
5. _____ is an example for natural adhesive.

III. True or False. If False, give the correct statement

1. Concentrated phenol is used as a disinfectant.
2. Gypsum is largely used in medical industries.
3. Plaster of Paris is obtained from heating gypsum.
4. Adhesives are the substances used to separate the components.
5. NPK are the primary nutrients for plants.

IV. Match the following

1.	Soap	-	C_6H_5OH
2.	Cement	-	$CaSO_4.2H_2O$
3.	Fertilizers	-	NaOH
4.	Gypsum	-	RCC
5.	Phenol	-	NPK

V. Arrange the following statements in correct sequence

1. Pour that solution into an empty match box, soap can be obtained after drying.

6th Science_IIIrd Term English Book_Unit_3.indd 44 27-09-2023 20:02:47

2. Take necessary quantity of water in a jar.
3. Then add coconut oil drop by drop and stir it well.
4. Add concentrated sodium hydroxide in the jar and allow it to cool.
5. Try this soap to wash your hand kerchief.
6. Cover your work area with old newspaper.

VI. Analogy

1. Urea : Inorganic fertilizer:
   Vermi compost: _____.
2. _____: Natural adhesives: Cello tape: Artificial adhesives.

VII. Give very short answer

1. What are the three main constituents of soap?
2. What are the two different types of molecules found in the soap?
3. Give an example for inorganic fertilizer.
4. Mention any three physical properties of phenol.
5. Explain the uses of plaster of paris.
6. What are the ingredients of the cement?
7. Why gypsum is used in cement production?

VIII. Give short answer

1. Why earthworm is called as farmer's friend?
2. Explain the process of manufacturing cement.
3. What are uses of Gypsum?

IX. Answer in detail

1. Explain what is RCC and give its uses?
2. How are detergents manufactured?

X. Questions based on Higher Order Thinking Skills

1. Ravi is a farmer; he rears many cattle in his farm. His field has many bio wastes. Advise Ravi how to change this bio waste to compost by using vermi -composting techniques. Explain the benefits of vermi castings.

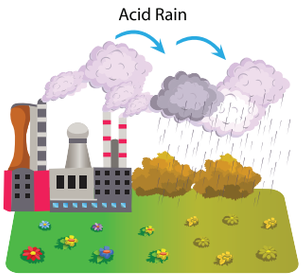
XI. Project

- ❖ Take 100 ml of hot water in a glass jar.
- ❖ Add 50 gram of maida in the hot water and stir it well.
- ❖ A paste like substances are formed. Add a small quantity of copper sulphate for a long use.
- ❖ Now you test this paste by binding your damaged book.

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Unit 4 Our Environment



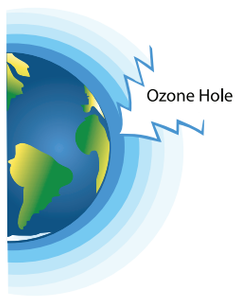


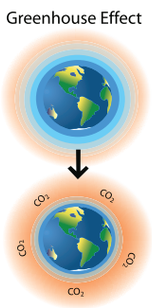














Learning Objectives

- To acquire knowledge about ecosystems and their components
- To understand food chains and their role in ecosystems
- To learn about waste, their management and recycling
- To find out the difference between biodegradable and non-biodegradable wastes
- To study different types of pollution and their impact on environment

CNRUT

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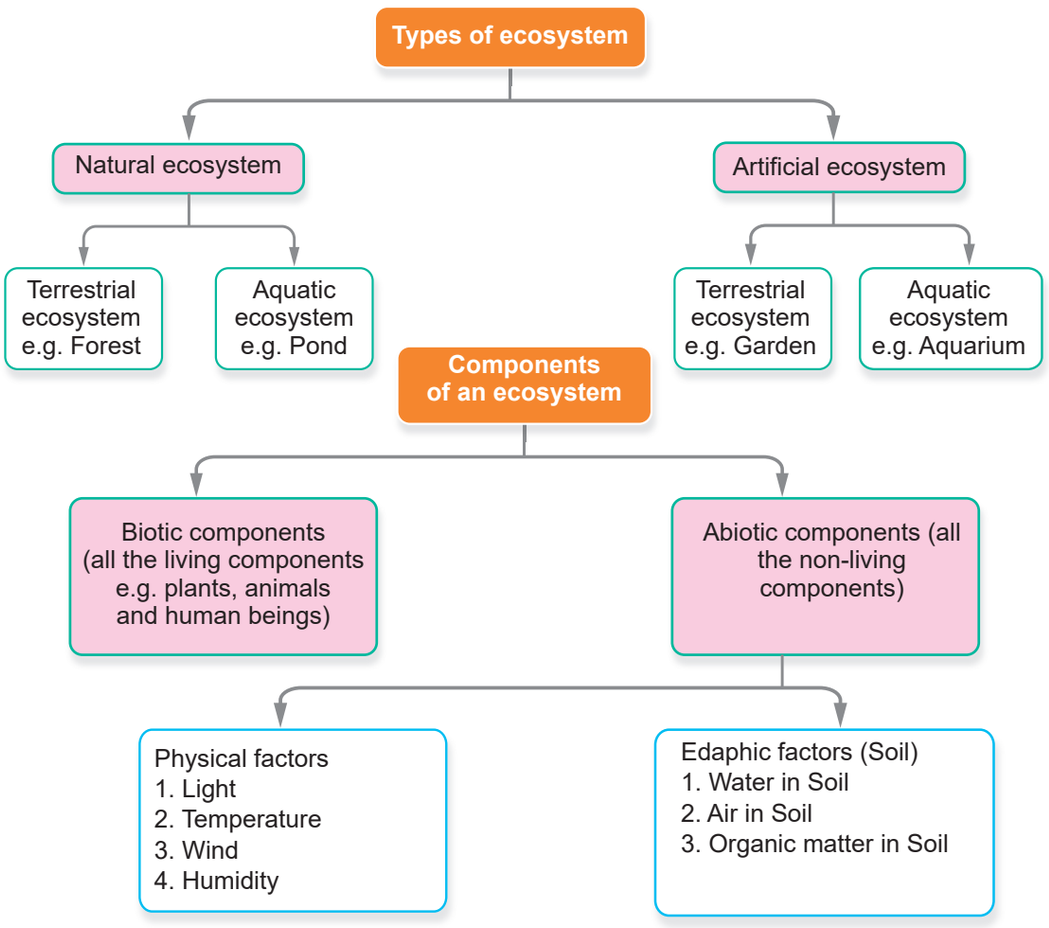
Introduction

The surroundings or space in which a person, animal, or plant lives, is known as an **environment**. Environment is everything that surrounds us. It can have both living (biotic) and non-living things (abiotic). **Abiotic factors** are non-living things such as sunlight, air, water and minerals in soil. **Biotic factors** are living things of our environment such as plants, animals, bacteria and more. Organisms live, constantly interact with one another and adapt themselves to conditions of their environment.

4.1 The Ecosystem

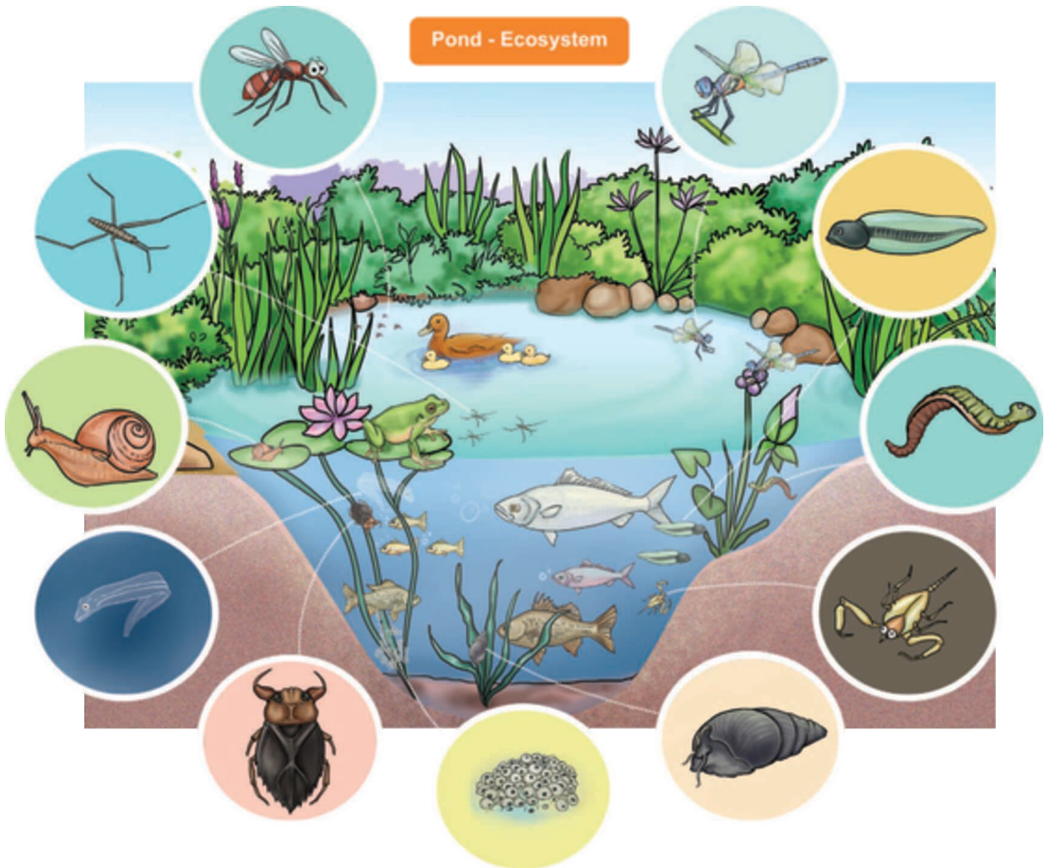
Ecosystem is a community of living and non-living things that work together. Each part of an ecosystem has a role to play. Any changes in the environment such as increased temperature or heavy rains, can have a big impact on an ecosystem.

Ecosystems can be either natural or artificial.



Activity 1: Think of the objects in your home. Just keep in mind, the books, toys, furniture, food materials and even pets of your home. These living and non-living things together make your home. Look at the following picture and list out the living and non-living things, in the pond.

6th Science_IIIrd Term English Book_Unit_4.indd 47 27-09-2023 20:03:36



Natural ecosystem

Ecosystem originated without human intervention is called a **natural ecosystem**. This can be an aquatic ecosystem or a terrestrial ecosystem.

The ecosystem in water is called **aquatic ecosystem**. Sea, river, lake, pond and puddle are some examples of natural aquatic ecosystem.

Ecosystems outside the water body and on land are called **terrestrial ecosystems.** Forests, Mountain regions, Deserts etc., are examples of natural terrestrial ecosystems.

Artificial ecosystem

Artificial ecosystem is created and maintained by human. They have some of the characteristics of natural ecosystems. They are much simpler than the natural ecosystems.

These can be the terrestrial ecosystems such as paddy fields, gardens etc. or the aquatic ecosystem such as fish tank.





6th Science_IIIrd Term English Book_Unit_4.indd 48 27-09-2023 20:03:41



Aquarium:

Aquarium is a place in which fish and other water creatures and plants are maintained. An aquarium can be a small tank, or a large building with one or more large tanks.



Terrarium:

Terrarium is a place in which live terrestrial animals as well as plants are maintained. With controlled conditions that copy their natural environment



Aquariums and Terrariums are used to observe animals and plants more closely. They are also used for decorations.

4.2 Food Chain and Food Web



Living organisms need food to perform their physiological activities. Some organisms can produce their own food, such as plants, while other organisms cannot do this and depends on other organisms to obtain their food.

We can therefore identify different feeding types of mechanisms in an ecosystem, based on how the organism obtain (gets) their food. They are **producers and consumers.**

Producers

Producers are organisms that are able to produce their own food. They do not need to eat other organisms. Producers are also called **autotrophs.** Can you name an organism that prepare it's own food?

Plants are producers because they make their own food by photosynthesis.

What do plants require for photosynthesis?

Consumers

Organisms which cannot produce their own food, has to eat other organisms as food. These organisms are called **consumers.** All animals are consumers as they cannot produce their own food. Consumers are also called **heterotrophs.**

6th Science_IIIrd Term English Book_Unit_4.indd 49 27-09-2023 20:03:42

There are many types of consumers and we can classify them into specific groups depending on the food that they consume. These are:

- **herbivores**

Animals which eat plants or plant products e.g: cow, deer, goat and rat.

- **carnivores**

Animals that eat other animals e.g: Lion, tiger, frog and owl.

- **omnivores**

Animals that eat both plants and animals e.g: Humans, dog and crow

- **decomposers**

Micro-organisms that obtain energy from the chemical breakdown of dead organisms (both plants and animals). They break complex organic substances into simple organic substances that goes into the soil and are used by plants. (e.g) Bacterium, Fungi

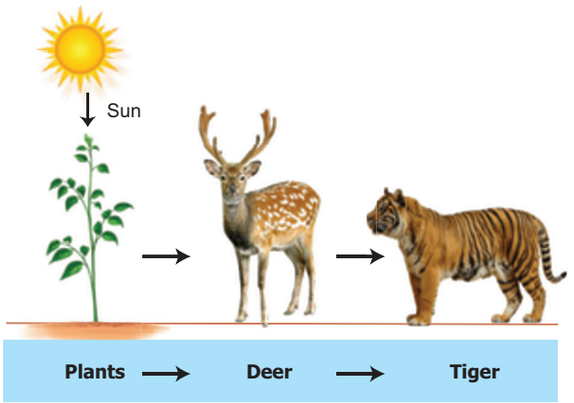
Food chain

In a forest, deer eats grass, and in turn tiger eats deers. In any ecosystem there is a chain like relationship between the organisms that live there. **The sequence of who eats whom in an ecosystem is called as food chain.**

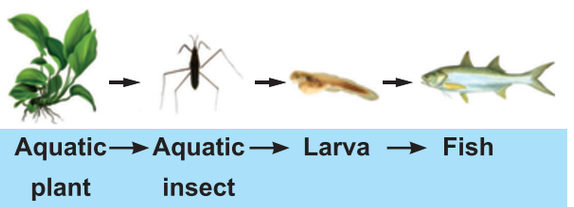
It describes how an organism gets food and nutrients by eating other organisms.

A food chain shows the relationship between producers (e.g. grass), consumers (e.g. deer, goat, cow and tiger) and decomposer (Bacteria and Fungi)

E.g. Food chain in a terrestrial (Grassland) ecosystem



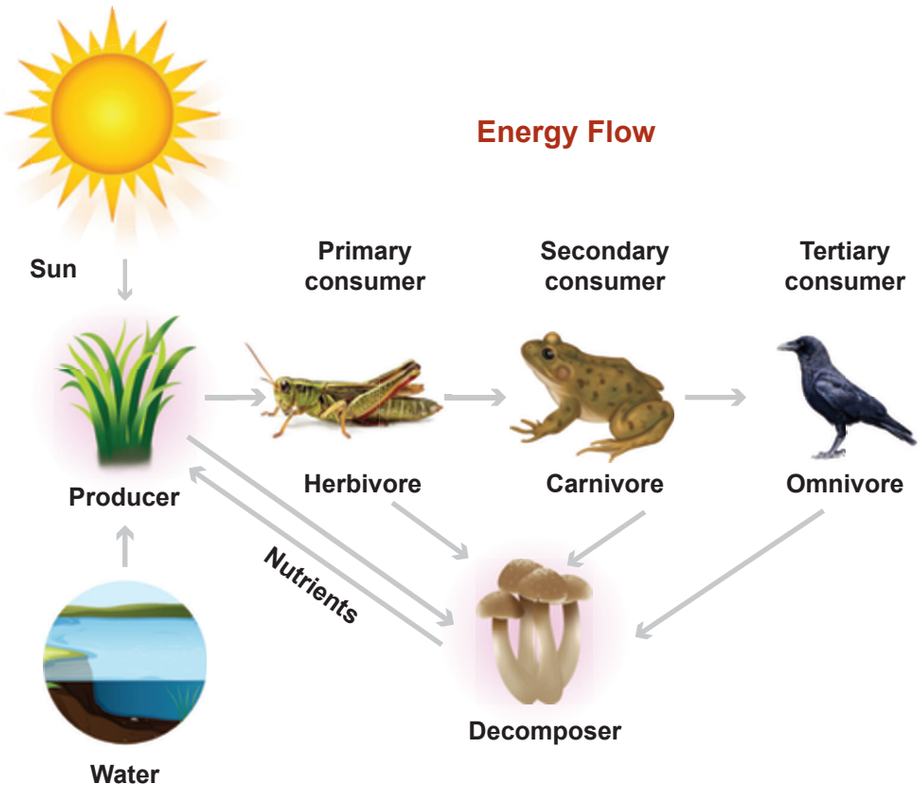
E.g. Food chain in an aquatic (Lake) ecosystem



Energy flow

The food chain begins with the energy given by the Sun. Sunlight triggers photosynthesis in plants. The energy from the Sun is stored in the plant parts. When the grasshopper eats the grass, the energy flows from grass to grasshopper. Frog gets energy by eating grasshopper. This energy is transferred to a crow, when the frog is eaten by a crow. Thus we conclude the primary energy production in the world of living things is produced by plants, that is by photosynthesis.

6th Science_IIIrd Term English Book_Unit_4.indd 50 27-09-2023 20:03:43



The micro organism degrade the excreta and the dead bodies of animals into primary simple components and puts them back into soil. It is this material that help the plants to grow. Thus we can see that there is a cyclic movement of materials from primary producers to highest level predators, then back to the soil.

Trophic levels

The energy is passed from the producer to the consumers. But, there are three different consumers in any food chain. How can we distinguish different consumers?

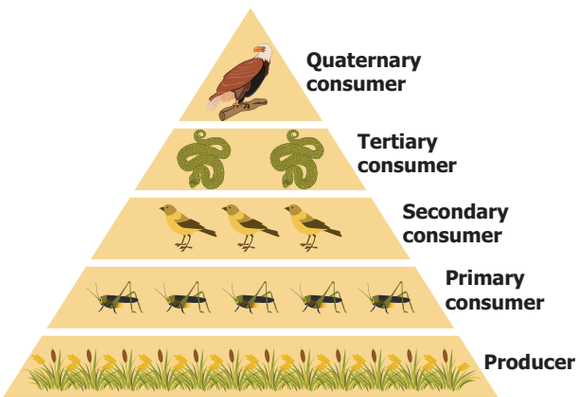
Animals that eat plants are **primary consumers.**

Animals that eat primary consumers are called **secondary consumers.**

Animals that eat the secondary consumers (mostly predators) are the **tertiary consumers.**

There may even be large predators that eat tertiary consumers. They are called as **quaternary consumers.**

Each of these levels in the food chain is called a **trophic level.**



Organism uses up to 90% of its food energy for its life processes. Only about

6th Science_IIIrd Term English Book_Unit_4.indd 51 27-09-2023 20:03:46

10% of energy goes into new body cells and will be available to the next animal when it gets eaten. This loss of energy at each trophic level can be shown by an **energy pyramid.**

A rat eats grains; and in turn we know snake eats rat. Now snake is a prey for peacock and in turn peacocks are easy prey for tigers and leopards. Now think? Do tigers have any natural predators?

In all food chain there is a top level predator that has no natural predators. In an aquatic ecosystem there are no natural predator for alligator; in a forest there are no natural predators for tigers.

Importance of food chain

1. Learning food chain help us to understand the feeding relationship and interaction between organisms in any ecosystem.

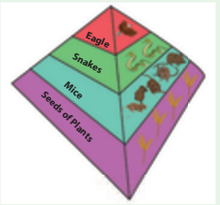
2. Understanding the food chain also helps us to appreciate the energy flow and nutrient circulation in an ecosystem. This is important because pollution impacts the ecosystem. The food chain can be used to understand the movement of toxic substances and their impacts.

Food web

Consumers have different sources of food in an ecosystem and do not rely on only one species for their food. If we put all the food chains within an ecosystem together, then we end up with many interconnected food chains. This is called a food web.

A food web is very useful to show different feeding relationships between different species within an ecosystem.

Activity 2: Take a square paper. Fold its diagonals. Draw three lines in three triangles as shown in the picture.

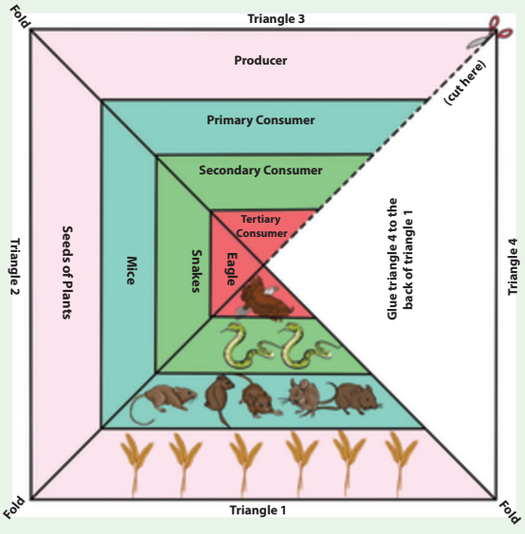


Cut from the edge of the diagonal to the center as shown in the picture.

If you fold this triangle and paste behind the third triangle you get a pyramidal shape.

In one of the triangles, draw images of each of the organisms in the different levels.

In another triangle write the names of the organisms. In the last triangle, write the energy level of the organism. Have a look at the following example. You must come up with different organisms!.



6th Science_IIIrd Term English Book_Unit_4.indd 52 27-09-2023 20:03:47

POLLUTION

When something harmful or poisonous is added to the environment.



FOOD CHAIN AND FOOD WEB



The flow of energy and nutrients.

OUR ENVIRONMENT

is everything around us.

AN ECOSYSTEM

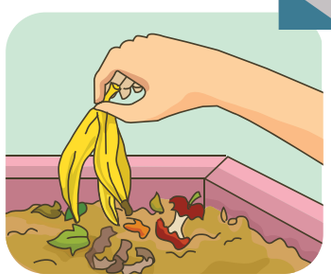
is a community made up of living organisms and non-living components.

3R PRINCIPLE

Idea of shifting from a mass consumption society

Reduce Reuse Recycle

BIODEGRADABLE



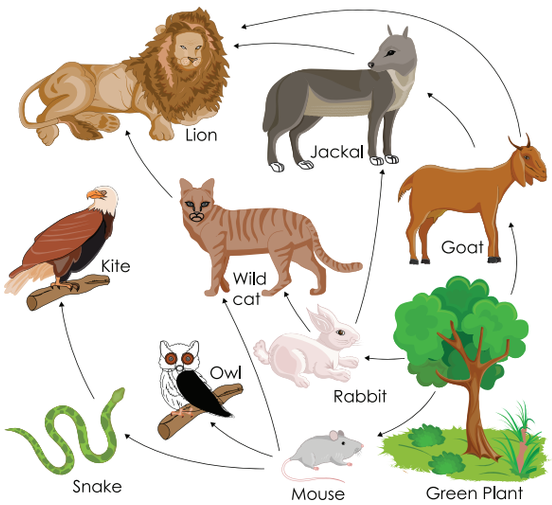
Materials which can be broken down by bacteria, fungi and earthworms.

NON-BIODEGRADABLE

Materials that cannot be broken down by the action of living organisms.



6th Science_IIIrd Term English Book_Unit_4.indd 53 27-09-2023 20:03:49



Food Web

4.3 Waste Management and Recycling

To protect our environment, it is very important to reduce waste, manage it properly and maximise recycling. Waste is any substance or material that has been used but is not wanted anymore. This is either because it is worn out, broken or no longer has any purpose. Everyone produces waste which has an impact on all ecosystems. However, most of us do not know where our garbage goes. There are many types of waste. There is liquid waste (in our drains), there are gases hiding in the air (like pollutants from factories) and there is solid waste (garbage) we put in our waste bins.

4.4 Biodegradable and Non-biodegradable Waste

Solid waste we generate can be classified into two major types:



1. Biodegradable wastes

2. Non-biodegradable wastes

Activity 3:

Take two mud pots or glass jars and fill them up with garden soil. In the first pot, mix wastes such as banana peel, some vegetable peels and a few tree leaves into the soil. In the second pot, mix a piece of plastic carry bag, sweet wrapper and metal foil into the soil.

What happen to the waste materials placed in both pots? Do you notice a difference between first and second pot? Observe the changes over two weeks and discuss with your classmates.

Biodegradable waste

The term **'Biodegradable'** is used for those things that can be easily



decomposed by natural agents like water, oxygen, ultraviolet rays of the sun and micro-organisms, etc.

One can notice that when a dead leaf or a banana peel is thrown outside,

6th Science_IIIrd Term English Book_Unit_4.indd 54 27-09-2023 20:03:51

it is acted upon by several micro-organisms like bacteria, fungi or small insects in a time period. Biodegradable waste includes vegetable and fruit peels, leftover food and garden wastes (grass, leaves, weeds and twigs).

Natural elements like oxygen, water, moisture, and heat facilitate the decomposition thereby breaking complex organic forms to simpler units. Decomposed matter eventually mixes or returns back to the soil and thus the soil is once again nourished with various nutrients and minerals.

Non-biodegradable waste

Those materials which cannot be broken down or decomposed into the soil by micro-organisms and natural agents are labeled as **non-biodegradable.** These substances consist of plastic materials, metal scraps, aluminum cans and bottles, etc.



These things are practically immune to the natural processes and thus cannot be fed upon or broken down even after thousands of years.

Give some examples for Biodegradable and Non-biodegradable waste.

S. No.	Biodegradable waste	Non-bio-degradable waste
1.	Food Waste	Plastic Bottles
2.		
3.		
4.		
5.		

Discuss with your teacher and friends.

1. Are animal bones biodegradable?
   _____



2. Are all types of clothes biodegradable? _____

Rani and her garbage

Rani gets home from school. She is hungry. She eats a banana and a packet of chips. She puts the banana peel and plastic chips packet into the waste bin. In the waste bin, the waste mixes together and the banana peel and makes the plastic chips packet dirty. The waste bin starts to smell and Rani's mother puts the waste outside on the street. The municipality collects the waste from outside Rani's house and many other houses in a tractor. The tractor drives to a big open dump and leaves all mixed wastes there.



6th Science_IIIrd Term English Book_Unit_4.indd 55 27-09-2023 20:03:54

Sometimes, there are fires in the open dump. When waste like Rani's chips packet burns, unhealthy chemicals pollute the ecosystem. These chemicals are present in the air we breathe. The leftover ash from burning waste pollutes the soil.

When it rains, some of the dangerous chemicals goes into the ground. Some of the rain never reaches the ground as it collects in the plastic garbage at the dump. Little pools of water let mosquitoes to breed and they can spread unwanted diseases like dengue and malaria. Cows and dogs go into the open dump looking for food. As the waste is mixed, many things that are not good to eat such as plastics, smell like food. The animals get confused and eat some plastics by accident. This makes them sick.

Rani is a student like you. She does not want to make animals sick. She does not want to pollute beautiful Town. She does not like mosquitoes and wishes that no one ever gets sick from them. So Rani takes this decision "I will dispose the waste property and reduce all type of pollution".

Do you want to do the same as Rani does? Learn about the 3R's and how you can start to solve these problems.

4.5 Solid Waste Management

It is our duty to reduce creating waste and protect environment. 3R's are important in protecting environment. The first R is reduce and the second R is reuse and the last R is recycle.

The waste hierarchy or pyramid shows the best ways to manage solid waste.



3R-Cycle

1. Avoid

Avoid the usage of unwanted materials which create more debris. Before you buy anything, think that "Do I really need it?" (e.g) Avoid buying packed foods. Refuse to buy use and throw plastic products.

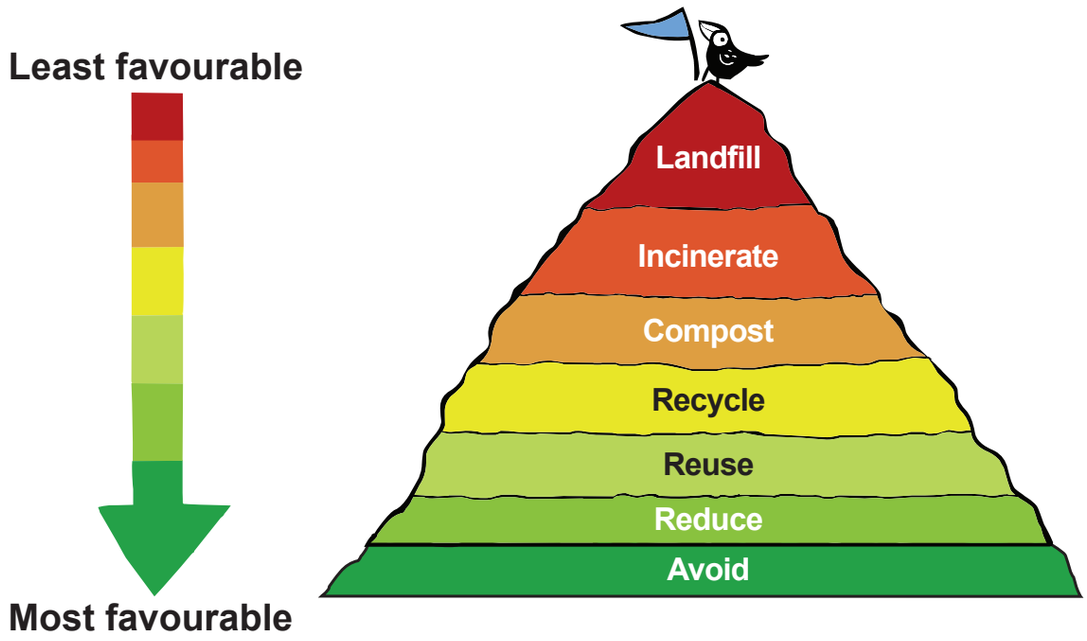
2. Reduce

We can reduce the waste by using durable goods that last longer instead of things that are used once and thrown away. (e.g) Write on both sides of papers. Instead of unnecessary printing, use electronic facilities. Share newspapers, magazines and other things with others.

3. Reuse

Reuse means using a thing again and again, rather than using and throwing after a single use. (e.g) Instead of using plastic bags, use and throw pens and batteries, use cloth bags, fountain pens and rechargeable batteries. Reuse glass bottles for other purposes. Repair foot wears and use them.

6th Science_IIIrd Term English Book_Unit_4.indd 56 27-09-2023 20:03:55



Creative reuse

DO YOU KNOW?

Creative reuse or Up-cycling is the process of converting waste materials or useless products into new materials or products of better quality or for better environmental value. When you upcycle, you are giving an item a new purpose. (e.g) Used tyres into chairs. Used PET bottle into penstand.



4. Recycle

The process by which waste materials are used to make new products is called recycling.(e.g) Using old clothes to make paper and melting some plastics to make floor mats, plastic boards and hose pipes.

5. Compost

The process of degradation of organic wastes into manure by the action of microorganism is called **composting**. The manure thus obtained becomes natural fertilizer for the plants as well as increases the soil fertility.



6th Science_IIIrd Term English Book_Unit_4.indd 57 27-09-2023 20:03:56

6. Incinerate

The burning of solid waste in incinerator is called incineration. (discarded medicines, toxic drugs, blood, pus). During incineration, the enormous heat kills all contagious disease-causing germs.



7. Landfill

Landfilling is a method in which wastes are dumped into naturally occurring or man-made pits and covered with soil. Garbage buried inside landfills remain here for a long time as they decompose very slowly and become manure. These places can be converted into parks, gardens, etc.,



Earlier in the lesson, you learn about Rani and how she did not want to cause pollution. Simple steps in your daily life can make big differences. There are two steps you should remember.

1. The first step should always be to reduce waste. Think of the 3R's and the waste pyramid and remember the order of the levels.
2. The second step is to keep waste separate. This way the waste will remain clean and can be easily reused or recycled. Mixing different types of waste together (e.g. biodegradable and non-biodegradable) makes that place dirty.

Waste separation exercise

The Solid Waste Management (SWM) rules, 2016 say that,

1. Every Household should segregate and store the waste generated by them in **three separate streams – namely bio-degradable, non bio-degradable and domestic hazardous waste** in suitable bins and handover segregated wastes to authorised waste pickers or waste collector as per the direction or notification by the local authorities from time to time.
2. No body shall throw, burn, or bury the solid waste on streets, open public spaces outside their premises or in the drain or water bodies.

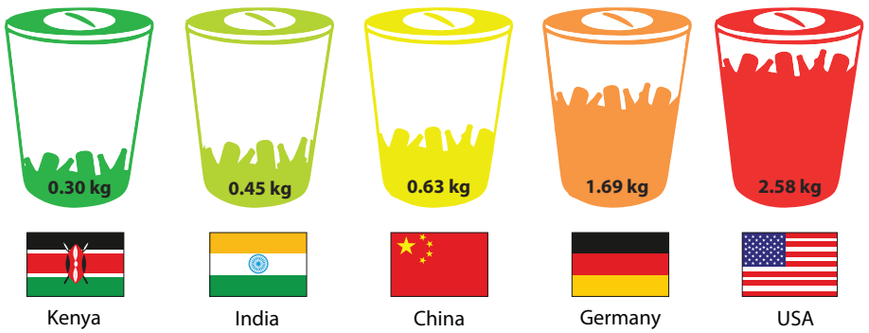
Domestic hazardous waste means discarded paint drums, pesticide cans, CFL bulbs, tube lights, expired medicines, broken mercury thermometers, used batteries, used needles and syringes and contaminated gauge, etc., generated at the household level.

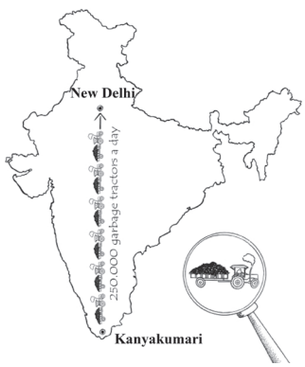
6th Science_IIIrd Term English Book_Unit_4.indd 58 27-09-2023 20:03:56

Learn how to separate waste correctly into 3 waste bins so you can keep Tamilnadu clean and beautiful!

How much waste does each person make around the world every day?

The average person in India produces 0.45kg of waste every day. It may be small amount of waste. But, India has a large population and imagine you collected all the waste today and put it into tractors. You would fill so many tractors that you could create a traffic jam approximately 2,800 kilometres long. Imagine, a road all the way from Kanyakumari to New Delhi completely blocked with tractors carrying garbage and no space to walk in between. This is how much waste we create in India each day! If we reduce the waste, we reduce the pollution.





Every day 532 million kilos of solid waste is generated in India.

Activity 4: Preparation of Vermi compost



Dig a pit for about one feet depth in the backyard or garden of your home or school. Fill the pit by bio wastes, paper and food wastes and place few earth worms in it, sprinkle water and close the place with jute or cardboard and ensure moisture all the time.

After 45 days the vermi compost casting layer formed just above the pit. These compost can be applied to the plant, which contains water soluble nutrients. This type of compost helps in plant growth as well as sustain the land is fertility.

6th Science_IIIrd Term English Book_Unit_4.indd 59 27-09-2023 20:03:59

4.5 Pollution

Pollution occurs when the environment gets contaminated by wastes, chemicals and harmful substances.

Pollution is the damage caused to the environment mainly because of human activities. Any substance that causes pollution is known as a **pollutant**. Pollution is an unwanted change in the physical, chemical and biological characteristics of our land, air and water.

4.6 Types of Pollution

There are four major kinds of pollution:

1. Air pollution
2. Water pollution
3. Land (soil) pollution
4. Noise pollution

4.6.1 Air pollution



Most air pollution is caused by the burning of fossil fuels (e.g. oil, petrol, coal and natural gas). The are used in industries, power plants and motor vehicles. Burning these fossil fuels release toxic gases and fine particles (such as ash and soot) into the air causing air pollution. Air pollution is also caused by burning solid wastes, like some plastics, gases or chemicals released from factories and fumes from aerosols (like deodorant spray cans) or paints.

Certain toxic gases produced by industries mix with raindrops in the atmosphere and make rain unusually acidic. This is called acid rain. It damages plants, washes the nutrients out of soils and kills fish. Air pollution is harmful to all living organisms including humans. Polluted air affects skin, eyes and respiratory system.

How can we reduce air pollution?

1. Cycle or walk short distances instead of using a motor vehicle.
2. Travel by public transport (bus or train)
3. Do not burn solid waste.
4. Avoid fireworks.

4.6.2 Water pollution



Water pollution occurs when wastes from factories, houses and farms mixes with the water in rivers, lakes, ponds, the ocean or even groundwater. Contaminated or polluted water can spread diseases and chemicals which are not good for our health.

6th Science_IIIrd Term English Book_Unit_4.indd 60 27-09-2023 20:04:00

The most significant sources of water pollutants are

1. Sewage (water we use at home for bathing, cleaning, cooking).
2. Industrial effluents (liquid wastes from factories).
3. Agricultural pollutants (chemical pesticides and fertilisers that get washed from farms).
4. Solid waste (when waste gets dumped into water bodies).

How can we reduce water pollution?

1. Do not pour leftover oil, old medicines or waste down the drain or into the toilet.
2. Reduce the use of chemical pesticides and fertilizers to grow crops.
3. Use waste water for garden in home.
4. Do not litter or dump waste – always use a waste bin.

4.6.3 Land (soil) pollution



In the same way as water and air get polluted, land or soil pollution happens when toxic chemicals change the natural balance in soil. Land pollution comes from farming (Excess use of chemical pesticides and fertilisers), mining (digging up metals and other materials), factories (industrial waste) and the solid waste from our own homes like plastics and broken electronics. Soil pollution affects animals, humans and even plants because soil or land acts like a sponge. When it rains, pollutant sinks into the soil. If we grow plants to eat in polluted soils, these dangerous chemicals can get into our food.

How can we reduce land pollution?

1. First try to reduce waste, then recycle the rest.
2. Always use a waste bin and never litter.
3. Do not burn waste, the ash mixes easily with soil.

4.6.4 Noise pollution



Noise pollution affects the environment. We all like a quiet and peaceful place since unpleasant or loud sounds disturb us. Loud music, the sounds of motor vehicles, fire works and machines cause noise pollution. Continuous noise disturbs our sleep and does not allow to study. Noise pollution has been directly linked to stress and health impacts such as high blood pressure and hearing loss. Loud noise or even loud music can damage our ears. Noise pollution also

6th Science_IIIrd Term English Book_Unit_4.indd 61 27-09-2023 20:04:04

disturb animals. Birds have to communicate (talk) louder so that, they can hear each other in noisy areas. Even underwater noise pollution from ships, can make whales lose their way as they use sounds to navigate.

How do we reduce noise pollution?

1. Turn off your electronics when you do not use them.
2. Lower the volume when you watch TV or listen to music.
3. Remind drivers not to use the horn too much.
4. Avoid fireworks.
5. Speak, do not shout.

Classroom Exercise

Identify who am I?

1. I am the type of pollution caused by burning of fossil fuels like petrol or coal and the smoke of burning garbage. I float around and cause breathing problems. I am _____ pollution.
2. I am the type of pollution caused by loud sounds and I can cause serious damage to your ears and also affect sleep. In India, I am mainly caused by loudspeakers and honking of air horns of cars. I am _____ pollution.
3. I flow from homes and farms into rivers and lakes. I kill fish and make water unfit for drinking. I am _____ pollution.
4. I am the type of pollution caused by using too much chemical fertilizers and pesticides by farmers. I lower the quality of soil and even move chemicals into plant parts which are eaten by people. I am _____ pollution.

Points to remember

- Living (biotic) and non-living (abiotic) components interact with one another.
- There are two types of ecosystems terrestrial (on land) and aquatic (in water).
- The feeding relationship in an ecosystem is called a food chain.
- Biodegradable and non-biodegradable waste should be kept separate
- The 3R's are in a certain order: First reduce, then reuse and finally recycle.
- Waste should never be burned as it causes air and soil pollution.
- Pollution occurs when the environment gets contaminated by wastes, chemicals and harmful substances.
- Major types of pollution are four: air pollution, water pollution, land pollution, and noise pollution.
- There are many small habits, any student can practice to reduce pollution, manage waste correctly and protect the environment.

6th Science_IIIrd Term English Book_Unit_4.indd 62 27-09-2023 20:04:04

ICT Corner

Our Environment

Through this activity you will be able to understand the atomic level of the process that plants use to convert solar energy into chemical energy.



Step 1: Type the URL given or scan the QR code to launch the activity. Food chain page will open.

Step 2: With the use of mouse drag the parts of the food chain - the animals or plants given to their correct place - in the empty boxes.

Step 3: When the chain is complete you can watch the food chain in action.

Step 4: Continue the activity by click on the next icon. Play and observe the various complex levels of food chain.

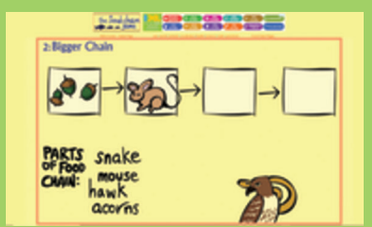
Step 1





Step 2

Step 3





Step 4

Our Environment URL:
http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm

*Pictures are indicative only

6th Science_IIIrd Term English Book_Unit_4.indd 63 27-09-2023 20:04:09

Evaluation



I. Choose the appropriate answer

1. Identify the fresh water ecosystem.

   a. Pond b. Lake

   c. River d. All of them

2. Producers are_____

   a. Animals b. Birds

   c. Plants d. Snakes

3. It is a biodegradable waste.

   a. Plastic b. Coconut Shell

   c. Glass d. Aluminium

4. It is an undesirable change that occurs in air and water.

   a. Recycling b. Reuse

   c. Pollution d. Reduce

5. Usage of chemical pesticides and fertilisers causes _____ pollution.

   a. Air pollution

   b. Water pollution

   c. Noise pollution

   d. None of the above

II. Fill in the blanks

1. Primary consumers that eat plants are called _____.

2. Temperature, light and wind are _____ factors.

3. _____ is the process of converting waste materials into new materials.

4. Water pollution can spread _____ diseases in man.

5. The 3R's are Reduce, _____ and Recycle.

III. True or False. If False, give the correct statement

1. The Pacific ocean is an example of an marine ecosystem.

2. Bacteria and fungi are called decomposers.

3. Human and animal wastes are examples of non-biodegradable waste.

4. Excessive use of pesticides leads to air pollution.

5. In schools, waste management rules say that we should separate waste in two categories.

IV. Match the following

1.	Biotic factor	-	Terrestrial Ecosystem
2.	Sewage	-	Land pollution
3.	Fertilizers	-	Air pollution
4.	Desert	-	Water Pollution
5.	Smoke	-	Animals

V. Arrange the following in a correct sequence and form a food chain

1. Rabbit ⟶ Carrot ⟶ Eagle ⟶ Snake

2. Human ⟶ Insect ⟶ Algae ⟶ Fish

6th Science_IIIrd Term English Book_Unit_4.indd 64 27-09-2023 20:04:10

VI. Give very short answer

1. Define ecosystem.
2. What are the two types of ecosystems?
3. Write any two things that can be recycled.
4. What are the types of pollution.
5. Give one example of a food chain in an aquatic ecosystem?
6. What are pollutants?
7. What are the pollutions caused by the objects given below?

   a. Loud Speaker b. Plastic

VII. Give short answer

1. What is biodegradable waste?
2. How can we reduce water pollution?
3. Write the importance of the food chain.

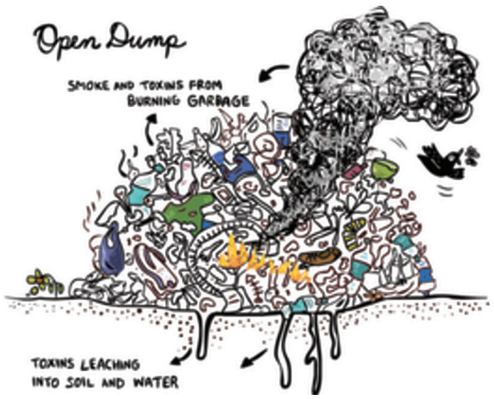
VIII. Answer in detail

1. Give two examples of how you can avoid or reduce waste?
2. Write a short note on noise pollution.

IX. Question based on Higher Order Thinking Skills

1. What would happen if an organism is removed from the food chain?
2. Explain the link between waste and dangerous diseases like dengue and malaria?

X. See the diagram and answer the following questions



1. Explain what is happening in the picture?
2. What types of pollution are caused by open dumps?

6th Science_IIIrd Term English Book_Unit_4.indd 65 27-09-2023 20:04:10



Unit 5 Plants in Daily Life



Learning Objectives

- Able to acquire knowledge about various types and uses of plants
- Able to understand the economic importance of plants
- Able to appreciate the interrelationship between plants and animals and its economical importance

6th Science_IIIrd Term English Book_Unit_5.indd 66 27-09-2023 20:04:57

Introduction

We are living in a green planet. Plenty of natural plant resources are around us. Economic botany basically deals with all pervading plants in relation to human welfare as food, clothing, shelter and medicine either directly or indirectly.

Indirect usage includes the needs of man's livestock and the maintenance of the environment; the benefits may be domestic, commercial, environmental, or aesthetic.

Plants bring about economy to the country in large extent and it is a fact that the wealth of any country largely depends upon its agriculture and plant products.

Economic botany is the study of relationship between people and plants and the uses of plants in economy.

From the earliest time rice, wheat and millet have been the staple food of a vast population of India as indicated by the presence of charred grains in most of the excavation sites. In addition, references are abundant in ancient literature about the existence and usage of several crops of economic importance.

Observe the following pictures carefully. Can you identify what they are doing?


Fig-1


Fig-2


Fig-3


Fig-4

1. Why are the farmers harvesting paddy?
2. A woman makes rope using coir. Where does the raw material come from?
3. Neem leaves are being collected in a plate. Do you know the uses of neem leaves?
4. What material is used by the man to make a chair?

In this lesson, let us discuss about the different crop plants of economic uses in relation to mankind. Based on their economic values and uses, plants may be broadly classified as follows.

1. **Plants as Food**
2. **Spice yielding plants**
3. **Medicinal plants**
4. **Fibre yielding plants**
5. **Timber yielding plants**
6. **Ornamental plants**

5.1 Plants as Food



Plants are the main source of food for humans beings. These plants are known as **food plants.**

Do you have a vegetable garden in your house? Have you ever seen harvesting of ripened vegetables?

Which part of the plants is used as food for us?

We eat different parts of plants such as root, stem, leaf, seed, unripe and ripe fruits. We can classify the food plants as follows.

6th Science_IIIrd Term English Book_Unit_5.indd 67 27-09-2023 20:04:58



6th Science_IIIrd Term English Book_Unit_5.indd 68 27-09-2023 20:04:59

1. **Vegetables**
2. **Cereals**
3. **Pulses**

Plants also give us coffee, tea, sugar and raw materials for oil.

Vegetables

We get vegetables from different parts of the plants.

Roots: eg: Beetroot, Carrot.




Leaves: eg: Green Vegetables Curry Leaves, Cabbage.




Stems: eg: Potato, Yam, sugarcane.




Flowers: eg: Banana flower, Cauliflower.




Fruits: eg: Amla, Guava.




Cereals

Cereals are edible components of grain of cultivated grass. Example Rice, Wheat, Bajra, Millet and Ragi.


Rice


Wheat


Bajra


Ragi

Pulses

Pulses are edible seeds of plants in the legume family. Pulses are produced in pods. eg: Bengal gram, Green mung bean.


Bengal gram


Green mung bean

Activity 1: Tabulate the names of vegetables, Cereals and pulses you know.

S.No.	Vegetables	Cereals	Pulses
1.			
2.			
3.			
4.			
5.			

Activity 2: How do Rava, Maida, Sago and Vermicelli are made? Discuss with your friends.






5.2 Spices

Spices are aromatic parts of tropical plants traditionally used to flavour the food. Spices come from the bark or roots of

6th Science_IIIrd Term English Book_Unit_5.indd 69 27-09-2023 20:05:07

DO YOU KNOW?

India is the second largest producer of fruits and vegetables in the world.

certain plants, leaves, flowers or stems of plants primarily used for flavoring, coloring or preserving food.

Spices used in India

Following spices are included in a variety of Indian dishes:

Cardamom, black pepper, curry leaves, fenugreek, fennel, ajwain, bay leaves, cumin, coriander seeds, turmeric, cloves, ginger, nutmeg and cinnamon.

DO YOU KNOW?

World Food Day, October-16.

The aim of celebration of this day is to promote worldwide awareness and action for those who suffer from hunger and for the need to ensure food security and nutritious diets for all.



Each year, World Food Day is celebrated by the Food and Agriculture Organization of the United Nations (FAO). World Food Day adopts a different theme each year. Ask your teacher about the theme of this year.



INDIAN SPICES

6th Science_IIIrd Term English Book_Unit_5.indd 70 27-09-2023 20:05:08

5.3 Medicinal plants

Some of the plants around us are good in healing our diseases. We call these plants as **medicinal plants.** They alleviate burns, cut, cold, fever, sneezes and more. Some chemical compounds in the **medicinal plants** act against insects, fungi and certain germs. Medicinal plants are considered as rich resources of ingredients which can be used in drug preparation.

Here is a list of plants that have the highest medicinal value.

Plant name	Parts used	Medicinal use
Amla	Fruit	Cure Vitamin 'C" deficiency diseases like Scurvy. Improve immunity.
Tulsi	Leaves, seed	Cough, cold, bronchitis, expectorant.
Aloe	Leaves	Laxative, wound healing, skin burns and ulcer.
Neem	Bark, leaf and seed	Skin diseases germicide
Turmeric	Rhizome	Helps body to fight foreign invaders,

Activity 3: Ask your parents about the medicinal uses of plants such as Phylanthus, Vallarai, Black nightshade, Tippili, Vettiver, Thuthuvalai and make a write up. What are the other plants used for medicinal purpose in your area?

5.4 Fibre yielding plants

Plants which give us fibres necessary for our uses are called as **Fibre yielding plants.** The fibre from these plants can be spun into thread , rope and cloth. These fibres are called as natural fibres.

We can classify the Fibre yielding plants into two types based on the uses and the parts of the plant from where we get the fibre.

Based on Use

1. **Textile Fibres** (making cloth), eg: Cotton
2. **Cordage Fibres** (making rope) eg: Coconut Fibre
3. **Filling Fibres** (making mattresses). eg: Silk cotton

Based on the plant parts

1. **Plant Fibres include seed hairs** eg: cotton;
2. **Stem (or bast) Fibres** eg: flax, jute;
3. **Leaf Fibres** eg: Agave,
4. **Husk Fibres** eg: coconut.



In India, Jute crop is grown in seven states – West Bengal, Assam, Odisha, Bihar, Uttar Pradesh, Tripura and Meghalaya. West Bengal alone accounts for over 50% of raw jute production.

6th Science_IIIrd Term English Book_Unit_5.indd 71 27-09-2023 20:05:08

Activity 4: Take a small quantity of cotton swap. Hold it between your thumb and fore finger. Now, gently start pulling out the cotton, while continuously twisting the Fibres.

Are you able to make a yarn?

The process of making yarn from Fibres is called **Spinning.**



5.5 Timber yielding plants

The wood needed for the construction of buildings and making of furniture are obtained from certain plants. We use wood for these purposes due to their features like durability, stylish finishing and resistance to temperature changes.



Timber

All commercial timbers are classified into two classes as Hardwoods and softwoods based essentially on their structure.

Hardwoods

Hardwoods come from angiosperms (flowering plants), the largest group of land plants. High-quality furniture, desks, flooring, and wooden construction are being made only using hardwood. eg. Teak, Jackfruit.

Softwoods

Softwoods come from gymnosperm (non-flowering plants) trees. Certain angiosperms also yield softwood.

Softwoods have a wide range of applications such as making plywood, wooden boxes, medium-density Fibreboard (MDF) and paper making. eg: katampu, Pine.





The finely cut wooden boards from the wood are layered one above the other to make plywood. This is a kind of composite wood.

5.6 Ornamental plants

Plants which are grown for aesthetic reasons are called as **ornamental plants**. Producing flowers from floral plant is the important section of horticulture. eg: Jasmine, Rose, Chrysanthemum, Carnation, Jerbara etc.

To decorate houses, gardens and parks we are planting shrubs such as Hibiscus, Grape, Jasmine and Crotons and climbers like Mullai, Allamanda and Bougainvillea, trees such as Golden shower tree, Mandarai, Delonix tree (Flame of the forest) etc.

6th Science_IIIrd Term English Book_Unit_5.indd 72 27-09-2023 20:05:09

What are the ornamental plants grown in your locality?



Floriculture

5.7 Interrelationship between plants and animals

Animal-plant Interactions

Animals rely on plants for their food and shelter. This relationship benefits not only animals but also plants. Such relationship is economically significant.

For example, silkworms feed on mulberry leaves and live on mulberry plants. This relationship between a worm and a plant is economically useful for us in silk production.



Silk worm

Animals, pests, and birds are essential for **cross-pollination** of flowers.

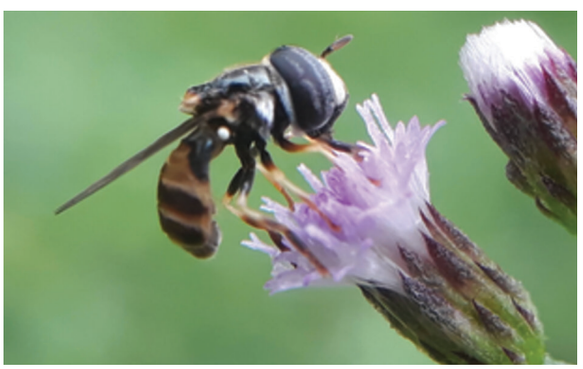
Bright colours of flowers, smell and honey attract insects. As the insects go from one flower to another, they leave the pollen grains from their body. This results in cross-pollination and the formation of vegetables and fruits.



Humming Bird

These insect pollinators and birds need to be protected to produce the best yield.

Bees are the best pollinators. They also give us honey.



Honey bee

Plants and algae living in coral reefs are the food for variety of fishes. Fisheries work is done in these areas.



6th Science_IIIrd Term English Book_Unit_5.indd 73 27-09-2023 20:05:15

Animals and birds play an important role in spreading seeds of various plants. The digestive enzymes in the digestive system of the birds soften the protective layer of the seeds and make it easier to germinate.

If these natural relationship between animals and plants are affected, it shows its impact on economy too.

Other uses of plants

1. Maintain soil fertility



Plants maintain soil fertility. Their droppings and shedding of leaves, fruits and other parts degrade in the soil to form humus. This humus increases soil fertility. Eg. Plants like blue green algae and bacteria Pseudomonas are extensively used to fix nitrogen in the soil for agriculture.

2. Prevent soil erosion

Plants when grown in dense will prevent **soil erosion** (ie) in times of wind or flood, the fertile top layer of soil is carried away by air or water. This is prevented by plants if grown around.

3. Bio – fuels

Some plants are also grown for the sake of bio - fuels. Plant fuel is less toxic as it does not emit harmful gases and also less expensive. **Eg. Jatropha.** Even the plant waste is used to generate electricity. **eg: Sugar mills**



Pala spinach

Osteo arthritis is a joint disease affecting joints and knee of any age people. Currently Indian scientists at CDRI (Central Drug Research Institute – Lucknow) have made a nano formulation from the Palak (Pala spinach) to cure this disease.

4. Rubber and Natural plastic

We obtain rubber for tyre, wiring, seats etc from plants. Natural plastics are also produced from plants which are biodegradable. So it does not do harm to our environment.



5. Neem Oil coated Urea

Farmers in India uses urea as a fertilizer to increase the agricultural productivity. Indian Scientists made Neem Coated urea which releases nitrogen gradualy and helps the plants to absorb maximum nitrogen. It reduces the impact of urea on an environment.

6th Science_IIIrd Term English Book_Unit_5.indd 74 27-09-2023 20:05:15

Points to remember

- ❖ Human beings directly or indirectly depend on plants for food, clothes, shelter and medicine.
- ❖ The branch of science which deals with the relationship between plants and human beings and the economical usages of plants is called economic botany.
- ❖ Plants are the main sources of food for human beings. The plants which give food to us are called food plants.
- ❖ Pulses are the edible seeds of plants in the legume family.
- ❖ Spices are the aromatic parts of tropical plants traditionally used to flavour food.
- ❖ Some chemcial compounds in some plants act against insects, fungi and certain germs. They are called as medicinal plants
- ❖ Plant fibres are classified into Textile Fibres, Cordage Fibres and Filling Fibres based on usage.
- ❖ Timbers are classified as hard wood and soft wood depending on their strength and structure.
- ❖ Plants grown for decorative purposes are called as ornamental plants.
- ❖ When the interrelationship between animals and plants are affected, our economy is also affected.

6th Science_IIIrd Term English Book_Unit_5.indd 75 27-09-2023 20:05:15

Kill or Cure?

ICT Corner

Through this activity you will be able to learn about medicinal properties of plants.



Step 1: Type the following URL in the browser. 'Kill or Cure?' activity page will open.

Step 2: Click the ' PLAY ' button then ' START ' button given in the activity window to start the activity.

Step 3: A small Figure of a Doctor will asking for a medicine/ drug by giving some clue.

Step 4: Click and Select the correct plant given at the bottom , from which the drug is extracted. For more information about the drug click the ' i ' icon at the top right of the activity window. Repeat the process to answer all the questions.

Step 1





Step 2

Step 3





Step 4

kill or cure URL:

http://www.rigb.org/education/games/natural-world/kill-or-cure

*Pictures are indicative only

6th Science_IIIrd Term English Book_Unit_5.indd 76 27-09-2023 20:05:18

Evaluation



I . Choose the correct answer

1. One of the following birds is an example of plant pollinator

   a. Duck b. Parrot

   c. Humming bird d. Dove

2. Natural Mosquito repellant is

   a. Nutmag b. Bamboo

   c. Ginger d. Neem

3. Which of the following is not a root ?

   a. Potato b. Carrot

   c. Radish d. Turnip

4. Which of the following medicinal plants has anticancer properties?

   a. Amla b. Tulasi

   c. Turmeric d. Aloe

5. Which is the national tree of India?

   a. Neem tree b. Jack tree

   c. Banyan tree d. Mango tree

II Fill in the Blanks

1. Every year, October _____ is celebrated as world food day.
2. _____ is an example of textile fibre.
3. I am the state tree of Tamilnadu . Who am I _____?
4. The juice of the leaves of _____ plant relieves cough and bronchitis.
5. The edible seeds of leguminous plants are called _____

III. True or False – If false give the correct answer

1. Plants grown for decorative purposes are called as softwood.
2. Silkworm eats mulberry leaves.
3. Cauliflower is used for ornamental purpose.
4. Cotton cloth is not suitable for summer season.
5. Sugarcane is used as bio fuel.

IV. Match the following

1.	Fibre yielding plant	-	Chloramine
2.	Hardwood	-	Spice
3.	Neem	-	Hemp
4.	Clove	-	Cereals
5.	Millet	-	Teakwood

V. Analogy

1. mango : fruit :: maize : _____
2. coconut : fibre :: rose : _____
3. bees : pollinators :: earthworms : _____

VI. Give very short answer

1. What is food ?
2. What are medicinal plants?
3. How hard wood differ from soft wood?
4. What is a spice?
5. Name any three medicinal plants, which are available in your area?
6. What are the uses of timber?

6th Science_IIIrd Term English Book_Unit_5.indd 77 27-09-2023 20:05:19

VII. Give short answer

1. What is a symbiotic relationship?
2. Write the uses of neem?
3. Name any five plants and their parts that we eat.

VIII. Answer in detail

1 Write short notes on – Timber yielding plants.

2. Comment on importance of plant animal interaction.

IX. Questions based on Higher Order Thinking Skills

1. Desert does not have water. Why? Give the reason.
2. Kavitha said " Palm tree is a tall tree, so it gives hard wood"! Do you agree with her statement or not ? Explain Why?
3. Look at the diagram given below and answer the following questions.

a. Soil fertility is increased by bacteria How?



b. Honey bees are essential for the reproduction of the plants Why?



6th Science_IIIrd Term English Book_Unit_5.indd 78 27-09-2023 20:05:19



Unit 6 Hardware and Software



Learning Objectives

- To identify Software and Hardware of a computer
- To distinguish the features of Hardware and software
- To recognize different types of software
- To identify some Open source software and utilize them effectively

6th Science_IIIrd Term English Book_Unit_6.indd 79 27-09-2023 17:47:50

Introduction

Computer is a device comprising both hardware and software. The functions of hardware and software combines together to make the Computer functional. A hardware device helps to enter input information. The software processes the input data and gives the output in the monitor, a hardware device. Thus computer is like a human body, where human body is the hardware and soul is the software.

6.1 Hardware



Hardware

Hardware is the parts of the computer which we can touch and feel. Hardware includes Input and Output devices, Cabinet, Hard Disk, Mother Board, SMPS, CPU, RAM, CD Drive and Graphics Card.

6.2 Software

Hardware is lifeless without software in a computer. Software are programmed and coded applications to process the input information. The software processes the data by converting the input information into coding or programmed language. Touching and feeling the software is not possible but we can see the functions of the software in the form of output.



Software



Email existed before the World Wide Web.

6.3 Types of Software

The software is divided into two types based on the process. They are

1. System Software (Operating System)
2. Application software

6.3.1 System Software

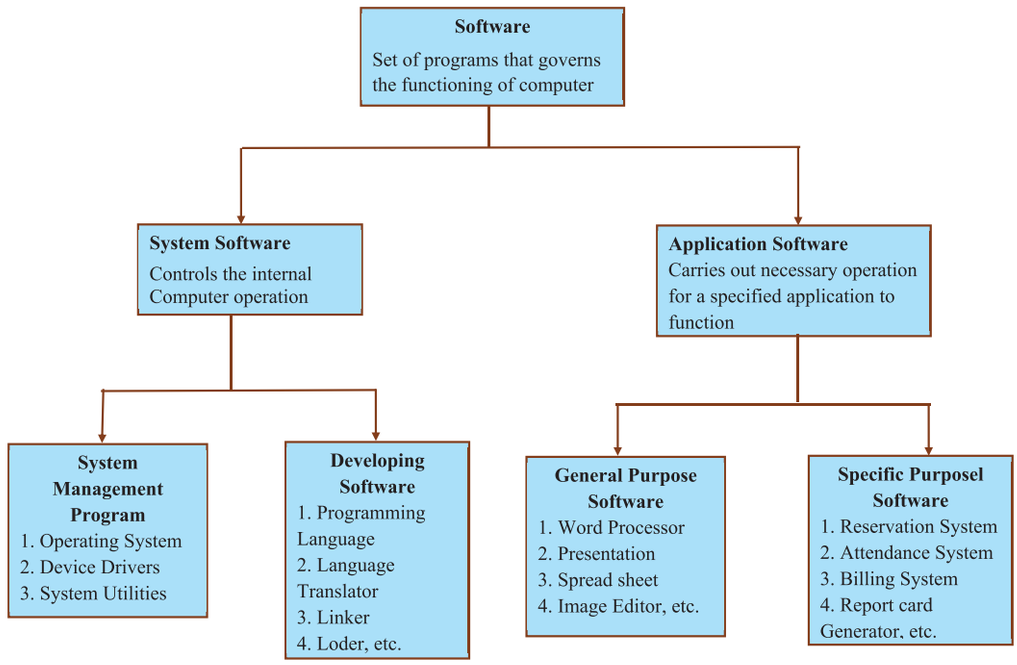
System Software (Operating system) is software that makes the hardware devices process the data inputted by the user and to display the result on the output devices like Monitor. Without the operating system, computer cannot function on its own. Some of the popular operating system are Linux, Windows, Mac, Android etc.

6th Science_IIIrd Term English Book_Unit_6.indd 80 27-09-2023 17:47:52



6.3.2 Application Software

Application software is a program or a group of programs designed for the benefit of end user to work on computer. The application programs can be installed in the hard disk for the usage on a particular computer. This type of application program completes one or more than two works of the end user. The following are the examples of application program: Video player, Audio player, Word processing software, Drawing tools, Editing software, etc.



6.4 System and Application Software types

The operating system and application software are available in two forms. They are:

1. Free and Open source
2. Paid and Proprietary Software

6.4.1 Free and Open source

Free and open software is available at free of cost and can be shared to many end users. Free software is editable and customizable by the user and this leads to updation

6th Science_IIIrd Term English Book_Unit_6.indd 81 27-09-2023 17:47:53

or development of new software. Examples of Free and Open source software: LINUX, Open office, Operating System, Geogebra etc.

6.4.2 Paid and Proprietary Software

There is software that is to be paid to use either permanently or temporarily, these types of software are paid and need a license to use it. The license of the software would not be provided unless it is purchased. Similarly the end users are legally prohibited to steal the software program or to use the pirated version of the Paid and Proprietary Software. Some of the examples of Paid & Proprietary Software are: Windows, Microsoft office, Adobe Photoshop, etc.



The Open Source Initiative (OSI) is an organization dedicated to promote Open Source Software.

Evaluation



I. Choose the correct answer

1. Find out the part that is not found in CPU?

   a. Mother Board b. SMPS
   c. RAM d. Mouse

2. Which of the following is correct?

   a. Free and Open source
   b. Free and Traditional software
   c. Passive and Open source
   d. Passive and Traditional source

3. LINUX is a

   a. Paid Software
   b. Licensed Software
   c. Free and Proprietary software
   d. Free and Open source software

4. Find out Paid and Proprietary software from the given list

   a. Windows b. MAC OS
   c. Adobe Photoshop d. All the above

5. _____ is a Operating System

   a. Android b. Chrome
   c. Internet d. Pendrive

II. Match the following

1.	MAC OS	-	Free and Open source Software
2.	Software	-	Paid and Proprietary Software
3.	Hardware	-	Input Device
4.	Keyboard	-	RAM
5.	LINUX	-	Geogebra

III. Short answer

1. What is Hardware and Software?
2. What do you mean by Operating System? How it Works?
3. What is Free and Open Source Software? Give any two examples?

6th Science_IIIrd Term English Book_Unit_6.indd 82 27-09-2023 17:47:53

GLOSSARY

Artificial magnet	-	செயற்கை காந்தம்
Adhesives	-	ஒட்டும்பொருள்கள்
Aloe	-	சோற்று கற்றாழை
Bio degradable waste	-	உயிரினச் சிதைவிற்கு உள்ளாகும் கழிவுகள்
Bio - fuel	-	உயிரி எரிபொருள்
Consumers	-	நுகர்வோர்கள்
Compost	-	மட்கிய உரம்
Cereal	-	தானியம்
Decomposers	-	சிதைப்பான்கள்
Disinfectant	-	கிருமி நாசினி
Electromagnet	-	மின் காந்தம்
Estuary	-	முகத்துவாரம்
Ecosystem	-	சூழ்நிலை மண்டலம்
Food Chain	-	உணவுச் சங்கிலி
Food web	-	உணவு வலை
Ground water	-	நிலத்தடி நீர்
Herbivore	-	தாவர உண்ணி
Hard wood	-	வன்கட்டை
Incinerate	-	எரித்துச் சாம்பலாக்குதல்
Inorganic fertilizer	-	கனிம உரம்
Land Fill	-	நிலத்தில் நிரப்புதல்
Like poles	-	ஒத்த துருவங்கள்
Magnet	-	காந்தம்
Magnetic Material	-	காந்தத்தன்மையுடைய பொருள்
Magnetic Compass	-	காந்த ஊசிப்பெட்டி
Magnetization	-	காந்தமாக்கல்
Magnetic attraction	-	காந்த ஈர்ப்பு
Magnetic repulsion	-	காந்த விலகல்
Non – Magnetic substances	-	காந்த தன்மையற்ற பொருள்கள்
North pole	-	வட துருவம்
South pole	-	தென் துருவம்
Natural Indicator	-	இயற்கை நிறங்காட்டி
Non Bio degradable waste	-	உயிரினச் சிதைவிற்கு உள்ளாகாத கழிவுகள்
Natural pesticides	-	இயற்கை களைக்கொல்லி
Organic fertilizer	-	கரிம உரம்
Ornamental Plant	-	அலங்காரத் தாவரங்கள்
Producers	-	தயாரிப்பாளர்கள்
Pollution	-	மாசுபாடு
Pulses	-	பருப்பு வகைகள்
Pollinators	-	மகரந்தச் சேர்க்கையாளர்கள்
Surface water	-	மேற்பரப்பு நீர்
Synthetic	-	செயற்கை
Swamp	-	சதுப்பு
Soft wood	-	மென்கட்டை
Spices	-	மசாலாப் பொருள்கள்
Turmeric Powder	-	மஞ்சள் தூள்
Timber	-	மரக்கட்டைகள்
Unlike poles	-	எதிரெதிர் துருவங்கள்
Vermi Compost	-	மண்புழுஉரம்
Water cycle	-	நீர் சுழற்சி
Water treatment plant	-	நீர் சுத்திகரிப்பு நிலையம்

6th Science_IIIrd Term English Book_Unit_6.indd 83 27-09-2023 17:47:53

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6th Science_IIIrd Term English Book_Unit_6.indd 84 27-09-2023 17:47:53

STANDARD SIX

TERM - III

VOLUME - 3

HISTORY

CONTENTS

Unit	Titles	Page No.	Month
History			
1.	Society and Culture in Ancient Tamizhagam:The Sangam Age	87	January
2.	The Post-Mauryan India	100	February
3.	The Age of Empires: Guptas and Vardhanas	112	February March
4.	South Indian Kingdoms	128	March April
Geography			
1.	Asia and Europe	143	January
2.	Globe	171	February
3.	Understanding Disaster	188	March
Civics			
1.	Democracy	196	January
2.	Local Bodies – Rural and Urban	203	February
3.	Road Safety	212	March



E - Book



Assessment

6th Std History_Term 3_EM_Unit1.indd 86 29-09-2023 17:39:43

Unit 1

Society and Culture in Ancient Tamizhagam: The Sangam Age



Learning Objectives

- To understand that Sangam Tamil literature is the main source for the study of ancient Tamil society
- To know the rule of Muvendars (Three Great Kings) – the Chera, Chola and the Pandya kings – and their contemporary minor chieftains
- To gain an understanding of the administrative system and the socio-economic conditions of Tamizhagam
- To learn about the Kalabhra period

The Sangam Age

The word 'Sangam' refers to the association of poets who flourished under the royal patronage of the Pandya kings at Madurai. The poems composed by these poets are collectively known as Sangam literature. The period in which these poems were composed is called the Sangam Age.

ArumugaNavalar (Jaffna), U.V.Swaminatha Iyer and Damodharam Pillai (Jaffna) strove hard and spent many years in retrieving and publishing the Tamil classics and the ancient Tamil texts, which were originally present as palm leaf manuscripts.

Sources

Inscriptions	Hathigumpha Inscription of King Karavela of Kalinga, Pugalur (near Karur) Inscription, Ashokan Edicts II and XIII, and inscriptions found at Mangulam, Alagarmalai and Kilavalavu (all near Madurai)
Copper Plates	Velvikudi and Chinnamanur copper plates

6th Std History_Term 3_EM_Unit1.indd 87 29-09-2023 17:39:44

Coins	Issued by the Cheras, Cholas, Pandyas and the chieftains of Sangam Age as well as the Roman coins
Megalithic Monuments	Burials and Hero stones
Excavated Materials from	Adichanallur, Arikamedu, Kodumanal, Puhar, Korkai, Alagankulam, Uraiyur
Literary Sources	*Tholkappiyam, Ettuthogai* (eight anthologies*), Pathupattu* (ten idylls), *PathinanKeezhkanakku* (a collection of eighteen poetic works), *Pattinapalai* and *Maduraikanji*. Epics *Silapathikaram* and *Manimegalai*.
Foreign Notices	*The Periplus of the Erythrean Sea*, Pliny's *Natural History,* Ptolemy's *Geography*, Megasthenes's *Indica*, *Rajavali*, *Mahavamsa* and *Dipavamsa*

Tholkappiyam is a work on Tamil grammar. It represents the quality of Tamil language and the culture of Tamil people of the Sangam Age.

Time Span	3rd century BC (BCE) to c. 3rd century AD (CE)
Tamizhagam	Vengadam (Tirupathi hill) in the north to Kanyakumari (Cape Comorin) in the south, Bounded by sea on the east and the west.
Age	Iron Age
Culture	Megalithic
Polity	Monarchy
Dynasties ruled	The Cheras, the Cholas and the Pandyas

George L. Hart, Professor of Tamil language at the University of California, has said that Tamil is as old as Latin. The language arose as an entirely independent tradition with no influence of other languages.

6th Std History_Term 3_EM_Unit1.indd 88 29-09-2023 17:39:44

Cheras

Muvendars (Three Great Kings) ruled the territories of Tamizhagam during the Sangam Age. The Tamil word 'Vendar' was used to refer to three dynasties, namely the Cheras, Cholas and Pandyas. The Cheras ruled over the central and north Travancore, Cochin, south Malabar and Kongu region of Tamil Nadu. The *Pathitrupathu* (a collection of ten decades of verses) provides information about the Chera kings. It is known that the Chera king Senguttuvan went on a military expedition to North India. He brought stones from the Himalayas for making the idol of Kannagi, an epic character from *Silappathikaram*. He introduced *pattini* cult. Cheran Senguttuvan's younger brother was Ilango Adigal. He was the author of *Silappathikaram*. Another Chera king, Cheral Irumporai, issued coins in his name. Some Chera coins bear their emblem of bow and arrow.

Prominent Chera Rulers

- Udayan Cheralathan
- Imayavaramban Netun Cheralathan
- Cheran Senguttuvan
- Cheral Irumporai

Cholas

The Chola kingdom of Sangam period extended upto Venkatam (Tirupathi hills). The Kaveri delta region remained the central part of the kingdom. This area was later known as Cholamandalam. KarikalValavan or Karikalan was the most famous of the Chola kings. He defeated the combined army of the Cheras, Pandyas and the eleven Velir chieftains who supported them at Venni, a small village in the Thanjavur region.

He converted forests into cultivable lands. He built Kallanai (meaning a dam made of stone) across the river Kaveri to develop agriculture. Their port Puhar attracted merchants from various regions of the Indian Ocean. The *Pattinapaalai*, a poetic work in the *Pathinenkeezhkanakku*, gives elaborate information of the trading activity during the rule of Karikalan.

Kallanai



It was a dyke, built with stones. It was constructed across the Kaveri to divert water throughout the delta region for irrigation. When it was built, Kallanai irrigated an area of about 69,000 acres.



Prominent Chola Rulers

- Ilanchetsenni
- KarikalValavan
- Kocengannan
- KilliValavan
- Perunarkilli

6th Std History_Term 3_EM_Unit1.indd 89 29-09-2023 17:39:44

Pandyas

The Pandyas ruled the present-day southern Tamil Nadu. The Pandya kings patronized the Tamil poets and scholars. Several names of Pandya kings are mentioned in the Sangam literature. Nedunchezhiyan is hailed as the most popular warrior. He defeated the combined army of the Chera, Chola and five Velir Chieftains at Talayalanganam. He is praised as the lord of Korkai.

Pandya country was well known for pearl hunting. Pandya kings issued many coins. Their coins have elephant on one side and fish on another side. MudukudimiPeruvazhuthi issued coins to commemorate his performance of many Vedic rituals.

Prominent Pandya Rulers

- Nediyon
- Nanmaran
- MudukudumiPeruvazhuthi
- Nedunchezhiyan



The Titles Assumed by the Muvendars

- Adhavan
- Kuttuvan
- Vanavan
- Irumporai
- Senni
- Sembiyan
- Killi
- Valavan
- Maran
- Valuthi
- Sezhiyan
- Tennar

6th Std History_Term 3_EM_Unit1.indd 90 29-09-2023 17:39:44

Royal Insignia

Sceptre *(kŌl)*, drum (*murasu*) and white umbrella (*venkudai*) were used as the symbols of royal authority.

Muvendar	Garland	Port	Capital	Symbols
Cheras	Palmyra flower	Muziri / Tondi	Vanchi / Karur	 Bow and arrow
Cholas	Fig (Athi) lower	Puhar	Uraiyur / Puhar	 Tiger
Pandyas	Margosa (neem) flower	Korkai	Madurai	 Two Fish

Minor Chieftains – Ay, Velir and Kizhar

Apart from three great kings, there were several brave independent minor chieftains called Velirs.



The famous Velirs were the seven patrons (*KadaiyezhuVallalgal*). They were Pari, Kari, Ori, Pegan, Ay, Adiyaman and Nalli. They were popular for their generous patronage of Tamil poets.

Kizhar was the village chief.

Sangam Polity

Kingship

The kingship was hereditary. The king was called *k*Ō. It is the shortened form of *Kon*. *Vendan, Kon, Mannan, Kotravan* and *Iraivan* were the other titles by which the king was addressed. The eldest son of the reigning king generally succeeded to the throne. The coronation ceremony was known as *arasukattilerudhal* or *mudisoottuvila*. The crown prince was known as *komahan*, while the young ones were known as *Ilango, Ilanchezhiyan* and

6th Std History_Term 3_EM_Unit1.indd 91 29-09-2023 17:39:45

Ilanjeral. King held a daily durbar (*naal-avai*) at which he heard and resolved all the disputes. The income to the state was through taxation. Land tax was the main source of revenue and it was called '*Irai'.* This apart, the state collected tolls and customs (*sungam*), tributes and fines.

The kings and soldiers wore the heroic anklet (Veera kazhal). On the anklet, the name and achievement of the wearer were blazoned. Spies were used not only to find out what was happening within the country, but also in foreign countries.

A wound in the back was considered a disgrace and there are instances of kings fasting unto death because they had suffered such a wound in the battle.

The Court

The king's court was called *Arasavai.* The king occupied a ceremonious throne in the court called *Ariyanai*. In the court, the king was surrounded by officials, distinguished visitors and court poets. The rulers had five-fold duties. They were encouraging learning, performing rituals, presenting gifts, protecting people and punishing the criminals. Ambassadors were employed by the kings. They played a significant role. The king was assisted by a number of officials. They were divided into *Aimperunguzhu* (five-member committee) and *Enberaayam* (eight-member group).

Army

The king's army consisted of four divisions, namely, infantry, cavalry, elephants and chariot force. The army was known as '*Padai'.* The chief of the army was known as *Thanaithalaivan.* The prominent weapons used during this period were sword, *kedayam* (shield), *tomaram* (lance), spears, bows and arrows. *Tomaram* is mentioned as a missile to be thrown at the enemy from a distance. The place where the weapons were kept was known as *paddaikottil*. The forts were protected by deep moats and trenches. The war drum was worshipped as a deity.

Law and Justice

The king was the final authority for appeal. In the capital town, the court of justice was called *Avai*. In the villages, *Mandram* served as the place for dispensing justice. Punishment was always severe. Execution was ordered for theft cases. The punishment awarded for other crimes included beheading, mutilation of the offending limbs of the body, torture and imprisonment and imposition of fines.

Local Administration

The entire kingdom was called *Mandalam*. Mandalam was divided into *Nadus*. *Kurram* was subdivision of Nadu. The *Ur* was a village, classified into *perur* (big village), *Sirur* (a small village) and *Mudur* (an old village) depending upon its population, size and antiquity. *Pattinam* was the name for a coastal town and *Puhar* was the general term for harbour town.

Important Towns

Puhar, Uraiyur, Korkai, Madurai, Muziri, Vanji or Karur and Kanchi.

6th Std History_Term 3_EM_Unit1.indd 92 29-09-2023 17:39:45

Thinai (tract)-based Sangam Society

The land form was divided into five *thinai*s (eco-regions).

Eco-region (*thinai*)	Landscape	Occupation	People	Deity
Kurinji	Hilly region	Hunting /gathering	Kuravar/kurathiyar	Murugan
Mullai	Forest region	Herding	Aayar/aaichiyar	Maayon
Marutham	Riverine track (plains)	Agriculture	Uzhavan/uzhathiyar	Indiran
Neithal	Coastal region	Fishing/saltmaking	Parathavar/ nulathiyar	Varunan
Palai	Parched land	Heroic deeds	Maravar/Marathiyar	Kotravai

Land was classified according to its fertility. Marutham was called *menpulam* (fertile land). It produced paddy and sugarcane. The rest of the landscape, excluding Neithal, was called *vanpulam* (hard land), and it produced pulses and dry grains.



Status of Women

There was no restriction for women in social life. There were learned and wise women. Forty women poets had lived and left behind their valuable works. Marriage was a matter of self-choice. However, chastity (*karpu)* was considered the highest virtue of women. Sons and daughters had equal shares in their parents' property.

Women Poets of Sangam Age

Avvaiyar, Velli Veethiyar, Kakkaipadiniyar, Aathi Manthiyar, Pon Mudiyar.

Religious Beliefs and Social Divisions

The primary deity of the Tamils was Seyon or Murugan. Other gods worshipped during Sangam period were Sivan, Mayon (Vishnu), Indiran, Varunan and Kotravai. The Hero stone (*natukkal*) worship was in practice. Buddhism and Jainism also co-existed.

Veerakkal/Natukkal

The ancient Tamils had a great respect for the heroes who died in the battle field. The hero stones were erected to commemorate heroes who sacrificed their lives in war.



Caste did not develop in Tamizhagam as it did in the northern India. Varuna system (occupation-based caste) came to the Dravidian south comparatively late.

Dress and Ornaments

The rich people wore muslin, silk and fine cotton garments. The common

6th Std History_Term 3_EM_Unit1.indd 93 29-09-2023 17:39:45



people wore two pieces of clothes made of cotton. The Sangam literature refers to clothes (*Kalingam*, which were thinner than the skin of a snake. Women adorned their hair plaits with flowers. Both men and women wore a variety of ornaments. They were made of gold, silver, pearls, precious stones, conch shells and beads. The People were fond of using aromatic perfumes.

Arts

There are many references to variety of musical instruments such as drum, flute and yazh. Karikalan was master of seven notes of music (*EzhisaiVallavan*). Singing bards were called *panar and viraliyar.* Dancing was performed by *kanigaiyar*. *Koothu* (folk drama) was the most important cultural practice of the people of Sangam Age. They developed the concept of *Muthamizh* (*Iyal*, *Isai*, *Naatakam*).

Occupation

The major occupations of the people were: agriculture, cattle rearing, fishing and hunting. Other craftsmen like carpenter, blacksmith, goldsmith, and potters were also part of the population. Weaving was the most common part-time occupation of the farmers and a regular full time job for many others.

Festivals and Entertainments

People celebrated several festivals. The harvest festival (Pongal) and the festival of spring, kaarthigai were some of them. Indira vizha was celebrated in the capital. There were many amusements and games. This included dances, festivals, bull fights, cock fights, dice, hunting, wrestling and playing in swings. Children played with toy cart and with the sand houses made by them.

Trade

Trade existed at three levels: local, overland and overseas. The extensive and lucrative foreign trade that Tamizhagam enjoyed during this period stands testimony to the fact that Tamils had been great seafarers. Warehouses for storing the goods were built along the coast. The chief ports had light houses, which were called *KalangaraillanguSudar*. Caravans of merchants carried their merchandise to different places in oxen-driven carts. Barter system was prevalent.

Malabar Black Pepper

When the Mummy of Ramses II of the Egypt was uncovered, archaeologists found black pepper corns stuffed into his nostrils and in his abdomen (as a part of embalming process practised in olden days).

6th Std History_Term 3_EM_Unit1.indd 94 29-09-2023 17:39:46

There were two kinds of markets or bazaars in the leading cities like Puhar and Madurai. In Madurai they were Nalangadi (the morning market) and Allangadi (the evening market). In these markets large varieties as well as large quantities of goods were sold and purchased.

Major Ports

- Musiri, Tondi, Korkai

Main Exports

- Salt, pepper, pearls, ivory, silk, spices, diamonds, saffron, precious stones, muslin, sandal wood

Main Imports

- Topaz, tin, glass, horses

Silk supplied by Indian merchants to the Roman Empire was considered so important that the Roman emperor Aurelian declared it to be worth its weight in gold.

Muziris – First Emporium

The Roman writer Pliny the Elder writes of Muziris in his *Natural History* as the 'first emporium (shopping complex) of India'. A temple of Augustus was built at Muziris, which had a Roman colony.

A papyrus document (now in Vienna museum) of 2nd century BC (BCE) records the agreement between two merchants' shippers of Alexandria and Muziris.

Trade Contact with Overseas Countries

Archaeological excavations have confirmed the trading relations between the Tamizhagam and the countries such as Greece, Rome, Egypt, China, South East Asia and Sri Lanka.

Kalabhras

Towards the end of the 3rd century AD (CE), the Sangam period slowly went into a decline. Following the Sangam period, the Kalabhras had occupied the Tamil country for about two and half centuries. We have very little information about Kalabhras. They left neither artefacts nor monuments. But there is evidence of their rule in literary texts. The literary sources for this period include *Tamil Navalar Charithai, Yapernkalam* and *Periapuranam*. *Seevaka Chinthamani* and *Kundalakesi* were also written during this period. In Tamizhagam, Jainism and Buddhism became prominent during this period. Many works under *Pathinen Keezhkanakku* were composed. Trade and commerce continued to flourish during this period. So the Kalabhra period is not a dark age, as it is portrayed.

6th Std History_Term 3_EM_Unit1.indd 95 29-09-2023 17:39:46

Elsewhere



Gateway
Han Dynasty – China
206 BC(BCE) – 220 AD(CE)



Pyramid
Mayan Civilisation
Central America



Colosseum
Roman Civilisation – Italy
3rd BC(BCE) – 1st AD(CE)

Summary

- The word 'Sangam' refers to the association of poets who flourished under the royal patronage of the Pandya kings at Madurai.
- Muvendars – the Cheras, Cholas and the Pandyas–controlled the territories of Tamizhagam during the Sangam Age.
- Apart from three great monarchs, Tamil country was ruled by several independent minor chieftains.
- Archaeological excavations have confirmed the trading relations between Tamizhagam and many foreign countries.
- Towards the end of the 3rd century AD (CE), the Sangam period slowly started to decline. The Kalabhras occupied the Tamil country. Evidence of their rule is available in Jain and Buddhist literature.

GLOSSARY

Strove	-	tried hard	-	கடும் முயற்சி
Dynasty	-	a line of hereditary rulers	-	ராஜ வம்சம்
Commemorate	-	to honour the memory of	-	கௌரவிப்பதற்காக
Royal insignia	-	symbols of power	-	அரச சின்னம்
Patronage	-	support given by a patron	-	ஆதரவு
Blazoned	-	displayed vividly	-	வெளிக்காட்டுதல்
Acquitted	-	released	-	விடுதலை
Bards	-	poets singing in praise of princes and brave men	-	புலவர்கள்
Warehouses	-	a large building for keeping goods	-	சேமிப்புக் கிடங்கு
Portrayed	-	described elaborately	-	சித்தரிக்கப்பட்டுள்ளது

6th Std History_Term 3_EM_Unit1.indd 96 29-09-2023 17:39:47

Exercise

I.Choose the correct answer

1. Pattini cult in Tamil Nadu was introduced by _____.

   a) Pandyan Neduncheliyan b) Cheran Senguttuvan
   c) Ilango Adigal d) Mudathirumaran



2. Which dynasty was not in power during the Sangam Age?

   a) Pandyas b) Cholas
   c) Pallavas d) Cheras

3. The rule of Pandyas was followed by _____

   a) Satavahanas b) Cholas
   c) Kalabhras d) Pallavas

4. The lowest unit of administration during the Sangam Age was_____

   a) Mandalam b) Nadu
   c) Ur d) Pattinam

5. What was the occupation of the inhabitants of the Kurinji region?

   a) Plundering c) Cattle rearing
   c) Hunting and gathering d) Agriculture

II. Read the Statement and tick the appropriate answer

1. **Assertion (A):** The assembly of the poets was known as Sangam.

   Reason (R): Tamil was the language of Sangam literature.

   a) Both A and R are true. R is the correct explanation of A.

   b) Both A and R are true. R is not the correct explanation of A.

   c) A is true but R is false.

   d) Both A and R is not true.

2. Which of the following statements are not true?

   1. Karikala won the battle of Talayalanganam.

   2. The Pathitrupathu provides information about Chera Kings.

   3. The earliest literature of the Sangam age was written mostly in the form of prose.

   a) 1 only

   b) 1 and 3 only

   c) 2 only

6th Std History_Term 3_EM_Unit1.indd 97 29-09-2023 17:39:47

3. The ascending order of the administrative division in the ancient Tamizhagam was

   a) Ur< Nadu < Kurram < Mandalam

   b) Ur < Kurram < Nadu <Mandalam

   c) Ur <Mandalam < Kurram < Nadu

   d) Nadu < Kurram < Mandalam <Ur

4. Match the following dynasties with the Royal Insignia

   A) Chera - 1. Two Fish

   B) Chola - 2. Tiger

   C) Pandya - 3. Bow and arrow

   a) 3 2 1

   b) 1 2 3

   c) 3 1 2

   d) 2 1 3

III. Fill in the blanks

1. The battle of Venni was won by _____.
2. The earliest Tamil grammar work of the Sangam period was_____.
3. _____built Kallanai across the river Kaveri.
4. The chief of the army was known as _____
5. Land revenue was called _____

IV. True or False

1. The singing bards of the Sangam age were called Irular.
2. Caste system developed during the Sangam period.
3. Kizhar was the village chief.
4. Puhar was the general term for city.
5. Coastal region was called Marudham.

V.Match

a. Thennar - Cheras

b. Vanavar - Cholas

c. Senni - Velir

d. Adiyaman - Pandyas

VI. Answer in one or two sentences

1. Name any two literary sources to reconstruct the history of ancient Tamizhagam.
2. What was Natukkal or Virakkal?

6th Std History_Term 3_EM_Unit1.indd 98 29-09-2023 17:39:47

3. Name five thinais mentioned in the Sangam literature.
4. Name any two archaeological sites related to Sangam period.
5. Name the seven patrons (Kadaiyelu Vallalgal).
6. Name any three Tamil poetic works of Kalabhra period.

VII. Answer the following

1. Discuss the status of women in the Sangam Society.

VIII. HOTs

1. Karikal Valavan is regarded as the greatest Chola king. Justify.
2. The period of Kalabhra is not a dark age. Give reasons.

IX. Map Work

1. Mark and colour the extent of Chera, Chola and Pandya empires on the river map of South India.
2. Mark the following places.

   Korkai, Kaveripoompattinam, Musiri, Uraiyur, Madurai

X.Life skill

1. Collect and paste the pictures of landscape and find out the eco-region to which it belongs. Write the important crops grown and occupation of the people there.

XI. Answer Grid

Mention two epics of the Sangam period. Ans:	Name the two groups of officials who assisted the king. Ans:	Name any two women poets of the Sangam period. Ans:
Name any three major ports of Sangam age. Ans:	What constituted Muthamizh? Ans:	*Silappathikaram* was written by_____
Talayalanganam is related to which Pandya king? Ans:	Which eco-region was called menpulam? Ans:	The light houses in the ports are called_____

6th Std History_Term 3_EM_Unit1.indd 99 29-09-2023 17:39:47

Unit 2

The Post-Mauryan India

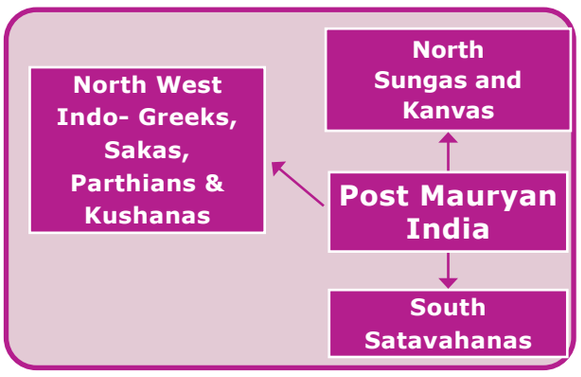


Learning Objectives

- To acquire knowledge of the history of dynasties and kingdoms that emerged after the breakup of the Mauryan Empire
- To gain an understanding of the polity, society, economy, and culture of various kingdoms that were established in the south, north and north-west of India
- To become familiar with their contributions to early medieval India

Introduction

The break-up of Mauryan Empire resulted in the invasions of Sakas, Scythians, Parthians, Indo-Greeks or Bactrian Greeks and Kushanas from the north-west. In the south, Satavahanas became independent after Asoka's death. There were Sungas and Kanvas in the north before the emergence of Gupta dynasty. In Kalinga, Chedi dynasty declared their independence.



It has to be noted here that, though Magadha ceased to be the premier state of India, it continued to be a great centre of Buddhist culture.

Sources

Archaeological Sources

Inscriptions / Copper Plates

- Ayodhya Inscription of Dana Deva
- Persepolis, Nakshi Rustam Inscriptions
- Moga(Taxila copper plate)
- Junagadh/Girnar Inscription
- Nasik *Eulogy*
- Inscription of Darius I

6th Std History_Term 3_EM_Unit2.indd 100 27-09-2023 19:25:44

Coins

- Coins of Satavahanas
- Coins of Kadphises II
- Roman coins

Literary Sources

- *Puranas*
- *Gargi Samhita*
- *Harshacharita* of Banabhatta
- *Mahabhasya* of Patanjali
- *Brihastkatha* of Gunadhya
- *Madhyamika Sutra* of Nagarjuna
- *Buddhacharita* of Asvaghosha
- *Malavikagnimitra* of Kalidasa

Foreign Notice

- Accounts of Hiuen Tsang, the Chinese Buddhist monk and traveller

The Sungas and Kanvas in the North

The Sungas

The last Mauryan emperor, Brihadratha, was assassinated by his own general, Pushyamitra Sunga, who established his Sunga dynasty in Magadha. Pushyamitra made Pataliputra as his capital.

Pushyamitra's kingdom extended westward to include Ujjain and Vidisha. He successfully repulsed the invasion of Bactria king, Menander. But Menander managed to keep Kabul and Sindh.

Pushyamitra thwarted an attack from the Kalinga king Kharavela. He also conquered Vidarba. He was a staunch follower of Vedic religion. He performed two Asvamedha yagnas (horse sacrifices) to assert his imperial authority.

ZE4AN

During the Sunga period, stone was replaced by wood in the railings and the gateways of the Buddhist *stupas* as seen in Bharhut and Sanchi.

Pushyamitra was succeeded by his son Agnimitra. This Agnimitra is said to be the hero of Kalidasa's *Malavikagnimitra*. The drama also refers to the victory of Vasumitra, Agnimitra's son, over the Greeks on the banks of the Sindhu river.

The weak successors of Sungas constantly faced threats from the Indo-Bactrians and Indo-Parthians. The Sunga dynasty lasted for about one hundred years. The last Sunga king was Devabhuti. He was killed by his own minister Vasudeva Kanva. Vasudeva established the rule of Kanva dynasty in Magadha.

Importance of the Sunga Period

The Sungas played an important role in defending the Gangetic Valley from the encroachments of the Bactrian Greeks. Pushyamitra, and then his successors, revived Vedic religious practices and promoted Vaishnavism. Sanskrit gradually gained ascendancy and became the court language.

Patanjali, the second grammarian in Sanskrit, was patronized by Pushyamitra.

6th Std History_Term 3_EM_Unit2.indd 101 27-09-2023 19:25:44

Though Pushyamitra persecuted Buddhists, Buddhism continued to be followed in many parts of his domain.

King Kharavela of Kalinga was a contemporary of the Sungas. We get information about Kharavela from the Hathigumba Inscription.



Hathigumba – Elephant cave Inscription

The Kanvas

The Kanva dynasty produced four kings and their rule lasted only for 45 years. The history of Magadha after the fall of the Kanvas is devoid of any significance until the emergence of the Gupta dynasty.

The Kanva rulers were

- Vasudeva
- Bhumi Mitra
- Narayana
- Susarman

The last Kanva ruler Susarman was assassinated by his powerful feudatory chief of Andhra named Simuka, who laid the foundation of the Satavahana dynasty.

Satavahanas in the South

The Kushanas in the north and the Satavahanas (Andhras) in the south flourished for about 300 years and 450 years, respectively. Simuka, the founder of the Satavahana dynasty, is said to have ruled for twenty-three years. His successor was his brother Krishna. The latter and his nephew Satakarni ruled for ten years each, establishing an empire, holding control over a vast area stretching from Rajasthan in the northwest to Andhra in the southeast and from Gujarat in the west to Kalinga in the east. Satakarni is said to have performed two horse sacrifices (*Asvamedha* yagna), indicative of his imperial position.



Coin of Satavahanas

Gautamiputra Satakarni was the greatest ruler of the family. In the Nasik *eulogy*, published by his mother GautamiBalasri, Gautamiputra Satakarni is described as the destroyer of Sakas, Yavanas (Greeks) and Pahlavas (Parthians). The extent of the empire is also mentioned in the record. Their domain included Maharashtra, north Konkan, Berar, Gujarat, Kathiawar and Malwa. His ship coins are suggestive of Andhras' skill in seafaring and their naval power. The Bogor inscriptions suggest that South India played an important role in the process of early state formation in Southeast Asia.

6th Std History_Term 3_EM_Unit2.indd 102 27-09-2023 19:25:45



Coins of Gautamiputra Satakarni

Contributions of Satavahanas

Literature

The Satavahana king Hala was himself a great scholar of Sanskrit. The Kantara school of Sanskrit flourished in the Deccan in second century B.C. Hala is famous as the author of *Sattasai (Saptasati),* 700 stanzas in Prakrit.

Art and Architecture

The Satavahana rulers were great builders. They began constructing Buddhist *stupas* in Amaravati. A bronze statue of the standing Buddha discovered in Oc-Eo (an archaeological site in Vietnam)resembles the Amaravati style. The later Satavahana kings issued lead or bronze coins depicting ships with two masts. A stone seal discovered in NakhonPathom in Thailand has the same design.

Gandhara, Madhura, Amaravati, Bodh Gaya, Sanchi and Bharhut were known for splendid monuments and art. The Mathura School of Sculpture produced images and life-size statues of the Buddhist, Brahmanical and Jain deities.

The world-famous life-size statues of Buddha at Bamyan valley on the mountains of the erstwhile northwestern frontiers of ancient India (currently in central Afghanistan and recently destroyed by the Talibans), were carved out of the solid rocks by the dedicated artists of the Gandhara School of Art during the post-Mauryan period.



Buddha at Bamyan valley

Indo-Greeks, Indo-Parthians, Sakas and Kushanas

Indo-Greeks and Indo-Parthians

After the conquest of north-western India and the Punjab region, Alexander the Great left the conquered territories under provincial governors. Two of its eastern satrapies, Bactria and Parthia, revolted under their Greek Governors and declared their independence. The satrapy of Bactria became independent under the leadership of Diodotus I and Parthia under Arsaces.

After the decline of the Mauryan empire, the Greek rulers of Bactria and Parthia started encroaching into the northwestern border lands of India. The Bactrian and Parthian settlers gradually inter-married and inter-mixed with the indigenous population. This facilitated the establishment of Indo-Greek and Indo-Parthian colonies along the north-western part of India.

6th Std History_Term 3_EM_Unit2.indd 103 27-09-2023 19:25:45

Rulers of Indo Greeks

Demetrius I – He was the son of Greco-Bactrian ruler Euthydemus.

He was king of Macedonia from 294 to 288 BC (BCE). Numismatic evidence proves that Demetrius issued bi-lingual square coins with Greek on the obverse and Kharosthi on the reverse. Scholars are not able to decide which of the three, named Demetrius, was the initiator of the Yavana era, commencing from second century BC (BCE) in India.



Demetrius



Menander

Menander– He was one of the best known Indo-Greek kings. He is said to have ruled a large kingdom in the north-west of the country. His coins were found over an extensive area ranging from Kabul valley and Indus river to western Uttar Pradesh. *MilindaPanha*, a Buddhist text, is a discourse between Bactrian king Milinda and the learned Buddhist scholar Nagasena. This Milinda is identified with Menander. Menander is believed to have become a Buddhist and promoted Buddhism.

Contributions of Indo-Greeks

Coinage: Indo-Greek rulers introduced a die system and produced properly shaped coins with inscription, symbols and engraved figures on them. Indians learnt this art from them.

Sculpture: The Gandhara School of Indian Art is heavily indebted to Greek influence. The Greeks were good cave builders. The Mahayana Buddhists learnt the art of carving out caves from them and became skilled in rock-cut architecture.

Sakas

The Indo-Greek rule in India was ended by the Sakas. Sakas as nomads came in huge number and spread all over northern and western India. The Sakas were against the tribe of Turki nomads. Sakas were Scythians, nomadic ancient Iranians, and known as Sakas in Sanskrit.

Rulers of Indo-Parthians (Pahlavas)

Indo-Parthians came after the Indo-Greeks and the Indo-Scythians who were, in turn, defeated by the Kushanas in the second half of the first century AD (CE). Indo-Parthian kingdom or Gondopharid dynasty was founded by Gondophernes. The domain of Indo-Parthians comprised Kabul and Gandhara. The name of Gondophernes is associated with the Christian apostle St.Thomas. He came to India and according to Christian tradition, visited the court of Gondophernes and embraced Christianity.

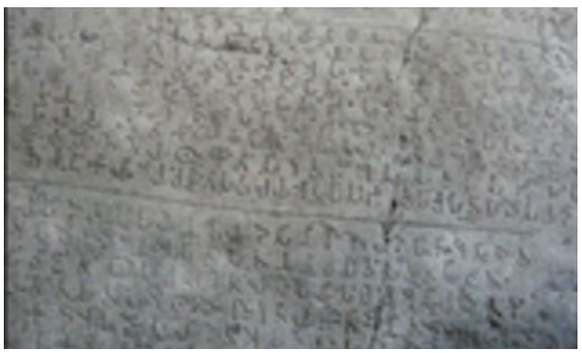


St.Thomas

6th Std History_Term 3_EM_Unit2.indd 104 27-09-2023 19:25:45

Saka rule was founded by Maos or Mogain in the Gandhara region and his capital was 'Sirkap'. His name is mentioned in Mora inscription. His coins bear images of Buddha and Siva.

Rudradaman was the most important and famous king of Sakas. His Junagadh/ Girnar inscription was the first inscription in chaste Sanskrit. In India, the Sakas were assimilated into Indian society. They began to adopt Indian names and practise Indian religious beliefs.



Junagadh Inscriptions



Coin of Rudradaman

The Sakas appointed kshatrapas or satraps as provincial governors to administer their territories.

Kushanas

The Kushanas formed a section of the yueh-chi tribes, who inhabited north-western China in the remote past. In the first century BC(BCE), the yueh-chi tribes were composed of five major sections, of which the Kushanas attained political ascendancy over others.

By the beginning of Christian era, all the yueh-chi tribes had acknowledged the supremacy of the Kushanas; they had shed their nomadic habits and settled down in the Bactrian and Parthian lands, adjacent to the north-western border of India.

The Kushanas overran Bactria and Parthia and gradually established themselves in northern India. Their concentration was mostly in the Punjab, Rajaputana and Kathiawar. Kushana rulers were Buddhists. Takshashila and Mathura continued to be great centres of Buddhist learning, attracting students from China and western Asia.

The Kushana Kings

Kanishka

Kanishka was the greatest of all the Kushana emperors. He assumed the sovereignty in 78 AD and proclaimed his rule by the foundation of a new era, which later became Saka era.

The Kushana capital initially was Kabul. Later, it was shifted to Peshavar or Purushpura.



Coin of Kanishka

6th Std History_Term 3_EM_Unit2.indd 105 27-09-2023 19:25:45

Rulers	Contributions
Kadphises I	He was the first famous military and political leader of the Kushanas. He overthrew the Indo-Greek and Indo-Parthian rulers and established himself as a sovereign ruler of Bactria. He extended his power in Kabul, Gandhara and upto the Indus.
Kadphises II 	He maintained friendly relationship with the emperors of China and Rome and encouraged trade and commerce with the foreign countries.

Conquests

Kanishka conquered and annexed Kashmir. He waged a successful war against Magadha. He also waged a war against a ruler of Parthia to maintain safety and integrity in his vast empire on the western and south-western border. After the conquest of Kashmir and Gandhara, he turned his attention towards China. He defeated the Chinese general Pan-Chiang and safeguarded the northern borders of India from Chinese intrusion.

His empire extended from Kashmir down to Benaras, and the Vindhya mountain in the south. It included Kashgar, Yarkhand touching the borders of Persia and Parthia.

Religious Policy

Kanishka was an ardent Buddhist. Kanishka's empire was a Buddhist empire. Kanishka adopted Buddhism under the influence of Asvaghosha, a celebrated monk from Pataliputra. Though a great warrior and an empire-builder, Kanishka was as equal as the exponent and champion of Mahayanism.

Kanishka made Buddhism as the state religion and built many stupas and monasteries in Mathura, Taxila and many other parts of his kingdom. He sent Buddhist missionaries to Tibet, China and many countries of Central Asia for the propagation of Buddha's gospel.

He organised the fourth Buddhist Council at Kundalavana near Srinagar to sort out the differences between the various schools of Buddhism. It was only in this council that Buddhism was split into Hinayanism and Mahayanism.

Art and Literature

Kanishka was a great patron of art and literature. His court was adorned with a number of Buddhist saints and scholars, like Asvaghosha, Vasumitra and Nagarjuna.

6th Std History_Term 3_EM_Unit2.indd 106 27-09-2023 19:25:46



Asvaghosha was the celebrated author of the first Sanskrit play, *Buddhacharita*.

He founded the town of Kanishkapura in Kashmir and furnished the capital of Purushapura with magnificent public buildings.

The Gandhara School of Art flourished during his time. The most favourite subject of the Gandhara artists was the carving of sculptures of Buddha.

Buddhist learning and culture was taken to China and Mongolia from Takshashila. The great Asiatic culture mingled with Indian Buddhist culture during the Kushana's time.

Kanishka's successors were weak and incompetent. Kushana empire rapidly disintegrated into number of small principalities.

6th Std History_Term 3_EM_Unit2.indd 107 27-09-2023 19:25:46

Elsewhere

Kushana Empire corresponded with the last days of the Roman Republic, when Julius Caesar was alive. It is said that Kushana Emperor sent a great embassy to Augustus Caesar.



Augustus Caesar



Julius Caesar

Summary

- The break-up of Mauryan empire resulted in the invasions of Sakas, Scythians, Parthians, Indo-Greeks and Kushanas from the north-west.
- The last Mauryan emperor, Brihadratha, was assassinated by his own general, Pushyamitra Sunga, who established Sunga dynasty in Magadha.
- The history of Magadha after the fall of the Kanvas is devoid of any significance until the emergence of the Gupta dynasty.
- The Kushanas in the north and the Satavahanas (Andhras) in the south flourished for about 300 years and 450 years, respectively.
- Rudradaman was the most important and famous king of Sakas.
- The best known of the Kushanas was Kanishka who was an ardent follower of Mahayana form of Buddhism. Gandhara Art developed during this period.

GLOSSARY

repulsed	driven back by force	விரட்டியடிக்கப்பட்டது
thwarted	prevent from accomplishing something	முறியடிக்கப்பட்டது
encroachments	intrusion on a person's territory, rights etc,	ஆக்கிரமிப்புகள்
renovated	Restored(something old, especially a building) to a good state of repair	புதுப்பிக்கப்பட்டது
assimilate	absorb (information, ideas or culture) fully	ஒன்றிப்போதல்
ardent	enthusiastic or passionate	தீவிர
magnificent	impressively beautiful	அற்புதமான

6th Std History_Term 3_EM_Unit2.indd 108 27-09-2023 19:25:46

Exercises



I. Choose the correct answer

1. The last Mauryan emperor was killed by_____.

   a) Pushyamitra b) Agnimitra
   c) Vasudeva d) Narayana

2. _____ was the founder of Satavahana dynasty.

   a) Simuka b) Satakarani
   c) Kanha d) Sivasvati

3. _____ was the greatest of all the Kushana emperors.

   a) Kanishka b) Kadphises I
   c) Kadphises II d) Pan-Chiang

4. The Kantara School of Sanskrit flourished in the _____ during 2nd century BC.

   a) Deccan b) north-west India
   c) Punjab d) Gangetic valley

5. Sakas ruled over Gandhara region _____ as their capital.

   a) Sirkap b) Taxila
   c) Mathura d) Purushpura

II. Match the statement with the reason and tick the appropriate answer

1. **Assertion (A):** Colonies of Indo-Greeks and Indo-Parthians were established along the north-western part of India.

   Reason (R): The Bactrian and Parthian settlers gradually intermarried and intermixed with the indigenous population.

   a) Both A and R are correct and R is the correct explanation of A.
   b) Both A and R are correct but R is not the correct explanation of A.
   c) A is correct but R is not correct.
   d) A is not correct but R is correct.

2. **Statement I:** Indo-Greek rulers introduced die system and produced coins with inscription and symbols, engraving figures on them.

   Statement II: Indo-Greek rule was ended by the Kushanas.

   a) Statement I is wrong, but statement II is correct.
   b) Statement II is wrong, but statement I is correct
   c) Both the statements are correct.
   d) Both the statements are wrong.

6th Std History_Term 3_EM_Unit2.indd 109 27-09-2023 19:25:46

3.Circle the odd one

Pushyamitra, Vasudeva, Simuka, Kanishka

4.Answer the following in a word

1. Who was the last Sunga ruler?
2. Who was the most important and famous king of Sakas?
3. Who established Kanva dynasty in Magadha?
4. Who converted Gondophernes into Christianity?

III. Fill in the blanks

1._____ was the founder of Indo-Parthian Kingdom.

2.In the South, Satavahanas became independent after _____ death.

3.Hala is famous as the author of _____.

4._____ was the last ruler of Kanva dynasty.

5.Kushana's later capital was_____.

IV. State whether True or False

1. Magadha continued to be a great centre of Buddhist culture even after the fall of the Mauryan Empire.
2. We get much information about Kharavela from Hathigumba inscription.
3. Simuka was the founder of Satavahana dynasty.
4. Buddhacharita was written by Asvaghosha.

V.Match the following

i) Patanjali	-	1. Kalinga
ii) Agnimitra	-	2. Indo-Greek
iii) King Kharavela	-	3. Indo-Parthians
iv) Demetrius	-	4. Second grammarian
v) Gondophernes	-	5. Malavikagnimitra

a) 4 3 2 1 5 b) 3 4 5 1 2 c) 1 5 3 4 2 d) 2 5 3 1 4

VI. Find out the wrong statement from the following

1. The Kushanas formed a section of the yueh-chi tribes who inhabited north-western China.
2. Kanishka made Jainism the state religion and built many monasteries.
3. The Great Stupa of Sanchi and the railings which enclose it belong to the Sunga period.
4. Pan-Chiang was the Chinese general defeated by Kanishka.

6th Std History_Term 3_EM_Unit2.indd 110 27-09-2023 19:25:46

VII. Answer in one or two sentences

1. What happened to the last Mauryan emperor?
2. Write a note on Kalidasa's Malavikagnimitra.
3. Name the ruler of Kanva dynasty.
4. Highlight the literary achievements of Satavahanas.
5. Name the places where Satavahana's monuments are situated.
6. Give an account of the achievements of Kadphises I.
7. Name the Buddhist saints and scholars who adorned the court of Kanishka.

VIII. Answer the following

1. Who invaded India after the decline of the Mauryan empire?
2. Give an account of the conquests of Pushyamitra Sunga.
3. Write a note on Gautamiputra Satakarni.
4. What do you know of Gondopharid dynasty?
5. Who was considered the best known Indo-Greek King.Why?
6. Who were Sakas?
7. Give an account of the religious policy of Kanishka.

IX. HOTs

1. The importance of Gandhara School of Art.
2. Provide an account of trade and commerce during the post-Mauryan period in South India.

X. Activitys

1. Prepare an album with centres of archaeological monuments of Satavahanas and Kushanas.
2. Arrange a debate in the classroom on the cultural contribution of Indo-Greeks Sakas and Kushanas.

XI. Answer Grid

Who wrote *Brihastkatha*? Ans. _____	Name the Satavahana ruler who performed two Asvamedha sacrifices. Ans. _____
How many years did the Satavahanas rule the Deccan? Ans. _____	Who laid the foundation of Saka era? Ans. _____
What was the favourite subject of the Gandhara artists? Ans. _____	Where did Kanishka organise the fourth Buddhist Council? Ans. _____

6th Std History_Term 3_EM_Unit2.indd 111 27-09-2023 19:25:47

Unit 3

The Age of Empires: Guptas and Vardhanas



Learning Objectives

- To know the establishment of Gupta dynasty and the empire-building efforts of Gupta rulers
- To understand the polity, economy and society under Guptas
- To get familiar with the contributions of the Guptas to art, architecture, literature, education, science and technology
- To explore the signification of the reign of HarshaVardhana

Introduction

By the end of the 3rd century AD (CE), the powerful empires established by the Kushanas in the north and Satavahanas in the south had lost their greatness and strength. After the decline of Kushanas and Satavahanas, Chandragupta carved out a kingdom and establish his dynastic rule, which lasted for about two hundred years.

After the downfall of the Guptas and thereafter and interregnum of nearly 50 years, Harsha of Vardhana dynasty ruled North India from 606 to 647 A.D (CE).

Sources

Archaeological Sources

- Gold, silver and copper coins issued by Gupta rulers.
- Allahabad Pillar Inscription of Samudragupta.
- The Mehrauli Iron Pillar Inscription.
- Udayagiri Cave Inscription, Mathura Stone Inscription and Sanchi Stone Inscription of Chandragupta II.
- Bhitari Pillar Inscription of Skandagupta.
- The Gadhwa Stone Inscription.

6th Std History_Term 3_EM_Unit3.indd 112 27-09-2023 19:27:12

- Madubhan Copper Plate Inscription (Punjab)
- Sonpat Copper Plate
- Nalanda Inscription on clay seal

Literary Sources

- *Vishnu, Matsya, Vayu* and *Bhagavata* Puranas and *Niti Sastras* of Narada
- Visakhadatta's *Devichandraguptam* and *Mudrarakshasa* and Bana's *Harshacharita*
- Dramas of Kalidasa
- Accounts of Chinese Buddhist monk Fahien who visited India during the reign of Chandragupta II.
- Harsha's *Ratnavali, Nagananda, Priyadharshika*
- Hiuen-Tsang's Si-Yu-Ki

Foundation of the Gupta Dynasty

Sri Gupta is considered to be the founder of the Gupta dynasty. He is believed to have reigned over parts of present-day Bengal and Bihar. He was the first Gupta ruler to be featured on coins. He was succeeded by his son Ghatotkacha. Both are mentioned as Maharajas in inscriptions.

Chandragupta I (319–335 AD(CE))

Chandragupta I married Kumaradevi of the famous and powerful Lichchhavi family. Having gained the support of this family, Chandragupta could eliminate various small states in northern India and crown himself the monarch of a larger kingdom. The gold coins attributed to Chandragupta bear the images of Chandragupta, Kumaradevi and the legend 'Lichchhavayah'.

Lichchhavi was an old gana–sanga and its territory lay between the Ganges and the Nepal Terai.

Samudragupta (335–380 AD(CE))

Samudragupta, son of Chandragupta I, was the greatest ruler of the dynasty. The Prayog Prashasti, composed by Samudragupta's court poet Harisena was engraved on Allahabad Pillar. This Allahabad Pillar inscription is the main source of information for Samudragupta's reign.



Allahabad Pillar

Prashasti

Prashasti is a Sanskrit word, meaning commendation or 'in praise of'. Court poets flattered their kings listing out their achievements. These accounts were later engraved on pillars so that the people could read them.

6th Std History_Term 3_EM_Unit3.indd 113 27-09-2023 19:27:12

Consolidation of Gupta Dynasty

Samudragupta was a great general and when he became emperor, he carried on a vigorous campaign all over the country and even in the south. In the southern Pallava kingdom, the king who was defeated by Samudragupta was Vishnugopa.

Samudragupta conquered nine kingdoms in northern India. He reduced 12 rulers of the southern India to the status of feudatories and forced them to pay tribute. He received homage from the rulers of East Bengal, Assam, Nepal, the eastern part of Punjab and various tribes of Rajasthan.

Samudragupta was a devotee of Vishnu. He revived the Vedic practice of performing horse sacrifice. Performed by kings to prove their imperial sovereignty. He issued gold coins and in one of them, he is portrayed playing harp (veenai). Samudragupta was not only a great conqueror but a lover of poetry and music and for this, he earned the title 'Kaviraja'.

Sri Meghavarman, the Buddhist king of Ceylon, was a contemporary of Samudragupta.

Chandragupta II (380 - 415AD(CE))

Chandragupta II was the son of Samudragupta. He was also known as Vikramaditya. He conquered western Malwa and Gujarat by defeating the Saka rulers. He maintained friendly relationship with the rulers of southern India. The iron pillar near Qutub Minar is believed to have been built by Vikramaditya. Fahien, a Buddhist scholar from China, visited India during his reign. Vikramaditya is said to have assembled the greatest writers and artists (Navaratna [Nine Jewels]) in his court. Kalidasa is said to be one among them.

Navaratna in the court of Vikramaditya	
Kalidasa	Sanskrit poet
Harisena	Sanskrit poet
Amarasimha	Lexicographer
Dhanvantri	Physician
Kahapanaka	Astrologer
Sanku	Architect
Varahamihira	Astronomer
Varauchi	Grammarian and Sanskrit scholar
Vittalbhatta	Magician

The surnames of Chandragupta II were Vikramaditya, Narendrachandra, Simhachandra, Narendrasimha, Vikrama Devaraja, Devagupta and Devasri.

Chandragupta II was succeeded by his son Kumaragupta I, who built the famous Nalanda University.

Kumaragupta's successor Skandagupta had to face a new threat in the form of the invasion of Huns. He defeated them and drove them away. But after twelve years, they came again and broke the back of the Gupta Empire. The last of the great Guptas was Baladitya,

6th Std History_Term 3_EM_Unit3.indd 114 27-09-2023 19:27:12

Fahien



During the reign of Chandragupta II, the Buddhist monk Fahien visited India. His travel accounts provided us information about the socio-economic, religious and moral conditions of the people of the Gupta age. According to Fahien, the people of Magadha were happy and prosperous, that justice was mildly administered and there was no death penalty. Gaya was desolated. Kapilavasthu had become a jungle, but at Pataliputra people were rich and prosperous.

assumed to have been Narasimha Gupta I. He was himself attracted towards Buddhism. He was paying tribute to Mihirakula but was distressed by his hostility towards Buddhism. So he stopped paying tribute. Though Baladitya succeeded in imprisoning him, Mihirakula turned treacherous and drove away Baladitya from Magadha. After Baladitya, the great Gupta Empire faded away. The last recognised king of the Gupta Empire was Vishnugupta.

Gupta Polity

The divine theory of kingship (the concept that king is the representative of God on earth and so he is answerable only to God and not to anyone else) was practised by the Gupta rulers. The Gupta kings wielded enormous power in political, administrative, military and judicial spheres. The Gupta king was assisted by a council of *mantris* (ministers). The council consisted of princes, high officials and feudatories. A large number of officials were employed by the Gupta rulers to carry on the day-to-day administration of the country. High-ranking officials were called *dandanayakas* and *mahadandanayakas*.

The Gupta Empire was divided into provinces known as *deshas* or *bhuktis*. They were administered by the governors, designated as *uparikas*. The province was divided into districts such as *vishyas and* they were controlled by the officers known as *vishyapatis*. At the village level, there were functionaries such as *gramika* and *gramadhyaksha*.

The extensive empire shows the important role of military organisation. Seals and inscriptions mentioned military designations as *baladhikrita* and *mahabaladhikrita* (commander of infantry and cavalry respectively). The system of espionage included spies known as *dutakas*.

Society and Economy

Land and Peasants

Nitisara, authored by Kamandaka, emphasises the importance of the royal treasury and mentions various sources of revenue. The military campaigns of kings like Samudragupta were financed through revenue surpluses. Land tax was the main revenue to the government. The condition of peasants was pathetic. They were required to pay various taxes. They were reduced to the position of serfs.

6th Std History_Term 3_EM_Unit3.indd 115 27-09-2023 19:27:12



Classification of land during Gupta period	
Kshetra	cultivable land
Khila	waste land
Aprahata	jungle or forest land
Vasti	habitable land
Gapata Saraha	pastoral land

Trade and Commerce

The contribution of the traders for the development of Gupta's economy was very impressive. There were two types of traders, namely *Sresti* and *Sarthavaha*.

6th Std History_Term 3_EM_Unit3.indd 116 27-09-2023 19:27:12

Nalanda University

- Nalanda University flourished under the patronage of the Gupta Empire in the 5th and 6th centuries and later under emperor Harsha of Kanauj.
- At Nalanda, Buddhism was the main subject of study. Other subjects like Yoga, Vedic literature and Medicine were also taught.
- Hiuen Tsang spent many years studying Buddhism in the University.
- Eight Mahapatashalas and three large libraries were situated on the campus.



Nalanda University

- Nalanda was ravaged and destroyed by Mamluks (Turkish Muslims) under Bhaktiyar Khalji.
- Today, it is a UNESCO World Heritage Site.

Who were the Huns? Huns were the nomadic tribes, who, under their great Attila, were terrorising Rome and Constantinople. Associated with these tribes were the White Huns who came to India through Central Asia. They undertook regular invasions and were giving trouble to all Indian frontier states. After defeating Skandagupta, they spread across Central India. Their chief, Toromana, crowned himself as king. After him, his son Mihirakula ruled the captured territories. Finally, Yasodharman, ruler of Malwa in Central India, defeated them and ended their rule.



Portrayal of Toromana, the Hun chief, in coins.

Sresti	Sarthavaha
Sresti traders usually settled at a standard place.	Sarthavaha traders were caravan traders who carried their goods to different places

Trade items ranged from daily products to valuable and luxury goods. The important trade goods were pepper, gold, copper, iron, horses and elephants. Lending money at a high rate of interest was in practice during Gupta period.

The Guptas developed roadways connecting different parts of the country. Pataliputra, Ujjain, Benaras, Mathura were the famous trade centres. Ports in western (Kalyan, Mangalore, Malabar) and eastern (Tamralipti in Bengal) coasts of India facilitated trade.

6th Std History_Term 3_EM_Unit3.indd 117 27-09-2023 19:27:12

Samudragupta introduced the Gupta monetary system. Kushana coins provided inspiration to Samudragupta. The Gupta gold coins were known as *Dinara*. Guptas issued many gold coins but comparatively fewer silver and copper coins. However, the post-Gupta period saw a fall in the circulation of gold coins, indicating the decline in the prosperity of the empire.

Metallurgy

- Mining and metallurgy were the most flourishing industries during the Gupta period.
- The most important evidence of development in metallurgy was the Mehrauli Iron Pillar installed by King Chandragupta in Delhi. This monolithic iron pillar has lasted through the centuries without rusting.

The metals used by them were: iron, gold, copper, tin, lead, brass, bronze, bell- metal, mica, manganese and red chalk.



Mehrauli Iron Pillar

Society

The society that adhered to four *varna* system was patriarchal. According to laws of Manu, which was in force, women should be under the protection of their father, husband or eldest son. Polygamy was widely prevalent. The kings and feudatory lords often had more than one wife. Inscriptions refer to Kubernaga and Dhrubaswamini as the queens of Chandragupta II. Sati was practised during the Gupta rule.

Slavery

Slavery was not institutionalised in India, as in the West. But there are references to the existence of various categories of slaves during the Gupta age.

Religion

There was revival of Vedic religion and Vedic rites. Samudragupta and Kumaragupta I performed *Asvamedha* Yagna (a horse sacrifice ritual). We notice the beginning of image worship and the emergence of two sects, namely Vaishnavism and Saivism, during the Gupta period. Buddhism also continued to flourish though it split into two sects, namely Hinayana and Mahayana.

Art and Architecture

The Guptas were the first to construct temples, which evolved from the earlier tradition of rock-cut shrines. Adorned with towers and elaborate carvings, these temples were dedicated to all Hindu deities.

6th Std History_Term 3_EM_Unit3.indd 118 27-09-2023 19:27:12

The most notable rock-cut caves are found at Ajanta and Ellora (Maharashtra), Bagh (Madhya Pradesh) and Udaygiri (Odisha). The structural temples built during this period resemble the characteristic features of the Dravidian style.

Two remarkable examples of Gupta metal sculpture are (i) a copper image of Buddha about 18 feet high at Nalanda and (ii) Sultanganj Buddha seven-and-a-half feet in height. The most important examples of the Gupta paintings are found on the Fresco of the Ajanta caves and the Bagh cave in Gwalior.

Literature

Though the language spoken by the people was Prakrit, the Guptas made Sanskrit the official language and all their epigraphic records are in Sanskrit. The Gupta period also saw the development of Sanskrit grammar based on the grammar of Panini and Patanjali who wrote *Ashtadhyayi* and *Mahabhashya* respectively.

A Buddhist scholar from Bengal, Chandrogomia, composed a book on grammar titled *Chandravyakaranam*. Kalidasa's famous dramas were *Sakunthala*, *Malavikagnimitra* and *Vikramaoorvashiyam*. Other significant works of Kalidasa were *Meghaduta*, *Raghuvamsa, Kumarasambava* and *Ritusamhara*.

Mathematics, Astronomy and Medicine

- Invention of zero and the consequent evolution of the decimal system were the legacy of Guptas to the modern world.
- Aryabhatta, Varahamihira and Brahmagupta were foremost astronomers and mathematicians of the time. Aryabhatta, in his book *Surya Siddhanta,* explained the true causes of solar and lunar eclipses. He was the first Indian astronomer to declare that the earth revolves around its own axis.
- Dhanvantri was a famous scholar in the field of medicine. He was a specialist in Ayurveda. Charaka was a medical scientist. Susruta was the first Indian to explain the process of surgery.

Vardhana Dynasty

The founder of the Vardhana or Pushyabhuti dynasty ruled from Thaneswar. Pushyabhuti served as a military general under the Guptas and rose to power after the fall of the Guptas. With the accession of Prabakaravardhana, the Pushyabhuti family became strong and powerful.

Rajavardhana, the eldest son of Prabhakaravardhana, ascended the throne after his father's death. Rajavardhana's sister Rajayashri's husband, Raja of Kanauj, was killed by the Gauda ruler Sasanka of Bengal. Sasanka also imprisoned Rajayashri. Rajavardhana, in the process of retrieving his sister was treacherously killed by Sasanka. This resulted in his younger brother Harshavardhana becoming king



6th Std History_Term 3_EM_Unit3.indd 119 27-09-2023 19:27:12



of Thaneswar. The notables of the Kanauj kingdom also invited Harsha to take its crown. After becoming the ruler of the both Thaneswar and Kanauj, Harsha shifted his capital from Thaneswar to Kanauj.

Conquest of Harshavardhana

- The most popular king of the vardhana dynasty was Harshavardhana. Harsha ruled for 41 years. His feudatories included those of Jalandhar, Kashmir, Nepal and Valabhi. Sasanka of Bengal remained hostile to him.
- It was Harsha who unified most of northern India. But the extension of his authority in the south was checked by Chalukya king Pulikesin II. The kingdom of Harsha disintegrated rapidly into small states after his death in 648 AD (CE). He maintained a cordial relationship with the rulers of Iran and China.

Harsha met the Chinese traveller, Hiuen Tsang, at Kajangala near Rajmahal (Jharkhand) for the first time.

Administration

The emperor was assisted by a council of ministers. The prime minister occupied the most important position in the council of ministers. Bhaga, Hiranya and Bali were the three kinds of tax collected during Harsha's reign. Criminal law was more severe than that of the Gupta age. Life imprisonment was the punishment for violation of the laws and for plotting against the king.

Perfect law and order prevailed throughout the empire. Harsha paid great attention to discipline and strength of the army. Harsha built charitable institutions for the stay of the travellers, and to care for the sick and the poor.



Coins of Harsha

6th Std History_Term 3_EM_Unit3.indd 120 27-09-2023 19:27:13

Religious Policy

Harsha was the worshipper of Shiva in the beginning, but he embraced Buddhism under the influence of his sister Rajyashri and the Buddhist monk and traveller Hiuen Tsang. He belonged to Mahayana school of thought. Harsha treated Vedic scholars and Buddhist monks alike and distributed charities equally to them. He was the last Buddhist sovereign in India. As a pious Buddhist, Harsha stopped the killing of animals for food.

Hiuen Tsang, the 'prince of pilgrims', visited India during Harsha's reign. His *Si-Yu-Ki* provides detailed information about the social, economic, religious and cultural conditions of India during Harsha's time. Hiuen Tsang tells us how Harsha, though a Buddhist, went to participate in the great *kumbhamela* held at Prayag.



Hiuen Tsang

He was noted for his policy of religious toleration and used to worship the images of Buddha, Shiva and Sun simultaneously. He summoned two Buddhist assemblies, one at Kanauj and another at Prayag.

The assembly at Kanauj was attended by 20 kings. A large number of Buddhist, Jain and Vedic scholars attended the assembly. A golden statue of Buddha was consecrated in a monastery and a small statue of Buddha (three feet) was carried in a procession.

In the assembly at Prayag, Harsha distributed his wealth among the Buddhists, Vedic scholars and poor people. Harsha offered fabulous gifts to the Buddhist monks on all the four days of the assembly.

Art and Literature

Harsha, himself a poet and dramatist, gathered around him a best of poets and artists. Harsha's popular works are *Ratnavali*, *Nagananda* and *Priyadharshika.* His royal court was adorned by Banabhatta, Mayura, Hardatta and Jayasena.

Temples and monasteries functioned as centres of learning. Kanauj became a famous city. Harsha constructed a large number of viharas, monasteries and stupas on the bank of the Ganges. The Nalanda University, a university and monastery combined, was said to have had 10,000 students and monks in residence, when Hiuen Tsang visited the university.

6th Std History_Term 3_EM_Unit3.indd 121 27-09-2023 19:27:13

Elsewhere

Chandragupta I was the contemporary of Constantine the Great, the Roman Emperor, who founded Constantinople.

Harsha's time coincided with a early days of Tang Dynasty of China. Their capital(Xi'an) was a great centre of art and learning.



Constantine the Great



King of Tang Dynasty

Summary

- Sri Gupta was the founder of Gupta dynasty
- Chandragupta I, Samudragupta and Chandragupta II were the great kings of Gupta dynasty
- Vishnugupta was the last recognised king of Gupta Empire
- Divine Right Theory of kingship was practised by the Gupta rulers
- Mining and metallurgy were the most flourishing industries during the Gupta Period
- The society that adhered to four varna system was patriarchal
- There was a revival of Vedic religion and Vedic rites
- The Guptas were the first to construct temples which evolved from the earlier tradition of rock-cut shrines
- Aryabhatta, Varahamihira and Brahmagupta were foremost astronomers and mathematicians of the time
- Harsha was a prominent ruler of Vardhana dynasty and was elevated to the position of an emperor
- Harsha was a great artist and dramatist and contributed to the development of literature and art
- Hiuen Tsang visited Nalanda and wrote his useful travel accounts, which help us understand the condition of India during Harsha's reign
- Harsha, though a strong follower of Buddhism, also promoted Vedic religion

6th Std History_Term 3_EM_Unit3.indd 122 27-09-2023 19:27:13

GLOSSARY

Engraved	carved/inscribed	பொறிக்கப்பட்ட (செதுக்கிய)
Flattered	lavish insincere praise and compliments upon (someone) especially to further one's own interest	முகஸ்துதி
Collapse	fall	சரிவு
Pathetic	pitiful	பரிதாபகரமான
adhered to	abide by, bound by	பின்பற்றப்பட்ட
pastoral land	land or farm used for grazing cattle	மேய்ச்சல் நிலம்
Portrayed	depicted in a work of art or literature	சித்தரிக்கப்பட்டுள்ளது
Desolated	made unfit for habitation	பாழடைந்த

Exercise



I.Choose the correct answer

1. _____ was the founder of Gupta dynasty.
   a) Chandragupta I b) Sri Gupta
   c) Vishnu Gopa d) Vishnugupta
2. Prayog Prashasti was composed by _____
   a) Kalidasa b) Amarasimha
   c) Harisena d) Dhanvantri
3. The monolithic iron pillar of Chandragupta is at _____
   a) Mehrauli b) Bhitari
   c) Gadhva d) Mathura
4. _____ was the first Indian to explain the process of surgery.
   a) Charaka b) Sushruta
   c) Dhanvantri d) Agnivasa
5. _____ was the Gauda ruler of Bengal.
   a) Sasanka b) Maitraka
   c) Rajavardhana d) Pulikesin II

II. Match the statement with the reason and tick the appropriate answer

1. **Assertion (A):** Chandragupta I crowned himself as a monarch of a large kingdom after eliminating various small states in Northern India.

   Reason (R): Chandragupta I married Kumaradevi of Lichchavi family.

   a) Both A and R are true and R is the correct explanation of A.
   b) Both A and R are correct but R is not correct explanation of A.
   c) A is correct but R is not correct.
   d) A is not correct but R is correct.

6th Std History_Term 3_EM_Unit3.indd 123 27-09-2023 19:27:13

2. **Statement I:** Chandragupta II did not have cordial relationship with the rulers of South India.

   Statement II: The divine theory of kingship was practised by the Gupta rulers.

   a) Statement I is wrong but statement II is correct.

   b) Statement II is wrong but statement I is correct.

   c) Both the statements are correct.

   d) Both the statements are wrong.

3. Which of the following is arranged in chronological order?

   a) Srigupta – Chandragupta I – Samudragupta – Vikramaditya

   b) Chandragupta I – Vikramaditya - Srigupta – Samudragupta

   c) Srigupta – Samudragupta – Vikramaditya -Chandragupta I

   d) Vikramaditya - Srigupta – Samudragupta - Chandragupta I

4. Consider the following statements and find out which of the following statement(s) is / are correct

   1.Lending money at high rate of interest was practised.

   2.Pottery and mining were the most flourishing industries.

   a) 1. is correct b) 2. is correct

   c) Both 1 and 2 are correct d) Both 1 and 2 are wrong

5.Circle the odd one

1.Kalidasa, Harisena, Samudragupta, Charaka.

2.Ratnavali, Harshacharita, Nagananda, Priyadharshika.

III. Fill in the blanks

1. _____, the king of Ceylon, was a contemporary of Samudragupta.
2. Buddhist monk from China _____, visited India during the reign of Chandragupta II.
3. _____ invasion led to the downfall of Gupta Empire.
4. _____ was the main revenue to the Government.
5. The official language of the Guptas was _____.
6. _____, the Pallava king was defeated by Samudragupta.
7. _____ was the popular king of Vardhana dynasty.
8. Harsha shifted his capital from _____ to Kanauj.

IV. State whether True or False

1. Dhanvantri was a famous scholar in the field of medicine.
2. The structural temples built during the Gupta period resemble the Indo-Aryan style.

6th Std History_Term 3_EM_Unit3.indd 124 27-09-2023 19:27:13

3. Sati was not in practice in the Gupta Empire.
4. Harsha belonged to Hinayana school of thought.
5. Harsha was noted for his religious intolerance.

V.Match the following

A

a. Mihirakula	1 Astronomy
b. Aryabhatta	2 Kumaragupta
c. Painting	3 Skandagupta
d. Nalanda University	4 Caravan trader
e. Sartavaga	5 Bagh

a) 1, 2, 4, 3, 5 b) 2, 4, 1, 3, 5 c) 3, 1, 5, 2, 4 d) 3, 2, 1, 4, 5

B

a. Bana	1 10,000 students
b. Harsha	2 Prayag
c. Nalanda University	3 Harshacharita
d. Hiuen -Tsang	4 Ratnavali
e. Buddhist Assembly	5 Si-Yu-Ki

a) 4, 3, 2, 1, 5 b) 5, 2, 1, 3, 4 c) 3, 5, 1, 2, 4 d) 2, 1, 3, 4, 5

VI. Answer in one or two sentences

1. Who was given the title Kaviraja? Why?
2. What were the subjects taught at Nalanda University?
3. Explain the Divine Theory of Kingship.
4. Highlight the achievement of Guptas in metallurgy.
5. Who were the Huns?
6. Name the three kinds of tax collected during the Harsha's reign.
7. Name the books authored by Harsha.

VII. Answer the following briefly

1. Write a note on Prashasti.
2. Give an account of Samudragupta's military conquests.
3. Describe the land classification during the Gupta period.
4. Write about Sresti and Sarthavaha traders.
5. Highlight the contribution of Guptas to architecture.
6. Name the works of Kalidasa.
7. Estimate Harshvardhana as a poet and a dramatist.

6th Std History_Term 3_EM_Unit3.indd 125 27-09-2023 19:27:13

VIII. HOTs

1. The gold coins issued by Gupta kings indicate_____.
   a) the availability of gold mines in the kingdom
   b) the ability of the people to work with gold
   c) the prosperity of the kingdom
   d) the extravagant nature of kings
2. The famous ancient paintings at Ajanta were painted on _____.
   a) walls of caves b) ceilings of temples
   c) rocks d) papyrus
3. Gupta period is remembered for _____.
   a) renaissance in literature and art b) expeditions to southern India
   c) invasion of Huns d) religious tolerance
4. What did Indian scientists achieve in astronomy and mathematics during the Gupta period?

IX. Student activity

1. Stage any one of the dramas of Kalidasa in the classroom.
2. Compare and contrast the society of Guptas with that of Mauryas.

X.Life Skills

1. Collect information about the contribution of Aryabhatta, Varahamihira and Brahmagupta to astronomy.
2. Visit a nearby ISRO centre to know more about satellite launching.

XI. Answer Grid

Who was Toromana? Ans.	Name the high ranking officials of Gupta Empire. Ans.
Name the Gupta kings who performed Asvamedha yagna. Ans.	Name the book which explained the causes for the lunar and solar eclipses. Ans.
Name the first Gupta king to find a place on coins. Ans.	Which was the main source of information to know about the Samudragupta's reign? Ans.
Harsha was the worshipper of _____ in the beginning.	_____ University reached its fame during Harsha period.

6th Std History_Term 3_EM_Unit3.indd 126 27-09-2023 19:27:13

ICT CORNER

THE AGE OF EMPIRES: GUPTAS AND VARDHANAS



This activity is to explore Maps. You can know about countries, capitals, flags and cities in all the continents using an Educational Interactive game **Settera Map Quiz**.

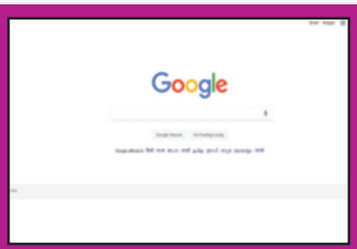
Steps:

Step 1: Open the Browser and type the given URL (or) Scan the QR Code.

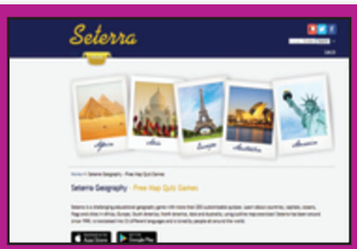
Step 2: Free map Quiz page will appear on the screen.

Step 3: Scroll down and You can select any continent or Country (ex. India Cities)

Step 4: Explore various places on the map, play and create customized quiz activities.



Step 1



Step 2



Step 3



Step 4

Browse in the link

Web: https://online.seterra.com/en/ (or) scan the QR Code

Mobile: https://play.google.com/store/apps/details?id=com.seterra.free

*Pictures are indicatives only.

6th Std History_Term 3_EM_Unit3.indd 127 27-09-2023 19:27:16

Unit 4

South Indian Kingdoms



Learning Objectives

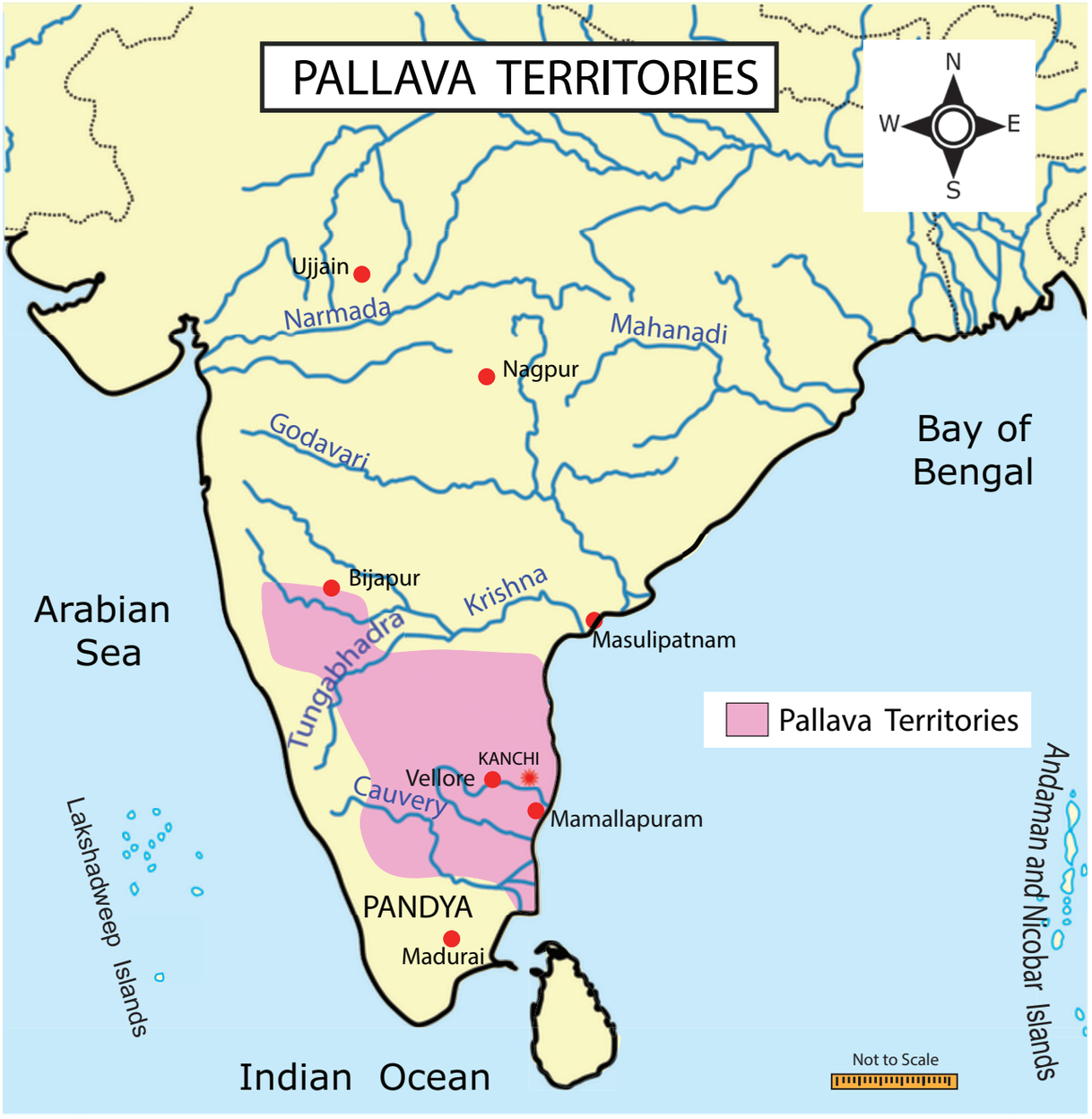
- To know the southern Indian states that emerged after the fall of the Mauryan Empire
- To acquire information of the ruling dynasties such as Pallavas, Chalukyas and Rashtrakutas and their domains
- To understand their contribution to society and culture with reference to literature, art and architecture
- To become familiar with the artistic and architectural splendour of Mamallapuram shore temple, Ellora monuments and Elephanta cave temples

South Indian Kingdoms

By the early 7th century, synchronising with the Harsha's reign in the north, the far south had come under the control of the Pallava kings of Kanchipuram. Pallava sovereignty included the domains of the Cholas and the Pandyas. The latter were then emerging as ruling dynasties in their respective river valley regions. Much of the central and eastern Deccan was under the Chalukyas of Badami (Vatapi), who were then pushed away by the Rashtrakutas. The medieval period in India was marked by thee mergence of regional centres of power. There was no single imperial power like Mauryas or Guptas who exercised control over the greater part of India in this period.

The Pallavas

The Pallava kings ruled around the prosperous agrarian settlement and important trade centre of Kanchipuram on the southeast coast of India. Kanchipuram was well known to Chinese and Roman merchants. From the flourishing trade centre of Kanchipuram, the later Pallavas extended their sovereignty over all the Tamil-speaking regions during the 7th and 8th centuries. The central part of their kingdom, however, was Thondaimandalam, a large political region comprising northern parts of Tamil Nadu and the adjoining Andhra districts.



Sources

Inscriptions	Mandagapattu Cave, Aihole Inscription of Pulakesin II
Copper Plates	Kasakudi Plates
Literature	*Mattavilasa Prahasana, Avanthi Sundarakatha, Kalingathu Parani, Periya Puranam, Nandi Kalambagam*
Foreign Notice	Accounts of Chinese traveller Hiuen Tsang

Pallava Genealogy (Prominent Kings)

There were early Pallava rulers who were feudatories of Satavahanas. Simhavishnu, son of Simhavarman II (around 550 AD (CE), created a strong Pallava kingdom after destroying the Kalabhras. He defeated many kings in the south including the Cholas and the Pandyas. His able son was Mahendravarman I. He was succeeded by his son Narasimhavarman I. The other prominent Pallava rulers were Narasimhavarman II or Rajasimha and Nandivarman II. The last Pallava ruler was Aparajita.

Mahendravarman (*c.*600–630 AD (CE)) contributed to the greatness of the Pallava kingdom. Mahendravarman I was a follower of Jainism in the early part of his rule. He embraced Saivism by the Saivite saint Appar (Tirunavukkarasar). He was a great patron of art and architecture. He is known for introducing a new style to Dravidian architecture, which is referred to as 'Mahendra style'. Mahendravarman also wrote plays, including (*c.*620) *MattavilasaPrahasana* in Sanskrit, which denigrates Buddhism.

Mahendravarman's reign involved constant battles with the Western Chalukya kingdom of Badami under Pulakesin II. Pulakesin seems to have defeated Mahendravarman in one of the battles and taken over a large part of his territory (Vengi) in the north. His son Narasimavarma I (c. 630–668) avenged the defeat by capturing Vatapi, the capital of Chalukyas. He set Vatapi on fire, killing Pulakesin in the process.

Narasimhavarman I's army general was Paranjothi. Popularly known as Siruthondar (one of the 63 Nayanmars), Paranjothi led the Pallava army during the invasion of Vatapi. After the victory he had a change of heart and devoted himself to Lord Siva

–Periya Puranam

Narasimhavarman II (c. 695–722), also known as Rajasimha, was a great military strategist. He exchanged ambassadors with China. His reign was comparatively free from any political disturbance. Therefore, he could concentrate on temple-building activities. During his reign, the famous Kailasanatha temple at Kanchipuram was built.

Name of the King	Title/s Adopted
Simhavishnu	Avanisimha
Mahendravarma I	Sankirnajati Mattavilasa Gunabhara Chitrakarapuli Vichitra Chitta
Narasimhavarma I	Mamallan, Vatapi Kondan

Pallava's Contribution to Architecture

Pallava period is known for architectural splendour. The Shore Temple and various other temples carved from granite monoliths and the Varaha cave (7th century) at Mamallapuram, are illustrious examples of Pallava architecture. In 1984, Mamallapuram was added to the list of UNESCO World Heritage Sites.

Pallava architecture can be classified as

1. Rock-Cut temples – Mahendravarman style
2. Monolithic Rathas and Sculptural Mandapas – Mamallan style
3. Structural Temples – Rajasimhan style and Nandivarman style

Mahendra Style

The best example of MahendraVarma style monuments are cave temples at Mandagapattu, Mahendravadi, Mamandur, Dalavanur, Tiruchirapalli, Vallam, Tirukazhukkundram and Siyamangalam.



Cave Temple Mandagapattu

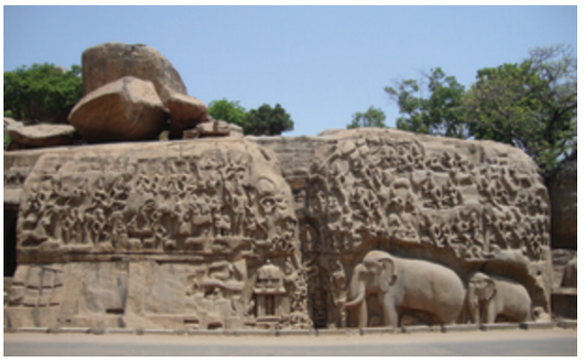
Mamalla Style

The five *rathas* (chariots), popularly called Panchapandavar rathas, signify five different style of temple architecture. Each ratha has been carved out of a single rock. So they are called monolithic. The popular mandapams (pillared pavilions) they built are Mahishasuramardhini mandapam, Thirumoorthi mandapam and Varaha mandapam.



Panchapandavar Rathas

The most important among the Mamalla style of architecture is the open art gallery. Several miniature sculptures such as the figure of lice-picking monkey, elephants of huge size and the figure of the ascetic cat have been sculpted beautifully on the wall of a huge rock. The fall of the River Ganga from the head of Lord Siva and the Arjuna's penance are notable among them. The Great Penance panel is considered to be the world's largest open-air bas relief.



Arjuna's Penance

Rajasimha Style

Narasimhavarma II, also known as Rajasimha, constructed structural temples using stone blocks. The best example for the structural temple is Kailasanatha temple at Kanchipuram. This temple was built by using sand stones. Kailasanatha temple is called Rajasimheswaram.



Kanchi Kailasanatha Temple

Nandivarma Style

The last stage of the Pallava architecture is also represented by structural temples built by the later Pallavas. The best example is Vaikunda Perumal temple at Kanchipuram.



Kanchi Vaikunda Perumal Temple

Society and Culture

The Pallavas supported Jainism, Buddhism and the Vedic faith. They were great patrons of music, painting and literature. Some of the Pallava kings patronised the Azhwars and Nayanmars. These exponents of Bhakti Cult preached a new form of Vaishnavism and Saivism. Among the Saivites were Appar and Manikkavasakar. Among the Vaishnavites were Nammazhvar and Andal. The Bhakti movement aimed at preaching a popular faith, in which prayers in Tamil were preferred to those in Sanskrit. Women were encouraged to participate in the religious congregations. The Tamil devotional cult was competitive with Buddhism and Jainism. Therefore the latter suffered a gradual decline in most parts of Tamil country.

Education and Literature

- Gatika (monastery or centre of learning) at Kanchi was popular during the Pallava times and it attracted students from all parts of India and abroad.Vatsyaya who wrote *Nyaya Bhashya* was a teacher at Kanchi (Gatika).
- The treatise on *Dakshin Chitram* (Paintings of South India) was compiled during the reign of Mahendravarma I.
- The great Sanskrit scholar, Dandin, adorned in the court of Narasimhavarma I. Dandin composed *Dashakumara Charita.*
- Bharavi, the great Sanskrit scholar, lived in the time of Simhavishnu. Bharavi wrote *Kiratarjuniya,* an epic in verses.
- Tamil literature had also flourished during the Pallava rule. *Thevaram* composed by Nayanmars and *Nalayradivyaprabantham* composed by Azhwars, which are still chanted by devout people. Perundevanar, who was patronized by Nandivarman II, translated the *Mahabharata* into Tamil as *Bharathavenba.*

Pallava Art

The Pallava kings had also patronised fine arts. The music inscriptions in Kudumianmalai and Thirumayam temples show Pallavas' interest in music. The famous musician Rudracharya lived during Mahendravarma I. The sculptures of this period depict many images in dancing postures.

The Chalukyas

The Chalukyas ruled larger parts of west and centre of South India, consisting of Maratha country with Vatapi (Badami)

as their capital. There were three distinct but closely related and independent Chalukya dynasties. They were

1. Chalukyas of Badami
2. Chalukyas of Vengi (Eastern Chalukyas)
3. Chalukyas of Kalyani (Western Chalukyas).

These Chalukyas held Harsha in the north, the Pallavas in the south and Kalinga (Odisha) in the east.

Sources

Inscriptions	Badami Cave Inscription of Mangalesha Kanchi Kailasanatha Temple Inscription Pattadakal Virupaksha Temple Inscription Aihole Inscription of Pulakesin II
Foreign Notice	Accounts of Chinese traveller Hiuen Tsang

Aihole Inscription: It is found at Meguti Temple in Aihole (Bagalkot district, Karnataka). It is written in Sanskrit by Ravikirti, a court poet of Chalukya king Pulakesin II. It makes a mention of the defeat of Harsha Vardhana by Pulakesin II.



The Chalukyas of Vatapi

Pulakesin I, a petty chieftain of Pattadakal in the Bijapur district, took and fortified the hill fort of Vatapi around 543 AD (CE). He soon conquered the territory between the Krishna and Tungabhadra rivers and the Western Ghats. His son Kirtivarman I (c. 566 to 597) brought the Konkan coast under Chalukya control. Pulakesin II (*c.*610 to 642) emerged as the most powerful ruler of the dynasty. The Persian (Iran) king Khusru II sent an embassy to the court of Pulakesin II. Pulakesin succeeded in seizing parts of Gujarat and Malwa. He defied the North Indian ruler Harsha and according to an agreed understanding Narmada river was fixed as the boundary between the two. About 624, Pulakesin II conquered the kingdom of Vengi and gave it to his brother Vishnuvardhana, the first Eastern Chalukya ruler.

During 641–647 the Pallavas ravaged the Deccan and captured Vatapi, but the Chalukyas had recaptured it by 655. Vikramaditya I (655 to 680) and Vikramaditya II, the successor of Vikramaditya I captured Kanchipuram but spared the city. Kirtivarman II, the successor of Vikramaditya II was defeated by Dantidurga, the founder of the Rashtrakuta dynasty.

Western Chalukyas of Kalyani

They were the descendants of Badami Chalukyas ruled from Kalyani (modern-day Basavakalyan). In 973, Tailapa II, a feudatory of the Rashtrakuta ruling

from Bijapur region defeated Parmara of Malwa. Tailapa II occupied Kalyani and his dynasty quickly grew into an empire under Somesvara I. Somesvara I moved the capital from Manyakheta to Kalyani.

For over a century, the two empires of southern India, the Western Chalukyas and the Chola dynasty of Thanjavur, fought many fierce battles to control the fertile region of Vengi. During the rule of Vikramaditya VI in the late 11th century, vast areas between the Narmada River in the north and Kaveri River in the south came under Chalukya control.

Contributions to Art and Architecture

As supporters of both Saivism and Vaishnavism, the Chalukyas contributed richly to art and architecture. A new style of architecture known as Vesara was developed. Vesara is a combination of south Indian (Dravida) and north Indian (Nagara) building styles. They perfected the art of stone building without mortar. They used soft sandstones in construction.

They built a number of rock-cut cave-temples and structural temples dedicated to Siva, Vishnu and Brahma. The structural temples of Chalukyas exist at Aihole, Badami and Pattadakal. The important stone temples are the Vishnu temples at Badami and Aihole and the Virupaksha or Siva Temple at Pattadakal in Bijapur district in present-day Karnataka. The Vishnu temple at Badami was built



Cave Temple Badami



Kalleshwara Temple - Bagali

by Mangalesa of the Chalukya Dynasty and contains the Aihole inscription of Vikramaditya II. Their cave temples are found at Ajanta, Ellora and Nasik.

The cave temples at Badami contain fine sculptures of Vishnu reclining on Sesha Nag; Varaha, the Boar; Narasimha or the lion-faced man; and Vamana, the dwarf. The Kasi Vishweshvara Temple at Lakkundi,

the Mallikarjuna Temple at Kuruvatti, the Kalleshwara Temple at Bagali and the Mahadeva Temple at Itagi represent well-known examples of the architecture of Western Chalukyas of Kalyani.

Chalukyas adopted the Vakataka style in paintings. Some of the frescoes of the caves of Ajantha were created during the reign of Chalukyas. The reception given to the Persian embassy by Pulakesin II is depicted in a painting at Ajanta.

Pattadakal (UNESCO World Heritage Site) is a small village in Bagalkot district of Karnataka. It has ten temples. Out of them, four were built in northern style (Nagara), while the rest six are in the southern (Dravida) style. Virupaksha Temple and Sangameshwara Temple are in Dravida Style and Papanatha temple is in Nagara style. The Virupaksha temple is built on the model of Kanchi Kailasanatha temple. Sculptors brought from Kanchi were employed in its construction.



The Rashtrakutas

The Rashtrakutas ruled not only the Deccan but parts of the far south and the Ganges plain as well from 8th to 10th century AD(CE). They were of Kannada origin and their mother tongue was Kannada. Dantidurga was the founder of Rashtrakuta dynasty. He was an official of high rank under the Chalukyas of Badami. Krishna I succeeded Dantidurga. He consolidated and extended the Rashtrakuta power. He was a great patron of art and architecture. The Kailasanatha temple at Ellora was built by him.

Rashtrakuta Kings

The greatest king of the Rashtrakuta dynasty was Amogavarsha. He built a new capital at Manyakheta (now Malkhed in Karnataka) and Broach became the port. Amogavarsha (c. 814–878) was embraced to Jainism by Jinasena, a Jain monk. Krishna II, who succeeded his father Amogavarsha, suffered a defeat in the battle of Vallala (modern Tiruvallam, Vellore district) at the hands of Cholas under Parantaka in c. 916. Krishna III (c. 939–967) was the last able ruler of Rashtrakuta dynasty. He defeated the Cholas in the battle of Takkolam (presently in Vellore district) and captured Thanjavur. The Chalukyas under Krishna III contested with other ruling dynasties of north India for the control of Kanauj. He built Krishneshwara temple at Rameshwaram.Govinda III was the last ruler to hold the empire intact. After his death, the Rashtrakuta power declined.

Contribution of Rashtrakutas to literature, art and architecture

Literature

Kannada language became more prominent. *Kavirajamarga* composed by Amogavarsha was the first poetic work in

Kannada language. Court poets produced eminent works in Kannada. The three gems of Kannada literature during the period were Pampa, Sri Ponna and Ranna. Adikavi Pampa was famous for his creative works *Adipurana* and *Vikramarjunavijaya.* The life of Rishabadeva, the first Jain Tirthankara is depicted in *Adipurana.* In *Vikramarjunavijaya* Pampa's patron, Chalukya Arikesari, is identified with Arjuna, epic hero of Mahabharatha.

Art and architecture

The Rashtrakutas made significant contribution to Indian Art. The art and architecture of the Rashtrakutas can be found at Ellora and Elephanta.

Kailasanatha Temple – Ellora (near Aurangabad, Maharashtra)

Kailasanatha Temple was one of the 30 temples carved out of the hill at Ellora. It was built during the reign of Krishna I. The temple is known for its architectural grandeur and sculptural splendour. The temple covers an area of over 60,000 sq. feet and *vimanam* (temple tower) rises to a height of 90 feet. This temple has resemblance to the shore temple at Mamallapuram. The Kailasanatha temple portrays typical Dravidian features.



Kailasanatha Temple – Ellora

Elephanta Island

Originally known as Sripuri and called Gharapuri by the local people, Elephanta is an island near Mumbai. The Portuguese named it as Elephanta, after seeing the huge image of an elephant. The Trimurthi (three-faced) Siva icon is an illustrative of the sculptural beauty portrayed in the Cave Temple of Elephanta. There are impressive images of *dwarapalakas* (entrance guards) at the entrance of the Temple.



Elephanta Cave

Pattadakal

Rashtrakutas built temples in the complex of Pattadakal. The Jain Narayana temple and the Kasi Vishwesvara temple were built by Rashtrakutas.



Jain Narayana Temple

Elsewhere



Leshan Giant Buddha
(71 metre tall)
Built during Tang dynasty in China,
(713 and 803 AD (CE)).



Baghdad
The greatest city of Islamic Empire
of 8th to 10th centuries AD (CE).

Summary

- By the early 7th century, South India had come under the control of Pallavas of Kanchi and Chalukyas of Badami
- Pallava period is known for architectural splendour. Pallava architecture can be classified as rock-cut temples, structural temples. monolithic *rathas* and *mandapam*s
- The Chalukyas contributed richly to art and architecture. A new style of architecture known as Vesara style developed during their period
- The Rashtrakutas also made significant contribution to Indian art. Their art and architecture can be found at Ellora cave and Elephanta island

GLOSSARY

feudatories	being subject to a sovereign	சிற்றரசர்கள்
ambassador	envoy	தூதுவர்
granite	a very hard rock	கருங்கல்
ravaged	severely damaged	சூறையாடிய
descendants	offspring	வழித்தோன்றல்கள்
reclining	leaning back	சாய்ந்திருக்கக்கூடிய

Exercise

I.Choose the correct answer

1. Who among the following built the VaikundaPerumal temple?
   a) Narasimhavarma II
   b) Nandivarma II
   c) Dantivarman
   d) Parameshvaravarma

2. Which of the following titles were the titles of Mahendra Varma I?
   a) Mattavilasa b) Vichitra Chitta
   c) Gunabara d) all the three
3. Which of the following inscriptions describes the victories of Pulakesin II?
   a) Aihole b) Saranath c) Sanchi d) Junagath

II. Read the statement and tick the appropriate answer

1. **Statement I:** Pallava art shows transition from rock-cut monolithic structure to stone built temple.
   Statement II: Kailasanatha temple at Kanchipuram is an example of Pallava art and architecture.
   a) Statement I is wrong.
   b) Statement II is wrong.
   c) Both the statements are correct
   d) Both the statements are wrong.

2. Consider the following statement(s) about Pallava Kingdom.
   Statement I: Tamil literature flourished under Pallava rule, with the rise in popularity of Thevaram composed by Appar.
   Statement II: Pallava King Mahendravarman was the author of the play Mattavilasa Prahasana.
   a) I only b) II only
   c) Both I and II d) Neither I nor II

3. Consider the following statements about the Rashtrakuta dynasty and find out which of the following statements are correct.
   1. It was founded by Dantidurga.
   2. Amogavarsha wrote Kavirajmarga.
   3. Krishna I built the Kailasanatha temple at Ellora.
   a) 1only b) 2 and 3
   c) 1 and 3 d) all the three

4. Which of the following is not a correct pair?
   a) Ellora caves - Rashtrakutas
   b) Mamallapuram - Narasimhavarma I
   c) Elephanta caves - Ashoka
   d) Pattadakal - Chalukyas
5. Find out the wrong pair.
   a) Dandin - Dasakumara Charitam
   b) Vatsyaya - Bharathavenba
   c) Bharavi - Kiratarjuneeyam
   d) Amogavarsha - Kavirajamarga

III. Fill in the blanks

1. _____defeated Harsha Vardhana on the banks of the river Narmada.
2. _____destroyed Vatapi and assumed the title VatapiKondan.
3. _____was the author of Aihole Inscription.
4. _____was the army general of Narasimhavarma I
5. The music inscriptions in _____and _____show Pallavas' interest in music.

IV. Match the following.

1.	Pallavas	-	Kalyani
2.	Eastern Chalukyas	-	Manyakheta
3.	Western Chalukyas	-	Kanchi
4.	Rashtrakutas	-	Vengi

V. State True or False

1. The famous musician Rudracharya lived during Mahendravarma I.
2. The greatest king of the Rashtrakuta dynasty was Pulakesin II.
3. Mamallapuram is one of the UNESCO World Heritage Sites.
4. Thevaram was composed by Azhwars.
5. The Virupaksha temple was built on the model of Kanchi Kailasanatha Temple.

VI. Answer in one or two sentences

1. Name the three gems of Kannada literature.
2. How can we classify the Pallava architecture?
3. What do you know of Gatika?
4. Panchapandavar rathas are monolithic rathas. Explain.
5. Make a note on Battle of Takkolam.

VII. Answer the following

1. Examine Pallavas' contributions to architecture.
2. Write a note on Elephanta island and Kailasanatha temple at Ellora.

VIII. HOTs

1. Give an account on Western Chalukyas of Kalyani.

IX. Life Skills

1 Collect temple architecture pictures of Pallavas, Chalukyas and Rashtrakutas and identify the distinguishing features of each period.

2. Field Trip:

   Plan a trip to any place of historical importance.

X. Activitys

1. Sketch the biography of Mahendravarma I and Pulakesin II.
2. See the picture and write a few sentences on it.



XI. Answer Grid

Give examples for the structural temples of Pallava period. Ans:	Name the new style of architecture developed during Chalukya period. Ans:	What does Aihole inscription mention? Ans:
Who built the Kailasanatha temple at Ellora? Ans:	Name the sculptural mandapas of Mamallan style of architecture. Ans:	Where do structural temples of Chalukya exist? Ans:
Name two Saivite saints and Vaishnavite saints who practised *bhakti*cult during Pallava period? Ans:	Who was the founder of Rashtrakuta dynasty? Ans:	What were the titles adopted by Narasimhavarma I? Ans:

ICT CORNER

South Indian Kingdoms

This activity for Interactivity Map is a UNESCO World Heritage Sites helps to know learn about ancient **Heritage Sites**



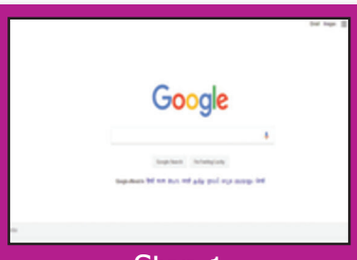
Steps:

Step 1: Open the Browser and type the URL given below (or) Scan the QR Code.

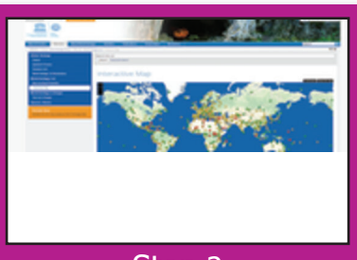
Step 2: World Heritage Centre page will appear on the screen.

Step 3: Double click or Zoom any tagged sites or places. (ex. Mamallapuram)

Step 4: You can see collective pictures, videos and more details.



Step 1



Step 2



Step 3



Step 4

Browse in the link

Web: http://www.elections.in/ (or) scan the QR Code

*Pictures are indicatives only.

GEOGRAPHY

Unit 1

Asia and Europe



Learning Objectives

- To understand the location, extent and political divisions of the continents of Asia and Europe
- To know about the physical features and drainage of these two continents.
- To understand the climate and natural vegetation of these continents.
- To discuss the economic activities and resources.
- To appraise the cultural mosaic of both the continents.
- To gain the skill of locating the given places on the map.

Students: Good morning, Teacher.

Teacher: Good morning, students! Did you celebrate the English New Year well?

Students: Yes madam.

Teacher: Ok. English is the native of which country?

Students: Britain.

Teacher: Good. Do you know which continent is it located in?

Students: Europe.

Teacher: Very good. Which is our home continent?

Students: Asia.

Teacher: Exactly. In the first term, you have learnt about how many continents are in the world and their names. In this lesson, we are going to learn in detail about Asia and Europe. Let us explore these two continents.

This lesson disscusses about the location, boundaries, physical and political divisions of Asia and Europe. The major rivers, climate and natural vegetation are highlighted in this lesson. It also explains about how economic activities are determined by the resources.

6th Std Geography_Term 3_EM_Unit1.indd 143 29-09-2023 17:41:52

The cultural mosaics of Asia and Europe are great eye openers for learners in terms of European and Asian cultures.

PART A. ASIA

Asia is the largest and the most populous continent in the world. It covers about 30 percent of the world's land area and about 60 percent of the world's population. Most of the land of Asia lies in the northern hemisphere. It has different types of physical and cultural features. Lofty mountains, plateaus, plains, islands and peninsulas are the major physiographic features of Asia. Many perennial rivers flow through different parts of Asia. These river valleys are the cradles of ancient civilizations (Indus valley, Mesopotamian and Chinese civilizations). Let us know more about our home continent.

Location and Area

Asia extends from 10°11' South to 81°12' North latitudes and from 26°2' East to 169°40' West, longitudes. It spreads for an area of 44 million km^2.

Boundaries

Asia is surrounded by the Arctic Ocean in the north, Pacific Ocean in the east, Indian Ocean in the south and the Ural Mountains, Caucasus Mountains, Red Sea, Mediterranean Sea, Caspian Sea and Black Sea in the west.

The Suez Canal separates Asia from Africa. The narrow Bering Strait separates Asia from North America.

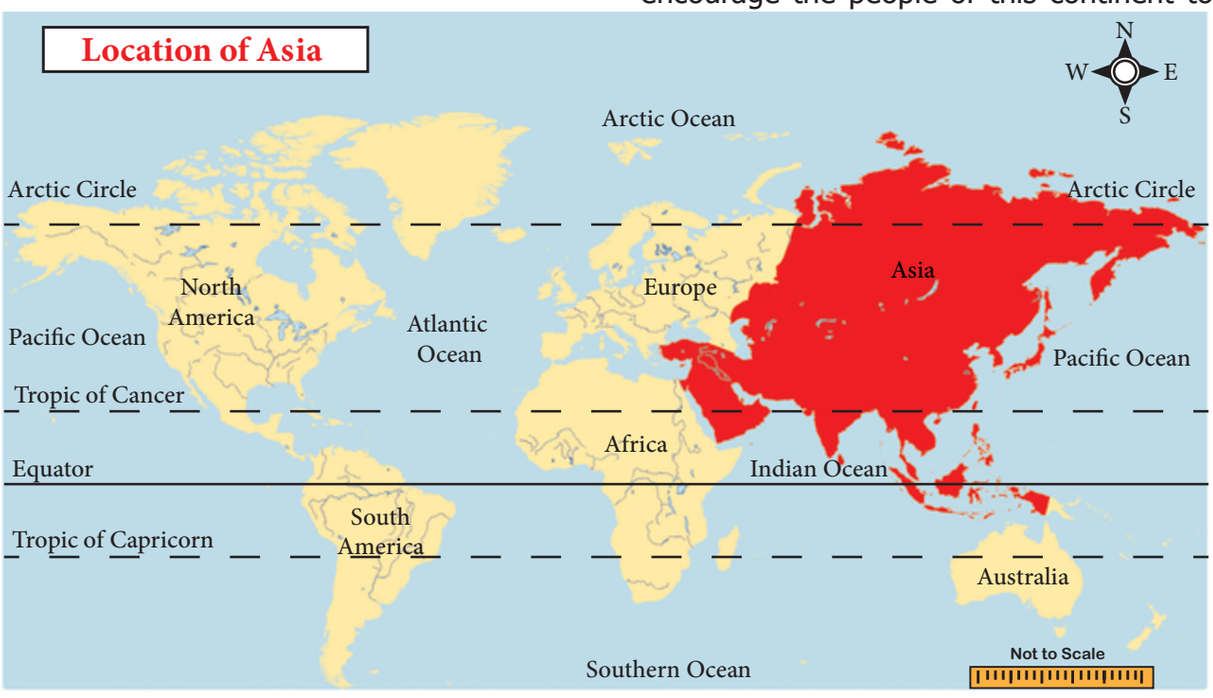
Political Divisions

There are forty eight countries in Asia. The countries are grouped into several realms based on landscape and political status such as

1.East Asia 2.Southeast Asia 3.South Asia 4.Southwest and 5.Central Asia

Physiographic Divisions

Asia is the land of long mountain ranges, snow capped high mountains, vast plateaus, extensive plains, river valleys and sea coasts. These diverse physical features encourage the people of this continent to



6th Std Geography_Term 3_EM_Unit1.indd 144 29-09-2023 17:41:54

ASIA - POLITICAL



Fact :

There are 12 landlocked countries in Asia. Among these, only one is doubly landlocked which means it is surrounded entirely by other landlocked countries. Find out the doubly landlocked country.

involve in diverse economic activities. The physiography of Asia can be divided into five major groups. They are;

1. The Northern lowlands

2. The Central High Mountains

3. The Southern Plateaus

4. The Great Plains and

5. The Island Groups

1. The Northern Lowlands

The most extensive lowland in Asia is the **Siberian plain**. It extends from the Ural Mountains in the west to the Verkhoyansk Range in the east.

2. The Central Highlands

The central highlands stretches from Turkey to the Bering Strait. There are two knots found in Asia. They are **1. The Pamir Knot 2.The Armenian Knot.**



'Knot' refers to the convergence of mountain ranges

The Hindukush range, the Sulaiman range, the Himalayan range and **the Tian Shan range** radiate from the Pamir

6th Std Geography_Term 3_EM_Unit1.indd 145 29-09-2023 17:41:54



Mountain Ranges radiate from the Pamir and the Armenian Knot

Knot. The Hindukush range continues westward as the **Elburz,** whereas the **Sulaiman** range continues south west as the **Zagros** range. The Elburz and the **Zagros** converge at the Armenian knot. The **Taurus** and the **Pontine** ranges radiate from the Armenian knot. The other important mountain ranges are the great **Khingan**, the **Altai**, the **Verkoyansk** and the **Arakan yoma**.

The Himalayan mountain range is the highest mountain range in the world. Mt. Everest (8848 m) is not only the highest peak in Asia but also in the world.

The lowest point in the world is located in **Dead Sea** in Asia.

Intermontane plateaus are found in these mountain ranges. The important plateaus are

1. The **plateau of Anatolia** (Pontine to Taurus)
2. The **plateau of Iran** (Elburz to Zagros mt)
3. The **plateau of Tibet** (Kunlun to Himalayas)



Tibet is called the **'Roof of the world'** and it is also known as the **third pole** because of its cold weather, largest reserve of freshwater and inhospitable environment.

HOTS :

The Khyber Pass is located in the Sulaiman range, the Bolan Pass is located in Toba Kakar range. What is the importance of these two passes?

6th Std Geography_Term 3_EM_Unit1.indd 146 29-09-2023 17:41:54

6th Std Geography_Term 3_EM_Unit1.indd 147



29-09-2023 17:41:56

3. The Southern Plateaus

The southern plateaus are relatively lower than the northern plateaus. The four important southern plateaus are the **Arabian Plateau** (Saudi Arabia), **Deccan Plateau** (India), **Shan Plateau** (Myanmar) and the **Yunnan Plateau** (China). Among these plateaus, the Arabian Plateau is the largest Plateau.

4. The Great Plains

The great plains are formed by the major rivers of Asia. They are the **West Siberian plain** (Ob and Yenisey), **Manchurian Plain** (Amur), **Great Plain of China** (Yangtze and Sikiang), **Indo-Gangetic Plain** (Indus and Ganga), **Mesopotamian plain** (Tigris and Euphrates) and **the Irrawaddy plain** (Irrawaddy).

5. The Island

Numerous islands are found in the Pacific coast of Southeast Asia. **Kuril, Taiwan, Singapore** and **Borneo** are the important island.

The **Philippines, Japan islands** and **Indonesia** are the major archipelagos in Asia. Smaller archipelagos are also located in the Indian Ocean such as the islands of **Maldives** and **Lakshadweep** are in the **Arabian Sea. Bahrain** is in the **Persian Gulf. Sri Lanka** is an island, which is located in the Bay of Bengal.



Drainage

The rivers of Asia originate mostly from the central highlands. The **Ob, Yenisey** and **Lena** are the major rivers that flow towards the north and drain into the Arctic Ocean. These rivers remain frozen during winter. On the other hand, South Asia has many perennial rivers (e.g.) **Brahmaputra, Indus, Ganga** and **Irrawaddy** which originate from the snow covered high mountains that do not freeze during winter. The **Euphrates** and **Tigris** flow in West Asia. **The Amur, Huang He,**

Major Rivers of Asia

S. No	Name of the River	Origin	Outflow	Length in Km
1	Yangtze	Tibetan plateau	East China sea	6,350
2	Hung Ho	Tibetan plateau	Gulf of Pohai	5,464
3	Mekong	Tibetan plateau	South China sea	4,350
4	Yenisey	Tannuala Mountain	Arctic Ocean	4,090
5	Ob	Altai Mountain	Gulf of Ob	3,650
6	Brahmaputra	Himalayas	Bay of Bengal	2,900
7	Indus	Himalayas	Arabian sea	3,610
8	Amur	Confluence of Shika and Argun rivers	Tatar Strait	2,824
9	Ganges	Himalayas	Bay of Bengal	2,525
10	Irrawaddy	North Myanmar	Bay of Bengal	2,170

6th Std Geography_Term 3_EM_Unit1.indd 148 29-09-2023 17:41:56

Yangtze and **Mekong** rivers flow in the south and south eastern parts of Asia. **Yangtze** is the longest river in Asia.



River Yangtze



The Three Gorges dam has been constructed across the river Yangtze. It is the largest power station dam in the world. It fulfills ten percent of power needs of China.



Climate

Asia exhibits a variety of climate. The northern part of Asia experiences severe long winter and short summer. **(Winter -37°C** and **Summer 10°C).** Precipitation is in the form of snow **(250 mm to 300 mm)**.The north eastern part of Asia experiences cold winter and warm summer and a moderate rainfall of **50 mm to 250 mm**.

The south, south east and eastern parts of Asia are strongly influenced by monsoon winds. Summer is hot and humid while winter is cool and dry. The summer monsoon winds bring heavy rainfall to India, Bangladesh, Indo-China, Philippines and Southern China **(1500 mm to 2500 mm)**. In India, **Mawsynram (11871 mm)** receives the highest rainfall. So, this place is called the wettest place in the world.

The areas found in and around the equator have uniform climate throughout the year. There is no winter. The average temperature is **27°C** and the mean rainfall is **1270 mm**.

HOTS :

There is no winter in the equatorial region. Why?

The west and central parts of Asia have hot, dry climate. The temperature is very high during the day and very low during the night. Rainfall varies from **25 mm to 200 mm**. The West coastal fringe of Asia (along the Mediterranean Sea) receives **rainfall in winter** and is warm in summer.

Deserts are found along the western part of Asia. The major hot deserts are the **Arabian** (Saudi Arabia) and **Thar** (India and Pakistan) **deserts**. The cold deserts of Asia are **Gobi** and **Taklamakan**. The largest desert in Asia is the Arabian Desert.

Natural Vegetation

Natural vegetation depends upon **rainfall, temperature** and **soil**. As Asia stretches from the equator to poles, all types of vegetation are found here. Some rare species are found in Asia. Such as **Orang-Utan, Komodo Dragon, Giant panda**. The Asian flora and fauna are listed below:

6th Std Geography_Term 3_EM_Unit1.indd 149 29-09-2023 17:41:57

The Natural Regions (Flora & Fauna)

Sl. No	Climate	Location	Flora	Fauna
1	High Temperature, High rainfall	Indonesia, Malaysia, Singapore Sri Lanka	Evergreen trees - Mahogany, Rubber, Rosewood, Sal	Rhinoceros, Tiger, Babirusa, Orangutan, Komodo Dragon
2	Rainy Summer, Dry winter	India, Vietnam, Cambodia, Thailand, Southern China	Deciduous trees – Teak, Sandal wood, Bamboo	Tiger, Elephant, Indian Cobra, viper
3	Extreme climate	Arabian desert, North, North West India	Cactus, Dates (Oasis), Thorny shrubs, Babul tree	Bactrian Camel, The Sand grouse, desert oryx
4	Dry winter, Warm summer	East China, Japan, North and South Korea	Cherry, Apricot, Plum	Giant Panda, Japanese macaque
5	Warm Summer and rainy winter	Israel, Lebanon, Turkey, Syria	Figs, Olives, Citrus fruits	Lynx, Jackrabbit
6	Long and dry winter, short and cool summer	Siberia, Himalayas	Coniferous trees - Pine, Fir, Spruce	Siberian Tiger, Brown bear, Wolf
7	Permanent snow cover	Beyond the snow line	Lichen, mosses Grass	Polar bear, Lemming, Reindeer, Arctic fox



Orang-Utan



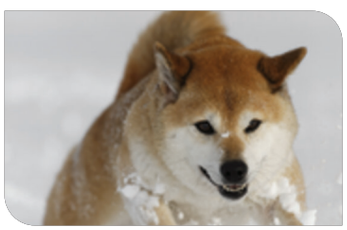
Tiger



Bactrian Camel



Panda



Wolf



Lynx

6th Std Geography_Term 3_EM_Unit1.indd 150 29-09-2023 17:42:01

Fact: DESERT

A Desert is a large area that gets very low rainfall and very few plants and animals. There are two types of deserts found in Asia, Hot and cold deserts.

DO YOU KNOW?

Rub-Al Khali desert is the largest, continuous sandy desert in the world. It is found in the southeastern part of Saudi Arabia.

Resource Base and Economic Activities of Asia

Mineral Resources

Asia has a variety of mineral deposits. It holds an important place in the production of **Iron, Coal, Manganese, Bauxite, Zinc, Tungsten, Petroleum, Tin** etc. **Oil** and **Natural Gas** found in the west Asian countries. One third of the world's oil is produced in Asia. Among the west Asian countries, **Iran** has a considerable wealth of mineral resources. The important minerals found in Asia are:

Iron Ore: Asia has the largest deposits of iron ore in the world. **China** and **India** are the important iron ore deposit countries of Asia. **Turkey, Philippines, Malaysia, Thailand, Myanmar** etc., are a few other countries that have iron ore deposits.

Coal: Coal is a **fossil fuel.** Asia has the largest deposits of coal in the world. **China** and **India** are the largest producers of coal in Asia.

Petroleum: Petroleum is a **mineral oi**l. The largest petroleum reserves are found in South West Asia. The important petroleum producing countries are **Saudi Arabia**, **Kuwait, Iran, Bahrain, Qatar** and **UAE. South China, Malaysia, Brunei, Indonesia, India, Russia** are the other important petroleum producing countries in Asia.



Coal mine in India

Bauxite is found in India and **Indonesia**. **India** is the largest producer of **Mica** in the world. **Tin** is found in **Myanmar, Thailand, Malaysia** and **Indonesia**.

Agriculture

Only about 18 percent of the total area is cultivable in Asia. Agriculture is the chief occupation of the people here. The river valleys in the South, South East and East Asia have rich alluvial soil. Agriculture is intensively practised in the riverine plains of Asia. However, some areas are not suitable for agricultural practices. **India** has the largest area of **arable lands** in Asia. Most of the west Asian countries cultivate their crops where the ground water level is nearer to the surface. Iraq practices agricultural activities based on the availability of rainfall and supply of water from Euphrates and Tigris rivers.

6th Std Geography_Term 3_EM_Unit1.indd 151 29-09-2023 17:42:02

Rice and **Wheat** are the staple food crops in Asia. China and India are the leading producers of rice in the world. Other important rice producing countries are **Myanmar, Japan, Bangladesh** and **Thailand**. Monsoon Asia is suitable for rice cultivation because of the abundant rainfall, fertile plains and availability of labour. **Thailand** is called the **Rice bowl** of South East Asia.

DO YOU KNOW?

Banaue rice terrace: The Banaue rice terraces were built 2000 year ago by the Ifugaos people in the Philippines. It is located approximately about 1524 m above sea level.



Wheat is grown in the **temperate** regions of Asia. **Russia, India, China** and **Pakistan** are the leading producers of wheat in Asia. Millets like **Bajra, Jower, Ragi and Sorgham** are grown in the drier parts of Asia. These are widely cultivated in **India, Pakistan** and a few **gulf countries**. Apart from these, **pulses, spices** and **oil seeds** are also cultivated in various parts of Asia.

Jute and cotton are the important natural fibres cultivated in Asia. One third of the world's cotton is produced by Asia. The major cotton producing countries are **India**, **China, Russia** and **Kazakhstan**. **India, Pakistan, China** and **Bangladesh** are the leading producers of **jute**.

The tropical wet and dry climate is suitable for **sugarcane** cultivation in Asia. **India, Indonesia** and **Philippines** are the major producers of sugarcane. **Coffee, Tea, Rubber, Palm trees** and **Cocoa** are the important plantation crops. **India, Sri Lanka, Thailand, Vietnam, Malaysia** and **Indonesia** are important an producers of plantation crops. **Malaysia** and **Thailand** are the leading producers of **natural rubber.**

Dates are produced in west Asia, among the countries Iran is the largest producer of dates in the world.



Cocoa Tree

Fishing

Fishing is an important economic activity in Asia. It is prevalent in open seas as well as inland water bodies. **China** and **Japan** are the leading fishing nations. In **Cambodia, Tonle Sap** lake is one of the world's richest sources of fresh water fishing. Bay of Bengal is the major fishing ground for India, Sri Lanka, Myanmar and Bangladesh. Fishing is the mainstay of the national economy in **Maldives**. **Pearl fishing** (Bahrein) is popular in the eastern **coast of Arabia**.

6th Std Geography_Term 3_EM_Unit1.indd 152 29-09-2023 17:42:05

Industrial Regions

In **China,** Manchurian, Shanghai-Wuhan, Peking—Shenyang, Guangdone-Hongkong regions are the major industrial regions. In **Japan,** the major regions are Tokyo, Yokohama and Osaka-Kyoto regions. In **India**, Mumbai, Ahmedabad, Coimbatore, Bengaluru and Chottanagpur are the important industrial regions.

Trasport

Transport is the backbone of the economic development of a region. Many Asian countries are developing their transport network for their economic progress. Roadway is the most common mode of transport in Asia.

Roadways

The Asian Highway connects Tokyo in the east to Turkey in the west, Russia in the north to Indonesia in the south and the total length of road is 1,41,000 km. It passes through 32 countries. The Asian Highway 1(AH 1) is the longest highway among the Asian Highway Network (20557 km). It connects Tokyo to Turkey. The Asian Highway 43 (AH 43) runs from Agra in India to Matara in Sri Lanka (3024 km).

Railways

The **Trans - Siberian Railways (9258 km)** is the longest rail route in the world. It is a **transcontinental railway** line which connects **Leningrad** and **Vladivostok**. T**he Trans Asian Railway links Singapore** and **Istanbul** in Turkey. The **Shinkansen, bullet train** is the world famous super express train that runs between **Osaka and Tokyo** in Japan at a speed of 352 km/h. The Indian railway network is the second largest railway network in Asia.

Waterways

The **Cape of Good Hope** route connects **Europe** to **South Asia**. The **Trans Pacific route** connects the ports of eastern Asia to the ports of western American countries. **The Suez Canal route** passes through the heart of the world trade route and connects Europe with South and Southeast Asia. **Tokyo, Shanghai, Singapore, Hong Kong, Chennai, Mumbai, Karachi** and **Dubai** are the important seaports in Asia.



Shanghai Port

CULTURAL MOSAIC OF ASIA

Population

Asia is the most populated continent in the world. Approximately six-tenth of the world's population lives in Asia. The population is unevenly distributed because of various physical features. **China** and **India** alone covers three fifth of Asia's population. Apart

6th Std Geography_Term 3_EM_Unit1.indd 153 29-09-2023 17:42:06

from these two countries, **Bangladesh, Indonesia, Japan, Pakistan** and **Philippines** have more than 100 million populations. The population density in Asia is **143 persons per Km²**. India, Japan, Bangladesh and Singapore have high population density. River plains and industrial regions have high density of population, whereas low density is found in the interior parts of Asia.

HOTS :

Few countries in Asia have high population. Give reasons.

ANKORWAT: It is a world heritage site. It was built by king Suriya Varma II in 1100 AD(CE) at Cambodia. **'Ankorwat' means 'the city of temples'** in Khmer language. It is the largest Hindu Temple in the world.



Religion & Language:

Hinduism, **Islam**, **Buddhism** **Christianity** and **Sikhism** are the major creeds in Asia. The minor creeds **Zoroastrianism, Jainism, Shintoism, Confucianism** and **Taoism** are also practised in Asia. **Mandarin, English, Indonesian, Japanese, Arabic, Korea, Vietnamese** and **Hindi** are the most widely spoken languages in Asia.

Art and Architecture:

Asia is the home land of three civilizations.(Mesopotamian, Indus valley and Chinese civilizations).These three contributed to the architectural works at an early stage.

Among the seven wonders of the world, two are **located in Asia (The Tajmahal in India, The Great wall of China)**.The people of Yemen built a **mud skyscraper** thousands of years ago. **Ankorwat** in Cambodia, **Buddhist Temple** in East and Southeast Asia, Mosques in west Asia and the temples and forts in India are fine examples of Asian architecture.

Food:

Rice, Wheat, Maize and **Barley** are the staple food in Asia. Dairy products, fruits and nuts are also consumed. In East Asia, bread and noodles are the staple food where rice is not available. **Tea**, **Coffee** and **green tea** are the chief beverages. In West Asia, meat, herbs and olive oil are the prime ingredients in their food.

Dance and Music:



kabuki

Yangee, **Dragon Dance**, **Kabaki** are popular in East Asia, **Ram Thai** in Thailand,

6th Std Geography_Term 3_EM_Unit1.indd 154 29-09-2023 17:42:07

Bhangra, Kathak and **Bharathanatyam** in India are also important dances in Asia. **Sufi music** and **Arabic classical music** are common in west Asia. **Tinikling** is the national dance of Philippines.

Festivals:



Mid Autumn festival

The **mid autumn festival / moon festival** in China, Taiwan and Vietnam. **Holi** and **Mahara Sankaranthi / Pongal** in major parts of India and **Sukkoth** in Israel are the important **harvest festivals** of Asia. The **snow sculpture festival**, **Chinese New Year**, **Thaipusam, Diwali, Taiwan Lantern festival, Songkran, winter light festival** are also some of the famous festivals in Asia.

Land of contrasts

Asia is the biggest continent. It has different types of land features such as mountain, plateau, plain, valley, bay, island etc. It also has different climatic conditions from the equator to polar region. Apart from this, many races, languages, religions and cultures are followed by people who live in Asia. So, Asia is called '**the land of contrasts**'.

Part – B Europe



6th Std Geography_Term 3_EM_Unit1.indd 155 29-09-2023 17:42:08

Europe is the sixth largest continent in size and the third largest in population in the world. It has diverse landforms and people. It is the birth place of **western civilizations** (Roman and Greek), **democracy** and **Industrial Revolution**. It is the most developed continent in the world. Let us explore the continent.

Location and area

Europe spreads from **34º 51' North** latitude to **81º 47' North** latitude and from **24º33'** West longitude to **69º 03' East** longitude. The **Prime Meridian 0º** longitude passes through **Greenwich** in England.

Europe is found in the northern hemisphere and it covers an area of 10.5 million sq.km. It is surrounded by the Arctic Ocean in the North, the Black Sea and Mediterranean Sea in the south, the Atlantic Ocean in the west and the Ural mountains in the east. So it looks like a **giant peninsula**.

HOTS :

Europe is called as the 'Peninsula of Peninsulas', Justify.

Political Divisions

EUROPE - POLITICAL



6th Std Geography_Term 3_EM_Unit1.indd 156 29-09-2023 17:42:09

European Union :

The European Union (EU) is an economic and political union of 27 member countries for their welfare. It has own flag and the common currency, the Euro (€).

Fact :

The Netherlands : About 25 percent of the Netherlands lies below sea level. So they have built dikes. They have reclaimed new land from the sea with the help of dikes. These reclaimed lands are called polders.



Physical Divisions

Europe has diversified physical features such as mountains, plains, plateaus, peninsulas, bays, islands and river basins. It can be divided into four physical divisions.

1. **The North Western Highlands**
2. **The Central Plateaus/High land**
3. **The Alpine Mountain system**
4. **The North European plains**

1. The North Western highlands

This region includes the mountains and plateaus of Norway, Sweden, Finland, Scotland and Iceland. This region has the most beautiful **fiord coast**. It was created by glaciations in the past. This region has a lot of lakes, which serve as reservoirs for producing hydroelectricity. Norway and Sweden are the largest producers of hydroelectricity in the world.

Fact :

Fiord : A fjord is a narrow and deep sea inlet between steep cliffs.

1. It reduces the speed of wind, irrespective of its direction.
2. The force of sea waves are also controlled.

Hence, areas with fiords are best suited for natural harbours.



Fiord coast in Norway

2. The Central Plateaus

The plateaus are found in east west direction across central Europe. Many rivers in Europe such as, the Danube, the Volga and the Tagus originate from this plateau. The important plateaus of this region are The **Pennines** (England), The **Meseta** (Spain), **The Central Massif** and **Jura** (France). The **Black forest** (Germany) in these region has rich mineral resources. The **Pennines** is called the **backbone of England**.

6th Std Geography_Term 3_EM_Unit1.indd 157 29-09-2023 17:42:11



R. River Mts. Mountains L. Lake m. Metres

6th Std Geography_Term 3_EM_Unit1.indd 158 29-09-2023 17:42:12

Black forest: The lush and dark coloured fig and pine trees give black colour to this region.

3. The Alpine Mountain System:

The alpine mountain system consists of a chain of young fold mountains found in the southern part of Europe. The important mountain ranges are **the Sierra Nevada**, the **Pyrenees, the Alps, the Apennines, the Dinaric Alps, the Caucasus** and **the Carpathian**. The Pyrenees forms a natural boundary between Spain and France.

The highest peak in Europe is **Mt. Elburz** (5645 m) in the Caucasus range. The **Mont Blanc** (4,807 m) found in the Alps is the second highest peak in the Alpine System.



Mont Blanc

There are several active volcanoes found in the Alpine mountain system. **Mt. Etna**, **Mt. Vesuvius** and **Mt. Stromboli** are the important volcanoes found in Europe. Earthquakes are common in this region. The Stromboli is called the '**light house of the Mediterranean**'.

The Matterhorn : The pyramid-shaped Matterhorn mountain is located in the Swiss Alps a height of 4478 m. It is popular for its shape.



4. The North European plain

The north European plain stretches from the Atlantic Ocean in the west to the Ural mountains in the east. On the north, it is surrounded by the Baltic Sea and on the South by the alpine mountain. It is narrow in the West and wide towards the East.

Major European rivers such as the Seine, the Rhine, the Danube and the Don criss-cross this region and deposit their alluvium.

The **Andalusian Plain, The Hungarian Plain** and **the Wallachian Plain** are also found in this region. It has rich deposits of coal and iron ore. The north European plain is densely populated region and cities like **Paris, Moscow** and **Berlin** are located here.

Drainage

The rivers play an important role in the development of Europe. These rivers are used to irrigate farmland and also help to produce electricity.

6th Std Geography_Term 3_EM_Unit1.indd 159 29-09-2023 17:42:12

The Important Rivers in Europe

S. No	Rivers	Length (Km)	Source	Out flow
1	Volga	3,692	Valdes plateau	Caspian Sea
2	Danube	2,860	Black forest	Black Sea
3	Dnieper	2,145	Valdai Hills	Black Sea
4	Rhine	1,230	Alps (Switzerland)	North Sea
5	Rhone	813	Swiss Alps	Mediterranean Sea
6	Po	652	Cottian Alps	Adriatic Sea
7	Thames	346	Kemble	North Sea

Source w.w.w.worldatlas.com

Most of the rivers originate in the Alps and the central plateau of Europe. These rivers are useful for inland navigation in central and Eastern Europe. The **Volga** is the longest river in Europe. The river **Danube** passes through Ten countries in Europe.



River Danube

HOTS :

Why are European rivers suitable for inland navigation?

Climate

The climate of Europe varies from the subtropical to the polar climate. The **Mediterranean climate** of the south has warm summer and rainy winter. The western and northwestern parts have a mild, generally **humid climate**, influenced by **the North Atlantic Drift**. In central and eastern Europe, the climate is humid **continental-type.** In the northeast, subarctic and tundra climates are found. The whole of Europe is subject to the moderating influence of prevailing **westerly winds** from the Atlantic Ocean.



Climate Divider: The Alps mountain separates the Mediterranean climate from the cold climate of the north.

Fact

North Atlantic Drift is a warm ocean current which brings warmth to the western Europe. The westerly wind further transports warmth across Europe.

Natural vegetation

The natural vegetation of Europe can be classified as follows:

6th Std Geography_Term 3_EM_Unit1.indd 160 29-09-2023 17:42:14

1. **Tundra**
2. **Taiga or Coniferous**
3. **Mixed Forest**
4. **Mediterranean Forest**
5. **Grassland**

The Arctic and northern Scandinavian highland have Tundra type of vegetation made up of lichens and mosses.



Coniferous Forest

Coniferous or Taiga vegetations are found to the south of the Tundra region in Norway, Sweden, Finland, Germany, Poland and Austria. **Pine, fir, spruce** and **larch** are the important tree varieties of taiga forest.

The mixed forest comprising of **birch, beech, poplar, oak** and **maple trees** found in the western part of Europe particularly in western France, Belgium, Denmark, Britain etc. **Mediterranean trees like cypress**, c**ork, oak, olive** and **cedar** are found along the borders of the Mediterranean Sea. Eastern Europe is covered by grasslands (Steppe).

Resources Base and Economic Activities of Europe

Availability of resources, efficient educated work force, research, contact with other nations and innovations have transformed Europe into a modern and economically developed continent in the world.

Europe is an industrially developed continent in the world. It has great diversity in its topography, climate and soil. These interact to produce varied patterns of agricultural activities such as **Mediterranean agriculture, Dairy farming, mixed livestock** and **crop farming and horticulture** (Truck Farming)



Tulip Flower Garden

Wheat is the dominant crop throughout Europe. **Barley, Oats, sugar beet, rye, potatoes** and **hay** are also common crops. Corn (maize) is an important crop in the lower Danubian lowlands and southwestern European Russia, France and **Italy. Rice** (northern Italy) and **citrus fruits, olive trees** (Spain, Sicily) depend on irrigation.



Olive tree

The northernmost countries grow few cereals (mainly oats) and concentrate on animal husbandry, especially cattle and dairying. Mixed farming and the use of well-

6th Std Geography_Term 3_EM_Unit1.indd 161 29-09-2023 17:42:17

tried crop rotations are widely practised. **Viticulture** is mostly practised in Italy, France and Germany.



Vineyard

As for industrial crops, European Russia, Ukraine, and Belarus are large producers of **flax** and **hemp, sugar beets** and **sunflower seeds**. T**obacco** is grown in Belarus and is also important in Bulgaria, Italy, and Macedonian Greece.

European Russia, Sweden and Finland are the major producers of softwood and hardwood. Fishing is a large industry in Norway, Iceland, Russia, Denmark, the United Kingdom, the Netherlands etc., The **Dogger Bank** in North Sea is an important fishing ground in Europe.

Industries

Europe produces a significant portion of the world's steel and iron ore. Shipbuilding, motor-vehicle and aircraft construction are widely distributed all over Europe. Europe is also a large producer of pharmaceutical drugs.

A wide range of small-scale industries (i.e., those that produce nondurable goods) is found throughout Europe. Some countries have a reputation for specialty goods, as in the case of English, Italian, and Dutch bicycles, Swedish and Finnish glass, Parisian perfumes and fashion goods and Swiss precision instruments.

Cultural Mosaic of Europe

Europe is the third most populous continent, after Asia and Africa. The population of Europe was 742 million in 2018, which accounted for 9.73% of the world's population. The population density in Europe is 34 persons / km^2.

High population density is often associated with the coalfields of Europe. Other populous areas are sustained by mining, manufacturing, commerce, offering large market, labour forces and productive agriculture. Monaco, Malta, San Marino, and the Netherlands are the most densely populated countries; Iceland and Norway have very low density of population. In general, population is scantiest in the mountain regions, some highlands, arid parts of Spain and the Arctic regions of Russia. Monaco has the highest density of population in Europe (26,105 persons / km^2) as well as in the world. Iceland has a very low density of population (3 persons/ km^2).

Religion & Language

Europe is a continent of great linguistic and cultural difference. English, Spanish, Portuguese, French, Italian and Slavic are the broadly spoken languages in Europe. Christianity is the major religion in Europe. A considerable number of Hindus, Muslims and Jews are spread throughout Europe. More than 90 percent of the people belong to the Caucasoid race.

6th Std Geography_Term 3_EM_Unit1.indd 162 29-09-2023 17:42:17

Art and Architecture

European art and architecture mostly reveals the ordinary human being and is popular all over the world. **Acropolis, the Colosseum, the statue of David, The thinker, Eiffel tower, Big Ben, Pisa Tower** and **Mona Lisa** are some of the master pieces of art and architecture in Europe.



The Thinker



Big Ben in London



Eiffel Tower



The Colosseum

Food and Festivals

Bread, fish, meat, potatoes and dairy products are the staple food in Europe. The Europeans celebrate both religious and holiday festivals. Christmas, Easter, Good Friday, the Saint Day, Redentore, Tomatina and Carnival are the important festivals of Europe. They play Rugby, foot ball, basket ball, ice hockey and skiing. Bull fighting in Spain is the world's attractive game.



Tomatina Festival

A Comparison of Asia and Europe

Asia and Europe are integrated geographically and separated politically. Europe is the giant peninsula of Asia. Both the Himalayas (Asia) and the Alps (Europe) were formed during the same geological period. The Steppe grass lands and coniferous forests are spread over

6th Std Geography_Term 3_EM_Unit1.indd 163 29-09-2023 17:42:22

several hundred kilometres from Europe to Asia. Generally, the plains are found in the northern part and the mountains in the southern part in both the continents. The two continents are the homeland of ancient civilizations. From the ancient period, these two continents had trade relationship through the silk route and the spice route. Despite the various geographical similarities, these two continents have striking differences.

Asia	Europe
1. It is the largest continent, both by area and population.	1. It is the smallest continent by area and the most developed.
2. It extends from 10° 11′ S to 81° 12′ N latitudes. That is, from the equatorial region to the polar region.	2. It extends from 34° 51′ N to 81° 47′N latitudes. That is, from the sub-tropical region to the polar region.
3. It is located on the eastern hemisphere	3. It is located at the centre of the earth.
4. The Bering Strait separates Asia and North America.	4. The Strait of Gibraltar separates Europe from Africa.
5. The Arabian, Indo China, India and Korea are the important peninsulas in Asia.	5. The Scandinavian, Iberian, Italian and Balkan are the important peninsulas in Europe.
6. The important parallels such as the Equator, Tropic of Cancer, Arctic Circle pass through it.	6. Only the Arctic Circle passes through it.
7. All kinds of climatic conditions are found here. It also enjoys the distinctive monsoon type of climate Southern Asia receives summer rainfall.	7. It lies in the temperate zone. It enjoys the distinctive Mediterranean type of climate. Southern Europe receives winter rainfall.
8. Both hot and cold deserts are located here.	8. There are no deserts here.
9. It has a variety of mineral deposits .	9. Mineral resources are limited, except for coal & iron.
10. Plantation crops such as tea, rubber and dates are largely cultivated in Asia.	10. Citrus fruits, olives and grapes are cultivated mostly in Asia.
11. A majority of people in Asia are involved in primary activities.	11. A majority of people in Europe are involved in secondary and tertiary activities.

6th Std Geography_Term 3_EM_Unit1.indd 164 29-09-2023 17:42:22

Recap

- Asia is the largest and the most populous continent in the world. It is divided into five physical divisions.
- From the equator to the poles, all types of climate are found in Asia.
- The treeless polar region to dense equatorial forest are found in Asia.
- Iron ore, coal, petroleum, Bauxite, mica, tin, zinc etc. are the chief minerals found in Asia.
- Rice, wheat, sugarcane, jute, cotton, tea, coffee and dates are the important crops.
- Asia is the birthplace of all religions.
- Europe is the sixth largest continent. It is divided into four physical divisions.
- The European rivers play a Vital role to the country economy.
- Europe experiences a cool temperate climate.
- Mixed farming is the most widely practised type of agriculture in Europe.
- Coal and Iron ore are a cheap minerals found in Europe.
- Christianity is the major religion in Europe.

Glossary

- Beverage – a drink other than water
- Perennial – Continuing throughout the entire year
- Monsoon wind – The seasonal wind of the Indian ocean
- Tundra – A vast, flat, treeless Arctic
- Riverine – Situated beside a river
- Staple food – food that makes up the dominant part of people's diet
- Irrigation – The artificial application of water to land
- Husbandry – The care, cultivation and breeding of crops and animals
- Viticulture – The cultivation of grapevines
- Steppes – a large area of flat unforested grassland in Siberia.
- Polder – A piece of low lying land reclaimed from the sea
- Race – a group of people who have similarities in biological traits.
- Horticulture – the art of garden cultivation and management (vegetables, fruits and flowers)

Exercise

I. Choose the correct answer

1. Which is not the western margin of Asia?
   a) Black Sea
   b) Mediterranean Sea
   c) Red Sea
   d) Arabian Sea



2. The Intermontane _____ plateau is found between Elbruz and Zagros.
   a) Tibet b) Iran
   c) Deccan d) The Yunnan

6th Std Geography_Term 3_EM_Unit1.indd 165 29-09-2023 17:42:22

3. Equatorial climate:
   (i) Uniform throughout the year.
   (ii) The average / mean rainfall is 200 mm.
   (iii) The average temperature is 10°C.
   (iv) Of the statements give above,
   a) i alone is correct
   b) ii and iii are correct
   c) i and iii are correct
   d) i and ii are correct

4. Match list I correctly with list II and select your answer from the codes given below.

List – I	List – II
A. Malaysia	1. Figs
B. Thailand	2. Rubber
C. Korea	3. Teak
D. Israel	4. Cherry

Codes

A	B	C	D

a) 2, 3, 4, 1
b) 4, 3, 2, 1
c) 4, 3, 1, 2
d) 2, 3, 1, 4

5. India is the leading producer of _____.
   a) Zinc b) Mica
   c) Manganese d) Coal

6. The natural boundary between Spain and France is _____.
   a) The Alps b) The Pyrenees
   c) The Carpathian d) The Caucasus

7. The western and north-western Europe enjoys mild and humid climate. Choose the correct option:
   a) These regions are found near the equator
   b) It is influenced by the North Atlantic Drift
   c) It is surrounded by mountains
   d) All of the above

8. Which of the following statements is incorrect?
   a) Europe produces electricity from hydel power
   b) All the rivers of Europe originate in the Alps
   c) Most of the rivers in Europe are used for inland navigation
   d) The rivers of Europe are perennial in nature

9. Choose the incorrect pair.
   a) The Meseta - Spain
   b) The Jura - France
   c) The Pennines - Italy
   d) The Black Forest - Germany

10. Which country in Europe has a very low density of population?
    a) Iceland b) The Netherlands
    c) Poland d) Switzerland

II Fill in the blanks.

1. The Taurus and the Pontine ranges radiate from the _____ knot.
2. The wettest place in the world is _____
3. Iran is the largest producer of _____ in the world.

6th Std Geography_Term 3_EM_Unit1.indd 166 29-09-2023 17:42:22

4. Europe connected with south and south east Asia by _____ sea route.
5. The national dance of Philippines is _____.
6. The second highest peak in Europe is _____.
7. The type of climate that prevails in the central and eastern parts of Europe is _____.
8. The important fishing ground in North Sea is _____.
9. The density of population in Europe is _____.
10. The river _____ passes through Ten countries of Europe.

III Match The Following

1. Mesopotomian Plain	-	Highest Rainfall
2. Mawsynram	-	Norway
3. Rice Bowl of Asia	-	Spain southeast
4. Fjord Coast	-	Euphrates & Tigris
5. Bull Fighting	-	Thailand

IV Let us learn

1. **Assertion (A):** Italy has dry summers and rainy winters

   Reason (R): It is located in the Mediterranean region

   a) Both A and R are individually true and R is the correct explanation for A

   b) Both A and R are individually true but R is not the correct explanation for A

   c) A is true, but R is false

   d) A is false, but R is true

2. Places marked as 1, 2, 3 and 4 in the given map are noted for the following plains.



ASIA

A. Indo – Gangetic plain
B. Manchurian plain
C. Mesopotamian
D. Great plains of China

Match the plains with the notation on the map and select the correct answer using the codes given below.

Codes:

	A	B	C	D
a)	2	1	4	3
b)	2	1	3	4
c)	1	2	3	4
d)	1	4	3	2

3. In the given outline map of Asia, the shaded areas indicate the cultivation of



ASIA

a) sugarcane b) Dates
c) Rubber d) Jute

6th Std Geography_Term 3_EM_Unit1.indd 167 29-09-2023 17:42:23

V. Answer in Brief

1. Name the important intermontane plateaus found in Asia.
2. Write a short note on monsoon climate.
3. How does physiography play a vital role in determining the population of Asia?
4. Name the ports found is Asia.
5. Asia is called the 'Land of Contrasts'- Justify.
6. Name the important mountains found in the Alpine system.
7. What are the important rivers of Europe?
8. Name a few countries which enjoy the Mediterranean type of climate.
9. Give a short note on the population of Europe.
10. Name the important festivals celebrated in Europe.

VI. Distinguish

1. Intermontane plateaus and southern plateaus.
2. Cold desert and hot desert
3. Tundra and Taiga.
4. The North western highlands and the Alpine mountain range.

VII. Give Reasons

1. Asia is the leading producer of rice.
2. Asia is the largest and most populous continent in the world.
3. Europe is called 'a giant peninsula'.
4. Although Western Europe is located in the high latitudes, it has a moderate climate.

VIII. Answer in Paragraph

1. Give an account of the drainage system in Asia.
2. Describe the mineral sources found in Asia.
3. What are fjords? How do they protect harbours from bad weather conditions?
4. Describe the climatic divisions of Europe.

IX. Map Skill

Mark the following in the outline map of Asia and Europe.

Asia : Ural mountain, Himalayas, Pamir knot, Gobi Desert, Arabian Peninsula, Deccan plateau, River Yangtze, River Ob, Aral Sea and Lake Baykal.

Europe : The Pyrenees, Black forest, Apennines, Hungarian Plain, Caucasus Mountain, River Volga, River Danube, Strait of Gibraltar, Lake Ladoga, North Sea

X .Activity

1. Complete the following.

I belong to _____ district. My district is famous for the following: 1. _____, 2. _____ and 3. _____. The boundaries of my districts are _____ in the north, _____ in the east, _____ in the south and _____ in the west. It spreads for an area of _____ km^2. There are _____ taluks and _____ villages in my district. _____, _____, _____ are the important

6th Std Geography_Term 3_EM_Unit1.indd 168 29-09-2023 17:42:23

mountain / plain / plateaus (If all, mention all features). The rivers ____, ____, ____ criss – cross my district. ____, ____, ____ are common trees and wildlife such as ____, ____, ____ are found here. ____, ____, ____ are important minerals available in my district. Based on this ____, ____ industries are located here. The major crops are ____, ____, ____. (Coastal districts may write the variety of fish). The total population is ____. We celebrate ____, ____, ____ festivals.

2. If you get a chance to settle in Europe, which country would you choose? List out the reasons why?

3. Choose any region is Asia. In the map of Asia, mark its distribution of natural vegetation and wildlife. Paste related pictures.

Reference

1. Douglas L. Johnson, Viola Haarmann, Merril L. Johnson, David L. Clawson (2012), World Regional Geography, A Development Approach, PHI Learning Private Limited, New Delhi, India.
2. JohnCole, (2010), Geography, of the world's Major Regions, Routledge, London.
3. Majid Husain (2017), Indian and world Geography McGraw Hill Education (India) Private Limited, New Delhi, India.

Web Links

1. https://www.whatarethe 7continents.com
2. www.natural history on the Net.com
3. www.worldatlas.com
4. www.internetgeographynet
5. www.worldometers.info

6th Std Geography_Term 3_EM_Unit1.indd 169 29-09-2023 17:42:23

ICT CORNER

Asia and Europe



Through this activity you will know about in their proper location on the map of Asia and Europe.

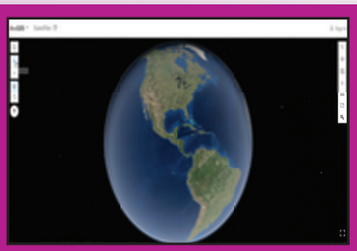
Steps:

Step -1 Use the URL or scan the QR code to open the activity page.

Step -2 Click the "Search" box and text Asia and Europe.

Step -3 Click the "+" "-" button to zoom in and out.

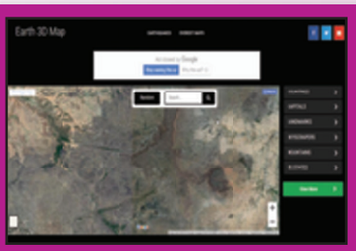
Step -4 Click the "Full screen" option to appear full screen mode.



Step 1



Step 2



Step 3



Step 4

Browse in the link

Web: http://earth3dmap.com/#?l=asia (or) scan the QR Code

*Pictures are indicatives only.

6th Std Geography_Term 3_EM_Unit1.indd 170 29-09-2023 17:42:27

Unit 2

Globe



Learning Objectives

- To understand the four cardinal directions.
- To learn about the shape of the Earth.
- To understand about the model of the Earth - the globe.
- To understand the significance of lines of latitudes and longitudes.
- To know how standard time is calculated around the world.

Surya and Poovendhan are very good friends who study in the sixth standard and live in a beautiful village called Thirunandriyur. Surya lives in South Street, while Poovendhan lives in North Street. Every day they go to school together. One day.....



Surya: Why are you coming so late, Poovendha?

Poovendhan: Please bear with me, Surya! Come, let's go.

Surya: What took you so long?

Poovendhan: You live on South Street. But, I have to come from the North Street, which is so far away from here. That's why I'm late.

Surya: Yes, that's true. But wherever we live, don't you remember that we all live on planet Earth?

Poovendhan: Yes! Yes! I do remember, Even our **Ponni Miss** taught us about the **Solar System**.

6th Std Geography_Term 3_EM_Unit2.indd 171 27-09-2023 19:36:43

Surya: But, I have a doubt ….

Poovendhan: Tell me, what is it?

Surya: We can see our house, the things around us, the people, animals and birds with our eyes. But, why can't we see our Earth as a whole?

Poovendhan: Haven't you seen it?

Surya: No, I haven't. Have you ever seen it?

Poovendhan: Yes, in our school only.

Surya: Did you say, in our school?

Poovendhan: Yes, on our **Ponni Miss'** table. Big and spherical!

Surya: Oh! Yes! Like a ball on a stand?

Poovendhan: Exactly! That is our Earth

Surya: But…….. But, our teacher said that our **Earth** is in the **Milky Way Galaxy.** But you say that our Earth is on our teacher's table. I am so confused. Come, let's go and ask Ponni Miss.

The bell rang as they reached school. They attended the morning assembly and went to the classroom. During the social science period, Surya asks Ponni Miss to clear his doubts.

Surya: Good morning, Miss.

Teacher: Good morning.

Surya: Madam, you told us on the other day that our Earth is in the Milky Way galaxy.

Teacher: Yes, it is true. This is the model of the Earth.

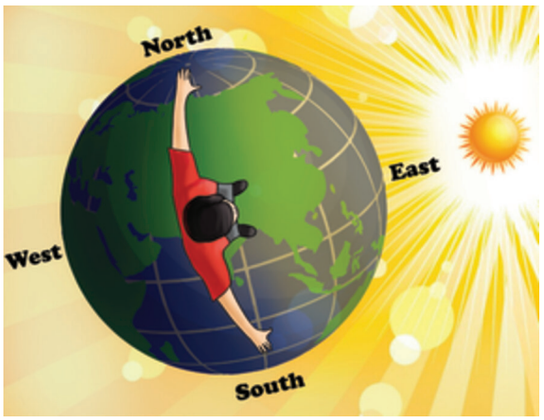
Surya: A model of the earth, Madam? Please explain!

Teacher: Sure, Surya.

The teacher asks all the students to sit down and starts explaining.

Directions

The directions on the ground are always shown with respect to the North. If we know the **North**, then it is easy to find the other directions, namely **South, East** and **West**. These are the four **cardinal directions**.



We know that the Sun rises in the East and sets in the West. If we stand facing the sun in the morning, then we face the east. The west is towards our back. The left hand points towards the north and the right hand points towards the south. We should always keep this in mind.

Globe

We live on the planet Earth, which is found third from the Sun. Since the Earth is huge and we live on a very small area, we are not able to see the Earth as a whole. But, when we travel to space, we can see the Earth as a whole.

6th Std Geography_Term 3_EM_Unit2.indd 172 27-09-2023 19:36:44



So, in order to see the shape of the Earth as a whole and to know its unique features, a three dimensional model of the Earth was created with a specific scale.

DO YOU KNOW?

The surface area of the Earth is 510.1 million square kilometres.

The Earth which is spherical, is flat at the poles and bulges at the Equator. The Earth cannot be compared with any other geometrical shape as it has a very unique shape. Hence, its shape is called a **geoid** (earth shaped).

The Earth moves around the Sun. It also rotates from the West to East on its axis at an inclination of 23 ½°. The globe is also inclined at an angle of 23 ½°. The axis is an imaginary line. It is not actually found on the Earth.

DO YOU KNOW?

- The first globe was created by the **Greeks** in the year 150 AD(CE).
- The Indian astronomer **Aryabhatta**-I has mentioned in his book. **'Aryabhatta Sidhantha'**. **'The stars in the sky seem to move towards the West because of the Earth's roation on its axis'**.

Lines on the Globe

There are imaginary lines which are drawn on the globe horizontally and vertically to find a location and calculate distance and time. These imaginary lines are called lines of **latitudes and longitudes.**

DO YOU KNOW?



Ptolemy, a Greco – Roman mathematician, astronomer and geographer, was the first person to draw the lines of latitude and longitude on a map.

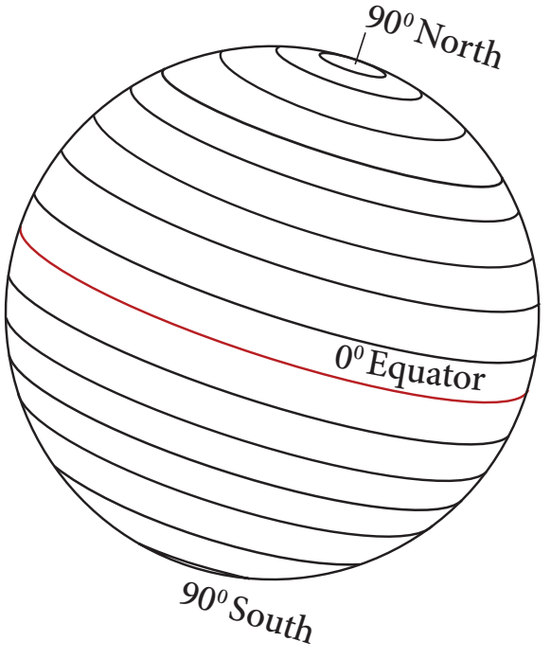
In his book, **'Geographia'** a detailed description about the Earth's surface, its size and circumference and many locations based on the lines of latitude and longitude are given.

Latitudes

The imaginary lines which are drawn horizontally on East - West direction on the Earth are called the lines or **parallels** of **latitudes**.

The 0° line of latitude which divides the Earth into two halves is known as the **Equator**. From the Equator, **parallel** lines are drawn towards the North and South poles at equal intervals. The latitudinal extent between **1°** line of latitude on Earth is **111 km**.

6th Std Geography_Term 3_EM_Unit2.indd 173 27-09-2023 19:36:44



Since the Earth is geoid shaped, the length of the lines of latitude decreases from the Equator towards the South and North Poles. The 90° North and South Poles are not found as lines, but as points.

The lines of latitude that are drawn horizontally between the Equator and the North Pole are called **'Northern latitudes'** and those which are found between the Equator and the South Pole are called **'Southern Latitudes'.**

The lines of latitude consist of **89** parallels in the Northern Hemisphere and **89** parallels in the Southern Hemisphere, **one** at the Equator and the **two** poles are found as points. Totally, there are **181 parallels** found on earth.

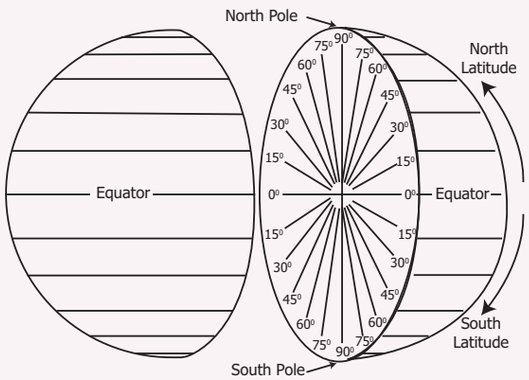


The Equator is the longest of all lines of latitude. Hence, it is also known as **'The Great Circle'.**

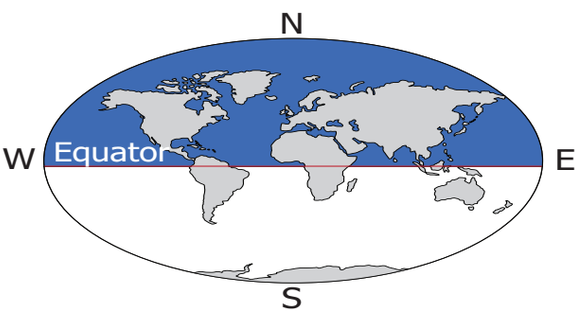
Activity :



Draw a circle on a paper. Draw a horizontal line across the middle of a circle. Keeping this line as 0°, draw lines on both sides with an equal interval of 15° with the help of a protractor. The lines you have drawn are lines of latitudes.



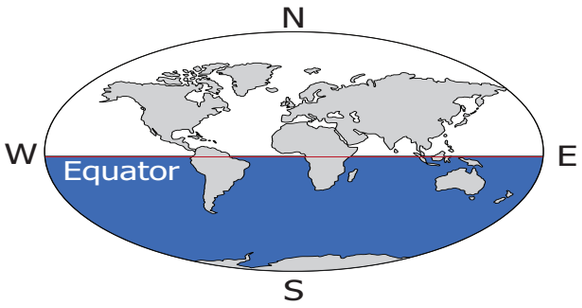
Northern Hemisphere



6th Std Geography_Term 3_EM_Unit2.indd 174 27-09-2023 19:36:45

The area of the Earth found between the Equator (0^0) and the North Pole (90°N) is called the **Northern Hemisphere**.

Southern Hemisphere



The area of the Earth from the equator (0°) to the South Pole (90°S) is called the **Southern Hemisphere**.

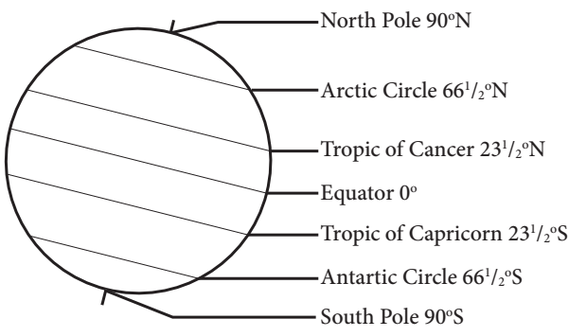
The location of any country or place is based on this division of the hemispheres.

HOTS

Based on the latitudinal extent, in which hemisphere is India located?

Important lines of latitude

The earth rotates on its axis at an inclination of 23½°. It also revolves around the sun while rotating. Based on the angle at which the sun's rays fall on the earth, certain lines of latitude gain significance.

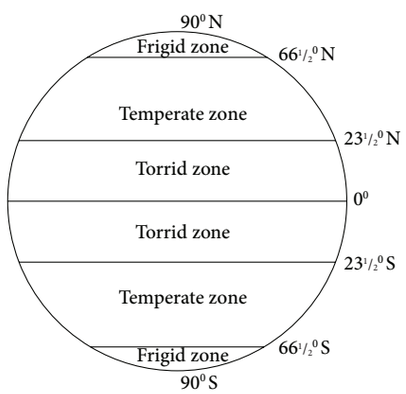


DO YOU KNOW?

- 0°**N** and **S** – 23½°**N** and **S** lines of latitudes are called – **Low latitudes**
- 23½°**N** and **S** – 66½°**N** and **S** lines of latitudes are called – **Middle Latitudes**
- 66½°**N** and **S** – 90°**N** and **S** lines of latitudes are called – **High Latitudes**

(Source : A Dictionary of Geography – Susan Mayhew, Oxford University Press, Fifth edition -2015)

The Sun's rays do not fall equally on all parts of the earth. They fall vertically over the Equator and slanting towards the poles. Thus, all the places on earth do not have the same amount of temperature. Based on the amount of heat received from the Sun, the lines of latitude help in dividing the earth into different climatic zones.



Torrid Zone

The region from the Equator towards the Tropic of Cancer (23½°N) and the Tropic of Capricorn (23½°S) is called the Torrid Zone. The Sun's rays fall vertically over this region and the average temperature is very high. Hence this region is known as the **Torrid Zone.**

6th Std Geography_Term 3_EM_Unit2.indd 175 27-09-2023 19:36:46

Temperate Zone

From the Tropic of Cancer (23½°N) to the Arctic Circle (66½°N) and from the Tropic of Capricorn (23½°S) to the Antarctic Circle (66½°S), the Sun's rays fall slantingly. Moderate temperature prevails in this region. Hence, this region is called **Temperate Zone.**

Frigid Zone

From the Arctic Circle (66½°N) to the North Pole (90^0N) and from the Antarctic Circle (66½°S) to the South Pole (90°S), the Sun's rays fall further inclined, through out the year. The temperature is very low. Hence, this region is known as **Frigid Zone.**

DO YOU KNOW?

Some lines of latitude are also called by the following names in Tamil.

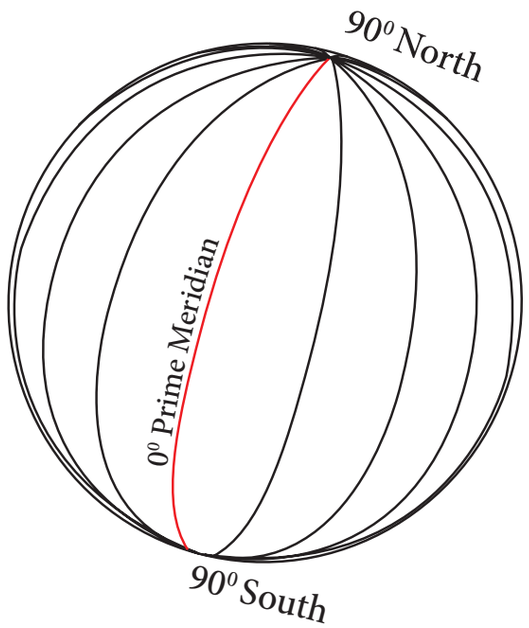
Latitude	-	ahalangu (அகலாங்கு)
Longitude	-	nettangu (நெட்டாங்கு)
Equator	-	nilanaduvarai (நிலநடுவரை)
Tropic of Cancer	-	kadagavarai (கடகவரை)
Tropic of Capricorn	-	magaravarai (மகரவரை)

(Source: Ariviyal Kalanjiyam, The Tamil University)

Longitudes

The imaginary lines drawn vertically connecting the North Pole and the South Pole are called lines or meridians of longitude. These lines of longitude are seen as semi circles.

The 0° line of longitude is called the **Prime Meridian**. There are 180 lines of longitude towards the East and West from the Prime Meridian. So, there are totally **360 lines of longitude**. These lines converge at the poles. The 180° W and 180° E line of longitude are the same line.



The lines of longitude that are found between the Prime Meridian and the 180° East line of longitude are called **'Eastern Longitudes'** and the lines of longitude that are found between the Prime Meridian (0°) and the 180° West line of longitude are called **'Western Longitudes'**. Two opposite meridians form a great circle

DO YOU KNOW?

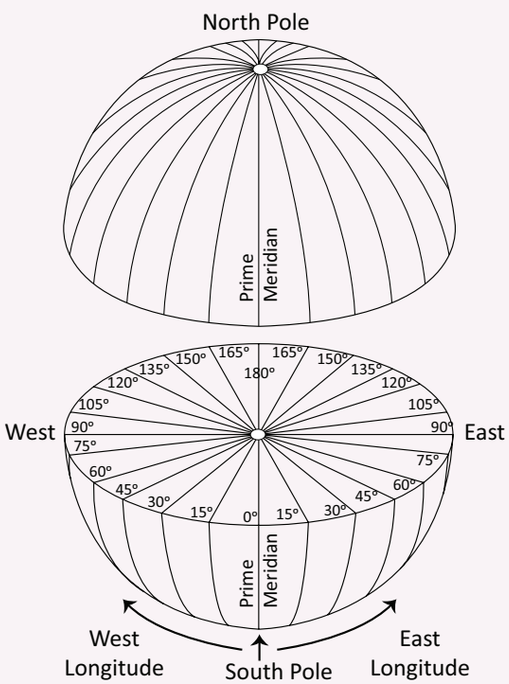
The lines of longitude are found as semi circles covering 111 km at the Equator, 79 km at 45° latitude and no space between the lines at the poles.

6th Std Geography_Term 3_EM_Unit2.indd 176 27-09-2023 19:36:46

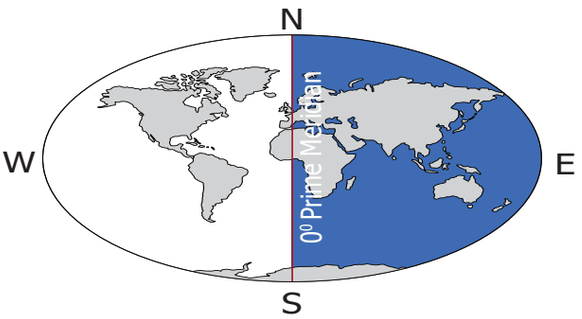
Activity :



Take a ball and a thin iron wire. Pierce the ball with the wire from one end to the other end through the middle. Remove the wire. Draw circles around the points. Name the northern most point as North Pole and the southern most point as South Pole. The angle of a circle is 360°. Mark points on the circle at an interval of 15° using a protractor. Then draw lines joining these points on the top and bottom of the ball. The lines that you have drawn are lines of longitudes.

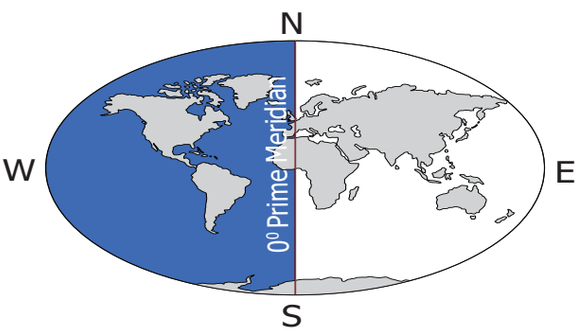


Eastern Hemisphere



The part of the Earth between the 0° line of longitude and the 180° East line of longitude is known as the **Eastern Hemisphere.**

Western Hemisphere



The part of the Earth from 0° line of longitude to 180° West line of longitude is called as **Western Hemisphere.**

Activity

Based on the longitudinal extent, in which hemisphere is our country located? Look at the globe and answer.

Significant Lines of Longitude

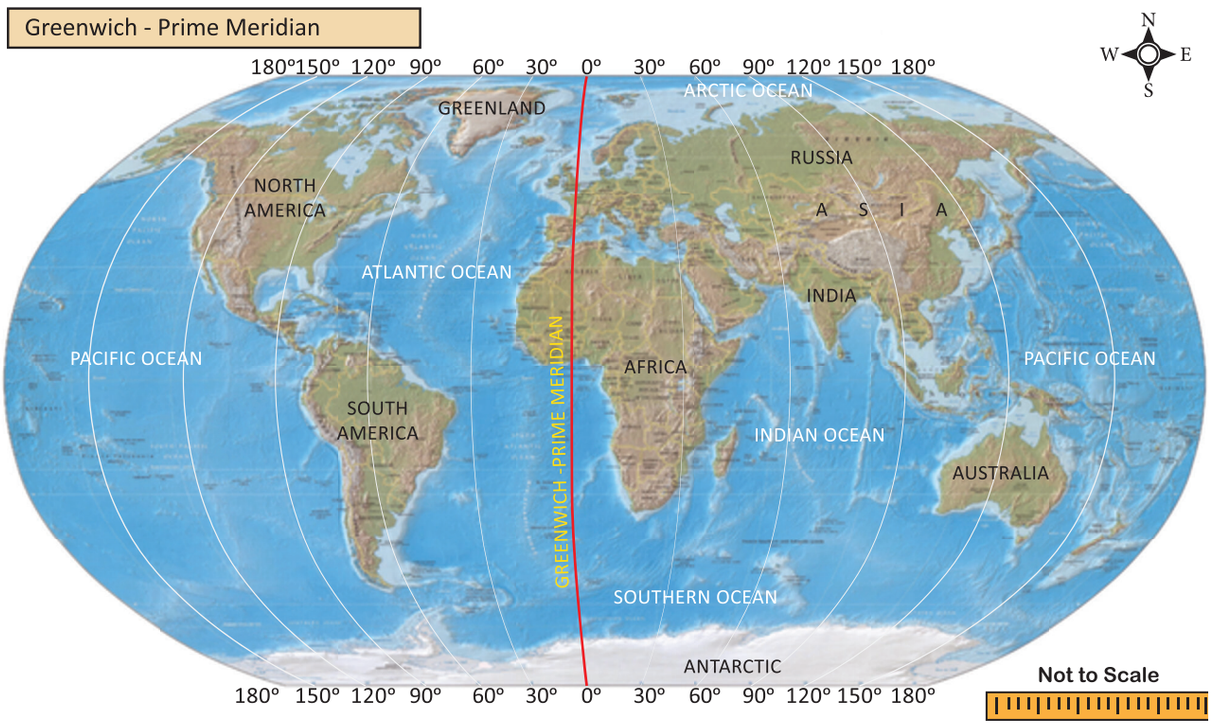
Greenwich Meridian

The Royal Astronomical Observatory is located at Greenwich near London in England. According to the International Meridian Conference held in 1884 in

6th Std Geography_Term 3_EM_Unit2.indd 177 27-09-2023 19:36:47

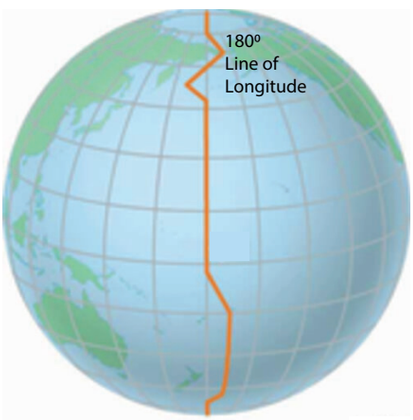


Washington DC in the U.S.A. all nations agreed on choosing the Greenwich Meridian as the international standard meridian (0°). This line of longitude is called the Prime Meridian and it is also known as the **Greenwich Meridian** because it passes through Greenwich.



International Date Line

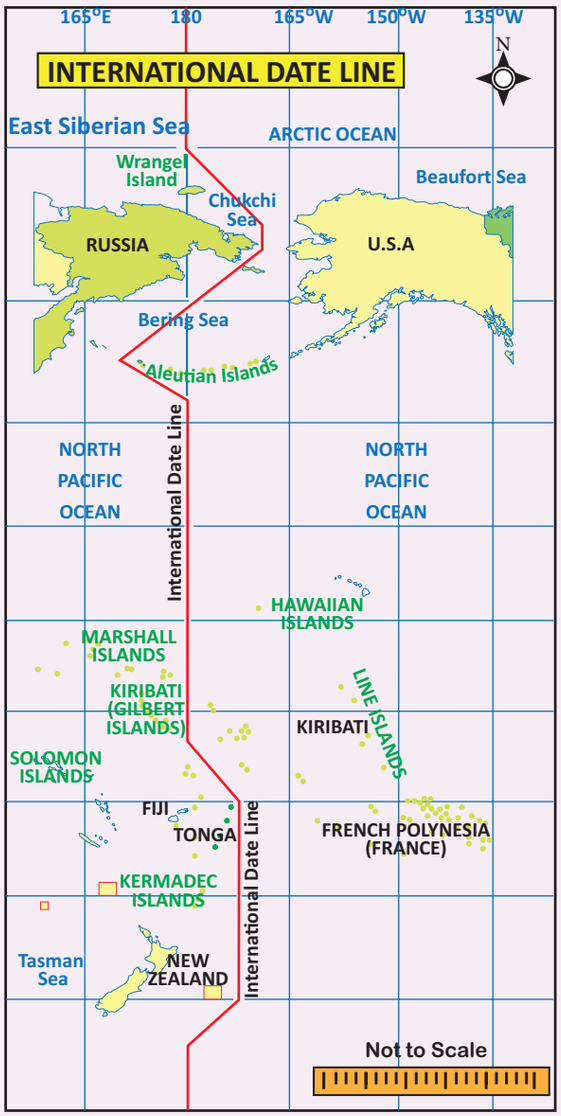
The 180° line of longitude has been fixed as the International Date Line, drawn on the Pacific Ocean between Alaska and Russia through Bering Strait. If a person crosses this line from the West to East, he loses a day. On the other hand, when he crosses from the East to West, he gains a day. Based on this, the date is fixed for different countries or regions of the world.



6th Std Geography_Term 3_EM_Unit2.indd 178 27-09-2023 19:36:50

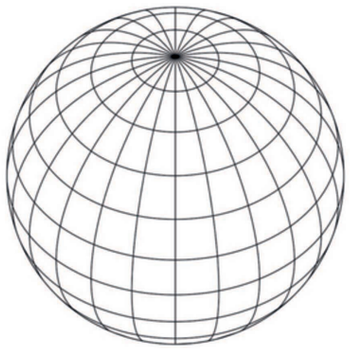
DO YOU KNOW?

The International Date Line is not straight. If the line is drawn straight, two places in the same country would have different dates. So the International Date Line is found zigzag in certain places to avoid confusion.



Earth Grid

The imaginary lines of latitude and longitude form a grid like pattern on the surface of the earth, known as the **'Earth grid'** or **'Geographic grid'.**



Earth grid

To locate a place exactly on earth, the latitudinal and longitudinal extensions are required.

Longitude and Time

As many as **360 lines of longitude** are drawn to connect the North and South Poles around the Earth 180° on the Eastern Hemisphere and 180° on the Western Hemisphere. Time is calculated on the basis of the lines of longitude.

Fact

- The Earth takes one day to rotate on its axis.
- 1 day = 24 hours
- 1 hour = 60 minutes
- 24 hours = 24 x 60 = 1440 minutes
- The angle of the earth = 360 °
- 360 ° = 360 Longitudes
- 360 ° = 1440 minutes
- So 1 ° = $\frac{1440}{360}$ = 4 minutes
- In 4 minutes = 1°rotation
- In 60 minutes = $\frac{60}{4}$ = 15° rotation
- So, in an hour (60 minutes) the earth rotates 15°

6th Std Geography_Term 3_EM_Unit2.indd 179 27-09-2023 19:36:51

Local Time

When the sun is overhead on a particular line of longitude, it is 12 noon at all the places located on that line of longitude. This is called local time.

The Sun is overhead on a line of longitude only once in a day. So the local time differs for every line of longitude.

When the Sun is overhead the Greenwich Meridian at 12 noon, it is the local time of that place. The world time is calculated by this standard line of longitude. It is known as the **Greenwich Mean Time (GMT).**

For example, if the time is 12 noon at Greenwich Meridian, it is **12:04 p.m.** at 1°E line of longitude and **11:56 a.m.** at 1°W line of longitude. So, as one moves towards the east from any meridian the time increases. And if one moves towards the west from any meridian, time decreases.

DO YOU KNOW?

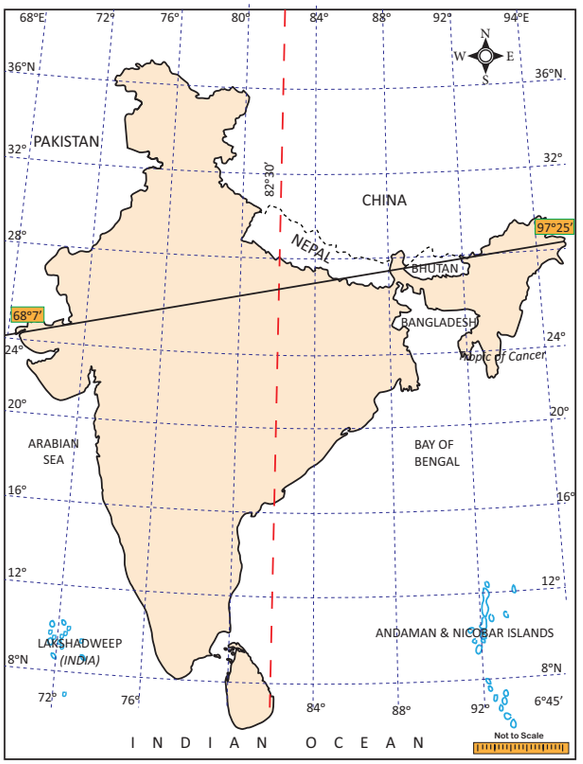
1. The word meridian is derived from the Latin word **'Meridianus'.** It means mid day. **(Medius – Middle, dies – day)**. So, meridian means the position of the Sun found overhead at a place at noon.
2. **a.m**. means 'anti Meridiem' **(anti – before)** – Before Noon.
3. **p.m**. means 'post Meridiem' **(Post – after/later)** – After noon.

Standard Time

Local time is calculated when the sun is overhead at noon. Many lines of longitude may pass through a country. Countries may or may not observe a common time. The standard time of a country or a part of it is calculated keeping a particular meridian as a standard one.

The meridians are selected in multiples of 15° or 7 ½°. It is done in such a way that the variation of standard time from the Greenwich is expressed either as 1 hour or ½ an hour.

Indian Standard Time



INDIAN STANDARD MERIDIAN

The longitudinal extent of India is from 68°7′ E to 97°25′ E. As many as twenty nine lines of longitude pass through India. Having 29 standard time is not logical. Hence 82½° E line of longitude is observed as the Prime Meridian to calculate the Indian Standard Time **(IST)**.

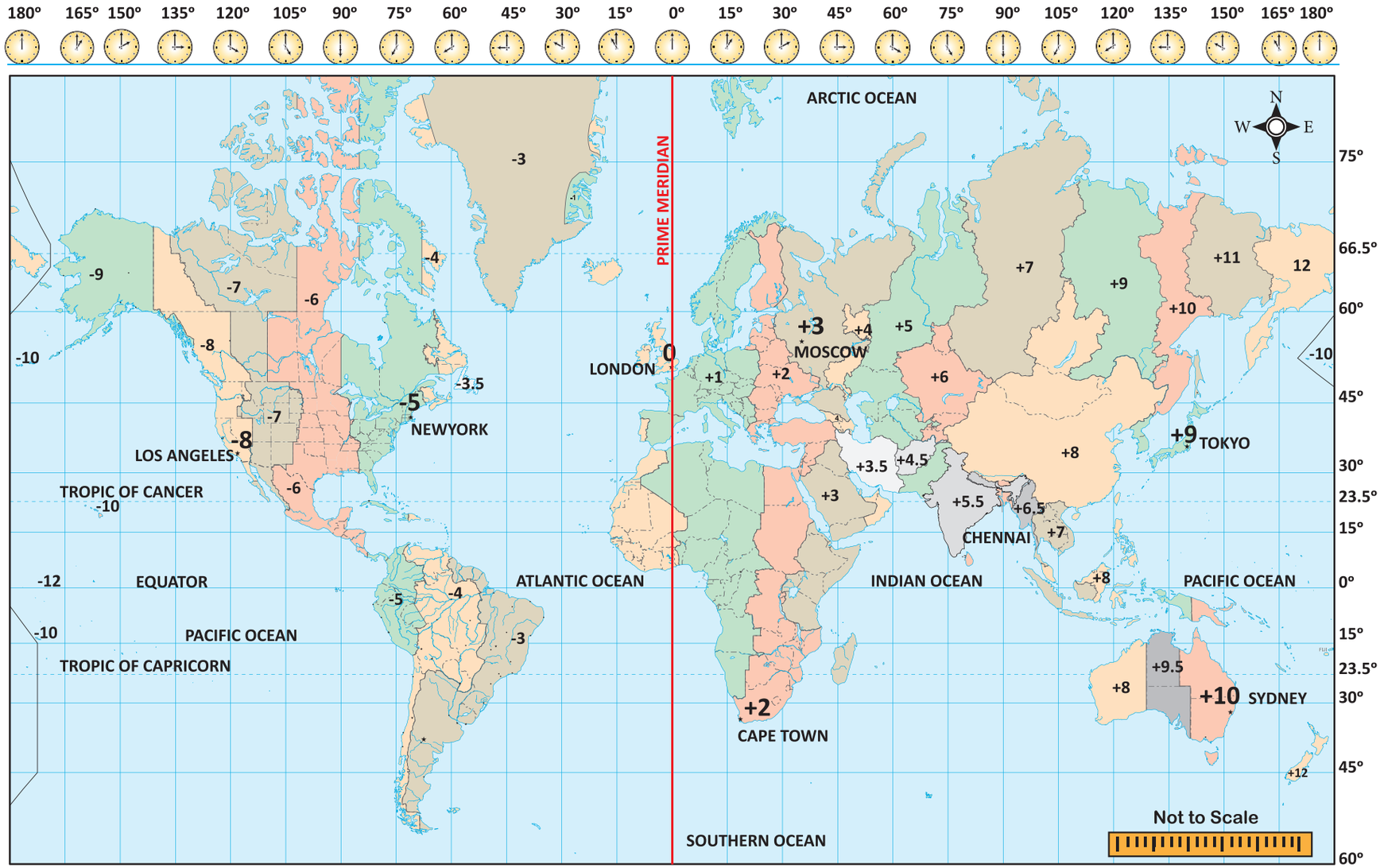
DO YOU KNOW?

The 82½° E line of longitude passes through **Mirzapur** near **Allahabad in Uttar Pradesh**. This is located at an equal distance from **Ghuar Mota** in **Gujarat** and **Kibithu** in **Arunachal Pradesh**.

6th Std Geography_Term 3_EM_Unit2.indd 180 27-09-2023 19:36:52

6th Std Geography_Term 3_EM_Unit2.indd 181

World Time Zone



27-09-2023 19:36:53

Time Zones

The world has 24 time zones. Some countries have a great longitudinal extent. So they have more than one standard time. Example: Russia has 7 time zones.

Activity:

1. What is the difference in time between the GMT and IST?
2. If it is 5 a.m. at New York City, USA. what would be the time at New Delhi, the capital of India?
3. If it is 12 Midnight at London, what would be the time in India?
4. The standard time of Sydney city in Australia is found to be at a difference of _____ hours from that of the GMT.
5. Mr. Senthamizh travels by flight from Chennai to London. He boarded the aeroplane at 9a.m After 12 hours of travel, at what time (GMT) would he have reach London?

We saw about the lines of latitude and longitude drawn on the globe. Besides these, physical land forms, seas, oceans, countries etc., are also found on the globe

Wrap up

1. The imaginary lines drawn horizontally from the East to West on the globe and maps are called lines of latitude or parallels.
2. The imaginary lines drawn vertically from the North to South on the globe and maps are known as lines of longitude or meridians.
3. The 0° line of latitude is called the Equator.
4. The 0° line of longitude is called the Greenwich Meridian or the Prime Meridian.
5. The part of the Earth from the Equator (0°) to North Pole (90°) is called the Northern Hemisphere and from the Equator (0°) to South Pole (90°) is called the Southern Hemisphere.
6. The part of the Earth from the Greenwich Meridian (0°) to 180° East line of longitude is called the Eastern Hemisphere and from Equator (0°) to 180° West line of longitude is called the Western Hemisphere.
7. Lines of latitude are circles which are drawn at a distance of about 111 km. The poles are shown as points.
8. Lines of longitude are drawn as semi circles. The distance between the lines of longitude at the Equator is 111 km. It is found at a distance of 79 km at 45° latitude and they converge at the poles.
9. Lines of latitude do not merge, while lines of longitude converge at the poles.
10. Time is calculated on the basis of the lines of longitude. The 180° line of longitude is the International Date Line.

6th Std Geography_Term 3_EM_Unit2.indd 182 27-09-2023 19:36:54

Glossary

1. Globe – A model of the earth
2. Lines of Latitude / Parallels – Imaginary lines drawn horizontally on the Earth from the East to West
3. Lines of Longitude / Meridians – Imaginary line drawn vertically on the Earth from the North to South
4. Geoid – The shape of the Earth
5. Hemisphere – Dividing the earth on the basis of 0° lines of latitude and longitude with regard to directions
6. Equator – The line of latitude drawn horizontally at the centre of the Earth
7. Tropic of Cancer – 23 ½° N line of latitude
8. Tropic of Capricorn – 23 ½° S line of latitude
9. Arctic Circle – 66 ½° N line of latitude
10. Antarctic Circle – 66 ½° S line of latitude

Exercise

3NPA2

I. Choose the correct answer

1. The shape of the Earth is _____
   a) Square b) Rectangle
   c) Geoid d) Circle
2. The North Pole is
   a) 90° N Latitude
   b) 90° S latitude
   c) 90° W Longitude
   d) 90° E longitude
3. The area found between 0° and 180° E lines of longitude is called
   a) Southern Hemisphere
   b) Western Hemisphere
   c) Northern Hemisphere
   d) Eastern Hemisphere
4. The 23 ½° N line of latitude is called _____
   a) Tropic of Capricorn
   b) Tropic of Cancer
   c) Arctic Circle
   d) Antarctic Circle
5. 180° line of longitude is
   a) Equator
   b) International Date Line
   c) Prime Meridian
   d) North Pole
6. The Sun is found overhead the Greenwich Meridian at
   a) 12 midnight
   b) 12 noon
   c) 1 p.m.
   d) 11 a.m.

6th Std Geography_Term 3_EM_Unit2.indd 183 27-09-2023 19:36:54

7. A day has _____.

   a) 1240 minutes
   b) 1340 minutes
   c) 1440 minutes
   d) 1140 minutes

8. Which of the following lines of longitude is considered for the Indian Standard Time?

   a) 82½° E
   b) 82½° W
   c) 81½° E
   d) 81½° W

9. The total number of lines of latitude are

   a) 171
   b) 161
   c) 181
   d) 191

10. The total number of lines of longitude are

    a) 370
    b) 380
    c) 360
    d) 390

II. Fill in the blanks

1. The line of latitude which is known as the Great Circle is _____.
2. The imaginary lines drawn horizontally on Earth from the West to East are called _____.
3. The 90° lines of latitude on the Earth are called _____.
4. The Prime Meridian is also called _____
5. The world is divided into _____ time zones.

III Circle the odd one

1. North Pole, South Pole, Equator, International Date Line.
2. Tropic of Capricorn, Tropic of Cancer, Equator, Prime Meridian.
3. Torrid Zone, Time Zone, Temperate Zone, Frigid Zone
4. Royal Astronomical observatory, Prime Meridian, Greenwich Meridian, International Date Line.
5. 10° North, 20° South, 30° North, 40° West

IV. Match the following

A	B
0° line of latitude	Pole
0° line of longitude	International Date Line
180° line of longitude	Greenwich
90° line of latitude	Equator

V. Examine the following statements

1. The Earth is spherical in shape.
2. The shape of the Earth is called a geoid.
3. The Earth is flat.

Look at the options given below and choose the correct answer

6th Std Geography_Term 3_EM_Unit2.indd 184 27-09-2023 19:36:54

a) 1 and 3 are correct

b) 2 and 3 are correct

c) 1 and 2 are correct

d) 1,2 and 3 are correct

VI. Examine the following statements

Statement I : The lines of latitude on Earth are used to find the location of a place and define the heat zones on Earth.

Statement II : The lines of longitudes on Earth are used to find the location of a place and to calculate time.

Choose the correct option

a) Statement I is correct; II is wrong

b) Statement I is wrong; II correct

c) Both the statements are correct

d) Both the statements are wrong

VII. Name the following

1. The imaginary lines drawn horizontally on Earth.
2. The imaginary lines drawn vertically on Earth.
3. The three dimensional model of the Earth.
4. India is located in this hemisphere based on lines of longitude.
5. The network of lines of latitude and longitude.

VIII. Answer briefly

1. What is a Geoid?
2. What is local time?
3. How many times would the sun pass overhead a line of longitude?
4. What are lines of latitude and longitude?
5. Name the four hemispheres of the Earth.

IX. Give reasons

1. The 0° line of longitude is called the Greenwich Meridian.
2. The regions on Earth between North & South lines of latitude (66 ½°) and poles (90°) is called Frigid Zone
3. The International Date Line runs zigzag.

X. Answer in detail

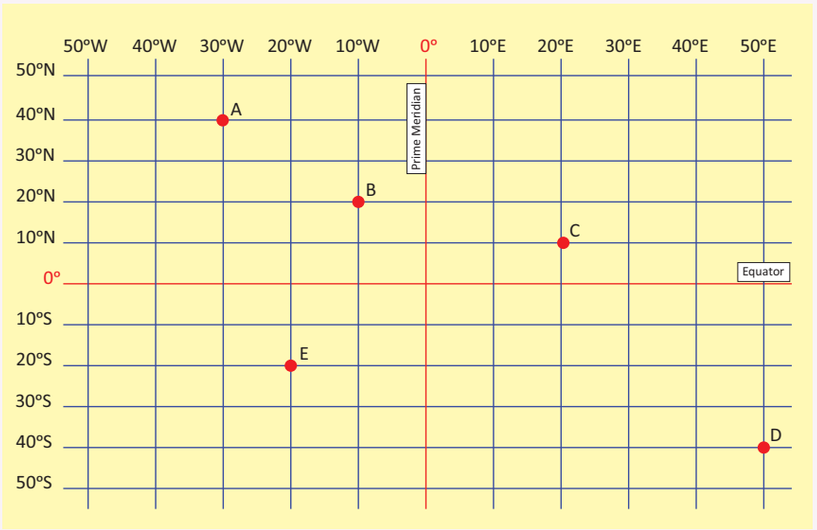
1. What are the uses of globe?
2. How are the hemispheres divided on the basis of lines of latitude and longitude? Explain with diagrams.
3. What are the significant lines of latitude? Explain the zones found between them.
4. Explain: Indian Standard Time.

6th Std Geography_Term 3_EM_Unit2.indd 185 27-09-2023 19:36:54

XI. Activity

There are five positions marked on the grid given below. Look at them carefully and fill the blanks with reference to the lines of latitude and longitude. The first one is done for you.

1. The latitudinal and longitudinal reference of point A 40° N 30° W



Earth Grid

2. The latitudinal and longitudinal reference of point B _____
3. The latitudinal and longitudinal reference of point C _____
4. The latitudinal and longitudinal reference of point D _____
5. The latitudinal and longitudinal reference of point E _____

Reference

1. Goh Cheng Leong, Certificate Physical and Human Geography (2009), Oxford University Press, New Delhi, India.
2. A Dictionary of Geography – Susan Mayhew, Oxford University Press, Fifth edition -2015.
3. அறிவியல் களஞ்சியம் (தொகுதிகள்), தஞ்சை தமிழ்ப் பல்கலைக்கழக வெளியீடு.
4. The earth shape and gravity (1965) Oxford Degman Press.
5. Strahler, Physical Geopraphy 4th Edition (1965) New York MC Graw – Hill Book Co.

Web Links

1. https://www.britannica.com
2. https://www.latlong.net

6th Std Geography_Term 3_EM_Unit2.indd 186 27-09-2023 19:36:54

ICT CORNER

Globe

Through this activity you will know about the globe model.



Steps:

Step -1 Use the URL or scan the QR code to open the activity page.

Step -2 Click the red "hot spot" area to see the main landmarks of the globe.

Step -3 In the view box Click the "Core" option to view the Earth's inner layers.

Step -4 Drag and rotate the Globe you can rotate the Globe.



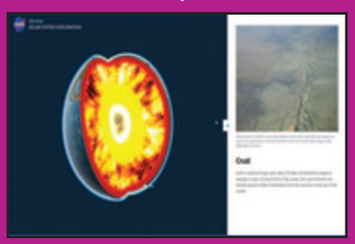
Step 1



Step 2



Step 3



Step 4

Browse in the link

Web: https://solarsystem.nasa.gov/planets/earth/overview/
(or) scan the QR Code

*Pictures are indicatives only.

6th Std Geography_Term 3_EM_Unit2.indd 187 27-09-2023 19:37:02

Unit 3

Understanding Disaster



Learning Objectives

- To understand the meaning of disaster.
- To know about the types of disasters.
- To know a few key concepts in Disaster Management and orient them to the words used in media.
- To understand Tsunami and flood.
- To understand about Forecasting, Emergency Operation Centre etc.,

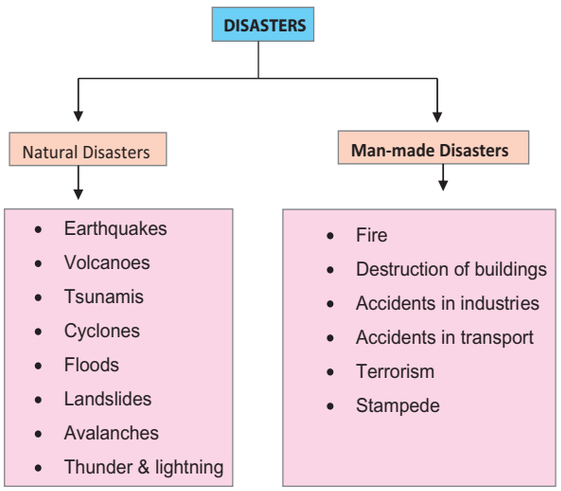
This lesson explains about the various natural disasters and man-made disasters. It also deals with the precautionary and mitigation measures taken to avoid the loss of lives and materials.

Disaster is a very common phenomenon in the human society. It has been experienced by people since time immemorial. Though its form may be varied, it has been a challenge for society. The latest development which has been discovered in the World Disaster Reports recently is that, the disasters have increased in frequency and intensity. India is one of the most disaster prone countries in the world. It has some of the world's most severe droughts, famines, cyclones, earthquakes, chemical disasters, rail accidents and road accidents. The high density of population in the developing countries, especially in the high risk coastal areas, results in millions of people getting affected by natural disasters, especially in recurring disasters like floods, cyclones, storm surges, etc.

Disaster

'A disaster is a serious disruption of the functioning of a society involving human and material loss. Disaster is broadly classified into natural and man-made disasters.

6th Std Geography_Term 3_EM_Unit3.indd 188 27-09-2023 19:40:15



Natural Disasters

Earthquake

The sudden shaking of the earth at a place for a short spell of time is called an earthquake. The duration of the earthquake may be a few seconds to some minutes. The point where an earthquake originates is called its '**focus**'. The vertical point at the surface from the focus is called '**epicentre**'.

Volcanoes

Volcanoes are openings or vents where lava, small rocks and steam erupt onto the earth's surface.

Tsunami

Tsunami are waves generated by earthquake, volcanic eruptions and underwater landslides.

Cyclones

A low pressure area which is encircled by high-pressure wind is called cyclone.

Floods

An overflow of a large amount of water, beyond its normal limits, especially on the rainfed areas is called flood.

Landslide

The movement of a mass of rocks, debris, soil etc., downslope is called landslide.

Avalanche

A large amount of ice, snow and rock falling quickly down the side of a mountain is called Avalanche.

Thunder and lightning

Thunder is a series of sudden electrical discharge resulting from atmospheric conditions. This discharge results in sudden flashes of light and trembling sound waves which are commonly known as thunder and lightning.

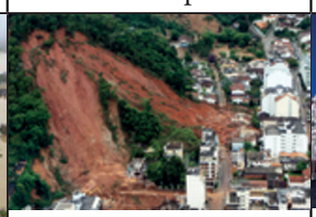

Earthquake


Volcanic explosion


Tsunami


Cyclones


Floods


Landslide


Avalanches


Thunder & lightning

6th Std Geography_Term 3_EM_Unit3.indd 189 27-09-2023 19:40:16

Man-made disasters

Fire

Massive **forest fires** may start in hot and dry weather as a result of lightning, and human carelessness or from other causal factors.

Destruction of buildings

Demolition of buildings by human activites.

Accidents in industries

Chemical, biological accidents that occur due to human error. (e.g.) Bhopal gas tragedy

Accidents in Transport

Violation of road rules, carelessness cause accidents.

Terrorism

The social unrest or differences in principles leads to terrorism.

Stampede

The term **stampede** is a sudden rush of a crowd of people, usually resulting in injuries and death from suffocation and trampling.

Tsunami and floods

A killer Tsunami hit the south east Asian countries on the 26th of December, 2004. A massive earthquake with a magnitude of 9.1 -9.3 in the Richter scale in the Indonesian island of Sumatra. It triggered one of the biggest Tsunamis the world had ever witnessed. The massive waves measuring up to 30 metres that killed more than 2,00,000 people of Asia. In India, over 10,000 people were killed by this disaster. Tamil Nadu alone accounted for 1,705 deaths.

All the coastal districts were affected, Nagapattinam was the worst hit in the state of Tamil Nadu. Fishermen, tourists, morning walkers, children playing in beach and people living on the coast were unprepared for the waves. So they lost their life and the most of the loss of lives and damage to property was within 500 metres of the shore. After that the Indian government set up a Tsunami Early Warning System at Indian National Centre for Ocean Information Services (INCOIS), Hyderabad in 2007.

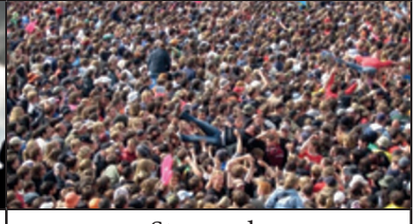

Fire


Destruction of buildings


Accidents in industries


Accidents in Transport


Terrorism


Stampede

6th Std Geography_Term 3_EM_Unit3.indd 190 27-09-2023 19:40:16





Tsunami - Do's and Don'ts

- You should find out if your home, school etc., are in valunarable areas along sea shore.
- Know the height of your street above sea level.
- Plan evacuation routes and practise your evacuation routes.
- Discuss tsunamis with your family. Review safety and preparedness measures with your family.
- If you see the sea water receding, you must immediately leave the beach and go to higher ground far away from the beach.
- Don't go to the coast to watch the Tsunami.
- Dont try to surf the tsunami waves.
- Be aware facts about tsunami.

Floods

Floods are high stream flows, which overlap natural or artificial banks of a river or a stream and are markedly higher than the usual flow as well as inundation of low land.

Types of floods

Flash floods: Such floods that occur within six hours during heavy rainfall.

River floods: Such floods are caused by Precipitation over large catchment areas or by melting of snow or sometimes both.

Coastal floods: Sometimes floods are associated with cyclone high tides and tsunami.

Causes of floods

- Torrential Rainfall.
- Encroachment of rivers bank.
- Excessive rainfall in catchment.
- Inefficient engineering design in the construction of embankments, dams and canals.

Effects of floods

- Destruction of drainage system
- Water pollution
- Soil erosion
- Stagnation of water
- Loss of agricultural land and cattle
- Loss of life and spread of contagious diseases.

Do's

- To find out if the settlement area is to be affected by flood or not.
- Keeping radio, torch and additional batteries, storing drinking water, dry foods items, salt and sugar. Safeguarding materials like

6th Std Geography_Term 3_EM_Unit3.indd 191 27-09-2023 19:40:17

kerosene, candle, match box, clothes and valuable things.

- Keeping umbrella and bamboo poles.
- Keeping first aid box and strong ropes to bind things.
- To dig canals from the farm land, to drain the excessive water keeping sand bags etc.,

Don'ts

- Try to connect electricity once it is cut.
- Operate vehicles
- Swim against floods
- Avoid going on excursions.
- Neglect flood warning messages

During floods

- Cut off gas connection and electricity.
- Keep sand bags on drainage holes and bathroom holes.
- Leave immediately through the known passage or prescribed passage
- Drink hot water.
- Use bleaching powder to keep your environment hygienic.
- Before using match sticks and candles, ensure that there is no gas leakage.
- Don't eat more food when you are affected by diarrhoea.
- Don't try to take anything that floats in flood.

Disaster Risk Reduction (DRR)

Disaster Risk Reduction: The practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters. There are four key approaches to public awareness for disaster risk reduction. Campaigns, participatory learning, informal education, and formal school based interventions.

CASE STUDY

Chennai flood – 2015



Chennai is one of the largest metropolitan cities in India, which lies on the south eastern coast. The north east monsoon along with tropical cyclone hits Chennai every year and gives heavy cyclonic rainfall. In 2015, November and December due to heavy rain, the devastating floods that hit Chennai and other parts of Tamil Nadu claimed more than 400 lives and caused enormous economic damage. The Government of India and Tamil Nadu have taken a lot of action to reduce loss of life and minimize human sufferings.

Forecasting and Early Warning

Weather forecasting, Tsunami early warning system, cyclonic forecasting and warning provide necessary information which help in reducing risks during disasters.

School Disaster Management Committee, Village Disaster Management Committee, State and Central government institutions take mitigation measures together during disaster.

6th Std Geography_Term 3_EM_Unit3.indd 192 27-09-2023 19:40:17

Newspaper, Radio, Television and social media bring updated information and give alerts on the vulnerable area, risk, preparatory measures and relief measures including medicine.

Glossary

Mitigation: The lessening of the adverse impacts of hazards and related disasters.

Forecast: Definite statement or statistical estimate of the likely occurrence of a future event or conditions for a specific area.

Magnitude: A measure of the amount of energy released by an earthquake.

Contagious: Transmissible by direct or indirect contact .

Catchment: The action of collecting water, especially the collection of rainfall over a natural drainage area.

Exercise

I Answer in brief

1. Define Disaster
2. What are the types of disasters? Give examples.
3. Write a short note on 'Thunder and lightning'
4. Chennai, Cuddalore and Cauvery delta are frequently affected by floods. Give reason.
5. Differentiate: Landslide – Avalanche

II Answer in a paragraph

1. What is flood? Explain the do's and don'ts during floods.

III Activity

Make a flood plan

On a piece of paper, draw your village/town map roughly. Locate your home,school and playground on the map. Then draw the rivers/stream/lake and road, located nearest to your village/ town. Answer the questions listed below.

1.Which areas and roads would be mostly affected by flood?

2. Can you find out evacuation route?

3. If you live in a flood-prone area, what are the precautionary measures you have to take during heavy rains?

4. What are things that you should have in your 'Go- Kit' / 'Drive -away kit'?

5.Make a list of emergency numbers.

('Go-Kit' - A kit prepared by and for an individual or group who expects to develop it in alternative locations during emergency)

6th Std Geography_Term 3_EM_Unit3.indd 193 27-09-2023 19:40:17

ICT CORNER

Understanding Disaster

Through this activity you will know about prevention activities before cyclone through a game.



Steps:

Step -1 Use the URL or scan the QR code to open the "storm safe" game page.

Step -2 Click the "play" icon to enter the game page

Step -3 Click the "continue" button start the game.

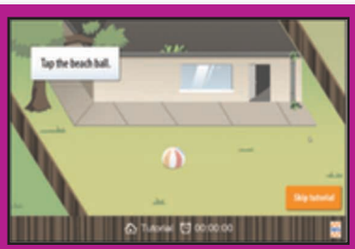
Step -4 Drag and put weightless things in the house.



Step 1



Step 2



Step 3



Step 4

Browse in the link

Web: http://www.vicses.com.au/stormsafe-game/ (or)
scan the QR Code

*Pictures are indicatives only.

6th Std Geography_Term 3_EM_Unit3.indd 194 27-09-2023 19:40:25

CIVICS

Unit 1

Democracy



Learning Objectives

- To know the meaning of democracy
- To know the types of democracy
- To know and appreciate the structure of our constitution
- To know the aims of democracy

'குடிதழீஇக் கோலோச்சும் மாநில மன்னன்
அடிதழீஇ நிற்கும் உலகு'

The world will constantly embrace the feet of the great king who rules over his subjects with love.

The teachers of Nallur Government High School were doing the final preparations for the programme 'Let's know the society' a monthly event. The Singaravelar Hall was filled with students. The Headmaster Mr. Jeeva welcomed the Chief Guest of the day, Advocate Mr. Rajasekaran. When he brought the chief guest to the hall, the students observed silence.

Mr. Britto, the history teacher welcomed the gathering. The chief guest, Mr. Rajasekaran stood up to address the students.

"Beloved brothers and sisters! I thank you for inviting me to this programme. I'm not going to speak on this occasion." When he said this and paused, everyone looked at him in wonder.

"Democracy should be found everywhere, shouldn't it? So I am going to converse with all of you," he said. He requested to give a microphone to the students. Mr. Rajasekar said,

"First let me ask you a question. Do you know what kind of society did the early man live in?"

"In the beginning, they were hunters and gathered food. Later, they settled near rivers and practised agriculture," said Deepika, a sixth standard student.

6th Std Civics_Term 3_EM_Unit1.indd 196 29-09-2023 17:37:51



"Yes, when man started to live in groups, tribes were formed. Every tribe had its own chief. These groups fought among themselves for land, water and other resources. Those who emerged victorious, formed kingdoms by uniting the other tribal groups. These kingdoms later integrated to form empires."

Arun questioned, "So the chief would have become the king, wouldn't he?"

"Yes, that was how monarchies ruled by kings were formed."

Suganya asked, "Was this how monarchy emerged in our country too?"

"Yes, this was how the system of monarchy formed throughout the world. Also, our country was ruled by kings and emperors and then came under the British rule."

The students answered together, "After centuries of struggle and many sacrifices, we got freedom from British colonialism."

"We adopted democracy as our ruling system when our country got freedom," said Rajasekaran.

Devarajan asked him, "What is democracy?"

"When you start a Sports Club, you'll share the responsibilities. Then you would enjoy its benefits, but share the income and expenditure, wouldn't you?"

"Yes sir"



Democracy is 'Government of the people, by the people, for the people'

– **Abraham Lincoln**

"Similarly, the citizens of a country select their representatives through elections. Thus, they take part in the direct governance of a country. This is termed **Democracy**. In a democratic form of government, a considerable amount of power lies with the people of that nation. People can participate in the politics of the country and decision making processes. There are different types of democracy."



6th Std Civics_Term 3_EM_Unit1.indd 197 29-09-2023 17:37:55

"Types of democracy!"

"Yes, there are various types of democracy in practice around the world. Among those, **direct democracy** and **representative democracy** are the most popular forms of government."

DO YOU KNOW?

The birth place of democracy is Greece.

Democracy is a term derived from two the Greek words "Demos" and cratia". 'Demos' means the people and 'Cratia' means the power or rule.

"What is Direct Democracy?" asked Sirajudeen.

"In a Direct Democracy, people have the power to frame laws. If we consider your Sports Club as an example, you all can discuss and amend laws and rules. The perspective of each member is considered and each one expresses his view. But how will you take a final decision?"

"The choice of the majority will be accepted. The others will also give their consent," said Selva.



In a Direct Democracy, only the citizens can make laws. All changes have to be approved by the citizen. The politicians only rule over parliamentary procedure. **Switzerland** has had a long history of a successful direct democracy.

HOTS

Is it possible to practise Direct Democracy in India?

"Yes, this system is actually known as Direct Democracy," said Rajasekaran.

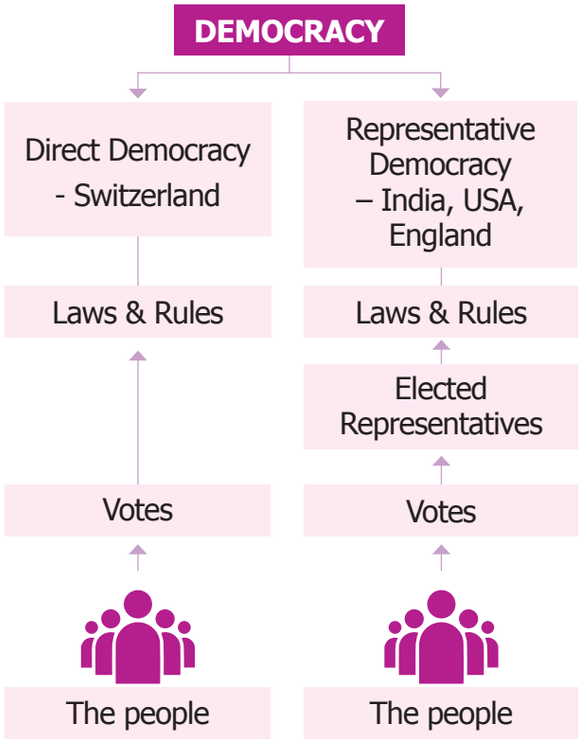
"What do you mean by Representative Democracy?"

"Imagine that your Sports Club has more number of members now. Is it possible for hundreds of them to gather and discuss to take various decisions?"

"No sir"

"In that case, all the members should be represented by a group of representatives, shouldn't they?"

"Yes," agreed the students in union.



"Those group members will administrate the sports club on behalf of all the other members. To select these representatives, elections are held. For example, many contest for the post of the Head, Secretary, Treasurer and members of the administration group.

6th Std Civics_Term 3_EM_Unit1.indd 198 29-09-2023 17:37:56

In the end, those who gain the maximum number of votes will be given the posts. On behalf of the other members, they obtain the power to take decisions in a democratic manner. This is termed as Representative Democracy."

REPRESENTATIVE DEMOCRACY

Parliamentary Democracy	Presidential Democracy
• India	• USA
• England	• Canada

"What is meant by democratic decision making?" questioned Judith.

"In the system of democracy, the power to take decisions does not lie with the Head. On the contrary, a group holds the power, but adheres to the rules and regulations. All the members of the group hold open discussions and take final decisions only when everyone is convinced. This is called democratic way of decision making."

"Are there rules and regulations to govern our country like the rules and regulations of this group?"



Tamil Nadu Legislative Assembly

"Yes. In a highly populated country like India, if people want to live peacefully, they have to follow certain rules and regulations, rights and duties properly. Hence, the constitution of India guides us in all these aspects and plays an important role in maintaining law and order."

DO YOU KNOW?

In 2007, the UNO General Assembly resolved to observe 15th September as the **International Day of Democracy**.

"What are the rights given in our Constitution?"

"Our Constitution ensures freedom, equality and justice to everyone."

"What other features are found in our constitution?"

"It defines the political principles, the structure of the government institutions and methods to follow these rules and regulations, the powers and responsibilities. And also, it fixes the Rights and Duties and the Directive Principles of the citizens. Thus our constitution provides a structure to us."

"Is the constitution of India such a detailed one?" asked Tamizhselvi in amazement.

"Indian Constitution is the longest written constitution in the world. It is drafted by the Drafting Committee of the Constituent Assembly headed by **Dr. B.R. Ambedkar**. That is why we call him as the '**Chief Architect of our Constitution**' Rajasekaran concluded.

The students clapped with joy and thanked him for the simple explanation of democracy.

6th Std Civics_Term 3_EM_Unit1.indd 199 29-09-2023 17:37:56

Aims of Democracy

Democracy is defined as "Government of the people, by the people and for the people."



In a democracy, the power is vested in the hands of the people. For that, the people should have rights to take decisions. Everyone cannot participate in decision making. So, the representative government elected by the people to form a democratic system, all those who attain the age of 18 are given the voting rights to elect the representatives. At the same time, the representatives have the responsibility to protect the welfare of the people.

World Democracy

New zealand is the first country to allow women to vote (1893). Voting rights to women were given in 1918 and 1920 in the UK and USA respectively. At the same time, the wealthy alone were given the voting rights in India. Many leaders like Mahatma Gandhi kept insisting on giving voting rights to all. Now in India, all the people above 18 years of age enjoy Universal Adult Franchise.



The world statistical data on democracy declares that 79% of the Indian citizens have faith in the democratic system. Hence, India ranks first among the democratic countries of the world.

Oldest Democracies in the World

Sl. No.	Democracy	Period	Location	Significance
1	Greek Democracy	5th century BC (BCE)	Greece	Foundation of political philosophy
2	Roman Empires Democracy	300 BC – 50 BC (BCE)	Italian Peninsula, Rome	Loads of expansions of the growth of civilization
3	San Merinos Democracy	AD (CE) 301	Italy	Earliest written constitution still in effect
4	The Iceland Democracy	AD (CE) 930	Thingvellir	The oldest and longest functioning parliament in the world.
5	The Isle of Man's Democracy	AD (CE) 927	Between Great Britain and Ireland	Self governing possessions of the crown
6	British Democracy	13th Century AD (CE)	England	Magna Carta of 1215
7	US Democracy	AD (CE) 1789	United States of America	The oldest standing democracy

6th Std Civics_Term 3_EM_Unit1.indd 200 29-09-2023 17:37:56

GLOSSARY

1. Democracy - a government formed by the people
2. Election - a process by which a representative is chosen
3. Decision - to make up one's mind
4. Government - a group of people with a authority to govern a country

RECAP

- "Government of the people, by the people for the people" is defined as democracy.
- Direct democracy and Representative democracy are the types of democracy.
- Our constitution ensures freedom, equality and justice to everyone.
- Indian constitution is the longest written constitution in the world.
- In India, all the people above 18 years of age enjoy Universal Adult Franchise.

Exercise

I. Choose the correct answer

1. Early man settled near _____ and practiced agriculture.

   a) plains b) bank of rivers
   c) mountains d) hills

2. The birth place of democracy is _____

   a) China b. America
   c) Greece d) Rome

3. _____ is celebrated as the International Democracy Day.

   a) September 15 b) October 15
   c) November 15 d) December 15

4. Who has the right to work in a direct Democracy?

   a) Men b) Women
   c) Representatives d) All eligible voters

II. Fill in the blanks

1. Direct Democracy is practised in _____
2. The definition of democracy is defined by _____.
3. People choose their representatives by giving their _____.
4. In our country _____ democracy is in practice.

III. Answer the following

1. What is Democracy?
2. What are the types of democracy?
3. Define: Direct Democracy.
4. Define: Representative Democracy.
5. What are the salient features of our constitution that you have understood?

IV. HOTs

1. Compare and contrast direct democracy and representative democracy.

V. Activitys

1. Find out your area's representative's names and write down

   a) MP b) MLA c) Local body member

2. Discuss about the merits and demerits of democracy.

6th Std Civics_Term 3_EM_Unit1.indd 201 29-09-2023 17:37:56

ICT CORNER

Democracy



Through this activity you will know about structure of government of India and political systems.

Steps:

Step 1: Use the URL or scan the QR code to open the activity page.

Step 2: Click the "**political systems**" to know government of India.

Step 3: Click the "**English**" button the map will appear.

Step 4: Choose and click "Tamilnadu" to know about the state government.



Step 1



Step 2



Step 3



Step 4

Browse in the link

Web: http://www.elections.in/ (or) scan the QR Code

*Pictures are indicatives only.

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Unit 2

Local Bodies – Rural and Urban



Learning Objectives

- To know about the structure and functions of rural and urban local bodies.
- To know about the Grama Sabha and the purpose of Grama Sabha meeting.
- To understand the special features of Panchayatraj.
- To know about the participation of women in local bodies.
- To know about the election of local body and will observe the forthcoming election.

Nandhini is in standard VI. It was her custom to read the headlines in the newspaper loudly to her parents Mr. Namburajan and Mrs. Manimegalai. They would clear her doubts. Sometimes, children from their neighbourhood would also join her and each one will read an article loudly. As it was a Saturday, Johnson, Maran and Anwar were also in Nandhini's house. Nandhini started to read an article from the newspaper.

"Avadi as been declared as corporation"

She was about to read the next heading, but she had a doubt and asked her father.

"Father, what is a corporation?"

"The Government of Tamil Nadu will declare certain municipalities based on above Ten laks population and high revenue. That's how Avadi has been declared as a corporation too", said her father Namburajan.

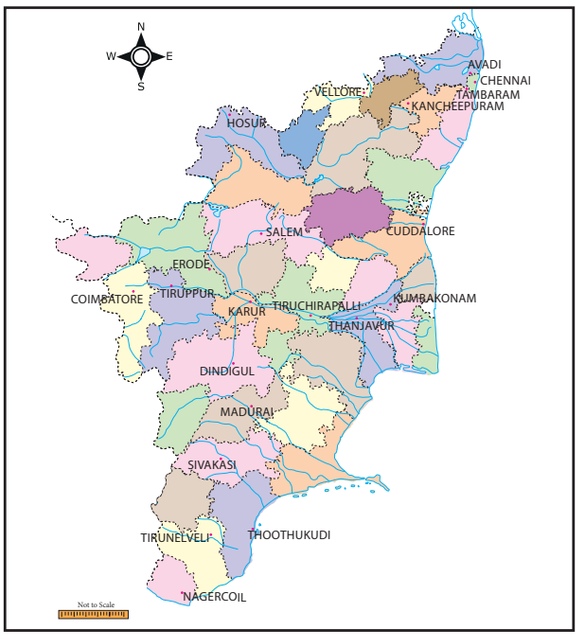
"Oh, if that is so, are there other corporations that exist already?"

"Yes, there are 21 corporations in Tamil Nadu, " said Namburajan.

6th Std Civics_Term 3_EM_Unit2.indd 203 29-09-2023 17:26:46

The List of corporations in Tamil Nadu

1. Chennai 2. Madurai 3. Coimbatore
4. Tiruchirapalli 5. Salem 6. Tirunelveli
7. Erode 8. Thoothukudi 9. Tiruppur
10. Vellore 11. Dindigul 12. Thanjavur
13. Nagercoil 14. Hosur 15. Avadi
16. Kancheepuram 17. Karur 18. Cuddalore
19. Sivakasi 20. Tambaram 21. Kumbakonam



DO YOU KNOW?

The Chennai Corporation which was founded in 1688 is the oldest local body in India.



"Father, what about the place we live in" enquired Maran.

"We live in a Panchayat, Maran".

"What is a Panchayat?"

"There are villages as well as cities in Tamil Nadu, aren't there?"

"Yes, father".

"Won't the needs of villages and cities differ? Our constitution has provided certain structures to fulfill the needs of the people.

Accordingly, the urban local bodies are categorized into City Minicipal Corporations, Municipalities and Town Panchayats, while the rural local bodies are categorised into Village Panchayats, Panchayat Unions and District Panchyats. These are together known as local bodies."

"Oh, are there so many divisions?"

"Yes, I'll tell you about them. Didn't I tell you about the City Municipal Corporations?"

"Yes, father".

"Those areas which have a population of more than one lakh and a high amount of revenue and is found in the level below the City Municipal Corporation is called a **Municipality**.

DO YOU KNOW?

- **Walajahpet Municipality** is the first Municipality in Tamil Nadu.

"You mentioned something about towns".

"A Town Panchayat has about 10,000 population. A **Town Panchayat** is between a village and a city.

6th Std Civics_Term 3_EM_Unit2.indd 204 29-09-2023 17:26:46

There is something special about the Town Panchayat. Can anyone tell me what is it?", asked Namburajan. Everyone was gazing at him. But none answered.

"Well, I'll tell the answer myself.

Tamil Nadu was the first state to introduce a town Panchayat in the whole of India".

All were amazed on hearing it.

A City Municipal Corporation has a **Commissioner,** who is an Indian Administrative Service (IAS) officer. Government officials are deputed as **Commissioners** for the municipalities. The administrative officer of a Municipality is an **Executive Officer** (EO).

"You mentioned about Panchayats and Panchayat Unions".

The **Village Panchayats** are the local bodies of villages. They act as a link between the people and the government. Villages are divided into wards based on their population. The representatives are elected by the people.



The Elected Representatives

1. Panchayat President
2. Ward members
3. Councillor
4. District Panchayat Ward Councillor

Panchayat Union

Many village Panchayats join to form a **Panchayat Union**. A **Councillor** is elected from each Panchayat, isn't it? Those councillors will elect a Panchayat Union **Chairperson** among themselves. A **Vice Chairperson** is also elected. A **Block Development Officer** (BDO) is the administrative head, of a Panchayat Union.

The services are provided on the Panchayat Union level.



The Nilgiris and **Perambalur** Districts have the lowest number of Panchayat Unions (4).

District Panchayat

A District Panchayat is formed in every district. A district is divided into wards on the basis of 50,000 population. The ward members are elected by the Village Panchayats. The members of the District Panchayat elect the **District Panchayat Committee Chairperson.** They provide essential services and facilities to the rural population and the planning and execution of development programmes for the district.

The local bodies are governed by the representatives elected by the people. The constituencies are called wards. People elect their ward members.

The Mayor of the City Municipal Corporation and the **Municipal Chairperson** are the elected representatives of the people. The people elect them. The Corporation **Deputy Mayor** and the Municipal **Vice Chairperson** are elected by the ward councillors" finished Namburajan.

"What are the benefits of local bodies, uncle?"

6th Std Civics_Term 3_EM_Unit2.indd 205 29-09-2023 17:26:47

"There are many benefits. The services provided can be divided as obligatory functions and discretionary functions. These are provided by the local bodies.

Functions of the village Panchayat

Obligatory Functions

- Water supply
- Street lighting
- Cleaning roads
- Drainage & sewage pipes system
- Laying down roads
- Activation of Central and State Government schemes

Discretionary Functions

- parks
- Libraries
- Playgrounds, etc.

Functions of the City Municipal Corporation

- Drinking water supply
- Street Lighting
- Maintenance of Clean Environment
- Primary Health Facilities
- Laying of Roads
- Building flyovers
- Space for markets
- Drainage System
- Solid waste management
- Corporation schools
- Parks
- Play grounds
- Birth and Death registration, etc.

"So, who does all these works?"

"As per the decisions taken in the Council meetings, the commissioner or officers assign these works to their subordinate officers or other servants. Thus, they all work in various levels to get these public works done".

"Will the Government provide funds for these services, father?"

"The Government directly allots funds for these works. The local bodies also collect revenue".

Revenue of the Village Panchayat

- House tax
- Professional tax
- Tax on shops
- Water charges
- Specific fees for property tax
- Specific fees for transfer of immovable property
- Funds from Central and State Governments, etc.

Revenue of the City Municipal Corporation

- House Tax
- Water Tax
- Tax on shopping complexes
- Professional Tax
- Entertainment Tax
- Vehicle Charges
- Funds by Central and State Government, etc.

"How are the Grama Sabha meetings

Activity

- Distinguish between rural and urban revenue and functions.
- Find out from your home: The taxes paid by your family.

6th Std Civics_Term 3_EM_Unit2.indd 206 29-09-2023 17:26:47

held, uncle?" asked Maran.

"Grama Sabha meetings? In movies, I have seen elders sitting under trees and discussing important matters and take decisions," said Johnson.

"No, no, both are different. A Grama Sabha is formed in every Village Panchayat. It is the only permanent unit in the Panchayat Raj System. Grama Sabha meetings are held even in smaller villages. The Grama Sabha is the grass root level democratic institution in a Village Panchayat".



Those who have attained the age of 18 years and whose names are found in the electoral roll of the same Panchayat can take part in a Grama Sabha meeting. The Grama Sabha meetings are conducted four times a year. Officers like the District Collector, the Block Development Officer, Panchyat President, Vice President, and Ward Members etc., also participate in this meeting. The people can freely express their needs and grievances".

When are these meetings convened?

January 26, May 1, August 15 and October 2.

Apart from these days, the meetings can be convened as per need or during emergency. These are called Special Grama Sabha meetings.

Activity

The teacher guides the student to visit the Grama Sabha meeting.

"Mahatma Gandhi advocated Panchayat Raj as the foundation of India's political system, as a form of government, where each village would be responsible for its own affairs. The Panchayat Raj Act was enacted on April 24, 1992".

DO YOU KNOW?

April 24 is National Panchayat Raj Day.

Special features of Panchayat Raj

- Grama Sabha
- Three tier local body governance
- Reservations
- Panchayat Elections
- Tenure
- Finance Commission
- Account and Audit, etc

"Thank you very much, uncle. We really learnt a lot about local bodies", said the children gratefully.

"I'm very happy that I could share so much with you today. That's enough of reading newspapers. Go out and play now", said Namburajan.

The children ran out to play joyously.

Activity

The Central Government gives awards to the best performing Village Panchayats. Find out if your village has received such awards.

6th Std Civics_Term 3_EM_Unit2.indd 207 29-09-2023 17:26:49

Role of women in the Local Self Government

All local bodies have a reservation of 33% for women. In the 2011 Local Bodies election, 38% seats were won by women. As per the Tamil Nadu Panchayats (Amendment) Act, 2016, 50% reservation for women is being fixed in Panchayat Raj institutions.

Activity

Find out about the ward members of your area. Talk to the women members and discuss about their participation and experiences.

Local Body Election



The tenure for the representatives of local self Government is 5 years. The election to the Local Bodies is held once in five years by the State Election Commission. Every state has a State Election Commission. The Tamil Nadu State Election Commission is situated in Koyambedu, Chennai.

Local Bodies of Tamil Nadu (At present)

Village Panchayats	-	12,525
Panchayat Unions	-	388
District Panchayats	-	36
Town Panchayats	-	490
Municipalities	-	138
Municipal Corporations	-	21

(Source: Tamil Nadu State Election Commission. www.tnsec.tn.nic.in)

Think it over

- Do you think the above numbers are stable? Find out about the recent changes.
- What is the number of votes cast by rural and urban voters in a local body election?

Works carried out by local bodies durings natural disasters and out break of diseases.



A-Z GLOSSARY

Town Panchayat	-	பேரூராட்சி
Municipality	-	நகராட்சி
Corporation	-	மாநகராட்சி
Village Panchayat	-	கிராம ஊராட்சி
Panchayat Union	-	ஊராட்சி ஒன்றியம்
District Panchayat	-	மாவட்ட ஊராட்சி

6th Std Civics_Term 3_EM_Unit2.indd 208 29-09-2023 17:26:50

RECAP

- Local bodies are structures to fulfill the needs of people.
- Panchayat, Panchayat Union and District Panchayat are rural local bodies.
- Town Panchayat, Municipality and Corporation are urban local bodies.
- Grama Sabha is the only permanent unit in a village Panchayat.
- Panchayat Raj System strengthened the local bodies.
- The election of local bodies take place in every five years.

Exercise

I. Choose the correct answer

1._____ is set up with several village panchayats

a) Panchayat Union
b) District Panchayat
c) Taluk
d) Revenue village

2. _____ is National Panchayat Raj Day.

a) January 24
b) July 24
c) November 24
d) April 24

3. The oldest urban local body in India is _____.

a) Delhi
b) Chennai
c) Kolkata
d) Mumbai

4. The head of a corporation is called a _____.

a) Mayor
b) Commissioner
c) Chair Person
d) President

II. Fill in the blanks

1. _____ is the first state in India to introduce town Panchayat.

2. The Panchayat Raj Act was enacted in the year _____.

3. The tenure of the local body representative is _____ years.

4. _____ is the first municipality in Tamil Nadu.

III. Match

Grama Sabha	-	Executive Officer
Panchayat Union	-	State Election Commission
Town Panchayat	-	Block Development Officer
Local body election	-	Permanent Unit

IV. Answer the following

1. Is there any corporation in your district? Name it.
2. What is the need for local bodies?
3. What are the divisions of a rural local body?
4. What are the divisions of a Urban local body?
5. Who are the representatives elected in a Village Panchayat?

6th Std Civics_Term 3_EM_Unit2.indd 209 29-09-2023 17:26:50

6. List out a few functions of corporations.
7. List out a few means of revenue of village Panchayats.
8. When are Grama Sabha meetings convened? What are the special on those days?
9. What are the special features of Panchayat Raj system?
10. What is the importance of Grama Sabha?

V. HOTs

1. Local bodies play an important role in the development of villages and cities. How?

VI. Activities

1. Prepare a questioner to interview a local body representative.
2. Discuss; If there is a contribution to the improvement of your school by local body representatives
3. If I were a local body representative, I would.....
4. Find out the number of local bodies in your district and list them.

Name of the District	Village Panchayat	Panchayat Union	District Panchayat	Town Panchayat	Municipality	Corporation

6th Std Civics_Term 3_EM_Unit2.indd 210 29-09-2023 17:26:50

ICT CORNER

Local body



Through this activity you will know about the local body structure of India.

Steps:

Step 1: Use the URL or scan the QR code to open the activity page.

Step 2: Click the "panchayat Raj" to know about panchayat rules and acts.

Step 3: Click the "Scheme" to know about state and central schemes of panchayat raj.

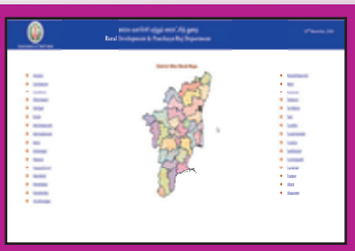
Step 4: Click the "map" option to know how many panchayat raj in tamilnadu.



Step 1



Step 2



Step 3



Step 4

Browse in the link

Web: https://www.tnrd.gov.in/index.html (or) scan the QR Code

*Pictures are indicatives only.

6th Std Civics_Term 3_EM_Unit2.indd 211 29-09-2023 17:26:53

Unit 3

Road Safety



Learning Objectives

- To understand about the importance of road safety.
- To know about the road rules and traffic signals.
- To learn about the road safety measures and strategies and ensure the safety of lives.

'Caution and care, make accident rare'

Traffic rules are the laws that govern how, when and why you are allowed to drive any vehicle. The traffic safety course education plays an important role in shaping the attitude and behaviour of children and young people ensuring to become responsible drivers, passengers, pedestrians and cyclists.

Keeping the children safe at all times can be tricky when you cannot be with them always.

Parents and teachers ensure the safety of the children at home and school. But who keeps them safe on the road? Therefore educating children about road safety is very important. Teaching about road safety to children can be started as soon as they are old enough to step out of the home.

Three types of traffic signs – Mandatory, Cautionary and Informatory

I. **Mandatory road signs** are the ones that give order regarding do's and don'ts and are to be followed strictly. These are generally circular in shape.



No entry



One Way



No right turn



No left turn



No U turn

6th Std Civics_Term 3_EM_Unit3.indd 212 27-09-2023 19:32:12

II **Cautionary road signs** are the ones that warn the road user regarding the road situation ahead. Cautionary signs are generally in triangular shape.


Narrow Bridge


Cross road


School


Left hand curve


Men at work

III **Informatory road signs** are the ones that give information regarding directions, destination, etc. Informatory signs are generally rectangular in shape.



Petrol Pump



Hospital


Eating Place



Parking


Railway station

	**Blue circles** give a positive instructions, about what is to be done.
	**Red rings** or **circles** give negative instructions. What should not be done.

Know your signals

What do the three colours red, amber and green signify?



RED means STOP- Wait behind the stop line.

- If there are no lines, stop before the traffic light at the intersection so that traffic light is clearly visible.
- Wait until a green signal appears before proceeding.
- You may turn left while the signal is red, if it is not prohibited by a sign. But give importance to pedestrians and other traffic.

AMBER means CAUTION-You may move on if the amber appears after you have already crossed the stop line or when you feel that your stopping may cause accident. Anyhow be extra careful.

GREEN means GO – Proceed ahead ensuring that the way is clear.

- You can make a right or left turn if not prohibited by signs, but take special care and give way to pedestrians crossing the road.

6th Std Civics_Term 3_EM_Unit3.indd 213 27-09-2023 19:32:15

- GREEN ARROW means that you can go in the direction shown by the arrow.

Cross roads and pedestrian crossing

Children have a tendency just to sprint across the street, as they like. Educate the children to never run across or along the road. Children can get distracted easily and leave their parent's hand to run or sprint away.

Children should cross only at pedestrian crossing.



Pedestrian Crossing

The pedestrian crossing was instituted in Britain in 1934. The roads were marked by dotted lines. On the pavement there were striped Belisha beacon light poles named after Britain's Minister of transport L. Horre-Belisha . The Zebra crossing with black and white stripes was developed after the Second World War.

Road signs, markings, traffic signals and other traffic devices are there to guide the road users and hence are the languages of the road. Every road user, whether a pedestrian, two-wheeler rider, driver of four-wheeled vehicle should have knowledge regarding these traffic controlling devices and should be aware of what they signify. **Traffic signs are there to regulate traffic, warn about hazards and to guide the road user.**

Always use pavements

Children must use the pavements while walking on the road.



Pedestrian

Do's

- Walk on any side of the road if there are footpaths.
- On roads without footpath walk on your extreme rightside facing the oncoming traffic.
- Use zebra crossing, foot over bridge & subways to cross the roads.



- Where such facilities are not available be extra cautious while crossing the road.
- Children below 8 years of age should cross the road with the help of elders.
- Cross the road when the vehicles are at a safe distance.
- Wear light coloured dresses during night.

6th Std Civics_Term 3_EM_Unit3.indd 214 27-09-2023 19:32:15

Don'ts

- Don't cross the road hastily by running.
- Don't cross the road in front of or in between parked vehicles.
- Don't try to cross the road from blind corners, turnings where you are not visible to the vehicle drivers.
- Don't jump over the railings to cross road.

Staying safe on a bicycle

Most children use bicycle to go to schools. So they should be aware of the road rules and road safety. Moreover they should maintain their bicycles in good condition.



Do's

- Cycle must be fitted with standard gadgets – bell, brakes, rearview mirror, both front and back mudguard painted white, reflective tapes affixed at the front and back.
- Cycle on the extreme left side of the road or use service road, if available
- Avoid busy roads.
- Keep a safe distance from fast motorized vehicles.
- Give proper indications before stopping or turning.

Don'ts



- Don't indulge in any kinds of stunts
- Don't load the cycle with another person or heavy goods.
- Don't ride holding onto other fast moving vehicle.

While commuting in School transportation

Dos

- Get up early and start early from home.
- Board the bus from the designated bus stop in a queue.
- Once inside the bus, behave properly.
- Hold on to the railings of the bus.
- Alight only at the designated bus stop.
- Get down only when the bus has stopped completely.
- If the driver is not following the road safety norms, bring it to the notice of school authorities/parents or traffic helpline.

Don'ts



6th Std Civics_Term 3_EM_Unit3.indd 215 27-09-2023 19:32:15

- Do not rush or run to catch your bus.
- Do not stand on the steps of the bus.
- Do not make noise that may distract the driver.
- Do not put any part of the body outside the bus.
- Do not get in or get down from a moving bus.

As pillion rider/co-passengers



- Always wear helmet/seatbelt.
- Do not indulge in talking with the driver.
- Children above 12 years of age should occupy the back seat.

Play at safe places

- Do not play on roads.
- Look for a playground or vacant land to play
- Do not play around a vehicle parked inside your school premises/colony or near your residence.

Exercise

I. Answer the following

1. Prepare slogans for road safety.
2. Identify the following signs.

a. 	b. 
c. 	d. 

3. Discuss about the statistics of 2017 accidents data.
4. Debate: Is wearing helmet necessary?
5. Draw posters related to road safety.

6th Std Civics_Term 3_EM_Unit3.indd 216 27-09-2023 19:32:15

ICT CORNER

Road Safety

Through this activity you will know abut safety rules and Road safety.



Steps:

Step 1: Use the URL or scan the QR code to open the activity page.

Step 2: Click the "Start" icon to enter the game page.

Step 3: Choose and Click any game you can start the game.

Step 4: Play and Finish the Game Step by Step.



Step 1



Step 2



Step 3



Step 4

Browse in the link

Web: https://www.sdera.wa.edu.au/programs/smart-steps/izzy-games/

*Pictures are indicatives only.

6th Std Civics_Term 3_EM_Unit3.indd 217 27-09-2023 19:32:21

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This book has been printed on 80 GSM Elegant Maplitho paper.
Printed by offset at:

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