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GOVERNMENT OF TAMILNADU

STANDARD NINE

TERM - I
VOLUME - 4

SOCIAL SCIENCE

Untouchability is Inhuman and a Crime

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Department Of School Education

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Government of Tamil Nadu

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Assessment

DIGI links

HOW TO USE THE BOOK

Learning Objectives

The scope of the lesson is presented

Introduction

The subject to be discussed in the lesson is Introduced

QR Code

Leads the students to animated audio, video aids for getting experiential learning

Do You Know?

Provides additional information related to the subject in boxes to stir up the curiosity of students

Infographs

Visual representations intended to make the complex simple and make the students grasp difficult concepts easily

Fun with History

Activities for 'learning by doing' individually or in groups

Summary

Describes the main points briefly in bullets for recapitulation

Exercise

For self-study and self evaluation

Glossary

Key words and technical terms explained at the end of the lesson for clarity

Reference

List of books and net sources for further reading

ICT Corner

Using technology for learning activites, which enables the students to access degital sources relevant to their lessons.

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UNIT 1

Evolution of Humans and Society - Prehistoric Period

Learning Objectives

- To trace the world's early history.
- To understand human evolution.
- To know prehistoric Tamilagam up to the Iron Age.

EZWI8Q

Introduction

We live in the age of Information Technology. The mobile phones have literally put the world on our finger tips. The all-encompassing knowledge that we possess now, which has helped in the development of powerful technology, did not emerge all of a sudden. The foundation for our modern life was facilitated by the development of the process of cognition among the human ancestors in the prehistoric age.

Prehistoric people were the pioneers of creative knowledge. From the artefacts and the languages they developed, we are able to understand how intelligent they were.

Artefact is an object or tool made or modified by humans.

Cognition refers to the act of mind in which knowledge and understanding are acquired through thoughts, experiences and senses. Cognition is related to development of human thought.

1.1 Origin of the Earth and the Geological Ages

The history of humans is closely related to the history of the earth. The earth contains geological, archaeological and biological records of historical times in its upper layers. They are important for reconstructing the history of the earth and various living organisms. The fossil bones of the human ancestors are embedded in the earth's layers.

Palaeoanthropologists and archaeologists excavate the soil and rock layers on the earth and extract evidence about human ancestors. These layers and the fossils are scientifically dated to study the various stages in human evolution and prehistory. Through the gathered evidence, they attempt to understand the evolution of human history and developments in a chronological order.

Archaeology is the study of human past through the analysis and interpretation of material remains.

Palaeoanthropology is the study of the human ancestors and their evolution by the study ofthe fossil remains.

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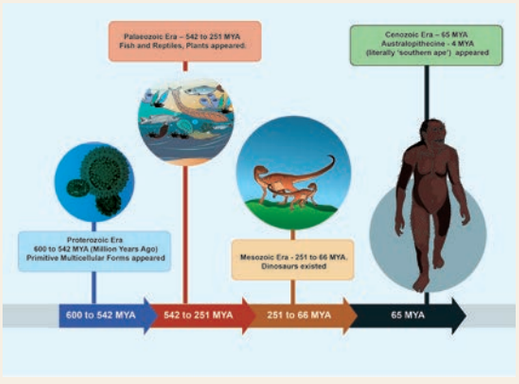
The earth was formed approximately 4.54 billion years ago. Gradually, conditions emerged for the growth of organisms. Then plants and animals came into being, and thereby foundation was laid for the evolution of humans. The long span of time in earth's history is divided into eras, periods and epochs by the geologists



The geological eras

The earliest trace of life in the form of microorganisms emerged 3.5 billion years ago. The primitive multi-cellular form of life first appeared in the Proterozoic era, about 600 to 542 million years ago. In the Palaeozoic era (542 to 251 million years ago), fish and reptiles along with various plants appeared. Dinosaurs existed in the Mesozoic Era (251 to 66 million years ago). Australopithecines (literally 'southern ape') appeared in the Cenozoic era, which commenced about 66 million years ago.

F16EAD

Australopithecines were the apes from which modern humans evolved. Now they are extinct, but they are considered to be the close relatives of humans.

1 billion = 100 crore
1 million = 10 lakh

1.2 Human Enquiries into the Past and Origin of the World

The Age of Speculation

Humans are the only species on earth concerned with understanding as well as explaining the world and the universe. In the course of evolution, humans became conscious and knowledgeable. They turned curious and began to think and ask questions about nature, organisms and the world around them. At first, they considered nature as God. They worshipped sun, moon and various natural forces about which they developed their own understanding, some of which is not scientific. The lack of scientific knowledge on the creation of the world is reflected in the ancient writings and religious literature.

BCE – Before Common Era

CE - Common Era

Scientific Foundations of Geology, Biology and Archaeology

The beginning of history writing can be traced to the ancient Greeks. Herodotus (484–425 BCE) is considered the Father of History, because the history he wrote was humanistic and rationalistic. In the Middle Ages, people were preoccupied with religion; but the real scientific enquiries became stronger only around the 15th and 16th centuries CE, with the Renaissance movement in Europe playing an influential role in rational thinking. Scientific enquiry was undertaken and scientific foundations for geology, biology, anthropology and archaeology were laid. Numerous ideas were articulated by various learned men in these fields during this period. Through their enquiry and observation, scholars believed that the evidence for the origin of the earth

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and the organisms lay in the upper layers of the earth.

The rise of scientific enquiry into the origin of humans was possible because of

- the interest in collection of archaeological remains and the opening of museums after the Renaissance Movement;
- the development of ideas of stratigraphy and geology;
- Darwin's theory of biological evolution;
- the discovery of human and animal fossils, stone tools, and artefacts of early civilizations; and
- the ability to decipher early scripts.

Stratigraphy – The study of origin, nature and relationships of rock and soil layers that were formed due to natural and cultural activities.

Oldest Museum – The museum of Ennigaldi-Nanna in Mesopotamia was established in 530 BCE. The princess Ennigaldi was the daughter of the neo-Babylonian king Nabonidus. The Capitoline Museum in Italy is perhaps the oldest surviving museum (1471 CE) at present. Ashmolean Museum at Oxford University is the oldest university museum in the world. It was established in 1677 CE.

Herbert Spencer's (1820–1903 CE) and Charles Darwin's (1809–1882 CE) theory on biological evolution, concepts of natural selection and survival of the fittest contributed to the scientific understanding of human origins. Charles Darwin published the books *On the Origin of Species* in 1859 and The Descent of Man in 1871.

Natural selection – The processes by which organisms that are better adapted to their environment would survive and produce more offspring.

Survival of the fittest means "survival of the form that will leave the most copies of itself in successive generations."

Fossil – Prehistoric animal or plant that turns into stone over a period of time (millions of years) because of chemical and physical processes. Animal bones are preserved due to mineralization. Palaeontology is the study of fossils.

The idea of the Three Age System proposed by C.J. Thomsen became the basis for understanding early human history. He classified the artefacts in the Danish National Museum, Copenhagen, into Stone Age, Bronze Age and Iron Age.

Stone Age – the period when stone was mainly used for making implements.

Bronze Age – the period when bronze metallurgy (extraction of metal from ores) developed.

Iron Age – the period when iron was smelted to produce implements.

Since the 19th century, scholars have used advanced scientific techniques and undertook systematic studies to contribute to the current state of knowledge on prehistory, human origins and the early civilisations. Now the theory of human evolution is widely accepted.

F1FAC1

1.3 Prehistory: From Australopithecus through Homo erectus to Homo sapiens

The introduction of writing system is a hallmark of the human civilisation. The period before the introduction of writing is called **prehistory**. Prehistoric societies

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are treated as pre-literate. But pre-literate should not be taken to mean primitive. The prehistoric people developed language, made beautiful paintings and artefacts, and they were highly skilful.

Who are we? What is the name of our species?

We are *Homo sapiens sapiens*

Human Evolution and Migration

The chimpanzee, gorillas and orangutans, along with humans, are collectively called the Great Apes. Among them, the chimpanzee is genetically the closest to humans.

The ancestors to humans were called Hominins, and their origins have been traced to Africa. They evolved from those origins and then began to move to other parts of the world in due course of time. The *Hominins* emerged around 7 to 5 million years ago. Skeletons of *Australopithecus*, one of the early species of this tribe, have been found in Africa.

DO YOU KNOW?

The DNA of a chimpanzee is 98% identical to that of a human being.

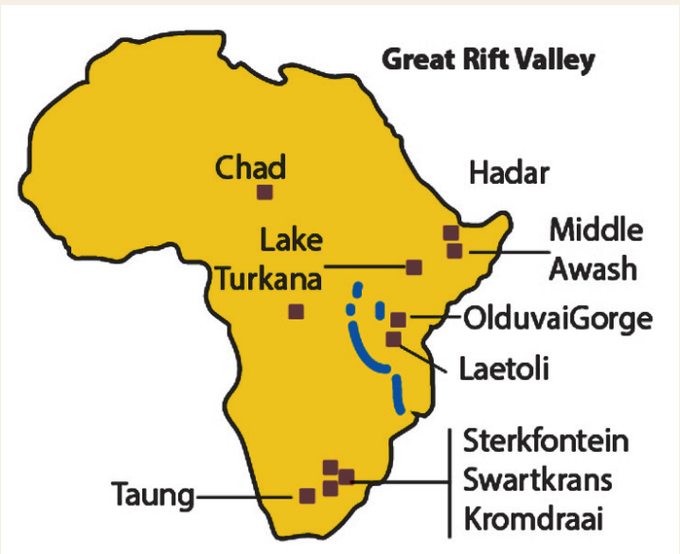
The Great Rift Valley in Africa has many sites that have evidence for the prehistoric period.

The Great Rift Valley is a valley-like formation that runs for about 6,400 km from the northern part of Syria to Central Mozambique in East Africa. This geographical feature is visible even from the space, and many prehistoric sites are found in eastern Africa.

Human ancestors are divided into various species according to their physical features.

Hominid refers to all the species of the modern and extinct great apes, which also includes humans.

Hominins (a zoological tribe) refers to the close relatives of human ancestors and their sister species including *Homo sapiens*



Prehistoric sites of human ancestors in Africa.

Fossils of Lucy
(Australopithecus)

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(the modern humans) and the extinct members of *Homo neanderthalensis*, *Homo erectus, Homo habilis* and various species of *Australopithecines*. Humans are the only living species of this 'tribe'. They stand erect, walk with two legs and have large brains. They can use tools and a few of them can communicate. It excludes the gorillas.

Homo habilis (handy human) was the earliest known human ancestors to make tools in Africa about 2.6 million years ago. Around 2 million years ago, the species of *Homo erectus/ergaster* emerged. This species made hand axes between 2 and 1 million years ago. They began to spread into various parts of Asia and Africa in time.

Anatomically, modern humans, called *Homo sapiens* (wise man), first appeared around 3,00,000 years ago in Africa. It is believed that these modern humans eventually migrated and dispersed into various parts of the world from around 60,000 years ago.

The chimpanzee and the pygmy chimpanzee (also known as bonobo) are our closest living relatives.

Prehistoric Cultures

While the fossil bones are classified as various species such as *Homo habilis*, *Homo erectus* and *Neanderthalensis*, based on the lithic tools, cultures are assigned names such as Earliest Lithic Assemblages, Oldowan Technology, Lower, Middle and Upper Palaeolithic and Mesolithic cultures.

Earliest Lithic Assemblages of Human Ancestors

The earliest tools made by human ancestors are found in Lomekwi in Kenya. They are dated to 3.3 million years. Oldowan tools occur in the Olduvai Gorge in Africa. They are 2 to 2.6 million years old. The human ancestors (*Australopithecines*) used hammer stones and produced sharp-edged flakes. The tools were used for cutting, slicing and processing food.

Stone tools from Kenya about 2.3 million year old.

An Olduvai chopper.

Lower Palaeolithic Culture

The Lower Palaeolithic Culture is marked by the human ancestors belonging to the species *Homo habilis* and *Homo erectus*. The human ancestors flaked large stone blocks and designed various tools including hand axes. These tools, which

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Hand axe - London Museum.

Flint biface from Saint-Acheul, France.

are found in Africa, Asia, and Europe, are dated the earliest to about 1.8 million years ago. They made various tools such as hand axes and cleavers to meet their subsistence needs. These tools are also known as bifaces. These tools have physical symmetry and convey the humans' cognitive (perception) skills. This culture is called the Lower Palaeolithic Culture. The hand axe tools are also known as Acheulian. This tool-making tradition continued till 250,000 years to 60,000 years ago in India.

Acheulian – They were first hand axes recognized at a place called St. Acheul in France. Hence they are called Acheulian tools.

Bifaces are tools that have flaking on both sides (bi = two, face = side).

Subsistence necessities of prehistoric humans were mainly food and water.

The human ancestors perhaps did not possess complex language skills we have now. They might have voiced a few sounds or words and possibly used sign language. They were intelligent enough to select stones as raw material and used the hammer **stones** to carefully flake the rocks and design tools for their needs. They hunted animals, fed on the meat of the animals killed by predators and gathered plant foods such as roots, nuts and fruits. In India, the Acheulian tools have been found near Chennai and many other sites such as Isampur in Karnataka and Bhimbetka in Madhya Pradesh.

Raw material is the naturally available stone block or pebbles selected by humans for making tools. Since these stones produced flakes with sharp edges, they were selected for making stone tools.

Core is the main block of stone from which small chips are flaked by using a hammer stone.

Flake is a small chip removed from a large stone block called the core.

Middle Palaeolithic Culture

After about 398000 years BCE, further changes took place in the lithic technology in Africa. The *Homo erectus* species existed during this period. Anatomically modern humans are said to have emerged around 3 lakh years ago.

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A cleaver.

Omo Kibish point.

Middle Palaeolithic flakes and tools India.

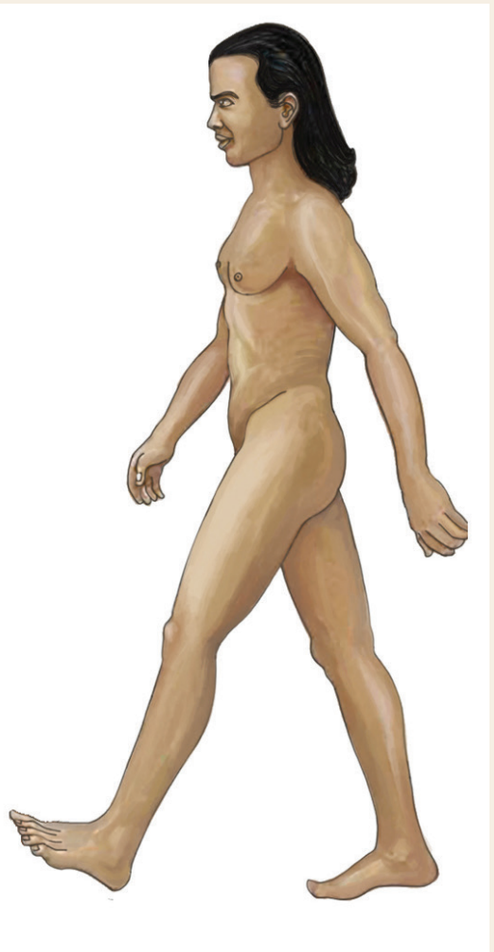
Lithic Technology: 'Lith' means stone. The methods and techniques involved in the production of stone tools are called lithic technology.

The hand axes turned out to be much attractive in design and many smaller tools were also produced. The core was prepared and then tools were made. Points and scrapers were used. Short blades were also produced. The lithic tool-making tradition of the Levalloisian belonged to this period. The tools made during this time are found in Europe and Central and western Asia.

Levalloisian tools are the implements made after preparing the core. It was named after the town of Levallois in France.

The Middle Palaeolithic Culture appeared between 3,85,000 and 1,98,000 years BCE ago in Europe and parts of western and South Asia. The tools that were made during this period were in use till about 28,000 BCE.

The people of this period were called Neanderthals. They buried the dead people systematically. Perhaps they were the first human ancestors to mourn death properly and bury the dead.



Neanderthal Man. Neanderthals did not have needles, sewn clothes and warm houses essential for survival in colder climates.

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Upper Palaeolithic Culture

The cultural phase that succeeded the Middle Palaeolithic is called the Upper Palaeolithic phase. This period was marked by innovation in tool technology. Long blades and burins were produced during this time. People used different varieties of silica-rich raw materials in this phase. Numerous paintings and art objects were made. The diversity of artefacts suggests the improvement in cognitive skills and the development of languages. Microliths appeared in this phase.

Burin is a stone-made chisel with a sharp cutting edge.

The modern humans, who first appeared as a result of human evolution in the sub-Saharan Africa 300,000 years ago, began to move to various parts of Asia around 60,000 years ago. They probably replaced the earlier populations. In Europe, humans known as Cro-Magnons lived in this period.

Horns and ivory were used for making tools and art works. Bone needles, fishhooks, harpoons and spears were also employed creatively. The humans of this time wore clothes and cooked food. The dead were placed in the burials with folded hands placed over their chest. Pendants and richly carved tools were also seen in use. Evidences from paintings, clay model sculptures and carvings are available. Images on stone and bone called **Venus** Statues were produced in Europe and in some parts of Asia.

The Upper Palaeolithic Culture appeared about 60,000 years ago. It continued till about the beginning of the Holocene about 12,000 years ago, when the Ice Age ended. Some of the rock paintings of India are also dated to this period.

Lascaux – Rock painting from west France – 17000 years old

Ice Age – the period before 8,000 BCE when many parts of the world remained covered by ice sheets and snow.

Mesolithic Culture

Mesolithic period is known as the Middle Stone Age, as it is placed between the Palaeolithic and Neolithic periods. People mainly used microlithic (small stone) tools during this period. These people were hunter-gatherers. With the global warming occurring after the Ice Age, they became highly mobile and occupied various eco-zones.

People of Mesolithic period widely employed microlithic technology. They made tiny artefacts that were less than 5 cm in size. They produced points, scrapers and arrowheads. They also used geometric tools such as lunates, triangles and trapezes. These tools were hafted onto wooden or bone handles and used.

Microliths are stone artefacts of small size.

The dating of the Mesolithic Culture varies across different parts of the world. It was pre-agricultural in certain areas. In northwest Europe, the people of this culture appeared between 8,000 and 3,000 years ago. In India, Mesolithic

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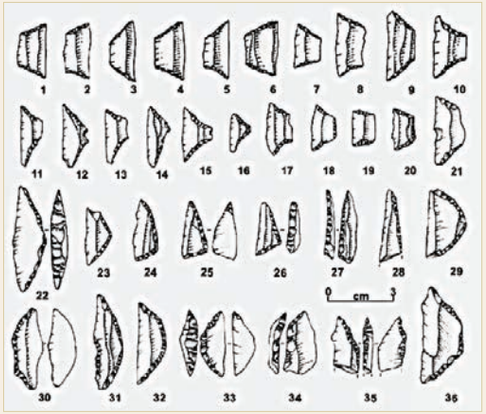

Microlithic tools

Rock paintings from Bhimbetka

Culture emerged around 10,000 BCE and in Tamil Nadu it continued up to 1000 BCE, till the beginning of the Iron Age. Some of the rock paintings of India date to the Mesolithic Period.

Neolithic Culture and the Beginning of Agriculture

The period called Neolithic marks the beginning of agriculture and animal domestication. It is an important phase in history. Early evidence of the Neolithic period is found in the fertile crescent region of Egypt and Mesopotamia, the Indus region, the Gangetic valley and in China. By about 10,000 BCE to 5000 BCE, agriculture had come to be practised in these regions.

DO YOU KNOW?

Wheat, barley and peas were domesticated around 10,000 years ago.

Fruit and nut trees were domesticated around 4,000 BCE. They comprised olives, figs, dates, pomegranates and grapes.

Fertile Crescent Region refers to the area covering Egypt, Israel-Palestine, and Iraq, which is in the shape of crescent moon.

Neolithic Age is called the 'new age', because of the new grinding and polishing techniques used for the tools. The Neolithic people also used the flaked stone tools. Until the Mesolithic period, people mainly hunted and gathered food for their subsistence. By hunting and gathering people obtained very limited food as a result of which only a small number of people could exist in a particular region.

F1P6DN

The introduction of domestication of animals and cultivating plants at home led to production and supply of large quantities of grains and animal food. The fertile soil deposited by the river on its banks helped the growth of agriculture. People preferred to live on river banks as it was better for adaptation. As a result of domestication and cultivating plants, there was an excess food production. The surplus food production was a main factor for the development of early civilisations. Permanent residences were built and large villages emerged as a result. Hence, the development of this period is called Neolithic Revolution.

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Domestication of Animals and Plants: A Milestone in Human History

Rice was probably cultivated in India and China around 7000 BCE or even earlier. Wheat and barley were cultivated at Mehrgarh in northwestern part of the Indian subcontinent (Pakistan) before 6000 BCE.

Animal domestication developed as part of symbiotic life. Dogs may have been domesticated first. Friendly animals were gradually domesticated. Sheep and goat were domesticated around 10,000 BCE in Southwest Asia. Oxen were used in Sumerian civilisation for tilling the land. Mehrgarh in Pakistan has evidence of sheep, goat and cattle domestication in the Neolithic period.

1.4 Prehistoric Tamilagam

Background to Prehistory

Have you ever thought about these questions?

- The origin of the people in Tamil region.
- How did cultures develop here?

We seek answer to these questions in this section.

In order to understand the cultural developments of the Sangam Age (which we discuss in the third lesson), we need to know about the prehistoric cultures of Tamil Nadu. Hence, let us see how and when humans first emerged here, before knowing about the genesis of Tamil culture.

Timeline: The Course of Cultures in Ancient Tamilagam

Culture	Time Period	Cultural Traits
Palaeolithic Period	Circa. 20,00,000 years to circa. 8,000 BCE	Hand axes, cleavers Hunting and gathering
Mesolithic Period	Circa. 8,000 years to circa. 1,300 BCE	Microlithic tools No knowledge of metal Hunting of animals and birds Gathering of plant food
Neolithic Period	Circa. 2,000 BCE to 1,000 BCE	Polished Stone Axes Microliths Domestication of animals Cultivation of crops Multiplicity of groups Co-existence of hunter-gatherers and pastoral groups
Iron Age	Circa. 1,300 BCE to 500 BCE	Megalithic burial custom Co-existence of hunter-gatherers and pastoral groups Development of chiefdom Knowledge of iron, black and red ware, black ware ceramics Craft specialisation, specialised groups: potters, blacksmiths
Early Historic and Sangam Age	300 BCE to 300 CE	Cultural traits of Iron age Monarchies of Chera, Chola and Pandya Development of hero worship Poetic traditions and literature Trade and exchange by sea

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DO YOU KNOW?

Athirampakkam and Gudiyam Cave yielded both Early and Middle Palaeolithic artefacts.

Lower Palaeolithic Culture in Tamil Nadu

One of the oldest Stone Age tools in the world made by human ancestors, called **hominins,** had been produced in Tamil Nadu. These stone tools are found near the Chennai region at several sites, especially at Athirampakkam. The **archaeological excavations** at this site and **cosmic-ray exposure dating** of the artefacts suggest that people lived here about 1.5 to 2 million years ago. The Kosasthalaiyar river is one of the major cradles of human ancestors in the world. The people who lived here belonged to the species of *Homo erectus*.

Archaeological excavation refers to digging undertaken to recover archaeological evidence such as stone tools, pottery, animal bones and pollens, in order to understand the past lifestyle of humans.

Cosmic-ray exposure dating – A method in which exposure to cosmogenic rays is done for dating the samples.

In 1863, Sir Robert Bruce Foote, a geologist from England, first discovered Palaeolithic tools at Pallavaram near Chennai. They are the earliest finds of such tools in India. Hence, the hand axe assemblages were considered the **Madras Stone Tool Industry.** The tools that he discovered are now housed in the Chennai Museum.

The Palaeolithic people hunted wild animals and gathered the naturally available fruits, roots, nuts and leaves. They did not have knowledge of iron and pottery making, which developed much later in history.

Hand axes and cleavers are the important tool types of the Lower Palaeolithic period. These tools fitted with a wooden and bone handle were used for cutting, piercing and digging. The people of this time also used hammer stones and spheroids. The quartzite pebbles and cobbles were chosen as raw materials. The tools are found in the soil deposits and also in the exposed river side. They occur at Pallavaram, Gudiyam cave, Athirampakkam, Vadamadurai, Erumaivettipalayam and Parikulam.

Lemuria and the Tamils

Some researchers relate the origin of the Tamils to the submerged continent of Lemuria. This theory of Lemuria continent was proposed in the 19th century. In the wake of advancements in plate tectonics theory, differing views are put forth by scholars.

The available literary references point to the submergence of areas around Kanyakumari. Some parts of Sri Lanka and Tamil Nadu were connected by land about 5000 years BCE. It is possible that some land might have submerged near Kanyakumari and around the coast of India, because of the rising sea levels. Underwater surveys are necessary in this area.

Archaeological research reveals that at least a section of people may have been living continuously in South India, including Tamil Nadu, from the Mesolithic and Neolithic times.

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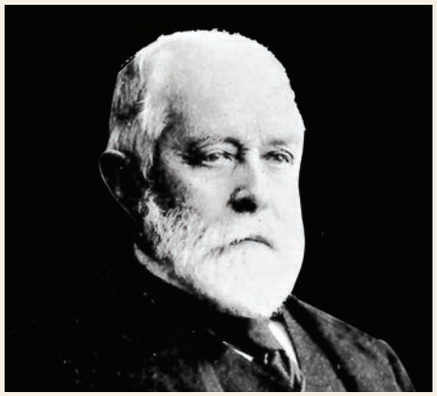
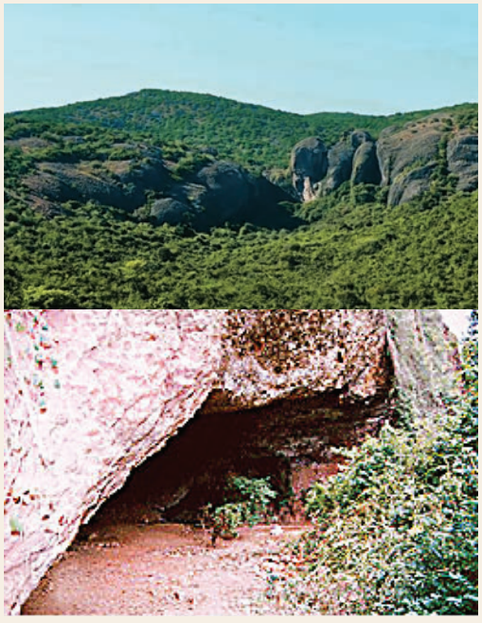


Sir Robert Bruce Foote discovered the first Palaeolithic tools in India at Pallavaram.

Tools discovered by Robert Bruce Foote



Gudiyam Cave near Chennai.

The Lower Palaeolithic tools are also found in the North Arcot and Dharmapuri districts. The people belonging to this period used **basalt rocks** for manufacturing artefacts. However, the southern part of Tamil Nadu and Sri Lanka do not have evidence of Lower Palaeolithic Culture.

Basalt rocks are igneous rocks: Igneous rocks are those formed from the molten lava from the earth.

The Lower Palaeolithic Culture is datable to about 2 - 1.5 million years at Athirampakkam. This cultural phase continued in other parts of India up to 300,000 years ago.

Middle Palaeolithic Culture in Tamil Nadu

In the course of time, the **Middle Palaeolithic Culture** emerged during 3,85,000 - 1,72,000 years ago. The tool types of this period underwent a change and smaller artefacts were used. Cores, flakes, scrapers, knives, borers, Levalloisian flakes, hand axes and cleavers are the artefact types of this period. Compared to the previous phase, these tool types became smaller in size.

Evidence for the Middle Palaeolithic Culture can be observed in some parts of Tamil Nadu. In the southern part of Tamil Nadu, at T. Pudupatti and Sivarakkottai, artefacts of the Middle Palaeolithic tools have been collected. Also near Thanjavur and Ariyalur, similar artefacts have been found.

Mesolithic Culture in Tamil Nadu

In many parts of the world, and in some parts of India, the Upper Palaeolithic Culture succeeded the Middle Palaeolithic Culture. There is no evidence for the Upper Palaeolithic Culture in Tamil Nadu. But the people who used **microliths** or small-stone artefacts lived in many parts of Tamil Nadu. Since this cultural period

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Microlithic flakes from Tamil Nadu.

occurs between Palaeolithic and Neolithic Culture, it is known as Mesolithic Culture or Middle Stone Age.

Evidence for the existence of Mesolithic hunter-gatherers is found at Chennai, North Arcot, Dharmapuri, Salem, Coimbatore, Ariyalur, Tiruchirappalli, Pudukkottai, Madurai, Sivagangai, Tirunelveli and Kanyakumari. The teri sites near Thoothukudi have evidence of microlithic artefacts. These sites have red sand dunes called **teris.**

Mesolithic people might have engaged in fishing activities. The microlithic artefacts of southern Tamil Nadu are also found in the coastal regions of Sri Lanka. Geologists argue that the Tamil Nadu region and Sri Lanka remained connected before 5000 BCE when the sea level was low.

The people of this period used small artefacts made of **chert** and **quartz**. The tool types are **scrapers**, **lunates** and **triangles**. These people hunted wild animals and gathered fruits, nuts and roots for their **subsistence**.

Scrapers are tools used for scraping the surfaces. Scrapers are similar to the tools used in the kitchen for removing skin of vegetables.

Triangles are tools in the shape of triangles.

Lunates are tools in the shape of a crescent.

Neolithic Culture in Tamil Nadu

The culture that domesticated animals and cultivated crops is called Neolithic. It is known as the New Stone Age. The Neolithic people used polished stone axes called celts. Cattle rearing was their main occupation. They lived in small villages with houses made of thatched roof and walls plastered with clay. Evidence of Neolithic village is found at Payyampalli in Vellore district and a few sites in the Dharmapuri region.

Payyampalli is a village in Vellore district of Tamil Nadu. The earliest evidence for the domestication of animals and cultivation of plants is found at this site, which was excavated by the Archaeological Survey of India. Evidence for pottery making and cultivation of horse gram and green gram has been found in this village.

These Neolithic sites were part of the Southern Neolithic Culture of India. They are mainly concentrated in the Andhra Pradesh and Karnataka regions. The Neolithic people used stone axes fitted on a wooden handle.These polished stone axes are worshipped in many village temples of Tamil Nadu even today.

DO YOU KNOW?

Neolithic people perhaps devised the first pottery. They made pottery, using a slow wheel called turn-table or made pottery out of hand. Before firing, the pottery was polished with pebbles. This process is known as burnishing.

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Iron Age / Megalithic period

The **cultural period** that succeeded the Neolithic is called the Iron Age. As the name suggests, people used iron technology. It preceded the Sangam Age. The Iron Age was a formative period and the foundation for the Sangam Age was laid in this time. During the Iron Age, many parts of Tamil Nadu were occupied by people. An exchange relationship developed among the people.

The people of this age had knowledge of metallurgy and pottery making. They used iron and bronze objects and gold ornaments. They used shell ornaments and beads made of carnelian and quartz. The evidence for Iron Age is found at many sites including Adhichanallur in Tirunelveli district, Sanur near Madhuranthakam and Sithannavasal near Pudukkottai. Megalithic burial sites are found in the whole of Tamil Nadu.

Megalithic Burial Types

The Iron Age is also known as megalithic, since people created burials with large stones for the dead people. Within these burials, the skeletons or a few bones of the dead persons were placed along with grave goods including iron objects, carnelian beads and bronze objects. Some of the burials do not have human bones and they have only the grave goods. They may be called memorial burials.

A Menhir

An urn covered with lids in Adhichanallur.

A stone circle with Menhir and the capstone.

Sarcophagus

Dolmen

Cist, Kodumanal.

Kodakkal, Kerala.

Toppikkal, Kerala.

Paththikal, Kerala.

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Grave goods are the objects placed in the burials along with the physical remains (bones) of the dead. People may have believed that these would be useful in the after-life. Egyptian pyramids also have similar artefacts.

Similar burials were also built in the early historic period or the Sangam Age. The Sangam literature mentions the various burial practices of the people. The megalithic burials are classified as dolmens, cists, menhirs, rock-cut caves, urn burials and sarcophagus. The burial types of Kodakkal (umbrella stone), Toppikkal (hatstone) and Paththikal (hoodstone) are found in Kerala. Dolmens, table-like stone structures, were erected as funerary monuments. Cists are stone enclosures buried under the earth. They were created by placing four stone slabs on the sides, one on top of each other. The cists and dolmens have openings called portholes. Urns are pottery jars and were used for burying the dead. Sarcophagi are burial receptacles made of terracotta. They sometimes had multiple legs. Menhirs are pillar-like stones erected as part of the burials or memorials.

Portholes are holes found in the cists and dolmens on one side. They may have acted as the entrance to the burials. There is a view that they were meant for the movement of the soul or spirit.

Why did they build using numerous burial types? What is the basis of this variation? There could be several factors influencing the megalithic burial types. For example, social status or the importance of the individuals buried or simply the choice of the relatives of the dead could have been the reasons. Raw material availability is another reason. In the deltaic areas where stones are not available, people used the simple urns made by potters using clay.

The menhirs may have been erected for the heroes in the Iron Age. The tradition of hero stones might have begun in the Iron Age or even before.

Agriculture and Pastoralism

The people in the Iron Age practiced agriculture, domesticated cattle and sheep, and some of the groups were still hunting and gathering. Millets and rice were cultivated. Irrigation management developed in this period, since many of the megalithic sites are found nearby rivers and tanks. In the deltaic regions, irrigation as a technology had developed. Evidence of rice is seen in the megalithic sites like Adhichanallur in Thoothukudi district and Porunthal near Palani.

Iron Age Society and Polity

The Iron Age society had farming communities, pastoralists and hunter-gatherers. Craft specialists, potters and blacksmiths were the professionals during this period. The society had several groups of peoples (tribes). The size of the burials and the variations found in the burial goods suggests the existence of numerous social groups and their diverse practices. Some of them seem to have had organised chiefdoms. Cattle lifting leading to wars and encroachment and expansion of territories had also started taking place in this period.

Chiefdoms were stratified societies in which chiefs were selected based on kinship relations.

The Ashokan inscriptions datable to third century BCE refers to the Cheras, Cholas, Pandyas and Satyaputras outside his empire in Tamilagam. If the Cheras, Cholas, Pandyas and Satyaputras had been powerful political powers in the Mauryan period, they must have commenced their political rule in the Iron Age.

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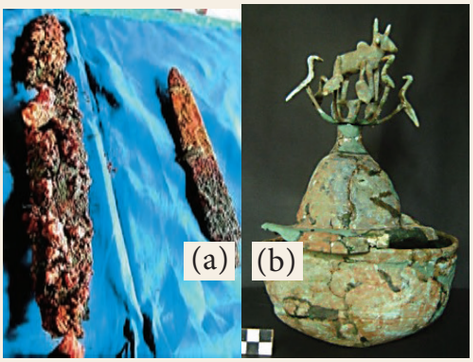
Black and red ware in Adhichanallur.



(a)Iron sword and dagger in Adhichanallur.
(b) Bronze vessel from a Burial at Auroville, puducherry

Pottery

Pottery is an important evidence found in the archaeological sites. The Iron Age and Sangam age people used the black and red colours to make black ware and red ware pottery. Potteries were used for cooking, storage and dining purposes. The black and red ware pottery has a black inside and a red outside, with lustrous surfaces.

Iron Technology and Metal Tools

The megalithic burials have abundant iron objects placed in the burials as grave goods. Weapons such as swords and daggers, axes, chisels, lamps and tripod stands are also found. Some of these objects were hafted to wooden or bone or horn handles and used. The iron tools were used for agriculture, hunting, gathering and in battles. Bronze bowls, vessels with stylish finials decorated with animals and birds, bronze mirrors and bells have also been found.

DO YOU KNOW?

Prehistoric period does not have evidence of writing.

SUMMARY

- The history of humans is intimately linked with the history of the earth. The earth originated around 4.54 billion years ago.
- The ancestors of human called hominins appeared about 5–7 million years ago.
- Although people gave divine explanations for the origin of humans, science believes in the theory of human evolution from the great apes.
- Humans began to domesticate animals and cultivate crops. The agricultural revolution led to many changes. Humans lived in permanent houses, made pottery and with the surplus production, they developed various crafts.
- The earliest evidence of humans is available in Tamil Nadu around 2 - 1.5 million years ago.
- The Middle Palaeolithic Culture is found in some parts of Tamil Nadu.
- The Mesolithic people lived in all the areas of Tamil Nadu.
- Iron tools were used in agriculture.
- The Iron Age saw further expansion of people in various cultural zones. The foundation of subsequent Sangam Age was laid during this age.

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EXERCISE

F1Y2FB

I. Choose the correct answer

1. _____ is genetically closest to humans
   (a) Gorilla
   (b) Chimpanzee
   (c) Orang-utan
   (d) Great Apes

2. The period called_____ marks the beginning of agriculture and animal domestication.
   (a) Palaeolithic
   (b) Mesolithic
   (c) Neolithic
   (d) Megalithic

3. Direct ancestor of modern man was _____.
   (a) Homo habilis
   (b) Homo erectus
   (c) Homo sapiens
   (d) Neanderthal man

4. _____ inscriptions datable to third century BCE refer to the Cheras, Cholas and Pandyas in ancient Tamilagam.
   (a) Pulekesin
   (b) Ashoka
   (c) Chandragupta
   (d) Dhanananda

5. _____ refers to the area covering Egypt, Israel-Palestine and Iraq.
   (a) Great Rift Valley
   (b) Fertile Crescent
   (c) Solo river
   (d) Neander Valley

6. Sir Robert Bruce Foote, a geologist from England first discovered the _____ tools at Pallavaram near Chennai.
   (a) Stone Age
   (b) Palaeolithic
   (c) Mesolithic
   (d) Neolithic

7. (i) The period before the introduction of writing is called pre-history.
   (ii) The pre-historic people developed language, made beautiful paintings and artefacts.
   (iii) The pre-historic societies are treated as literate.
   (iv) The pre-historic period is called ancient.
   a) (i) is correct
   b) (i) and (ii) are correct
   c) (i) and (iv) are correct
   d) (ii) and (iii) are correct

8. (i) The Neolithic people used polished stone axes called Celts
   (ii) Evidence of Neolithic village is found at Payyampalli in Chennai district
   (iii) The cultural period that succeeded the Neolithic is called the Bronze Age
   (iv) The period that witnessed domestication of animals and cultivation of crops is called Mesolithic
   a) (i) is correct
   b) (ii) is correct
   c) (ii) and (iii) are correct
   d) (iv) is correct

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9. Assertion (A): Many of the Mesolithic sites are found nearby rivers and tanks.

   Reason (R): Irrigation management developed during Mesolithic period.

   a) A and R are correct and R explains A

   b) A and R are correct but R doesn't explain A

   c) A is correct but R is incorrect

   d) A and R both are incorrect

10. Assertion (A): The Ashokan inscriptions datable to third century BCE refer to the Cheras, Cholas, Pandyas and Satyaputras outside his empire in Tamilagam.

    Reason (R): Ancient kings of Tamilagam commenced their political rule in the Iron Age.

    a) A and R are correct and R explains A

    b) A and R are correct but R doesn't explain A

    c) A is correct but R is incorrect

    d) A and R both are incorrect

II. Fill in the blanks

1. _____ is an object or tool made or modified by humans.
2. The primitive multi - cellular life first appeared in the age of _____.
3. Hand axes and cleavers are the important tool types of the _____ culture.
4. The methods and techniques involved in the production of stone tools are called _____ technology.
5. _____ is known as the Middle Stone Age, as it is placed between the Palaeolithic and Neolithic.

III. Find out the correct statement

1. a) The concept 'survival of the fittest' contributed to the scientific understanding of human origins.

   b) The book on the Origin of Species was published by Herbert Spencer.

   c) Darwin's theory of biological evolution connects with the process of natural selection.

   d) Geology is the study of lithic technology.

2. aAmong the great Apes Orang-utan is genetically the closest to humans.

   c) The ancestors to humans were called Hominins and their origins have been traced to Africa.

   d) Flake is a small chip that has flaking on both sides.

   d) Acheulian is the main block of stone from which small chips are flaked by using a hammer stone.

IV. Match the following

1.	Palaeo anthropology	-	Teris
2.	Hand axe tools	-	Venus
3.	Images on stone and bone	-	Acheulian
4.	Red sand dunes	-	Microliths
5.	Stone artefacts of small size	-	the study of the human ancestors

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V. Answer the following briefly

1. Discuss how the age of speculation made humans become conscious and knowledgeable.
2. Write a note on the impact of pastoralism on the prehistoric people in Tamil Nadu.
3. Enumerate the distinctive characteristics of Neanderthals.
4. List out the features of Megalithic Burial types.
5. Domestication of animals is a milestone in Human history. Explain.
6. Examine the tool making technical skills of lower Palaeolithic people.

VI. Answer all the questions given under each caption

1. Hominid and Hominins
   a) Who are Hominids?
   b) Who was the earliest human ancestor to make tools in Africa?
   c) How are the modern humans known?
   d) Name any one species of this tribe

2. Earliest Lithic Assemblages of Human ancestors
   a) Where are Acheulian tools are reported to have been found in Karnataka and in Madhya Pradesh?
   b) What is meant by Lithic Technology?
   c) What are Biface tools?
   d) Name a few stone tools used by the human ancestors.

VII. Answer the following in detail

1. The developments in the fields of agriculture, pottery and metal tools are considered a landmark in the life of Megalithic period-Substantiate.
2. The history of humans is closely related to the history of the earth. Elucidate.

FUN WITH HISTORY

Student Activities

Mark the prehistoric sites on the world map

Organize an exhibition on the pre-historic sites of Tamil Nadu

Assignment with teacher's guidance

A power-point presentation on the origin of human life

A power-point presentation on the pre-historic tools

A power-point presentation on the scripts of the ancient

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TAMIL GLOSSARY

Archaeology	-	தொல்லியல்
Artefact	-	செய்பொருள்
Billion	-	நூறு கோடி
Bronze Age	-	வெண்கலக் காலம்
Cognition	-	அறிதல்
Iron Age	-	இரும்புக்காலம்
Mesolithic Period	-	இடைக்கற்காலம்
Microliths	-	நுண்கற்கருவிகள்
Million	-	பத்து இலட்சம்
Neolithic	-	புதிய கற்காலம்
Palaeoanthropology	-	தொல் மானுடவியல்
Palaeoantologist	-	தொல்லுயிரியலாளர்
Palaeolithic	-	பழங்கற்காலம்
Prehistory	-	தொல்பழங்காலம் (வரலாற்றுக்கு முற்பட்ட காலம்)
Stone Age	-	கற்காலம்

ENGLISH GLOSSARY

Subsistence	-	means minimum requirements for maintaining human existence.
Assemblage	-	A collection of artefacts and other objects unearthed from archaeological sites.

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INTERNET RESOURCES

http://www.sharmaheritage.com
http://humanorigins.si.edu
https://www.nature.com
https://www.britannica.com
http://www.ancient-origins.net

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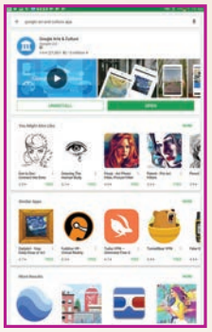
ICT CORNER

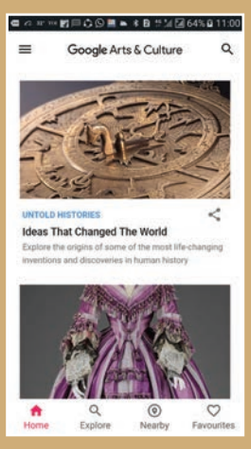
Explore Pre-Historic Objects in Museums

Back in Time



Steps

- Scan the QR code and install the app.
- You can see three bars at the left side of the screen. Click them.
- When we click on 'collections', you can find world famous Museums. Select 'British Museum' Take a tour by clicking the yellow man icon. Click on 'Collections' to view the images of various objects in the Museum with high resolution and at the relevant ages.
- Click on the 'clock' to watch the timeline.



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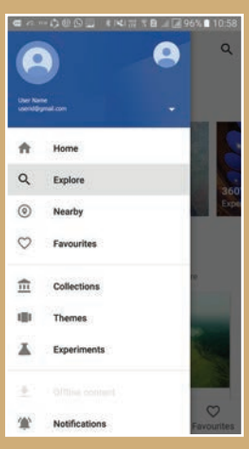

Step 2

Step 3

Step 4

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UNIT 2

Ancient Civilisations

Learning Objectives

- To learn about early societies and state formations
- To understand the development of civilisations
- To learn about the ancient Egyptian civilisation
- To study the main features of the Mesopotamian civilisations
- To know the Chinese civilisation
- To gain knowledge about the Indus civilisation

F27XGY

Introduction

Societies that adopted complex ways of life were more organised than the early hunter-gatherer and Neolithic farming societies. Urban socties had social stratification and well-planned cities. They practised crafts, engaged in trade and exchange, adopted science and technology and formed political organisation (early form of state). Hence the term 'civilisation' is used to distinguish them from the early forms of societies. However, they should not be considered superior to other forms of societies, since each culture or civilisation had its own unique features.

2.1 Early Societies and Early State Formation

Societies before the modern times are classified as bands, tribes, chiefdoms and proto-state by scholars. Early societies were organised as **bands** during the Pre-Mesolithic Age.

Bands were small groups of people who were nomadic, making their living on **hunting and gathering**.

As the Neolithic way of life came into practice, large groups of people were concentrated in the villages. They were organised as **tribal** communities with a sedentary or semi sedentary lifestyle. The **tribal** organisations that developed in the Mesolithic times were mostly egalitarian in nature.

The **chiefdoms** are political formations larger than the tribal-level formations. People under chiefdoms lived over a larger area than the areas covered by tribes. Social distinction existed among these groups in terms of wealth and authority.

The cultural developments after the Neolithic period in certain regions that had a flowing river and rich and fertile alluvial soil gave rise to civilisations. In the post-Neolithic period, that is, in the Bronze Age societies, early form of state (proto-state) originated in the areas where agricultural surplus and population density was more.

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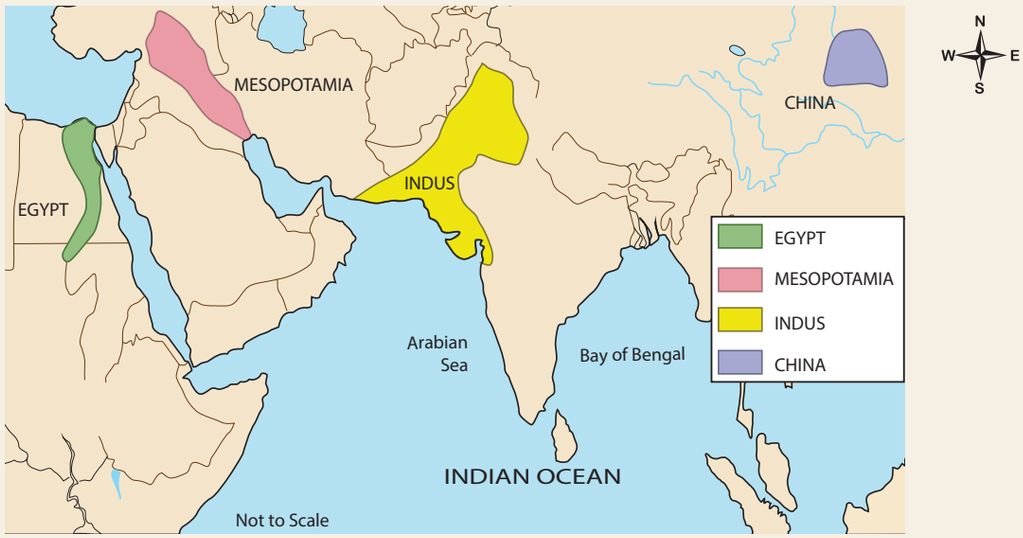

Early world civilisations

These early states had a political system that controlled many smaller regions, chiefs and cities through conquests. The kings and royals occupied the higher position in the social hierarchy. Palatial buildings were built for their dwelling. Priests, king's officials and traders formed the middle strata. Craft persons and peasants formed the lower sections in this hierarchical social system. Taxes were collected from the peasants and artisans. Language was refined, literary texts were composed and script developed. Sciences, including mathematics and astronomy, emerged from research. The process of urbanisation began.

2.2 Early Civilisations

Civilisation is seen as an advanced, organised way of life. It instilled a way of life that could be considered as an adaptation to particular environmental and cultural contexts. When it became necessary for large numbers of people to live in close proximity, they brought in planning, organisation and specialisation. Settlements were planned and laid out, a polity emerged, society became organised and food production and craft production were regulated. As civilisations began to take shape, huge buildings were built, the art of writing developed and science and technology contributed to the betterment of society.

The surplus food production by the farmers in the fertile regions supported the livelihood of a large number of people. The people who did not cultivate crops engaged in artisanal activities such as making of bronze tools, ornaments and pottery. Priests, scribes, nobles, rulers, administrators and craft persons became part of this civilisation.

The Egyptian, Mesopotamian, the Chinese and the Indus were the important early civilisations. While these civilisations flourished in certain regions, people in other parts of the world lived as hunter-gatherers and pastoralists. The hunter-gatherers and pastoralists maintained their relationships with these civilisations through interactions. Their history is also equally important. During the time of these civilisations, South India witnessed the emergence of Neolithic agro-pastoral communities and Microlith form of life by hunter-gatherers.

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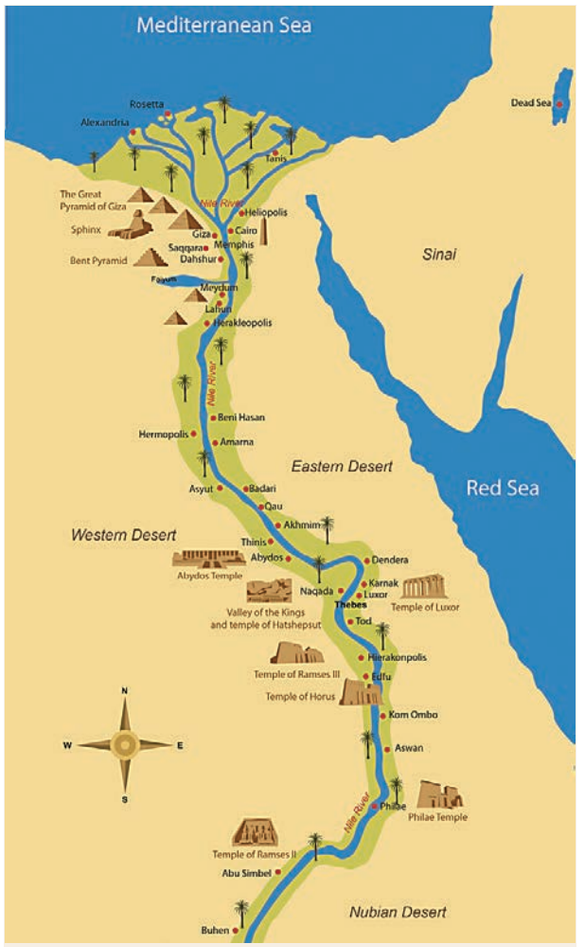

The cities of Egyptian civilisation

2.3 Egyptian Civilisation

As one of the oldest civilisations, the Egyptian civilisation is known for its monumental architecture, agriculture, arts, sciences and crafts at a very early age.

Geography

Egypt lies in the north-eastern corner of the African continent. It is bounded by the Red Sea on the east and Mediterranean Sea in the north. Egypt is irrigated by the River Nile, which originates in Lake Victoria in the south and flows into the Mediterranean Sea in the north. Deserts are seen on both sides of the Nile River. The Egyptian civilisation depended solely upon the flow of Nile River, and hence Egypt was called as the Gift of Nile by the Greek historian Herodotus. The Nile also served as a means of transport. The Nile valley is very rich and fertile as the river deposits fresh alluvium every year. This alluvium nurtured agriculture and helped to produce surplus of food grains, leading to the development of Egyptian civilisation. The dry regions on both the sides of the Niles, however remained deserts.

The Egyptian kingdoms generally controlled the whole of Nile valley and when they became weak, the feudal lords and invaders dominated the region. Egypt was invaded by the Hyksos (around 1700 BCE), the Persians and the Greeks under the Alexander the Great, in 332 BCE, and later by the Romans. Ptolemies (Ptolemaic dynasty) ruled Egypt after Alexander's conquest. At the end of Ptolemaic rule, Roman influence became dominant. Cleopatra VII, Julius Caesar and Mark Antony dominated the political affairs of the pre-Roman Egypt. In 30 BCE, the Roman Empire annexed Egypt. After the conquest by the Romans, Egypt became intimately connected with the Sangam Age Tamilagam by the sea route.

The Hyksos were the rulers of the 15th dynasty of Egypt and they were probably from West Asia.
Persians are the people from the region of Persia, the ancient Iran.
Greek refers to the language and people of modern-day nation-state of Greece in Europe.
Rome refers to the ancient Roman Empire, which had as its capital the city of Rome in Italy.

Pharaohs, Society and Administration

The Egyptian king was known as the Pharaoh. The people treated pharaoh as a divine form. Under the pharaoh, there

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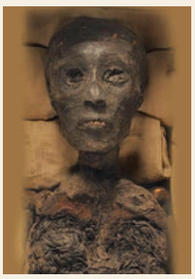
was a hierarchy of officials including viziers, the governors of provinces, local mayors and tax collectors. The entire social system was supported by the work and production of artisans including stone cutters, masons, potters, carpenters, coppersmiths and goldsmiths, peasants and workers. Land belonged to the king and was assigned to the officials. Slavery was not common, but captives were used as slaves.

The mask of Tutankhamen



The mummified body of Tutankhamen

Mummies of Egypt

The preserved dead body is called the mummy. The Egyptians had the tradition of preserving the dead bodies using Natron salt, a combination of sodium carbonate and sodium bicarbonate. The preservation process is called mummification. After 40 days, when the salt absorbed all the moisture, the body was filled with sawdust and wrapped with strips of linen cloth and covered with a fabric. The body was stored in a stone coffin called sarcophagus.

F2GTIL

Viziers were the high officials who administered territories under the direction of the Pharaohs.

The Egyptians believed in life after death. Therefore, they preserved the dead body. The art of preserving the dead body is known as mummification. Pyramids and tombs were built to preserve the body of pharaohs.

The famous Egyptian pharaoh Tutankhamen's (who ruled from 1332 to 1322 BCE) tomb with a rich variety of offerings is located near Luxor in Egypt. The mask of his mummy made of gold and decorated with precious stones is an important artefact of the Egyptian civilisation.

Agriculture and Trade

The Egyptians cultivated wheat, barley, millets, vegetables, fruits, papyrus and cotton. Papyrus was used for making rope mats and sandals, and later for producing paper. They domesticated cattle, sheep, goat and pigs, and hunted wild animals. They had pets such as dogs, cats and monkeys. The Egyptians had trade relations with Lebanon, Crete, Phoenicia, Palestine and Syria. Gold, silver and ivory were imported, and they acquired the

A ploughing farmer, 1200 BCE

Depiction of grain harvest

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Lapis Lazuli, a precious stone of bluish colour, from Afghanistan.

Art and Architecture

The Egyptians excelled in art and architecture. Their writing is also a form of art. Numerous sculptures, painting and carvings attest to the artistic skills of Egyptians.

The pyramids are massive monuments built as tombs of mourning to the Pharaohs. The great pyramids near Cairo are known as the Giza Pyramids. Pyramids are considered to be one of the wonders of the world, and they were built between 2575 and 2465 BCE. These monuments display the engineering, architectural and human resource management skills of the Egyptians.

The Great Sphinx of Giza is a massive limestone image of a lion with a human head. It is dated to the time of Pharaoh Khafre. It is one of the largest sculptures of the world and measures seventy three metres in length and twenty metres in height.

The Great Pyramid of Giza

View of the Sphinx with the Great Pyramid, Egypt

Religion

Egyptians practiced polytheism. Amon, Re, Seth, Thoth, Horus and Anubis are some of the gods of Egyptians. They worshipped many gods, but the Sun god, Re, was the predominant one. Later on, the Sun god was called Amon. Amon was considered to be the king of gods. Anubis is the god of death, related to embalming of the dead. He is considered the protector of the dead and depicted with a jackal head. Thoth was the god of writing and learning. He has the head of the bird, ibis.

Ancient Egyptian Gods

Amon

Seth

Thoth

Statue of Horus

Anubis

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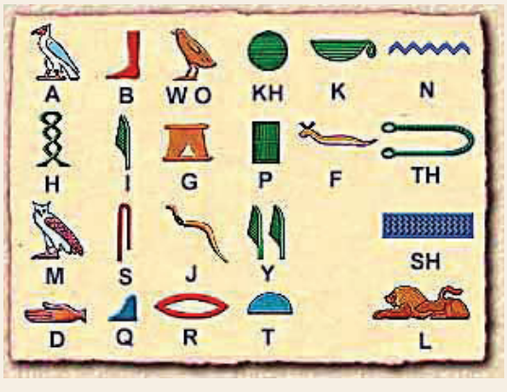
Philosophy, Science and Literature

Egyptian civilisation excelled in science, literature, philosophy, astronomy, mathematics and the measurement system. Sundial, water clock and glass were developed by the Egyptians. They devised a solar calendar that consisted of twelve months of thirty days each, with five days added to the end of a year. This calendar was introduced as early as 4200 BCE. Literary works included treatises on mathematics, astronomy, medicine, magic and religion. The Egyptians also distinguished themselves in painting, art, sculpture, pottery, music and weaving.

Writing System

Egyptians are well known for their writing system. Their form of writing is known as hieroglyphic. Hieroglyphic was used in the inscriptions on seals and other objects. The heretic, an another form of writing, was used for common purposes. This form of writing used a pictogram-based system. It was developed around 3000 BCE and many texts and books were written using this script. The Egyptian writing system was deciphered by the French scholar, Francois Champollion (1822 CE). He used the Rosetta stone, a trilingual inscription, for deciphering the script. This inscription, which was written in Hieroglyphic, Demotic and Greek, was taken to France by Napoleon and from there it was taken to England. Now this inscription is on display in the British Museum London.



Hieroglyphic script on a Rosetta stone

DO YOU KNOW?

The word 'paper' comes from 'Papyrus'. The Egyptians wrote on the leaves of a plant called papyrus, a kind of reed, which grew on the banks of Nile.

Characteristics and Contributions of the Egyptian Civilisation

- Egyptians developed a solar calendar system.
- The pyramids and their designs show their mathematical and surveying skills.
- Hieroglyphic writing system attests to their skills in handling symbols.
- Preservation of human body in the form of Mummies.
- They applied innovation in the use of science and technology.

2.4 Mesopotamian Civilisations

Mesopotamia refers to the region of Iraq and Kuwait in West Asia. Several kingdoms emerged around the city states of this region from the early third millennium BCE. The Sumerian, Akkadian, Babylonian and Assyrian civilisations flourished in Mesopotamia.

Geography

In the Greek language, *meso* means 'in between' and *potamus* means river. The Euphrates and Tigris flow here and

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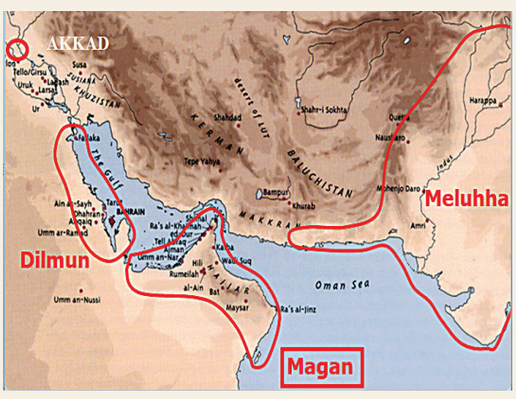
drain into the Persian Gulf is since this area is in between two rivers it is known as Mesopotamia. The northern part of Mesopotamia is known as Assyria, and the southern part is called Babylonia.

The Sumerians

The oldest civilisation in Mesopotamia belonged to the Sumerians. The Sumerians were the contemporaries of the people of Indus and Egyptian civilisations. These civilisations had trade connections. The Sumerians settled in the Lower Tigris valley around 5,000 to 4,000 BCE. They are believed to have originated from Central Asia. They founded many cities and Nippur was one of the important cities. They developed the cuneiform writing system. During the early phase of the Sumerian civilisation, kings acted as the chief priests. Their political domination came to an end by 2450 BCE.

The Akkadians

The Akkadians dominated Sumeria briefly from 2450 to 2250 BCE. The Sargon of Akkad was a famous ruler. Sargon and his descendants (ca.2334–2218 BCE) ruled Mesopotamia for more than hundred years. In the cuneiform records of Akkadians, mention is made about the Indus civilisation. The documents of Sargon of Akkad (2334–2279 BCE) refer to the ships from Meluhha, Magan and Dilmun in the quay of Akkad.



Map of ancient lands of Magan, Dilmun and Meluhha

DO YOU KNOW?

The city of Akkad later became the city of Babylon, a commercial and cultural centre of West Asia.

The Babylonians

The Semitic people called Amorites from the Arabian desert moved into Mesopotamia. They were known as Babylonians as they established a kingdom and made Babylon its capital. By the time of the king Hammurabi, they extended their domination to the western part of Mesopotamia. The powerful states of Ur (2112 to 2004 BCE) and Babylon (1792 to 1712 BCE) controlled this region. The hero Gilgamesh referred to in the first ever epic on the earth may have been a king of Sumeria. Hammurabi, the sixth king of Babylon belonging to the first Amorite dynasty (1792–1750 BCE), attained fame as a great law-maker.

DO YOU KNOW?

The Epic of Gilgamesh is perhaps the oldest written epic on earth. It was originally written on twelve clay tablets in cuneiform in ancient Sumaria.

Gilgamesh

Assyrians

The Assyrian Empire was politically active in Mesopotamia around 1000 BCE. The Assyrian kings were the priests of Ashur, the chief deity of Assyria. The Assyrian government was controlled

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Mesopotamia and its cities

by the emperor and provincial governors were appointed by the emperor to administer provinces. Assur was the capital city of Assyria. Ashurbanipal was a popular ruler of the late or neo-Assyrian empire (ca. 668 to 627 BCE). He maintained a famous library of cuneiform records. Assyrians worshipped the deity of Lamassu for protection.

A stone image of Lamassu

Society, State and Administration

The Sumerian civilisation had many city states. A typical Sumerian city was surrounded by cultivable lands. The fortified Sumerian cities had the temples called Ziggurats at its centre. The temple was controlled by the priests. Priests, scribes and nobles were part of the

DO YOU KNOW?

Assyrian Empire was the first military power in history. They emerged militarily powerful because they were the earliest to use iron technology effectively.

government. The rulers and priests occupied the top of the social hierarchy. The ruler performed the role of the chief priest. The scribes, merchants and artisans were placed next in the hierarchy. The scribes maintained the account of the taxes and the priests collected the taxes. The temples acted as storehouses of the taxed commodities. Assemblies were created for the administration of the state. Cultivable lands were owned by the kings and the higher classes of people in the hierarchy. The peasants who remained attached to the temples in the earlier phase of Mesopotamian civilisation became free from that association in the later period. Not all people were allowed to live in the cities.

Ziggurat of Ur

Food and Agriculture

Agriculture was the main occupation of the Mesopotamians. They had developed irrigation systems for ensuring the availability of water for agriculture and cultivated wheat, barley, onions, turnips, grapes, apples and dates. They domesticated cattle, sheep and goats. Fish was part of their diet.

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Trade and Exchange

Trade was an important economic activity of the Mesopotamian society. Traders assisted in the exchange of goods procured from the potters and artisans. They traded with Syria and Asia Minor in the west, and in Iran and the Indus Valley civilisation in the east. They travelled in ships across the seas for trade. Their temples acted as banks and lent credit on their own account. The Mesopotamian documents have references to loan and repayment, with or without interest. Perhaps this is the first written evidence of charging an interest on borrowed money.

DO YOU KNOW?

Ziggurats were pyramid-shaped monuments found in ancient Mesopotamia (modern Iraq). One of the most famous Ziggurats of the time is the one in the city of Ur.

Cities and Town Planning

The Mesopotamian cities featured mud or baked brick walls with gates. Some people lived in reed huts outside the cities. The Ziggurats were at the city centre on a platform and appeared like steep pyramids, with staircases leading to the top. Around this temple were complexes of ceremonial courtyards, shrines, burial chambers for the priests and priestesses, ceremonial banquet halls, along with workshops, granaries, storehouses and administrative buildings.

Religion

Sumerian religion was polytheistic. They worshipped several gods and goddesses. Sumerians did not pay much attention to the life after death and so they did not build pyramids like the Egyptians. The Sumerians prayed to Enlil, the god of sky and wind. The city of Nippur was centre of Enlil's worship. Ninlil was the Sumerian goddess of grain. The Babylonians worshipped Marduk, and Ashur was the supreme god of the Assyrians. Ishtar was goddess of love and fertility, Tiamat the god of the sea and chaos, and Sin, the moon god. The **kings were seen as** representatives of the gods on earth. The Mesopotamians developed a rich collection of myths and legends. The most famous of these is the epic of Gilgamesh, which is written in the cuneiform text. It contains a legend of the flood and has similarities with the account of Noah's Ark mentioned in the Bible and other myths in the Hindu *puranas*.

Hammurabi's Law Code

Hammurabi Code is an important legal document that specifies the laws related to various crimes. It has 282 provisions specifying cases related to family rights, trade, slavery, taxes and wages. It is carved on a stone, which portrays Hammurabi as receiving the code from the Sun god Shamash. It was a compilation of old laws based on retributive principles. The 'eye for eye' and 'tooth for tooth' form of justice is used in the Hammurabi Code.

Cuneiform tablet

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Cuneiform: The Sumerian Writing System

Cuneiform is the Sumerian writing system. The shape of the letter is in the form of wedge and hence it is called cuneiform. Evolving around 3000 BCE, it is one of the earliest scripts of the world. The epic of Gilgamesh was written in this script. They used this script for commercial transactions and writing letters and stories. The clay tablets contain loads of information on the Sumerian civilisation.

Development of Script

Development of script is an important milestone in human history. Writing system began to emerge in Sumeria in the later part of fourth millennium BCE. Hieroglyphic, the Egyptian system of writing, developed in early third millennium BCE. The Harappans also had a system of writing around the same time, but it has not yet been deciphered. The Chinese civilisation too developed a writing system from a very early period.

Development of cuneiform script

A clay tablet with the accounts of sheep and goats, from Tello, southern Iraq

Art

The Mesopotamian art included sculptures in stone and clay. A few paintings and sculptures from the Mesopotamian times have survived today. Mesopotamian sculptures portray animals, such as goats, rams, bulls and lions. Some mythological figures like lions and bulls with human head have also been found in their art. Massive sculptures were created at the time of Assyrian and Babylonian empires.

Science

The Mesopotamians excelled in mathematics, astronomy and medicine. They developed the concepts of multiplication, division and cubic equation. The numerical system based on 60 was conceived by them. They were the ones to formulate the 60-minute hour, the 24-hour day and the 360° circle. The Sumerian calendar had seven days in a week. Their numerical system had place values. They created the water clock and the lunar calendar based on the movement of the moon. They developed methods for measuring areas and solids. They also developed advanced weight and measurement systems.

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They introduced the twelve month calendar system based on lunar months. Their ideas influenced Greek astronomy. They had developed a medicinal system as well. A text called the *Diagnostic Handbook*, dated to the 11th century BCE Babylon, lists symptoms and prognoses. This indicates their scientific understanding of herbs and minerals.

Contributions of the Mesopotamian Civilisation

- The invention of the potter's wheel is credited to the Sumerians.
- They developed the calendar system of 360 days and divided a circle into 360 units.
- The cuneiform system of writing was their contribution.
- The Hammurabi's law code was another legacy of the Mesopotamians.

2.5 The Chinese Civilisation

China has two major rivers. One is known as Huang He (Yellow River) and the other is called Yangtze River. The Yellow River is known as the Sorrow of China, since it changed its course and caused frequent floods.

Evidence for the prehistoric Peking man (700,000 BP and 200,000 BP) and Yuanmou Man exists in China. Neolithic communities lived in China between 4500 and 3750 BCE. The Henan province in the Yellow and Yangtze river valley contain evidence for Neolithic villages. China had many city states and gradually these states became part of an empire.

Map of Chinese civilisation

Polity and Emperors

Shi Huangdi (Qin Shi Huang, which means the first emperor) founded the Qin (Chin) dynasty. The emperor had the title 'son of heaven'. He is considered to be the first emperor of China. The period between 221 and 206 BCE is known as the imperial era in China. He conquered other

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The Great Wall of China

The Great Wall of China, one of the wonders of the world, was a massive effort undertaken for the protection of China from the Mongols. In 220 BCE, under Qin Shi Huang, earlier fortifications were connected by walls as a form of defence against invasions. It was built from third century BCE until 17th century CE. It ran for over 20,000 kilometres covering the hills and plains, from the border of Korea in the east to the Ordos Desert in the west.

The Great Wall of China

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principalities in 221 BCE and remained the emperor till 212 BCE. He defeated the feudal lords and established a strong empire. He is credited with unifying China. Shi Huangdi destroyed the walled fortifications of different states and constructed the Great Wall of China to protect the empire from the invading nomadic people. He also built roads to integrate the empire.

The Han Empire (206–220 CE)

During this period, a written history of this empire was made available in China. The greatest of the Han emperors, Wu Ti (Han Wu the Great, 141 to 87 BCE), expanded the empire and built many public amenities, including irrigation tanks. He sent Zhang Qian as emissary to the West in 138 BCE and thereby paved the way for the opening of the Silk Road in 130 BCE to encourage trade activities.

The Terracotta Army

The Terracotta Army refers to the large collection of terracotta warrior images found in China. They depict the armies of the king Qin Shi Huang, the first emperor of China. They were buried with the king in 210–209 BCE. They are found at the northern foot of the Lishan Mountain, thirty five kilometres northeast of Xi'an, Shaanxi Province, as part of the mausoleum of the king.

Terracotta Warriors, China

Because of the Silk Road and the resultant trade connections, China benefitted immensely during the rule of Emperor Zhang (75–88 CE). Chinese silk was much sought after by the Romans during the time of the Roman emperor Marcus Aurelius in 166 CE. Some of the Chinese silk might have reached Rome through the ports of Tamilagam.

Philosophy and Literature

Chinese poets and philosophers such as Lao Tze, Confucius, Mencius, Mo Ti (Mot Zu) and Tao Chien (365-427 CE) contributed to the development of Chinese civilisation. Sun-Tzu, a military strategist, wrote the work called *Art of War*. The *Spring and Autumn Annals* is the official chronicle of the state at the time. The Yellow Emperor's *Canon of Medicine* is considered China's earliest written book on medicine. It was codified during the time of Han Dynasty.

Confucius

Lao Tze (c. 604–521 BCE) was the master archive keeper of Chou state. He was the founder of Taoism. He argued that desire is the root cause of all evils.

Confucius (551–497 BCE) was famous among the Chinese philosophers. He was a political reformer. His name means Kung the master. He insisted on cultivation of one's own personal life. He said, "If personal life is cultivated, family life is regulated; and once family life is regulated, national life is regulated."

Mencius (372–289 BCE) was another well-known Chinese philosopher. He travelled throughout China and offered his counsel to the rulers.

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Chinese script on the bone

Chinese Script

Chinese developed a writing system from an early time. Initially it was a pictographic system and later it was converted into a symbol form.

Contribution of the Chinese Civilisation

- Writing system was improved
- Invention of paper
- Opening of the Silk Road
- Invention of gun powder

2.6 Indus Civilisation

The Indus civilisation, known also as the Harappan civilisation, covers an area of over 1.5 million square kilometres in India and Pakistan. Sutkagen-dor in the west on the Pakistan–Iran border; Shortugai (Afghanistan) in the north; Alamgirpur (Uttar Pradesh in India). in the east; and Daimabad (Maharashtra in India). in the south are the boundaries with in which the Harappan culture has been found. Its main concentration is in the regions of Gujarat, Pakistan, Rajasthan and Haryana.

DO YOU KNOW?

The Indus Valley civilisation is also known as the Harappan civilisation, since Harappa was the first site to be discovered. This civilisation is known as Harappan civilisation rather than Indus Valley civilisation, since it extended beyond the Indus river valley.

Indus cities and towns

Planned Towns

Harappa (Punjab, Pakistan), Mohenjo-Daro (Sindh, Pakistan), Dholavira (Gujarat, India), Kalibangan (Rajasthan, India), Lothal (Gujarat, India), Banawali (Rajasthan, India., Rakhigarhi (Haryana, India) and Surkotada (Gujarat, India) are the major cities of the Indus civilisation. Fortification, well-planned streets and lanes and drainages can be observed in the Harappan towns. The Harappans used baked and unbaked bricks and stones for construction. A civic authority perhaps controlled the planning of the towns. A few of the houses had more than one floor. The tank called the Great Bath at Mohenjo-Daro is an important structure, well paved with several adjacent rooms. Some unearthed structures have been identified as the granary. We do not know about the nature of the state or political organisation of the Harappans. But they must have had a political organisation at the level of an early form of state. A male image from Mohenjo-Daro has been identified as 'priest king', but we do not know about the accuracy of this interpretation.

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The structure identified as granary should be considered as archaeologists' interpretation.

Agriculture and Animal Domestication

The Harappans practiced agriculture. They cultivated wheat, barley and various types of millets. They adopted a double cropping system. Pastoralism was also known to them. They reared cattle, sheep and goats. They had knowledge of various animals including elephants but did not use horses. The Harappan cattle are called Zebu, and it is a large breed, often represented in their seals.

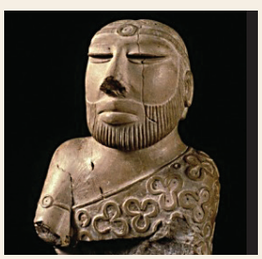
Pottery

The Harappans used painted pottery. Their potteries have a deep red slip and black paintings. The pottery has shapes like dish-on-stands, storage jars, perforated jars, goblets, S-shaped jars, plates, dishes, bowls and pots. The painted motifs, generally noticed on the pottery, depict *pipal* tree leaves, fish-scale designs, intersecting circles, zigzag lines, horizontal bands, and geometrical motifs, and floral and faunal patterns.

Metal, Tools and Weapons

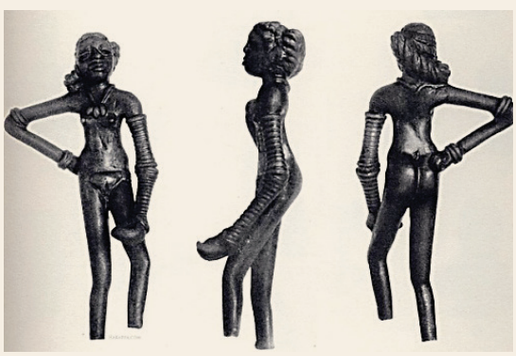
The Harappans used **chert** blades, copper objects and bone and ivory tools. They did not possess knowledge about iron. The tools and equipments such as points, chisels, needles, fishhooks, razors, weighing pans, mirror and antimony rods were made of bronze. The chisels made out of Rohri chert were used by

The Great Bath



The priest king from Mohenjo-Daro

Harappan painted pottery.



The Dancing Girl from Mohenjo-Daro

Rohri chert blades from Harappan site of Shikarpur, Gujarat

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the Harappans. Their weapons included arrows, spears, a chisel-bladed tool and axe. The bronze image of dancing girl from Mohenjo-Daro is suggestive of the use of lost-wax process.

Rohri chert refers to the chert raw material collected from Rohri in Pakistan. It was used by the Harappans for making blades.The Harappans used both stone and bronze tools.

Textiles and Ornaments

The Harappans used metal and stone adornments. They had knowledge of cotton and silk textiles. They made carnelian, copper and gold ornaments. Faience, stoneware and shell bangles were also used. Some of them had etched designs, and the Harappans exported them to the Mesopotamia.

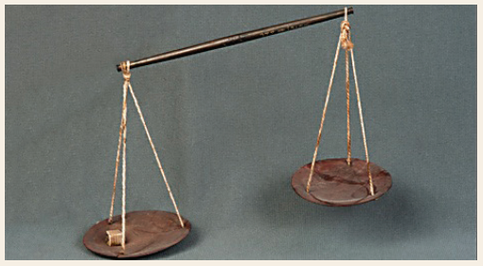
Indus ornaments.

Trade and Exchange

The Harappans had close trade links with the Mesopotamians. Harappan seals have been found in the West Asian sites, Oman, Bahrain, Iraq and Iran. The cuneiform inscriptions mention the trade contacts between Mesopotamia and the Harappans. The mention of 'Meluhha' in the cuneiform inscriptions is considered to refer to the Indus region.

Weights and Measures

Weights of Harappan civilization



Copper balance
from Mohenjo-Daro

The Harappans developed a system of proper weights and measures. Since they engaged in commercial transactions, they needed standard measures. The cubical chert weights are found at the Harappan sites. The copper plates for weighing balances have also been found.The weights point to their knowledge of the binary system. The ratio of weighing is doubled as 1:2:4:8:16:32.

Seals, Sealings and Scripts

A seal with the script

The seals from various media such as steatite, copper, terracotta and ivory are found in the Harappan sites. They were probably used in the trade activities. The Harappan script is not yet deciphered. About 5,000 texts have been documented from the Harappan sites. Some scholars are of the view that the script is in Dravidian language.

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Arts and Amusement

Terracotta toys

The terracotta figurines, paintings on the pottery and the bronze images from the Harappan sites suggest the artistic skills of the Harappans. 'Priest king' made of steatite and dancing girl made of bronze (both from Mohenjo-Daro) as well as stone sculptures from Harappa, Mohenjo-Daro and Dholavira are the important objects of art. Toy carts, rattles, wheels, tops, marbles and hop scotches made in terracotta suggest the amusement of the Harappan people.

Religion

The Indus people had a close relationship[with nature. They worshipped *pipal* trees. Some of the terracotta figures resemble the mother goddess. Fire altars have been identified at Kalibangan. The Indus people buried the dead. Burials were done elaborately and evidence for cremation has also been found.

Original Inhabitants and their Culture

The authors of the Harappan civilisation are not known, since the script has not been deciphered. One school of thought argues that they spoke the Dravidian language. The archaeological evidence shows movement of the Harappans to the east and south after the decline of the Indus civilisation. It is probable that some of the Harappan people moved into different parts of India. Only the decipherment of the script can give a definite answer.

Indus civilisation had more than one group of people. Several groups including farmers, pastoralists and hunter-gatherers lived in the Indus region. The Indus region had villages and large towns. The population was mixed.

The period of the civilisation has been divided into Early Harappan, starting around 3300 BCE and continuing to 2600 BCE and mature Harappan, are the last phase civilisation from 2600 to 1900 BCE. The later Harappan existed upto 1700 BCE.

Decline of Indus Culture

The Indus civilisation and its urban features started declining from about 1900 BCE. Changes in climate, decline of the trade with Mesopotamia and drying up or flooding of the river Indus, foreign invasion were some of the reasons attributed to the collapse of this civilisation and for the migration of people in the southern and eastern directions. It did not completely disappear. It continued as rural culture.

Indus Civilisation and Tamil Civilisation

The similarity of the graffiti found on the megalithic burial pots of South India with the Indus script and the identical place names of Tamil Nadu and Indus region of Pakistan are presented as arguments to establish the relationship between the Indus civilisation and Tamil culture. Researchers like Father Henry Heras, Asko Parpola and Iravatham Mahadevan find similarity between the Indus script and the Dravidian/ Tamil language.

Archaeological evidence points out that several groups of people have been living in Tamil Nadu and South India continuously from the Mesolithic period. A few groups from the Indus region might have migrated into southern India. Some of the ideas and technologies of the Indus civilisations had reached South India in the Iron Age. The carnelian beads, shell bangles and bronze

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mirrors found in the Megalithic/Early Historic sites of Tami Nadu were first introduced by the people of the Indus civilisation. More research is needed to arrive at any definite conclusion in this matter.

The towns of ancient Tamilagam such as Arikkamedu, Uraiyur and Keezhadi that flourished are part of the **second urbanisation** of India and these towns are much different from the Indus cities. These towns emerged approximately 1,200 years after the decline of the Indus civilisation.

SUMMARY

- After the Neolithic Age, civilisations sprang and grew in the Bronze Age.
- People began their settled life in planned towns and began to involve in trade and exchange. Science and technology developed.
- The civilisations are relatively complex social systems.
- The Egyptian civilisation excelled in architecture and the pyramids were its important contribution.
- The Mesopotamian civilisation contributed to the development of calendar system and astronomy.
- The Chinese civilisation contributed in terms of philosophy and inventions.
- The Indus civilisation produced a variety of commodities using innovative techniques. It had cultural contacts with West Asia.

EXERCISE

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I. Choose the correct answer

1. The earliest signs to denote words through pictures
   a. Logographic
   b. Pictographic
   c. Ideographic
   c. Stratigraphic
2. The preservation process of dead body in ancient Egypt
   a. Sarcophagus
   b. Hyksos
   c. Mummification
   c. Polytheism
3. The Sumerian system of writing
   a. Pictographic
   b. Hieroglyphic
   c. Sonogram
   c. Cuneiform
4. The Harappans did not have the knowledge of
   a. Gold and Elephant
   b. Horse and Iron
   c. Sheep and Silver
   d. Ox and Platinum

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5. The Bronze image suggestive of the use of lost-wax process known to the Indus people.

a. Jar b. Priest king

c. Dancing girl d. Bird

6. (i) The oldest civilisation in Mesopotamia belonged to the Akkadians.

(ii) The Chinese developed the Hieroglyphic system.

(iii) The Euphrates and Tigris drain into the Mannar Gulf.

(iv) Hammurabi, the king of Babylon was a great law maker.

a. (i) is correct

b. (i) and (ii) are correct

c. (iii) is correct

d. (iv) is correct

7. (i) Yangtze River is known as Sorrow of China.

(ii) Wu-Ti constructed the Great Wall of China.

(iii) Chinese invented gun powder.

(iv) According to traditions Mencius was the founder of Taoism.

a. (i) is correct

b. (ii) is correct

c. (iii) is correct

d. (iii) and (iv) are correct

8. What is the correct chronological order of four civilisations of Mesopotamia

a. Sumerians - Assyrians - Akkadians - Babylonians

b. Babylonians - Sumerians - Assyrians - Akkadians

c. Sumerians - Akkadians - Babylonians - Assyrians

d. Babylonians - Assyrians - Akkadians - Sumerians

9. Assertion (A): Assyrians of Mesopotamian civilisation were contemporaries of Indus civilisation.

Reason(R): The Documents of an Assyrian ruler refer to the ships from Meluha

a. A and R are correct and A explains R

b. A and R are correct but A doesn't explain R

c. A is incorrect but R is correct

d. BothA and R are incorrect

II. Fill in the blanks

1. _____ is a massive lime stone image of a lion with a human head.

2. The early form of writing of the Egyptians is known as _____.

3. _____ specifies the Laws related to various crimes in ancient Babylonia.

4. _____ was the master archive keeper of Chou state, according to traditions.

5. The _____ figurines and paintings on the pottery from the sites suggest the artistic skills of the Harappans.

III. Find out the correct statement

1. a. The Great Bath at Harappa is well-built with several adjacent rooms.

b. The cuneiform inscriptions relate to the epic of Gilgamesh.

c. The terracotta figurines and dancing girl made of copper suggest the artistic skills of Egyptians.

d. The Mesopotamians devised a solar calendar system.

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2. a. Amon was considered the king of god in ancient Egypt.

b. The fortified Harappan city had the temples.

c. The great sphinx is a pyramid-shaped monument found in ancient Mesopotamia.

d. The invention of the potter's wheel is credited to the Egyptians.

IV. Match the following

a.	Pharaoh	-	A kind of grass
b.	Papyrus	-	the oldest written story on Earth
c.	Great Law maker	-	Mohenjo-Daro
d.	Gilgamesh	-	Hammurabi
e.	The Great Bath	-	The Egyptian king

V. Answer the following briefly

1. The Egyptians excelled in art and architecture. Illustrate.
2. State the salient features of the Ziggurats.
3. Hammurabi Code is an important legal document. Explain.
4. Write a note on the Great Wall of China.

VI. Answer all the questions given under each caption

1. Early Civilizations

1. What is meant by civilization?

2. Name the important early civilizations.

3. What supported the livelihood of a large number of people?

4. What happened when civilization began to take shape?

2. Features of Egyptian civilization:

1. Who built the pyramids and why?

2. What is the process of mummification?

3. What is the belief system of ancient Egyptians?

4. What is the importance of great sphinx?

VII. Answer the following in Detail

1. Define the terms Hieroglyphics and Cuneiform with their main features.
2. To what extent is the Chinese influence reflected in the fields of philosophy and literature.

FUN WITH HISTORY

Student Activities

Mark the areas of Bronze Age civilization on the world map.

Prepare a chart on the pyramids and the mummies.

Collect the pictures of the seals and the pottery of Indus people.

Assignment with teacher's guidance

Prepare a hand out comparing the ancient world civilizations.

Prepare a scrap book collecting pictures on Indus civilization from website.

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TAMIL GLOSSARY

Bands	-	சிறு குழு
Civilization	-	நாகரிகம்
Chiefdom	-	குடித்தலைமை முறை
Cuneiform Script	–	ஆப்பு வடிவ எழுத்து
Farming Societies	–	வேளாண் சமுதாயம்
Food gatherers	–	உணவு சேகரிப்பவர்
Pastoral group	–	ஆடு மாடு மேய்த்து நாடோடியாக வாழும் குழு
State	–	அரசு
Terracotta	–	சுடுமண்சிற்பம்
Tribe	–	பழங்குடி

ENGLISH GLOSSARY

Tribe	-	is a community of people who live in a region connected by kinship ties. They are linked by social, economic, religious or blood relationships. They share a common culture and dialect, under the control of a chief.
Chiefdom	-	is a hierarchical political formation and it is larger than the tribe-level formation.

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2. G.L.Possehl. Indus Age-The Beginnings. Oxford and IBH Publications.
3. J.M.Kenoyer. Ancient Cities of the Indus Valley Civilisation. American Institute of Pakistan Studies.

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1. https://www.britannica.com
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NOTES

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Cracking The Indus Script

Harappans knew the art of writing. The script is found on seals, in moulded terracotta and on pottery. It has not been deciphered till now. Because the Indus texts are very short, the average length of the inscription is less than five signs. It has no bilingual text (like a Rosetta stone written in Egyptian and Greek).

It was written generally from right to left.

- Based on computer analysis, the Russian scholar Yuri Knorozov suggested that the Indus inscriptions have a Dravidian-like word order.
- Scholar and researcher Iravatham Mahadevan, who has done extensive research on Indus civilisation, says, "We may hopefully find that the proto Dravidian roots of Harappa language and South Indian Dravidian languages are similar."
- According to Mahadevan, a stone Celt discovered in Mayiladuthurai (Tamil Nadu) has same marking as that of the symbol of the Indus script.
- In May 2007, the TamilNadu Archaeology Department found pots with arrow head symbols at Melaperumpallam near Poompuhar, which resembled the seals in Mohenjo-Daro.

According to Parpola, the sign of the Indus script is likely to represent Dravidian mono-syllabic roots.

Sign	Identification	Reading	Meaning	Sign	Identification	Reading	Meaning
a.	halving + fish	*pacu mi*$^{-}$*n*	green star (Mercury)	a.	fish	*mi*$^{-}$*n*	1. fish 2. star
b.	roof + fish	*mey/may mi*$^{-}$*n*	black star (Saturn)	b.	3 + fish	*mu(m) mi*$^{-}$*n*	three stars (Mrigasiras)
c.	intermediate space + fish	*vel(li) mi*$^{-}$*n*	white star (Venus)	c.	6 + fish	*caru mi*$^{-}$*n*	six stars (Pleiades)
d.	dot/drop + fish	*pottu mi*$^{-}$*n*	1. red fish (carp) 2. red star (Rohini)	d.	7 + fish	*elu mi*$^{-}$*n*	seven stars (Ursa Major)

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ICT CORNER

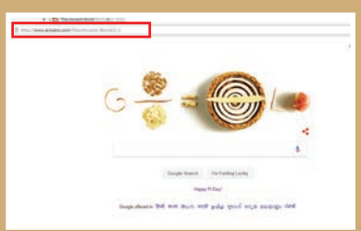
Explore ancient architecture

Let us fly on air

Steps

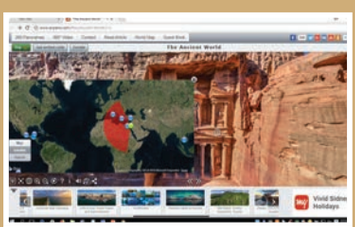
- Type the URL given below or scan the QR code. Then press the enter key.
- Click the 'Full Screen' to view the architecture.
- Explore the options given at the left lower side. Click 'Open Google Map'. Drag the mouse and rotate the 'Red Shaded Area' in it to watch the area in 360° view or use the arrow keys for the same view.
- Keep the cursor on question marks to get details about that place.

Step 1



Step 2

Step 3



Step 4

Website URL:

http://www.airpano.com/files/Ancient-World/2-2

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UNIT 3

Early Tamil Society and Culture

Learning Objectives

The objectives of this lesson are to familiarize yourself with

- Tamil literary, archaeological, epigraphic and non-Tamil text sources for the study of the early Tamil society.
- *Thinai*-based life in the society
- Literature, polity, society, economy and urbanization during the period

FB98HP

Introduction

Tamil civilization, as we have seen, begins atleast three centuries before the Common Era (CE). As seafaring people, Tamil traders and sailors established commercial and cultural links across the seas and merchants from foreign territories also visited the Tamil region. The resulting cultural and mercantile activities and internal developments led to urbanization in this region. Towns and ports emerged. Coins and currency came into circulation. Written documents were produced. The Tamil-Brahmi script was adopted to write the Tamil language. Classical Tamil poems were composed.

In the unit one, we studied the cultural developments in the Tamil region from the prehistoric period to the beginning of the Iron Age. In this lesson, we will learn about the development of Tamil culture in the Early Historic Period also known as the Sangam Age.

3.1 Sources for the study of early Tamil society

The sources for reconstructing the history of the ancient Tamils are:

1. Classical Tamil literature
2. Epigraphy (inscriptions)
3. Archaeological excavations and material culture
4. Non-Tamil and Foreign Literature

The Classical Sangam Tamil Literature

The Classical Sangam *corpus* (collection) consists of the *Tholkappiyam*, the *Pathinen Melkanakku* (18 Major works) and the *Pathinen Kilkanakku* (18 minor works) and the five epics.

Tholkappiyam

Tholkappiyam, attributed to Tholkappiyar, is the earliest written work on Tamil grammar. Apart from elaborating the rules of grammar, the third section of *Tholkappiyam* also

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describes poetic conventions that provide information on Tamil social life.

The texts of *Pathinen Melkanakku* include *Pathupaattu* (ten long songs) and *Ettuthogai* (the eight anthologies). These texts are the oldest among the classical Tamil texts. The texts of *Pathinen Kilkanakku* belong to a later date.

The *Ettuthogai* or the eight anthologies are

(1) *Nattrinai* (2) *Kurunthogai*
(3) *Paripaadal* (4) *Pathittrupathu*
(5) *Aingurunuru* (6) *Kalithogai*
(7) *Akanaanuru* (8) *Puranaanuru*

Pathupattu collection includes ten long songs

(1) *Thirumurugatrupadai*
(2) *Porunaratrupadai*
(3) *Perumpanatruppadai*
(4) *Sirupanatrupadai*
(5) *Mullaipaattu*
(6) *Nedunalvaadai*
(7) *Maduraikanchi*
(8) *Kurinjipaattu*
(9) *Pattinappaalai*
(10) *Malaipadukadam*

Pathinen Kilkanakku (18 minor works)

The *Pathinen Kilkanakku* comprises eighteen texts elaborating on ethics and morals. The pre-eminent work among these is the *Thirukkural* composed by Thiruvalluvar. In 1330 couplets *Thirukkural* considers questions of morality, statecraft and love.

The Five Epics

The epics or *Kappiyams* are long narrative poem of very high quality. They are,

(1) *Silappathikaaram* (2) *Manimekalai*
(3) *Seevaka Chinthamani*
(4) *Valaiyapathi* (5) *Kundalakesi*

Epigraphy

Epigraphy is the study of inscriptions. Inscriptions are documents scripted on stone, copper plates, and other media such as coins, rings, etc. The development of script marks the beginning of the historical period. The period before the use of written script is called prehistoric period. Tamil-Brahmi was the first script used for writing in Tamil Nadu. Inscriptions in Tamil-Brahmi are found in caves and rock shelters, and on pottery and other objects (coins, rings and seals).

Tamil-Brahmi inscriptions

Tamil-Brahmi inscriptions have been found in more than 30 sites in Tamil Nadu mostly on cave surfaces and rock shelters. These caves were the abodes of monks, mostly Jaina monks. The natural caves were converted into residence by cutting a drip-line to keep rain water away from the cave. Inscriptions often occur below such drip-lines. The sites have smooth stone beds carved on rock surface for monks who led a simple life and lived in these shelters. Merchants and kings converted these natural formations as habitation for monks, who had renounced worldly life. Mangulam, Muttupatti, Pugalur, Arachalur and Kongarpuliyankulam and Jambai are some of the major sites of such caves with Tamil-Brahmi inscriptions. Around Madurai many such caves with Tamil-Brahmi inscriptions can still be seen. Many of them are located along ancient trade routes.

A drip-line at a rock cave with Tamil-Brahmi inscription,

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The Tamil-Brahmi inscrption at Arachalur

Estampage copy of the above inscription

A rock bed at K. Puliankulam

Note: You will notice that among the old inscriptions, people (both local and tourists) have marked their names thereby destroying some of the ancient inscriptions. Such acts of destruction of heritage property or property belonging to others are called **vandalism**.

Hero Stones

Hero stones are memorials erected for those who lost their lives in the battles and in cattle raids. As cattle were considered an important source of wealth, raiding cattle owned by adjoining tribes and clans was common practice in a pastoral society. During the Sangam Age, the *Mullai* landscape followed the pastoral way of life. Tribal chieftains plundered the cattle wealth of enemies whose warriors fought to protect their cattle. Many warriors died in such battles and were remembered as martyrs. Memorial stones were erected in their honour. Sangam literature vividly portrays these battles and clashes, and describes such hero stones as objects of worship. *Tholkappiyam* describes the procedures for erecting hero stones.

Hero stones of the Sangam Age with Tamil-Brahmi inscriptions can be found at Pulimankombai and Thathapatti in Theni district and Porpanaikottai in

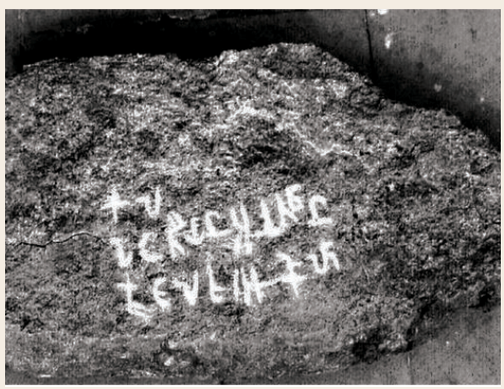
Pulimankombai Hero stone

Pulimankomba is a village in the Vaigai river valley in Theni district. In 2006, rare hero stone inscriptions in Tamil-Brahmi script were discovered in this village.

One of the inscriptions from Pulimankombai reads

"Kudalur Akol pedu tiyan antavan kal"

It means "The stone of Tiyan Antavan who was killed in a cattle raid at the village of Kudalur".



Hero stone-Pulimankombai

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Pudukkottai district. Those of the Sangam Age discovered till now do not have images or sculptures.

Hero stones of the post-Sangam Age and the Pallava period occur in large numbers in pastoral regions especially around the Chengam region near Thiruvannamalai district. These hero stones have inscriptions and the images of warriors and names of heroes.

FBI4JC

Inscriptions

Pottery vessels from the Early Historic Period have names of people engraved on them in Tamil-Brahmi script. Potsherds have been discovered in Arikkamedu, Azhagankulam, Kodumanal, Keezhadi, and many other sites in Tamil Nadu. Pottery inscribed with names in Tamil-Brahmi script have also been found in Berenike and Quseir al Qadhim in Egypt and in Khor Rori in Oman indicating that early Tamils had trade contacts with West Asia and along the Red Sea coast. People etched their names on pottery to indicate ownership. Many of the names are in Tamil while some are in **Prakrit**.

A motif of a ship on pottery from Azhagankulam

Prakrit Prakrit was the language used by the common people in the Northern part of India during the Mauryan period.

Archaeology and Material Culture

Archaeology is the study of the past by interpretation of the material cultural remains. Such remains are unearthed by the systematic excavation of old inhabitation sites called archaeological sites. Archaeological sites have mounds which are an accumulation of soil, pottery, building and organic remains and objects. In many parts of Tamil Nadu they are called Nattam, Kottai and Medu. Such sites provide evidence of how people lived in the past.

Archaeological Sites

Archaeological excavation refers to systematically digging a site to recover material evidence for exploring and interpreting societies of the past.

A ring well at Arikkamedu

Archaeological excavations at the early historic sites are the source of evidence of the activities of the Sangam Age people. Excavations at Arikkamedu, Azhagankulam, Uraiyur, Kanchipuram, Kaveripoompattinam, Korkai, Vasavasamudram, Keezhadi, Kodumanal in Tamil Nadu, and Pattanam in Kerala provide the evidence we have of this period.

Arikkamedu, near Puducherry, is a Sangam Age port, excavated by the Archaeological Survey of India (ASI). British archaeologist, Robert Eric Mortimer Wheeler, French Archaeologist,

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J.M. Casal, and Indian archaeologists, A. Ghosh and Krishna Deva, excavated this site. They found evidence of a planned town, warehouse, streets, tanks and ring wells

The Archaeological Survey of India (ASI) is a Central government agency that manages archaeological sites and monuments in India. The Government of Tamil Nadu has its own department for archaeology called the Tamil Nadu State Department of Archaeology. The Indian Treasure Trove Act (1878), the Antiquities and Art Treasures Act (1972), the Ancient Monuments and Archaeological Sites and Remains Act (1958) are legislation related to the preservation of archaeological remains in India.

Material Culture

Archaeologists have found evidence of brick structures and industrial activities, as well as artefacts such as beads, bangles, cameos, intaglios, and other materials in these sites. Tamil-Brahmi inscriptions on pottery and coins have also been unearthed. Evidences of the various arts, crafts and industries together help us reconstruct the way of life of the people of those times. From this we learn and understand how they might have lived.

An intaglio-
Pattanam, Kerala

Cameo – an ornament made in precious stone where images are carved on the surface.

Intaglio – an ornament in which images are carved as recess, below the surface.

Coins

Coins as a medium of exchange were introduced for the first time in the Sangam Age. The coins of the Cheras, the Cholas and the Pandyas, punch-marked coins, and Roman coins form another important source of evidence from the Sangam Age. Punch-marked coins have been found at Kodumanal and Bodinayakkanur. Roman coins are concentrated in the Coimbatore region, and are found at Azhagankulam, Karur, and Madurai. They were used as **bullion** for their metal value and as ornaments.

Punch-marked coins

Roman Coins - Pudukkottai

Bullion means precious metal available in the form of ingots.

Punch-marked coins are the earliest coins used in India. They are mostly made of silver and have numerous symbols punched on them. Hence, they are known as punch-marked coins

Non-Tamil Sources (Foreign Accounts)

Non-Tamil literary sources also offer information on early Tamil society. The presence of the non-Tamil sources reveals the extensive contacts and interactions of

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the early Tamil society with the outside world.

Arthasastra

Arthasastra, the classic work on economy and statecraft authored by Chanakya during the Mauryan period, refers to Pandya kavataka. It may mean the pearl and shells from the Pandyan country.

Mahavamsa

Mahavamsa, the Sri Lankan Buddhist **chronicle**, composed in the Pali language, mentions merchants and horse traders from Tamil Nadu and South India.

Chronicle is a narrative text presenting the important historical events in chronological order.

Periplus of Erythrean Sea

Periplus of Erythrean Sea is an ancient Greek text whose author is not known. The term Periplus means navigational guide used by sailors. Erythrean Sea refers to the waters around the Red Sea. It makes references to the Sangam Age ports of Muciri, Thondi, Korkai and Kumari, as well as the Cheras and the Pandyas.

Pliny's *Natural History*

Pliny the Elder, was a Roman who wrote *Natural History*. Written in Latin, it is a text on the natural wealth of the Roman Empire. Pliny speaks about the pepper trade with India and he states that it took 40 days to reach India, from Ocealis near North East Africa, if the south west monsoon wind was favourable. He also mentions that the Pandyas of Madurai controlled the port of Bacare on the Kerala coast. The current name of Bacare is not known. Pliny laments the loss of Roman wealth due to Rome's pepper trade with India – an indication of the huge volume and value of the pepper that was traded.

Ptolemy's *Geography*

Ptolemy's *Geography* is a gazetteer and atlas of Roman times providing geographical details of the Roman Empire in the second century CE. Kaveripoompattinam (Khaberis Emporium), Korkai (Kolkoi), Kanniyakumari (Komaria), and Muciri (Muziris) are some of the places mentioned in his *Geography*.

Peutingerian table

Peutingerian table is an illustrated map of the Roman roads. It shows the areas of ancient Tamilagam and the port of Muziris.

Map of Peutingerian table,

***Note*:** Taprobane refers to Sri Lanka as Island. Muziris refers to the port of Muchiri.

Vienna Papyrus

Vienna **papyrus**, a Greek document datable to the second century CE, mentions Muciri's trade of olden days. It is in the Papyrus Museum attached to the Austrian National Library, Vienna (Austria). It contains a written agreement

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between traders and mentions the name of a ship, Hermapollon, and lists articles of export such as pepper and ivory that were shipped from India to the Roman Empire.

Papyrus, a paper produced out of the papyrus plant used extensively for writing purposes in ancient Egypt.

3.2 The Sangam Age

The Sangam Age or the Early Historic period is an important phase in the history of South India. This period is marked out from prehistory, because of the availability of textual sources, namely Sangam literature and Tamil-Brahmi inscriptions. Sangam text is a vast corpus of literature that serves as an important source for the study of the people and society of the relevant period.

Chronology

There is considerable debate among scholars about the age and chronology of Sangam society. The Sangam texts are generally dated to between third century BCE and the third century CE. The references in Greco-Roman texts, Tamil-Brahmi inscriptions and the references to the Cheras, Cholas and the Pandyas in the **Ashokan** inscription corroborate this date. It is generally agreed that the Sangam poems were composed in the early part of the historical period, but were compiled into anthologies in the later period.

Ashokan Brahmi - the script used in Ashokan edicts or inscriptions.

The Thinai

The concept of *Thinai* is presented in the Tamil Grammar work of *Tholkappiyam* and this concept is essential to understand the classical Tamil poems. *Thinai* is a poetic theme, which means a class or category and refers to a habitat or eco-zone with specific physiographical characteristics. Sangam poems are set in these specific eco-zones and reveal that human life has deep relationships with nature.

The themes of the poems are broadly defined as *akam* (interior) and *puram* (exterior). *Akathinai* refers to various situations of love and family life, while Purathinai is concerned with all others aspects of life and deals particularly with war and heroism.

Ainthinai: The Five *Thinais* or landscapes.

Tamilagam was divided into five landscapes. Each region had distinct characteristics – a presiding deity, occupation, people and cultural life according to its specific environmental conditions. This classification has been interpreted by scholars to reflect real life situations in these landscapes.

The five landscapes are *Kurunji, Mullai, Marutham, Neythal and Paalai.*

- *Kurunji* refers to the hilly and mountainous region.
- *Mullai* is forested and pastoral region.
- *Marutham* is the fertile riverine valley.
- *Neythal* is coastal region.
- *Paalai* is sandy desert region.

3.3 Sangam Age Polity: Political Powers of Tamilagam

The Sangam Age has its roots in the Iron Age. In the Iron Age people were organised into **chiefdoms**. From such communities of Iron Age emerged the Vendhars of the early historic period and the Velirs of the Sangam Age were chieftains.

The Mauryan emperor, Asoka, conquered Kalinga (Odisha) and parts of Andhra and Karnataka regions. Ashokan inscriptions found in present day Odisha,

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Karnataka, Telangana and Andhra Pradesh are not seen in Tamil Nadu and Kerala. Therefore, we may conclude that the Tamil rulers were independent of Mauryan authority.

The Muvendhar

Among the political powers of the Sangam Age, the Cheras, the Cholas and the Pandyas occupied pre-eminent positions. They were known as *Muvendhar* (the three kings). The *muvendhar* controlled the major towns and ports of the Sangam period.

The Cheras

The Cheras, referred to as Keralaputras in the Ashokan inscriptions, controlled the region of present-day Kerala and also the western parts of Tamil Nadu. Vanci was the capital of the Cheras while Muciri and Thondi were their port towns. Vanci is identified with Karur in Tamil Nadu while some others identify it with Thiruvanchaikkalam in Kerala. Pathirtruppathu speaks about the Chera kings and their territory. The Cheras wore garlands made from the flowers of the palm tree. The inscriptions of Pugalur near Karur mention the Chera kings of three generations. Coins of Chera kings have been found in Karur.

The *Silappathikaram* speaks about Cheran Senguttuvan, who built a temple for Kannagi, the protagonist of the epic. The bow and arrow was the symbol of the Cheras. Legend has it that Ilango who composed the *Silappathikaram,* was the brother of Cheran Senguttuvan.

The Cholas

The Cholas ruled over the Kaveri delta and northern parts of Tamil Nadu. Their capital was Uraiyur and their port town was Kaveripoompattinam or Pumpuhar, where the river Kaveri drains into the Bay of Bengal. Pattinappaalai is a long poem about Kaveripoompattinam composed by the poet Kadiyalur Uruthirankannanar. Silappathikaram describes the trading activities at Kaveripoompattinam. Karikalan is notable among the Chola kings and is credited with bringing forestlands under the plough and developing irrigation facilities by effectively utilising the water from the river Kaveri. The foundation for the extensive harnessing of water for irrigation

A Chera coin with bow and arrow, and an elephant goad on the obverse and elephant on the reverse

Chola Coins with a tiger on the obverse, elephant and the sacred symbols on the reverse

Sangam Age Pandya coin with fish symbol

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purposes, which reached its zenith in later Chola times (10th to 13th centuries) was laid in his time. Karikalan fought battles with the Pandyas, Cheras and other chieftains. The Chola emblem was the tiger and they issued square copper coins with images of a tiger on the obverse, elephant and the sacred symbols on the reverse.

The Pandyas

The Pandyas who ruled the southern part of Tamil Nadu are referred to in the Ashokan inscriptions. Madurai was the Pandya's capital. Tamil literary tradition credits Pandyan rulers with patronizing Tamil Sangams (academies) and supporting the compilations of poems. The Mangulam Tamil-Brahmi inscription mentions the king Nedunchezhiyan. Nediyon, Mudathirumaran, Palayagasalai Mudukudumipperuvazhuti were some of the important rulers of the dynasty. The Pandyan symbol was the fish.

Velirs / Chieftains

Apart from the *Vendhars*, there were *Velirs* and numerous chieftains who occupied territories on the margins of the *muvendhar*. The *velirs* were the seven chiefs Pari, Kari, Ori, Nalli, Pegan, Ai and Athiyaman. Sangam poems write extensively about the generosity of these *velirs*. These chiefs had intimate relations with the poets of their time and were known for their large-heartedness. These chieftains had alliance with one or other of the *muvendhar* and helped them in their battles against the other *Vendhars*.

3.4 Society in Sangam Age

Many of the communities of the Iron Age society were organised as tribes, and some of them were Chiefdoms. The Sangam Age society was a society in transition from a tribal community ruled by a chief to a larger kingdom ruled by a king

Composition of the Society

Social stratification had begun to take root in Tamil society by the Sangam times. There were several clan-based communities including groups such as Panar, Paratavar, Eyinar, Uzhavar, Kanavar, Vettuvar and Maravar. The *Vendhars*, chiefs, and their associates formed the higher social groups. There were priests who were known as Antanars. There were artisan groups specialising in pottery and blacksmithy. The caste system we find in northern India did not take root in Tamil country as social groups were divided in to five situational types (tamil) and related occupational patterns.

Even though Sangam society was characterized by limited consumption of commodities, the kings, chiefs and merchants led a prosperous life. People at the margins lived in poverty. Panars depended on their patrons for their livelihood. The development of agriculture and pastoral ways of life might have harmed the eco-system and the naturally available forest and wild animals. It is possible that some of the hunter-gatherers might have been pushed to the forest areas and a few might have taken up the occupation of manual labourers. The development of agriculture in the wet-land region depended on the use of certain groups of people as labourers.

Women

Women are frequently referred to in Tamil texts as mothers, heroines, and foster-mothers. Women from Panar families, dancers, poets, and royal women were all portrayed in Sangam literature. There are references to women from all five

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eco-zones. For example, Vennikkuyathiyar is identified as a poetess from the village of Venni. There are references to women protecting Thinai fields from birds and Umanar women selling salt showing that women were involved in primary production. Instances where women preferred to die along with their husbands also occur in the literature of the times.

3.5 Economy

The *economy* was mixed as elaborated in the Thinai concept. People practiced agriculture, pastoralism, trade and money exchange, hunting-gathering, and fishing depending upon the eco-zones in which they lived.

Primary Production

Agriculture was one of the main sources of subsistence. Crops like paddy, sugarcane, millets were cultivated. Both wet and dry land farming were practiced. In the riverine and tank-irrigated areas, paddy was cultivated. Millets were cultivated in dry lands. Varieties of rice such as *sennel* (red rice), *vennel* (white rice), and *aivananel* (a type of rice) are mentioned in the literature. Rice grains were found in burial urns at excavations in Adichanallur and Porunthal. People in the forest adopted *punam* or shifting cultivation.

Pastoralism – nomadic people earning livelihood by rearing cattle, sheep, and goat.

Industries and Crafts of the Sangam Age

Craft production and craft specialization were important aspects of urbanization. In the Sangam Age there were professional groups that produced various commodities. The system of production of commodities is called industry.

Paddy grains collected from Porunthal excavations

Different types of pottery from Porunthal excavations.

Russet coated painted pottery with wavy line decoration

Pottery

Pottery was practised in many settlements. People used pottery produced by *Kalamceyko* (potters) in their daily activities and so they were made in large numbers. Black ware, russet-coated painted ware, black and red ware potteries were the different types of pottery used.

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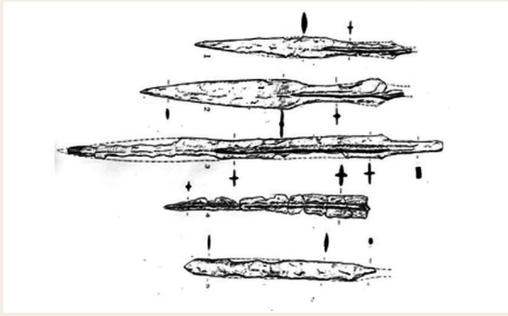
Iron Smelting Industry

Iron manufacturing was an important artisanal activity. Iron smelting was undertaken in traditional furnaces and such furnaces, with terracotta pipes and raw ore have been found in many archaeological sites. For instance evidence of iron smelting has been found in Kodumanal and Guttur. Sangam literature speaks of blacksmiths, and their tools and activities. Iron implements were required for agriculture and warfare (swords, daggers, and spears).



Iron Swords from Puducherry

Stone Ornaments

Sangam Age people adorned themselves with a variety of ornaments. While the poor wore ornaments made of clay, terracotta, iron, and leaves and flowers, the rich wore jewellery made of precious stones, copper, and gold.

A terracotta seal with rice husk impression, Keezhadi

A map of major Sangam Age sites

Carnelian Beads of Sangam Age

Carnelian beads with etched designs of Sangam Age

Gold ornament axe

Gold pendant, Porunthal

Gold ornaments, Pattanam

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Quartz, amethyst (sevvantikkal) and carnelian (semmanikkal) were some of the semi-precious stones used for making ornaments. Diamond drills were used to pierce holes in the hard stones and etched carnelian beads have been found in the megalithic monuments.

Gold jewellery

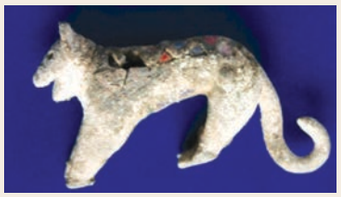
Gold ornaments were well known in this period. Gold coins from Roman was used to make jewellery. Evidence of gold smelting has been found at Pattanam in Kerala. Gold ornaments have been unearthed at the megalithic sites of Suttukeni, Adichanallur and Kodumanal, and towns of Arikkamedu, Keezhadi and Pattanam in Kerala.

Glass Beads

The presence of glass beads at the sites reveals that people of the Sangam Age knew how to make glass beads. Glass material (silica) was melted in a furnace and drawn into long tubes which were then cut into small beads. Glass beads came in various shapes and colour. Arikkamedu and Kudikkadu, near Cuddalore show evidence of glass beads industry. It is possible that people who could not afford precious stones used glass beads instead.

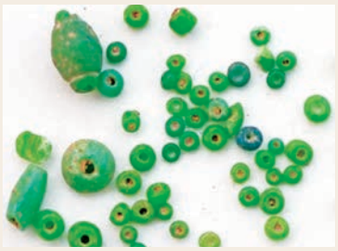
Pearl Fishery and Shell Bangle

The Pamban coast is famous for pearl fishery. A pearl has been discovered in recently excavated Keezhadi site. Shell bangles were very common in the Sangam Age. The Parathavars collected conch shells from the Pamban Island, which were cut and crafted into bangles by artisans. Whole shells as well as fragments of bangles have been found at many sites. Sangam literature describes women wearing shell bangles.



A bronze tiger with carnelian stones, Kodumanal

A bronze vessel from a megalithic burial Auroville, Puducherry



Glass beads from Porunthal excavations

A spindle whorl, Pattanam

Textile and spindle whorls from Kodumanal

Shell wastes of bangle craft production

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Textiles

Textile production was another important occupation. Evidence of spindle whorls and pieces of cloth have been found at Kodumanal. Literature too refers to clothes called *kalingam* and other fine varieties of textiles. Periplus also mentions the fine variety of textiles produced in the Tamil region.

Spindle whorls were used for making thread from cotton.

Exchange, Trade, Merchants, and Trade Routes

We saw the primary production of grains, cattle wealth, and various commodities. These goods were not produced by everybody and were not produced in all settlements. Resources and commodities were not available in all regions. For example, the hill region did not have fish or salt and the coastal regions could not produce paddy. Therefore trade and exchange was important for people to have access to different commodities. Specialised groups called *vanikars* (traders) travelled in groups trading goods and commodities between regions.

Traders

The terms *vanikan* and *nigama* (guild) appear in Tamil-Brahmi inscriptions. There were different types of merchants: gold merchants, cloth merchants, and salt merchants. Salt merchants were called Umanars and they travelled in bullock carts along with their family.

Means of Transport

Bullock carts and animals were used to transport goods by land. Trade routes linked the various towns of Tamilagam. Various types of water crafts and sea-going vessels such as Kalam, Pahri, Odam, Toni, Teppam, and *Navai* are also mentioned in Tamil literature.

Akanaanuru poem 149 describes the trading at the port of Muciri as follows:

"the well crafted ships of the Yavana came with gold returned with pepper at the wealthy port of Muciri"

The trade route from Tamilagam to Rome.

Barter and Coins

Barter was the primary mode of exchange. For instance, rice was exchanged for fish. Salt was precious and a handful of it would fetch an equal amount of rice. The extensive availability of coin hoards of the Sangam Age of the Cheras, Cholas, Pandyas, and Malayaman indicates that they were used widely.

Tamilagam and Overseas Interactions

Tamil country had connections with countries overseas both in the east and west. Roman ships used monsoon winds to cross the Western Sea or the Arabian Sea to connect Tamilagam with the Western world. Spices including pepper, ivory, and precious stones were exported. Metal including gold, silver and copper and precious stones were imported.

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Yavanar referred to the Westerners, including the Greeks, Romans and West Asian people. Yavana derives from the Greek region of Ionia.

Tamil Nadu to Red Sea Coast

An Indian jar with 7.5 kg of pepper, teak wood, a potsherd with Tamil-Brahmi inscription and Indian pottery have been discovered at Berenike, a port on the Red Sea coast of Egypt.

Ceramic Jars from Tamilagam with preserved pepper, Berenike, Egypt

Pottery with the name "Cattan"

Perumpatankal, Kuan Luk Pat, Thailand

At Quseir al Qadhim, another port located north of Berenike on the Red Sea Coast, three Tamil-Brahmi inscriptions, *Panaiori*, *Kanan*, and *Cattan*, have been found on pottery discovered here.

A stone with the name "Perumpatankal" has been found at Khuan Luk Pat, Thailand. Southeast Asia was known as Suvarna Bhumi in Tamil literature. This stone was used by a person called Perumpattan, probably a goldsmith. It was a touchstone used to test the purity of gold.

3.6 Emergence of towns and ports

The Sangam Age saw the first urbanization in Tamilagam. Cities developed and they had brick buildings, roof tiles, ring wells and planned towns, streets, and store houses. The towns worked as ports and artisanal centres. Arikkamedu, Kaveripoompattinam, Azhagankulam and Korkai on the east coast and Pattanam in Kerala were port centres. Kanchipuram, Uraiyur, Karur, Madurai and Kodumanal were inland trade centres.

Many goods and commodities were produced in these centres and were exported to various regions. Though few in number, large towns appeared in the Sangam Age. Small villages however were found in many areas. Bronze vessels, beads, shell bangles, glass beads, pottery with names of people written in Tamil-Brahmi script were found at these sites.

What is an urban centre?

A planned town with brick architecture and a proper layout. Urban centres have a larger population involved in non-agrarian, commercial and political occuptations. Various industrial activities are seen in these towns.

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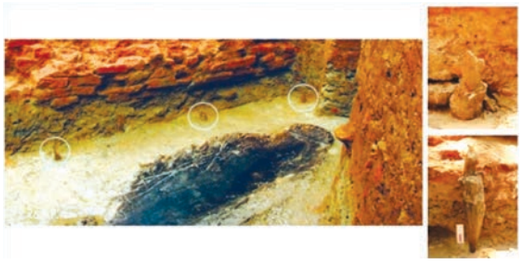
Pattanam, Kerala

Pattanam is located near North Paravur in Vadakkekara village of Ernakulam district of Kerala. It was an ancient port town that had overseas connections with the western and eastern worlds.

Turquoise glazed pottery, West Asia

Pottery sherds from West Asia

Cameo blanks in Carnelian



Canoe excavated at Pattanam

Gold ornaments from Pattanam

Kodumanal, Tamil Nadu

Kodumanal is located near Erode in Tamil Nadu and is identified with the Kodumanam of Pathitrupattu. Evidence of iron, stone bead and shell work, as well as megalithic burials have been discovered at this site. More than 300 pottery inscriptions in Tamil-Brahmi have also been found.

Excavated Megalithic Burial at Kodumanal

Iron objects (horse equipment) from Kodumanal

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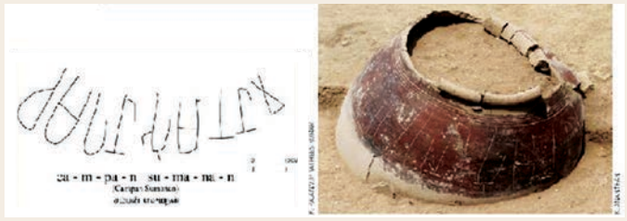
Shell bangle bragments and a conch, Kodumanal

Carnelian beads, Kodumanal



Jar with writing in Brahmi

Human skeleton from Kodumanal

Keezhadi near Madurai, Tamil Nadu

Keezhadi is located near Silaimaan east of Madurai, on the highway to Rameswaram. In a large coconut garden, called Pallichandai Tidal, the Archaeological Survey of India excavated an ancient town dating to the Sangam Age. Archaeological excavations have produced evidence for brick buildings, drainage, Tamil-Brahmi inscription on pottery, beads of glass, carnelian and quartz, pearl, iron objects, games pieces, and antimony rods. Further excavation may shed light on the nature of the craft production and the cultural activities undertaken at this settlement.

Various objects and ornaments from Keezhadi

Brick Structures at Keezhadi

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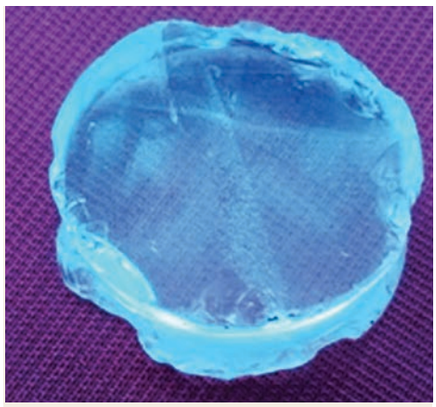
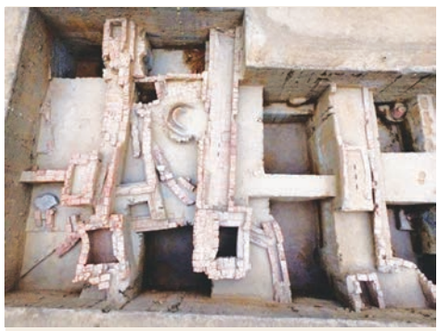


Crystal ear ornaments, Keezhadi



A brick structure, Keezhadi

Furnace, Keezhadi

A brick built tank, Keezhadi

3.7 Faith and Belief System

Like the diverse nature of the society and economy, the belief system of the Sangam Age was also diverse. It consisted of animism, ancestor worship, hero worship and worship of several deities.

Tholkappiyam lists the presiding deities of Kurunji, Mullai, Marutham, Neythal and Paalai landscapes, as Murugan, Thirumal, Indiran, Varunan and Kotravai, respectively.

However, people also worshipped natural forces and dead heroes, and ancestors. The force of anangu is mentioned in the literature which indicates the prevalence of animistic beliefs.

Jainism was present as evidenced by the caves with Tamil-Brahmi inscriptions. Performance of *Yagna* is also evidenced. Buddhism was also present in certain centres. Different groups practiced various forms of worship

3.8 Culture of Arts

Various art forms too existed in the Sangam Age. Performances of ritual dances called Veriyatal are referred to in the literature. Composition of poems, playing of music instruments and dances were also known. The literature mentions the fine variety of cuisine of the Sangam Age. People took care of their appearance and evidence of antimony rods (kohl sticks) made of copper has been found in archaeological sites. They were used by women for decorating their eyebrows.

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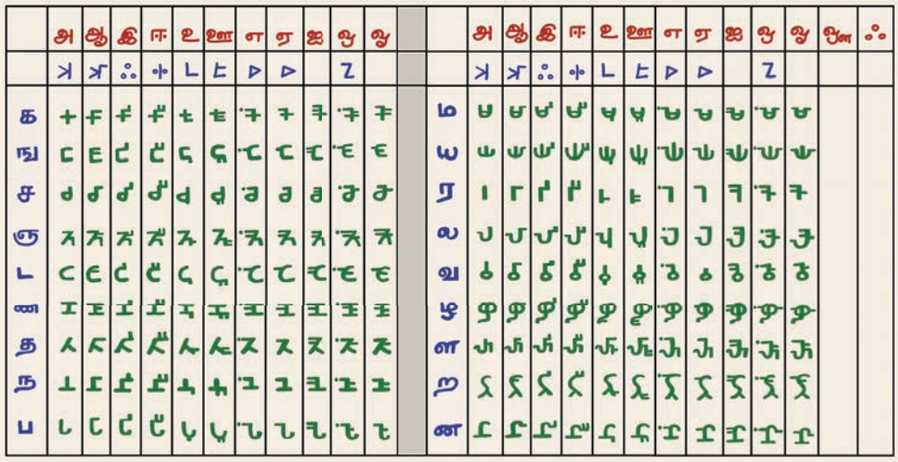
Antimony rods (kohlsticks) were made of bronze

Copper rods used for decorating eyelashes

Tamil-Brahmi Script

used in the Sangam Age for writing the Tamil Language



SUMMARY

- Primary production and exchange and social relationships in the landscapes and mercantile activities across the seas led to urbanization and development of culture paving way for the development of literature during this period.
- The texts were compiled through the Tamil Academies (Sangam) at a later date.
- The Thinai concept is a distinct classification of land and people as elaborated in *Tholkappiyam*.
- The Sangam age witnessed the transition from tribal society to kingdom-centred polities.
- Sea borne trade with the Indian Ocean regions developed.
- Large towns with buildings made of bricks appeared in Tamil country.
- The society was diverse in nature.

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Timeline	
ca. 1300 BCE to 300 BCE	Iron Age or Megalithic Period
ca. 300 BCE to 300 CE.	Early Historic Period / Sangam Age
ca. 300 BCE to 300 CE.	Sangam Literature
ca. 400 BCE to 300 BCE	Introduction of Tamil-Brahmi Script
1st Century CE	Periplus of Erythrean Sea
1st Century CE	Pliny's Natural History
2nd Century CE	Ptolemy's Geography
2nd Century CE	Vienna Papyrus G 40822
ca. 300 CE to 500 CE	Post Sangam Age

EXERCISE

FC1VHM

I. Choose the correct Answer:

1. The name of the script used in the Sangam Age
   a) English
   b) Devanagari
   c) Tamil-Brahmi
   d) Granta
2. The Sri Lankan chronicle composed in the Pali language mentioning about merchants and horse traders from Tamil Nadu
   a) Deepa vamsa
   b) Arthasastra
   c) Mahavamsa
   d) Indica
3. The notable Chola king credited with bringing forest lands under the plough and developing irrigational facilities
   a) Karikalan
   b) Rajarajan I
   c) Kulothungan
   d) Rajendran I
4. Inscription that mentions the Cheras
   a) Pugalur
   b) Girnar
   c) Pulimankombai
   d) Madurai
5. The famous Venetian traveller who described Kayal as a great and noble city
   a) Vasco da gama
   b) Alberuni
   c) Marco Polo
   d) Megasthenes
6. (i) Coins as a medium of exchange were introduced for the first time in the Sangam Age.
   (ii) Prakrit was the language used by the common people in Northern India during the Mauryan period.

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(iii) Vienna Papyrus, a Roman document, mentions trade related to Muziri.

(iv) The concept of Thinai is presented in the Tamil grammar work of Pathupaattu.

a) (i) is correct

b) (ii) is correct

c) (i) and (ii) is correct

d) (iii) and (iv) is correct

7. (i) Pathitrupathu speaks about the Pandya kings and their territory.

(ii) The Akanaanuru describes the trading activities at Kaveripoompattinum.

(iii) The Chola Emblem was the tiger and they issued square copper coins with images of a tiger.

(iv) Neythal is a sandy desert region.

a) (i) is correct

b) (ii) and (iii) is correct

c) (iii) is correct

d) (iv) is correct

II. Fill in the blanks

1. _____ are documents scripted on stones, copper plates, coins and rings
2. _____ refers to systematically digging a site to recover material evidence for exploring societies of the past
3. _____ the classic work on economy and statecraft authored by Kautilya during the Mauryan period.
4. _____ is a poetic theme which means a class or category and refers to a habitat or eco-zone with specific physiographical characteristics.
5. _____ referred to the Westerners, including the Greeks, Romans and West Asian people.

III. Find out the correct statement

1. a) Evidence of iron smelting has been found in Kodumanal and Guttur.

b) Periplus of Erythren Sea mentions about the pepper trade with India.

c) Punch marked coins are the earliest coins used in India mostly made of gold.

d) The Sangam Age has its roots in the Bronze Age.

2. a) The Cheras ruled over Kaveri delta and their capital was Uraiyur.

b) The Maangulam Tamil-Brahmi inscriptions mention the King Karikalan.

c) The terms Vanikan and Nigama appear in Tamil-Brahmi inscriptions were different types of merchants.

d) Salt merchants were called Vanikars and they travelled in bullock carts along with their family.

IV. Match the following

1. Epigraphy - a narrative text presenting the important historical events
2. Chronicle - a Sangam Age port
3. Pastoralism - an ornament made in precious stone.
4. Cameo - the study of inscriptions
5. Arikkamedu - nomadic people earning livelihood by rearing cattle.

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V. Answer the following questions briefly

1. Archaeological sites provide evidence of past history - Discuss.
2. How important are coins as a source of evidence for the study of Sangam Age?
3. The Tamil rulers were independent of Mauryan authority. What explanation would you offer.
4. Agriculture was one of the main sources of subsistence in Sangam Age. Give reasons.
5. Overseas interactions brought glory to ancient Tamilagam. Give examples in support.

VI. Answer all the questions given under each caption

1. Hero Stones:

   a. What was the common practice in a pastoral society?

   b. Who plundered the cattle wealth of enemies?

   c. How were the dead warriors remembered?

   d. Which Tamil text describes the procedures for erecting hero stones?

2. Non - Tamil Sources (Foreign Accounts)

   a. What does the presence of the non-Tamil sources reveal?

   b. Name the classic work of the Mauryan period that makes a mention that the pearl and shells came from Pandya country.

   c. What is a chronicle?

   d. Who speaks about the pepper trade between Roman empire and India?

3. Industries and Crafts of the Sangam Age

   a. What were the important aspects of urbanisation?

   b. What is the Tamil name for a potter?

   c. What were the different types of pottery used by the people?

   d. Identify the Iron implements required for agriculture and warfare

VII. Answer the following in detail

1. To what extent do you think the political powers of Tamilagam influenced Sangam Age polity?
2. Indicate how the industries and crafts of the Sangam Age contribute to their economy.

FUN WITH HISTORY

Student Activities

Mark on the map of south India, the ancient Tamilagam and the territories of Tamil kingdoms.

Visit a museum and collect information about inscriptions, coins and instruments used by the ancient people.

Visit the early historic sites of Arikkamedu, Kaveripoompattinam, Keezhadi etc.,

Conduct a study on materials excavated from prehistoric sites and on Tamil - Brahmi script.

Assignment with teacher's guidance

A power-point presentation on the origin of human life

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TAMIL GLOSSARY

Archaeology - தொல்லியல்
Before Common Era (BCE) - பொது ஆண்டிற்கு முன் (பொ.ஆ.மு.)
Common Era (CE) - பொது ஆண்டு (பொ.ஆ)
Craft - கைவினைத் தொழில்
Early History - வரலாற்றின் தொடக்க காலம்
Excavation - அகழாய்வு
Material culture - பண்பாட்டுப் பொருள்கள்
Punch-marked coins - முத்திரை பொறித்த நாணயங்கள்
Ring Well - உறைகிணறு
State - அரசு
Urbanization - நகரமயமாக்கம்
Vandalism - மரபுச் சின்னங்களைச் சிதைத்தல்

ENGLISH GLOSSARY

Estampage - the process of making copies of inscriptions using paper and ink.
Corpus - a collection of texts

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NOTES

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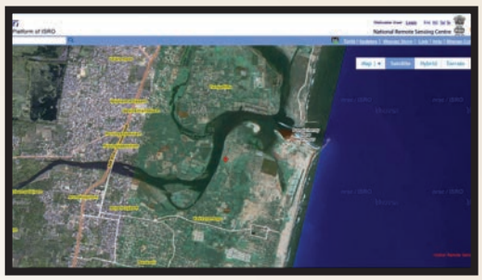
ICT CORNER

Finding Arikamedu

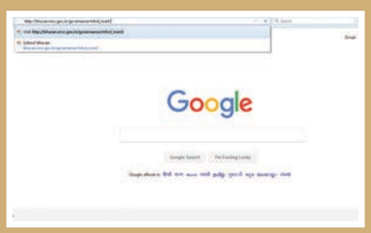
Let's Find



Steps

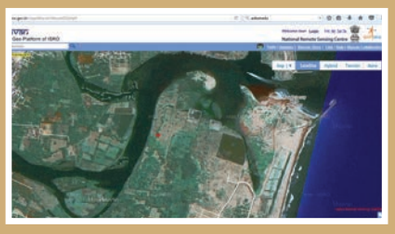
1. Type the given URL in browser or scan the QR code.
2. Click 'Bhuvan 2D'.
3. Type Arikamedu in search box. Click 'Search' button or press the 'Enter key'.
4. Select the 'Satellite' option given at the right side to watch the area in satellite view. Click '+' or '-' signs given at the left side to' zoom in 'or 'zoom out'.

Step 1



Step 2

Step 3



Step 4

Website URL:
http://bhuvan.nrsc.gov.in/bhuvan_links.php#

Website URL:
https://play.google.com/store/apps/details?id=com.prajwal.history.science.isro.bhuvan.earth.map.satellite

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UNIT 4

Intellectual Awakening and Socio-Political Changes

Learning Objectives

- To understand the transition of society from 6th century to 2nd century BCE.
- To familiarise ourselves with the essence of new religious faiths: Buddhism, Jainism and Ajivika in India, Zoroastrianism in Persia, and Confucianism and Taoism in China.
- To become aware of the circumstances that led to the formation of states with a focus on Magadha Empire.
- To understand the socio-political changes of the pre-Mauryan and Mauryan states.

Introduction

The discovery of iron marked the beginning of the second phase in the history of civilisations. The invention of smelting of iron transformed both production and warfare. Before iron, copper and its alloy, bronze, which were expensive, were employed in production. The copper or bronze edges became blunt quickly and so implements, whether weapons or ploughs, made of bronze could not be used effectively. Iron ore, in contrast, was available in abundance compared to copper or bronze. The effect of iron axe on agriculture was immense. The iron axe enabled cultivators to clear the jungles and the iron plough was used to break the hardest soil. The Assyrian Empire, which made use of iron technology, was ascendant by the beginning of the seventh century BCE. Small kingdoms or city states emerged in China, Asia Minor (modern Turkey), Greece, Italy, Palestine, Lebanon and North Africa.

A new civilisation began to develop in northern India, with the revival of trade and urbanization during the sixth century BCE. In this period of major political and social changes in north India, Buddha and Mahavira were born. In the century following their death, Buddhism and Jainism took root as major religions in India. This meant that new religious orders were coming up with many followers, propagating new beliefs and philosophies. Similarly Zoroastrianism in Persia and Confucianism and Taoism in China became popular during this period.

4.1 Religion in the Sixth Century BCE

The new civilisations that emerged in the new Iron Age had certain common features. They were characterised by the proliferation of new crafts, growth of long-distance trade, building of cities and towns, rise of universalistic religions and evolution of a code of

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Places associated with the intellectual awakening in 6th century BCE

conduct. Sixth century BCE was, therefore, a period of exceptional development in all spheres of life such as material, cultural and intellectual. About this time, we find that a number of prominent men, great thinkers and founders of new religions lived, making it a period of great historical importance. Philosophical and religious thinkers such as Confucius in China, Zoroaster in Iran and Mahavira and Buddha in India gained popularity in sixth century BCE.

4.2 Confucianism and Taoism

In the sixth century BCE, two great thinkers were born in China: Confucius and Lao-Tse. They laid down the systems of morals and social behaviour for individuals and communities. But after their death, temples were built in their memory and the philosophy they taught was developed into a religion. Known as Confucianism and Taoism respectively, their books were held in great reverence in China. Confucianism exerted a big influe nce on not only the political class of China but also on the common people.

Confucius
(551–478 BCE)

Confucius was born in the Shantung province of China in 551 BCE. He studied history, poetry, philosophy and music. He is the author of five important works: (1) *The Book of Records*,

Confucius

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which is chiefly ethical, providing guidelines for the regulation of human society; (2) *The Book of Odes*, illustrating the sound principles of morality in songs; (3) *The Book of Changes* dealing with metaphysics; (4) *The Spring and Autumn Annals*, a code of political morality; and (5) *The Book of History* narrating the events and legends of the early religions of China.

The correct way of writing Confucius, according to the new Pinyin system of transliteration, is Kong Fu-Tse. The European scholars who visited China found it difficult to pronounce the name and so they turned it into Latin and called him Confucius. [Linguists developed a system called Pinyin, meaning spelled sounds, for pronouncing and spelling Chinese names and words in languages written in the Latin alphabet.]

Five Cardinal Principles of Confucius' Ethics

1. Humaneness
2. Righteousness
3. Propriety;
4. Wisdom
5. Trustworthiness

Confucius said that wisdom grows from the family, and that the foundation of society is the disciplined individual in an orderly family. The superior man, according to him, is not merely intelligent or scholarly, but his character should be exemplary. The superior man of Confucius possesses three virtues: intelligence, courage and goodwill. Though Confucius insisted on children obeying parents and wife her husband, he also clearly proposed that "when the command is wrong a son should resist his father and a minister should resist the prince." When asked about government, he said that there are three requisites for it: "That there should be sufficiency of food, sufficiency of military equipment and confidence of the people in their ruler."

Lao-Tse

The philosophy of Confucius gave the Chinese people an awareness about their political rights. It also clearly listed the government's duty towards the people. Confucius felt that the government should work with an ideal. In matters of national life, Confucius felt that the people in the nation are the actual and proper source of political sovereignty. He advised that the ruler must appoint persons of character in the government to govern the people impartially. Confucianism is often characterised as a system of social and ethical philosophy rather than as a religion.

Taoism

Lao-Tse, the greatest of the pre-Confucian philosophers, was 53 years older than Confucius. Lao-Tse was born in 604 BCE. Disgusted with the intrigues of politicians and the prevailing corruption of his time, he left China to live in a peaceful abode. Lao-Tse wrote a book in two parts, running into 5,000 words. He then disappeared from the place and no one knew where he died. His book *Tao Teh Ching* is a guide to the conduct of life.

Teachings of Lao-Tse (Taoism)

- The cause of human unhappiness in the world is human selfishness. Selfishness creates unlimited human desires, which can never be satisfied.

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- In nature, all the things act in a natural way. The law of human conduct must correspond with nature.
- Humans live a life under the regulation of someone. This is because they have acquired knowledge and have not remained innocent. On the basis of their acquired knowledge, they have built up an urban civilisation and have made themselves unhappy.

4.3 Zoroastrianism

Zoroastrianism is one of the oldest of the revealed world religions. It remained as the state religion of three great Iranian empires, which flourished from the 6th century BCE and dominated much of the Near and Middle East. Zoroaster of Persia is the founder of Zoroastrianism. Zoroaster was pained to find his people worshipping primitive deities. He revolted against it and proclaimed to the world that there is one god, Ahura Mazda (the Lord of Light).

The holy book of Zoroastrians is *Zend Avesta*. It is a collection of sacred literature of different epochs, containing religious hymns, invocations, prayers, confessions, laws, myths and sacred reminiscences. The doctrines and rituals of the Zoroastrians have much similarity to those of the Vedas.

The language of Avesta bears similarity to that of the Indo-Aryan. Linguists have established a close relationship between Indo-Aryan and the languages of West Asia, in particular Iran. The old Iranian language dates back to the second millennium BCE. Later, it incorporated languages of Dravidians and those of aboriginals of the Indian sub-continent. According to the historian Romila Thapar, the old Iranian and Indo-Aryan speakers originally belonged to a single group and later split up because of dissentions.

Teachings

Zoroaster taught that the great object of religion, state or society is the cultivation of morality. The highest religious conception is purity of thought, word and deed. He asserted that Ahura Mazda has seven qualities:(1) light; (2) good mind; (3) right; (4) dominion; (5) piety; (6) well-being; and (7) immortality. Ahura Mazda is omniscient (knows everything), omnipotent (all powerful) and omnipresent (is everywhere). In Zoroastrianism, sacrifice and image worship were discarded. Fire was worshipped as a symbol of the deity and considered the highest form of worship. Charity was made an essential part of religion, and service to the poor was particularly emphasised. Human virtues did not mean only prayer, meditation, sacrifices and rituals. It meant much more, such as fighting evil, making efforts for good and assisting the activity of Ahura Mazda.

This religion ceased to exist in its place of origin, as in the wake of Muslim conquest of Persia (Iran), many of the Zoroastrian families fled to different countries, including India between the eighth century and tenth century CE. With their dwindling numbers and in the face of coercive measures adopted by the Arabs to push through their new faith, as well as the incidents of destruction of fire temples and killing of priests, Zoroastrianism went into a decline. The Parsis, who came to India from Persia first as merchants and later in the wake of persecution, brought

Manichaeism, resembling Iranian and Indian religions, was founded in Persia by Mani in the 3rd century CE but could not survive in the face of persecution of the Church on grounds of heresy.

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Zoroastrianism with them and they have been practicing it ever since.

4.4 Impact of Iron Technology in India

In the Gangetic valley, people learnt to produce crops more than that was required for subsistence. So, another section of people took up some professional crafts as their livelihood. Like the farmers, these craftsmen also had to rely on a group of people who collected raw materials and distributed the craft products. Early urbanisation happened in two ways. One was as a result of some villages specialising in black smithy, pottery, carpentry, cloth weaving and the like. The other was on account of the congregation of specialised craftsmen in villages close to where the raw materials were available and where markets were present. Such a concentration enabled villages to evolve into towns and exchange centres. Vaisali, Shravasti, Rajagriha, Kausambi and Kashi were some significant commercial centres of the Gangetic plain.

4.5 Religion: Post-Rig Vedic

Three more Vedas – Yajur, Sama and Atharva –were composed after the Rig Veda. Manuals of rituals called *Brahmanas*, specifying rhyming words to be sung, and two commentaries on certain Rig Vedic hymns called *Aranyakas*, containing knowledge to be learnt secretly in the forest, and the Upanishads, were compiled in the upper Gangetic plain during 1000–600 BCE.

FCJMQX

4.5.1 Post-Vedic

During the post-Vedic period, the Rig Vedic gods such as Varuna, Indra, Agni, Surya and Usha lost their importance. New gods like Siva, Vishnu and Brahma appeared on the religious firmament. Aryans developed the ideas of *tapas* (virtuous living) and *brahmacharya* (celibacy). Rites and rituals insisted on by Brahman priests overshadowed the true spirit of the religion. The sacrificial cult, supported by the wealthy and the elite, practised in accordance with the formulae prescribed in *Brahmanas*, were opposed by Buddha and Mahavira, who revolted against the existing practices and proposed their ethical teachings.

4.6 Jainism and Buddhism

In the Gangetic plain, iron plough agriculture required the use of bullocks. But the indiscriminate killing of cattle for Vedic rituals and sacrifices caused resentment. The founders of Jainism and Buddhism did not prescribe killing as a religious rite. They secured their livelihood mostly by alms. Celibacy and abstinence from holding property made the new teachers much more acceptable than the Brahman priests. The people's resentment about the expensive and elaborate Vedic rituals, animal sacrifice and the desire for wealth eventually took them towards Jainism and Buddhism.

Mahavira and Buddha lived a life of purity and exemplified simplicity and self-denial. They lived in the times of Bimbisara and Ajatashatru, the famous kings of Magadha. The commercial development of the northern cities like Kaushambi, Kushinagara, Benaras, Vaishali and Rajgir added importance to the Vaishyas who turned to Buddhism

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and Jainism in their eagerness to improve their social status.

Jainism

Mahavira: Birth and Life

Mahavira

Vardhamana Mahavira was born in 599 BCE at Kundagrama near Vaishali. His mother was Trishala, a Lichchavi princess. He spent his early life as a prince and was married to a princess named Yashoda. The couple had a daughter. At the age of thirty, he left his home and became an ascetic. For over twelve years, Mahavira wandered from place to place, subjecting himself to severe penance and self-mortification. In the thirteenth year of his asceticism, he acquired the highest knowledge and came to be known as Jaina (the conqueror) and Mahavira (great hero). Jains believe that Mahavira came in a long line of Tirthankaras and he was the twenty fourth and the last of them. Rishabha was the first Tirthankara and Parshvanath the penultimate or the twenty third. Mahavira travelled extensively as a preacher in the kingdoms of Magadha, Videha and Anga. Magadha rulers Bimbisara and Ajatashatru were influenced by his teachings. Thousands of people became his followers. After 30 years of preaching, Mahavira died at Pawapuri in 527 BCE at the age of seventy two.

Teachings of Mahavira

The three principles of Jainism, also known as Tri-ratnas, are the following:

1. Right faith: Belief in the teachings and wisdom of Mahavira.
2. Right knowledge: Acceptance of the theory that there is no God and that the world existed without a creator.
3. Right action: It refers to the Mahavira's observance of the five great vows: (a) ahimsa, (b) honesty, (c) kindness, (d) truthfulness and (e) not coveting or desiring things belonging to others.

Spread of Jainism

In order to spread his new faith, Mahavira founded monasteries and engaged munis (Jaina monks) who led a very austere life. In North India, this new faith was patronised by rulers such as Dhana Nanda, Chadragupta Maurya and Kharavela. There was a notable following for Jainism in Karnataka and western India during the 4th century BCE. Jainism encouraged the public spirit among all who embraced it. Varna system practiced by Brahmans was challenged. People were spared from the costly and elaborate rituals and sacrifices. Mahavira believed that all objects, both animate and inanimate, have souls and various degrees of consciousness. They possess life and feel pain when they are injured.

Split in Jainism

In course of time, Jainism split into two branches, namely the Digambaras (sky-clad) and the Svetambaras (white-

DO YOU KNOW?

Bahubali

The statue of Bahubali (known as Gomateswara, 57 feet) at Shravanabelgola in Karnataka is the tallest Jaina statue ever carved out in India.

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DO YOU KNOW?

Jaina Kanchi : Jainism was one of the major faiths in the Tamil region during the 7th century CE. The Pallava king. Mahendravarman was a Jain. Under the influence of Appar he got converted to Saivism. Close to the present town of Kanchi there is a place called Jaina Kanchi where you find many Jain temples. One of the important temples is the Thiruparuthikundram temple, where the ceiling is painted with the life story of Mahavira.

clad). The Digambaras were the orthodox followers of Mahavira. The Digambaras rejected clothes altogether. Svetambaras wore a white dress from head to toe.

Decline of Jainism

The lack of royal patronage, its severity, factionalism and spread of Buddhism led to the decline of Jainism in India.

Buddhism

Gautama Buddha: Birth and Life

Gautama Buddha

Gautama Buddha was the son of Suddhodana, the chief of a Kshatriya clan of the Sakyas of Kapilavastu in present-day Nepal. His given name was Siddhartha. As he belonged to the Sakya clan, he was also known as 'Sakya Muni'. He was born in 567 BCE in Lumbini Garden, near Kapilavastu. His mother, Mayadevi (Mahamaya), died after a few days of his birth and he was brought up by his step-mother. In order to divert his attention towards worldly affairs, his father got him married at the age of sixteen to a princess called Yashodhara. He led a happy married life for some time and had a son by name Rahula.

One evening, while Siddhartha was passing through the city, he came across an old man who had been abandoned by his relatives, a sick man crying with pain and a dead body surrounded by weeping relatives. Siddhartha was deeply moved by these sights. He also saw an ascetic who had renounced the world and found no sign of sorrows. These 'Four Great Sights' prompted him to renounce the world and search for the cause of suffering. In 537 BCE, he left his palace and went into the forest in search of truth. In the course of his wanderings, he sat under a peepal tree for several days until he attained enlightenment. The place where he attained enlightenment, the Mahabodhi temple, still exists in Bodh Gaya (Bihar).

After his enlightenment, Buddha decided to impart his knowledge to the people. He went to Varanasi and gave his first sermon at Saranath. He preached in the kingdoms of Magadha and Kosala. A large number of people became his followers including his own family. After forty five years of preaching, he breathed his last in 487 BCE at Kushinagar (near Gorakhpur in Uttar Pradesh) at the age of eighty.

Teachings of Buddhism

(i) **Four Great Truths:** (1) There is suffering and sorrow in this world. (2) The cause of human suffering is desire and craving. (3) This pain or sorrow can be removed by suppressing desire and craving. (4) This is to be achieved by leading a disciplined life or by following what Buddha called the 'Noble Eight-fold Path'.

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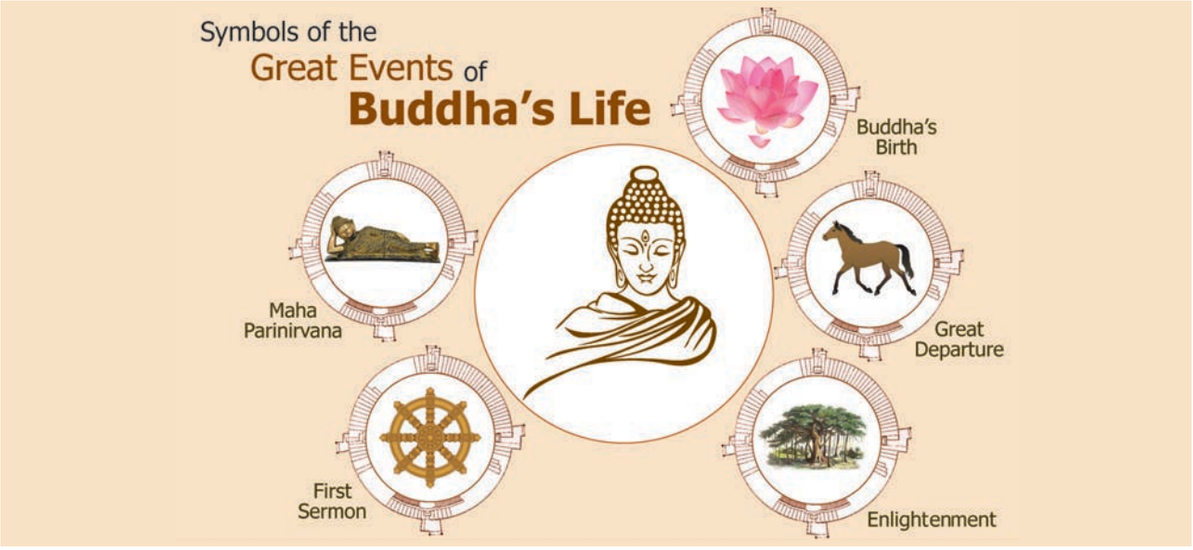

(ii) **Attainment of Nirvana:** According to Buddha, a person should aim at attainment of nirvana or the highest bliss, and it could be achieved by any person by leading a virtuous life and by following the Noble Eight-fold Path.

(iii) **The Noble Eight-fold Path:** Buddha preached a new path to attain the purest state of mind: (1) right views, (2) right aspirations, (3) right speech, (4) right action, (5) right livelihood, (6) right effort, (7) right mindfulness and (8) right contemplations or meditation. Buddha preached that he who practices the eight-fold path can attain the highest and purest state of mind.

(iv) **Middle Path and Salvation:** Buddha advised his followers neither to indulge in material pleasures and luxuries nor to practice austere penances. He said that by following the 'Middle Path', people could attain moksha or salvation, that is freedom from the cycle of birth, death and rebirth.

(v) **Ahimsa or Non-violence** was another fundamental belief of Buddha. He condemned bloody sacrifices in the yajnas. According to him, love for all living beings was an essential disposition for a good practitioner of Buddhism.

(vi) **Emphasis on Morality:** Buddha advised his followers to do good deeds and lead a moral and disciplined life. He appealed to them to refrain from lying, from killing living beings, from taking intoxicants, from stealing and from leading a sensual life.

Spread of Buddhism

Buddha, in order to carry his message to different parts of India, established the Buddhist *sangha* or the Holy Order of Monks. The *bikshus* (monks) and the *bikshunis* (nuns) were enlisted for spreading the faith and they were required to lead a life of purity and poverty. Buddhism spread to Central Asia, Sri Lanka, Tibet, Southeast

DO YOU KNOW?

When Buddha's closest disciple Ananda asked Buddha whether women can become monks. Buddha said, Yes, if women can follow the path of renunciation, they can become monks and completely enlightened just as men.

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Asia, as well as the eastern countries of China, Mongolia, Korea, Japan and Vietnam.

The Split in Buddhism

During the reign of Kanishka, the Buddhist monk Nagarjuna initiated reforms in the way Buddhism was being followed. As a result, Buddhism was split into two as *Hinayana* and *Mahayana*.

(i) The Hinayana (Lesser Vehicle) was the original creed preached by Buddha. The followers of this form regarded Buddha as their guru and did not worship him as God. They denied idol worship and continued with the people's language, Pali.

(ii) In Mahayana (Greater Vehicle), Buddha was worshipped as God and Bodhisattuva as his previous avatar. The followers made images and statues of Buddha and Bodhisattuva and offered prayers, and recited hymns (mantras) in their praise. Later, they wrote their religious books in Sanskrit. This form of Buddhism was patronised by Kanishka.

Decline of Buddhism

Buddhism declined in India due to the following reasons:

1. Buddhism was popular in the beginning because it was preached in people's language (Pali). The later texts were written in Sanskrit, which was difficult for the common people to understand.
2. The split in Buddhism into Hinayana and Mahayana was another vital reason. Image worship in Mahayana made no difference between Hinduism and Buddhism.
3. Buddhism lost its royal patronage during the reign of Guptas.
4. Further, the invasions of Huns and Turks almost wiped out Buddhism.

4.7 Other Heterodox Sect

Ajivika

The period that produced Buddhism and Jainism also witnessed the birth of a sect known as Ajivika. Its founder was Gosala (Maskariputra Gosala), a friend of Mahavira. For some time, they were together. Later, Gosala moved away and founded the Ajiviaka sect. As an atheistic sect, Ajivikas rejected the karma theory, which postulated that the condition of men is determined by their past actions. Gosala argued that acts of charity and piety can, in no way, influence this finality.

Ajivikas had a small presence in southern India. Under the Cholas, a special tax was levied on them. Three Tamil texts, the *Manimekalai* of Buddhists, the *Nilakesi* of Jains and the *Sivajnanasiddhiyar* of Saivites, contain the outlines of Ajivika doctrine.

4.8 Political Organisation: Pre-Mauryan

The spread of Aryans in the east led to the establishment of new settlements in the Gangetic region. One important result of introduction of iron tools was the easy removal of dense forest cover from the banks of the Ganges. Sedentary agriculture had resulted in a permanent settlement of a clan in a particular area, thereby giving it a geographical identity. Retaining their acquired land required political organisation. The emergence of *gana-sangha*, chiefdom, has to be seen in this context. The clusters where particular clansmen were dominant came to be known as *janapadas*.

Gana-sanghas

There were two distinct forms of government at the time of Mahavira and Buddha: monarchical kingdom and clan oligarchies or *Gana-sanghas*. The Gana-

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sanghas provided a polity alternative to the kingdoms. Vedic rituals and the rules of *varna* were not followed. The Gana-sanghas consisted of either a single clan, such as the Shakyas, Koliyas and Mallas, or a confederacy of clans, such as the Vrijjis and the Vrishnis (a confederacy located at Vaisali). The Gana-sanghas had only two strata: the Kshatriya rajakula, ruling families, and the dasa-karmakara, the slaves and labourers. The dasa-karmakaras had no representation in the Assembly. The presence of various other popular religious cults in Gana-sanghas is in contrast to the socio-cultural system prevailing in kingdoms.

In Gana-sanghas, the head of the clan presided over the Assembly, comprising the heads of families. The clan's head was not chosen following heredity. This Assembly discussed the matters relating to the affairs of the Gana-sanghas and if a unanimous decision was not possible, it was put to vote. There were advisers to the head of the clan. In later days, elaborate judicial procedures also evolved. The income of the Gana-sanghas was drawn from agriculture and cattle rearing, which was confined only to the Punjab and the *doab,* and to some extent from trade. For the chieftains of the north-west, the income primarily came from trade. Land was owned in common by the clan. They were cultivated by dasa-karmakara. There was only domestic slavery. The use of slaves in production was absent.

4.9 Rise of Kingdoms

The 6th century BCE witnessed the establishment of kingdoms, oligarchies and chiefdoms as well as the emergence of towns. From the largest of the chiefdoms emerged kingdoms. Many tribes of Rig Vedic period such as Bharatas, Pasus, Tritsus and Turvasas passed into oblivion and new tribes such as the Kurus and Panchalas rose into prominence. Sixteen *mahajanapadas* are listed in the Buddhist texts. Linguistic and cultural commonality prevailed in the *janapadas*, whereas in the *mahajanapadas*, different social and cultural groups lived. With the emergence of kingdoms, the struggle for supremacy among different states occurred frequently. Sacrifices such as Rajasuya and Asvamedha were performed to signify the imperial sway of monarchs over their rivals. The Rig Vedic title of 'Rajan' was replaced by impressive titles such as Samrat, Ekrat, Virat or Bhoja.

Northern India extended from the Kabul Valley in the north to the Godavari in the South. It witnessed the rise of sixteen states known as *Mahajanapadas* or sixteen great states: Kasi, Kosla, Anga, Magadha, Vajji, Malla, Chedi, Vatsa, Kuru, Panchala, Matsya, Surasena, Assaka, Avanti, Gandhara and Kamboja.

Growth of Royal Power

The king enjoyed absolute power. The *sabha* of the Rig Vedic period ceased to exist. The king sought the aid and support of the *samiti* on matters like war, peace and fiscal policies. However, in spite of the existence of the assemblies, the power of the king kept increasing. The *Satapatha Brahmana* describes the king as infallible and immune from all punishments. The growth of royal power was reflected in the enlarged administrative structure. The king was now assisted by a group of officers such as *Bhugadugha* (collector of taxes), *Suta* (charioteer), the *Aksharapa* (superintendent of gambling), *Kshattri* (chamberlin), *Gorikartana* (king's companion in the chase), *Palogola* (courtier), *Takshan* (carpenter) and *Rathakara* (chariotmaker). In addition,

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there were the ecclesiastical and military officials like the *Purohita* (chaplain), the *Senani* (army general) and the *Gramani* (leader of the village).In the later Vedic period, Gramani, who acted both a civil and military officer, was the link through which the royal authority was enforced in the village. The king administered justice and occasionally delegated his judicial power to *Adhyakshas* (royal officials). In the villages, *Gramyavadin* (village judge) and *Sabha* (court) decided the cases. Punishments for crimes were severe.

The Rise of Magadha Kingdom

The polity followed in kingdoms was different from that of gana-sanghas. Kingdoms operated with a centralised government. Political power was concentrated in the ruling family, which had become a dynasty, with succession becoming hereditary. There were advisory bodies such as *parishad* (ministers) and *sabha* (advisory council). The *sabha* collected the revenue and remitted it to the treasury in the capital of the kingdom, from where it was redistributed for the public expenses, such as maintenance of army and salaries to state officials.

Of the kingdoms mentioned in the literature of the period, Kashi, Kosala and Magadha are considered to be powerful. The only republic that rivalled these kingdoms was the Vrijjis, whose capital was Vaisali. In the struggle for control for the Gangetic Plain, which had strategic and economic advantages, the Magadha kingdom emerged victorious. Bimbisara was the first important king of Magadha. Through matrimonial alliances with the high-status Lichchavi clan of Vaishali and the ruling family in Kosala, Bimbisara went on to conquer Anga (in West Bengal now), thereby gaining access to the Ganges delta.

Bimbisara succeeded in establishing a comprehensive structure of administration. Village was the basic unit of his administrative system. Apart from villages (*gramas*), there were fields and pastures as well as wasteland and the forests (*aranya*, *khetra* and *vana*). Each village was brought under a *gramani* (headman), who was responsible for collecting taxes and remitting them to the state treasury. Officers appointed to measure the land under cultivation and assess the value of crop were to assist the *gramani* in his task. Land tax (*bali*) was the main source of revenue to the kingdom and the share of the produce (*bhaga*) was determined proportionate to the extent of land cultivated. The term *shadbhagin* – one who is entitled to a share of one-sixth –referred to the king. Thus, a peasant economy came into being at Magadha.

Iron plough agriculture led to the rise of empires Assiriyan in Iran and Magadha in India.

Ajatashatru, the son of Bimbisara, is said to have murdered his father and ascended the throne in 493 BCE. He continued his father's policy of expansion through military conquests. The capital city of Magadha was Rajagriha, which was surrounded by five hills, providing protection to the kingdom from external threats. Ajatashatru strengthened the Rajagriha fort and also built another fort at Pataligrama on the Ganges. It served as the exchange centre for the local produce and later became the Mauryan capital of Pataliputra. Ajastashatru died in 461 BCE and he was succeeded by five kings. All of them followed the example of Ajatashatru by ascending the throne by killing their

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parent. Fed up with such recurring instances, people of Magadha appointed the last ruler's viceroy Shishunaga as the king. After ruling nearly for half a century, the Shishunaga dynasty lost the kingdom to Mahapadma Nanda who founded the Nanda dynasty. The Nandas were the first of non-kshatriya dynasties to rule in northern India.

Nandas extended the Magadhan Empire still further. Nandas gave importance to irrigation, with the canals they built touching even the Kalinga (Odisha) kingdom. During their period, officials were regularly appointed to collect the taxes which became a part of the administrative system. Nandas' attempt to build an imperial structure was cut short by Chandragupta Maurya who founded the Mauryan kingdom in 321 BCE.

4.10 North-West India and Alexander

Historically, the north-west part of India remained a region under varying suzerainties such as north India, Afghanistan and Persia (Iran). During 6th century BCE, it was part of the Achaemenid empire founded by Cyrus II of Persia. The Indian region had since been providing mercenaries for the Persian armies in their fight against the Greeks. Takshashila or Taxila, as the Greeks called it, was a prominent city in the north-west. It turned out to be a centre for inter-mixing of Iranian and Indian culture and learning. The ascendency of Achaemenid empire in north-west ended with the conquest of that empire by Alexander of Macedonia. While marching on the territories of the Achaemenid Emperor Darius III. Alexander, the Greek Emperor entered the Indian provinces in 326 BCE. His campaign in northern India lasted for two years. The king of Jhelum region, Porus, fought him heroically in the battle of the Hydaspes (Jhelum). Though Porus lost the battle, he was restored to the throne only to be killed by one of Alexander's generals after Alexander's death.

Greek Emperor Alexander

Alexander had left his governors in India. But his sudden death at the age of thirty three prompted his governors to leave north-west India to seek their fortune in West Asia. Alexander was a great general and a world conqueror. After his death, his great empire fell to pieces. Ptolemy took Egypt with its capital Alexandria, while Seleucus had Persia and Mesopotamia and part of Asia Minor as his share. Alexander's death, however, cleared the way for the founding of a great empire, the Mauryan empire in India.

4.11 Mauryan Empire: State and Society

Mauryan Kings

Vishnugupta, who was later known as Chanakya or Kautilya, fell out with the Nanda king and vowed to dethrone him. Chandragupta perhaps inspired by Alexander of Macedonia, was raising an army and looking for opportunities to establish a kingdom of his own. On hearing the news of Alexander's death, Chandragupta stirred up the people and with their help drove away the Greek garrison that Alexander had left at Taxila. Then he and

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his allies marched to Pataliputra and defeated the Nanda king in 321 BCE. Thus began the reign of the Mauryan dynasty.

Chandragupta Maurya

During Chandragupta's reign, Seleucus, the general of Alexander, who had control over countries from Asia Minor to India, crossed the Indus only to be defeated by Chandragupta. Seleucus's envoy, Megasthenes, is said to have remained in India and his account titled *Indica* is a useful record about Mauryan polity and society.

After gaining control over the Gangetic plain, Chandragupta turned his attention to north-west to take advantage of the void created by Alexander's demise. These areas comprising the present-day Afghanistan, Baluchistan and Makran surrendered without any resistance. Thereupon Chandragupta moved to Central India. According to Jaina tradition, towards the end of his life, Chandragupta, who had by now become an ardent follower of Jainism, abdicated his throne in favour of his son Bindusara.

Emperor Ashoka

Bindusara, during his rule, succeeded in extending the Mauryan empire upto Karnataka. At the time of his death, a large part of the subcontinent had come under Mauryan suzerainty. Ashoka succeeded Bindusara in 268 BCE. Desirous of bringing the remaining parts of South India into his empire, Ashoka waged a war against Kalinga in the eighth year of his reign. The people of Kalinga fought bravely, but they were defeated after a large-scale slaughter. This war and slaughter affected Ashoka so much that he decided to give up war. Ashoka became an ardent Buddhist after meeting the Buddhist monk Upagupta and propounded his Dharma. The only true conquest, he proclaimed, is the conquest of self and the conquest of men's hearts by the *dhamma* (Pali) or *dharma* (Sanskrit). He issued edicts, which were carved out in the rock.

There are 33 edicts, including 14 major rock edicts, 7 pillar edicts and 2 Kalinga edicts, apart from Minor Rock edicts and Minor Pillar inscriptions. They form the reliable sources to know about the Mauryan Empire, in particular the dharmic rule of Ashoka.

In one of his Kalinga edicts, he tells us his horror and sorrow over the deaths which the war and conquest caused. In yet another edict, he makes it known that Ashoka would not tolerate any longer the death or captivity of even hundredth or thousandth part of the number killed and made captive in Kalinga.

Ashoka Pillar, Allahabad

Ashoka's passion for protecting life extended to animals as well. Hospitals were constructed for them and animal sacrifice was forbidden. Ashoka sent his son Mahendra and his daughter Sanghamitra to Ceylon to spread his message of Dharma there. Ashoka died after ruling for 38 years.

Our national emblem with four lions is a replica of the Ashoka Pillar of Saranath.

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Mauryan Administration

The Mauryan state in its early years undertook some measures that were positive for the development of society. The state raised taxes to finance a huge standing army and a vast bureaucracy. The Mauryans had evolved a very efficient system of governance. The king, as the head of the administration, was assisted by a council of ministers. There were *mahamatriyas*, who functioned as secretaries to the ministers. The person in charge of revenue and expenditure was *samaharta*. The empire was divided into four provinces and these provinces were administered by governors, who were usually princes or from the royal family.

FCTISK

DO YOU KNOW?

Chandragupta's minister Chanakya is credited with a book titled *Arthasastra*, which gives a detailed account of the Mauryan administration.

The district was under a *sthanika*, while *gopas* were in charge of five to ten villages. The urban administration was under a *nagaraka*. Six committees with five members each carried on their duties under him. They were to take care of the foreigners, to register the birth and death of the citizens, to look after trade and commerce, to supervise different manufactures and to collect excise duties and custom duties respectively. Like the city or town administration, the military department was also managed by a board of 30 members, split into six committees, with five members in each of them. At the village level, there was *gramani*, whose responsibility was maintaining the boundaries, keeping the records of land and a census of population and livestock. In order to keep a vigil over the entire administration, including the conduct of officers, a well-knit spy system was evolved and put in place. Justice was administered through well-established courts in all major towns and cities. Punishment for crimes was severe.

The state used the surplus appropriated for the development of the rural economy by founding new settlements, granting land and encouraging the people to settle as farmers. It also organised irrigation projects and controlled the distribution of water. There was state control of agriculture, mining, industry and trade. The state discouraged the emergence of private property in land and banned its sale. The Mauryan state gave further boost to urban development. It secured land trade routes to Iran and Mesopotamia, as well as to the kingdoms of northern China. *Arthasastra* refers to Kasi (Benares), Vanga (Bengal), Kamarupa (Assam) and Madurai as textile centres. The distribution of black polished ware of northern India as far as South India is indicative of the extent of trade during the Mauryan rule. Trade contributed to urbanisation in a big way. New cities such as Kaushambi, Bhita, Vaishali and Rajagriha had sprung up in the *doab* region.

Educational Centres

Monasteries and temples served the purpose of imparting education. Nalanda was a great monastery built by the Magadha Empire. Educational centres offered Buddhist and Vedic literature, logic, grammar, medicine, philosophy and astronomy. Even the science of war was taught. Nalanda became the most renowned seat of learning in course of time. It was supported by the revenues of 100 villages. No fees were charged to the students and they were provided free board and lodging.

Nalanda University

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SUMMARY

- Sixth century BCE was a period of material, cultural and intellectual development.
- Confucius' ethics in China and Zoroastrian religion in Persia, Mahavira's Tri-ratnas and Buddha's eight-fold path in India created a new awakening and provided a moral code of conduct to humanity.
- Sixth century BCE was also a period that witnessed the rise of Mahajanapadas. The sixteen such chiefdoms are listed with the focus on Magadha as a powerful kingdom.
- The Mauryan dynasty was founded by Chandragupta Maurya with the aid of Chanakya.
- The Mauryan administration and the greatness of Ashoka with particular reference to his dhamma is highlighted.

FD3EU8

EXERCISE

I. Choose the correct answer

1. Identify the founder of a new sect who exemplified simplicity and self-denial.
   (a) Buddha
   (b) Lao-tze
   (c) Confucius
   (d) Zoroster
2. The Magadha king influenced by the teachings of Mahavira
   (a) Dhananandha
   (b) Chandragupta
   (c) Bimbisara
   (d) Shishunaga
3. The northern India extended from the Kabul Valley in the north to the Godavari in the south witnessed the rise of Sixteen States.
   (a) Mahajanapadas
   (b) Gana-sanghas
   (b) Dravida
   (d) Dakshinapatha
4. Tri-ratnas are the three priniciples taught by
   (a) Buddha
   (b) Mahavira
   (c) Lao-tze
   (d) Confucius
5. The account which throws light on Mauryan polity and society
   (a) Marco Polo
   (b) Fahien
   (c) Megasthanes
   (d) Seleucus
6. (i) Under the Magadha king the mahamatriyas functioned as secretaries to the ministers.

   (ii) Accounts of Megasthanes titled Indica is a useful record about Mauryan polity and society.

   (iii) Nanda's attempt to build an imperial structure was cut short by Ashoka who founded the Mauryan kingdom.

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(iv) According to tradition,towards the end of his life Chandragupta become an ardent follower of Buddhism.

a) (i) is correct

b) (ii) is correct

c) (i) and (ii) is correct

d) (iii) and (iv) is correct

II. Fill in the blanks

1. _____ is a collection of sacred literature of different epochs, containing prayers, confessions and myths.
2. In the Gangetic plain _____ agriculture required the use of bullocks.
3. Jains believe that _____ came in a long line of Tirthankaras and he was the twenty - fourth and the last.
4. The place where Buddha attained enlightenment has been built into the Mahabodhi temple that still exists in _____
5. The rock edicts form the reliable source to know about the Mauryan empire in particular the Dharmic rule of _____.

III. Find out the correct statement

1. a) The introduction of Bronze tools made easy the removal of dense forest cover from the banks of the Ganges.

   b) Ajivikas had a small presence in western India.

   c) The clusters where particular clansmen were dominant came to be known were Pre-Mauryan states.

   d) Of the kingdoms mentioned in the literature of the period Kashi, Kosala and Magadha are considered to be powerful.

2. a) Ajatashatru was the first important king of Magadha.

   b) Bimbisara succeeded in establishing a comprehensive structure of administration.

   c) The Mauryas were the first of non-Kshatriya dynasties to rule in northern India.

   d) Nanda's attempt to build an imperial structure was cut short by Ashoka.

IV. Match the following

1.	Eight-fold path	-	tallest Jaina statue
2.	Bahubali	-	a code of political morality
3.	The Spring and Autumn Annals	-	sacred literature of laws and myths
4.	Zend Avesta	-	first Tirthankara
5.	Rishabha	-	path to attain the purest state of mind

V. Answer the following briefly

1. The invention of smelting of Iron transformed both production and warfare- Justify.
2. Elaborate the term "Tri-ratnas".
3. What do you know of Ajatasatru?
4. What does the Edict of Kalinga convey?
5. Highlight the steps taken by Ashoka to spread Buddhism.

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VI. Answer all the questions given under each caption

1. Zoroastrianism
   (a) Who was the founder?
   (b) Name the God he proclaimed
   (c) What did Zoroaster teach?
   (d) What was the highest form of worship?
2. Gautama Buddha
   (a) What was the original name of Buddha?
   (b) Name the birth place of Buddha
   (c) Where did he get enlightenment?
   (d) Mention the place of his first sermon

VII. Answer the following in detail

- Discuss the five cardinal principles of Confucius
- Compare and contrast the principles of Jainism and Buddhism

FUN WITH HISTORY

Student Activities

Prepare a case study of Asoka's Edicts.

Enact a drama about the life and teachings of Buddha.

Assignment with teacher's guidance

List out the countries where Buddhism exists in the world and mark on the world map.

Prepare a clay model of Sanchi Stupa, Darmachakra.

GLOSSARY

smelting	-	heating and melting ore to extract metal
proliferation	-	increase in great numbers or large amounts
cardinal	-	fundamental
epoch	-	a period of time in history
aboriginal	-	one living on a land from earliest times.
dissension	-	disagreement
heresy	-	opinion which goes against the accepted belief
resentment	-	anger or displeasure
ascetic	-	self discipline avoiding any physical pleasure
penultimate	-	last but one
austere	-	simple and plain
clad	-	clothed (dressed)

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piety	-	religious devotion
confederacy	-	an alliance, especially of states
oligarchy	-	a small group of people having control of a state
abdicate	-	give up
suzerainty	-	the control of one country over another country
slaughter	-	killing animals for food
bureaucracy	-	government by unelected officials

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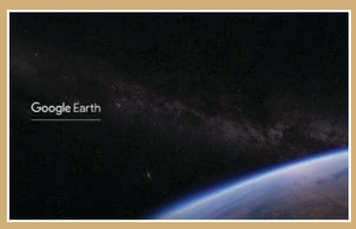
ICT CORNER

Virtual Tour

Let us go for a tour to Saranath

Steps

1. Launch the 'Google Earth' in the desktop .
2. Type the name 'Ashokan Pillar, Saranath' in the search box and enter.
3. Drag the 'Yellow Man icon' on the 'Ashokan Pillar' to watch the street view. The pillar was destroyed and you can see them in broken stage and fenced.
4. Place the mouse pointer on yellow colour path and scroll the button upward or downward. You will feel that you are walking at the site.
5. Drag and move mouse to watch the surroundings of the site where you walk.



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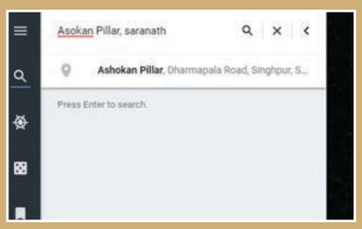

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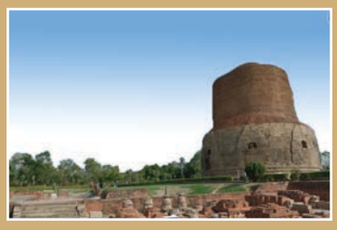

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Authors

Dr. Kanagalatha Mukunth,
Professor, Mumbai University
Mumbai, Maharashtra

Dr. Selva Kumar V
Associate Professor, Dept. of Epigraphy,
Tamil University, Thanjavur

Tmt. Amutha M,
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PGT History, Sayed Ammal Hr. Sec. School,
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Thiru. Balakrishnan R,
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B.T.Asst. (History), Kumara Rajah Muthiah
Hr. Sec. School, Adyar, Chennai-600 020

Tmt. S. Elilarasi ,
B.T.Asst. (History), Karnataka Sangha Hr. Sec. School,
T.Nagar, Chennai

Art and Design Team

Chief Co-ordinator and Creative Head

Srinivasan Natarajan

Illustration

K.T. Gandhi Rajan
Tamil Virtual University, Kotturpuram, Chennai
Sakthi

Art Teachers, Government of Tamil Nadu.
Students, Government College of Fine Arts,
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Joy christy. N
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GEOGRAPHY

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UNIT 1

Lithosphere – I Endogenetic Processes

Learning Objectives

- To know about the spheres of the Earth
- To illustrate the internal structure of the Earth
- To study the rock types and its cycle
- To explain the internal processes of the Earth
- To understand the processes of Earthquakes and volcanoes

FDCAVV

Pathway

The Earth is a unique planet of the Solar family. The Earth is composed of four spheres namely, the lithosphere, the atmosphere, the hydrosphere and the biosphere. This lesson focuses on the internal processes of the Earth. The sequence of lessons generally follows the spheres of the Earth system in a comprehensive manner.

Have you ever wondered what our Earth is made up of? Or what lies underneath the Earth's surface?

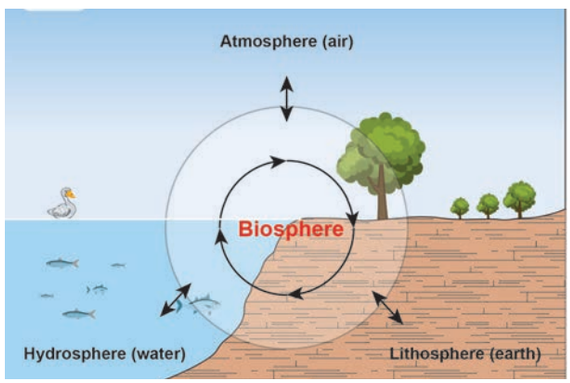
"The Earth can physically be described as a ball of rock (the lithosphere), partly covered by water (the hydrosphere) and wrapped in an envelope of air (the atmosphere). To these three physical zones it is convenient to add a biological zone which includes all the living organisms (the biosphere)."

Arthur Holmes

1 Spheres of the Earth

Earth's surface is a vast area of 510 million sq.km, where four spheres of the Earth interact. The abiotic spheres are the lithosphere, atmosphere and hydrosphere. The biotic sphere is the biosphere. Together, these spheres constitute the planet, Earth.

This topic 'lithosphere' has been bifurcated for the sake of convenience. It is divided into Endogenetic processes (Internal processes) and Exogenetic processes (External processes). This lesson deals with the Endogentic processes in detail, the next lesson will deal with the Exogenetic processes.



Spheres of the Earth

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The 'Pedosphere' is a part of the lithosphere made up of soil and dirt. It exists at the interface of lithosphere, atmosphere, hydrosphere and biosphere.

The **lithosphere** is the solid outer part of the Earth.

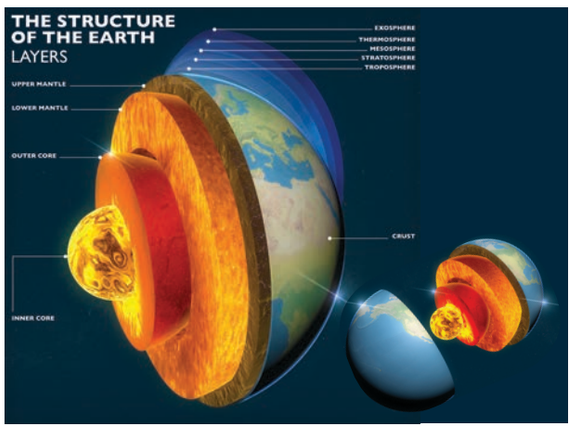
The **atmosphere** is a thin layer of gases that surrounds the Earth.

The **hydrosphere** is the watery part of the Earth's surface including oceans, rivers, lakes and water vapour

The **biosphere** is the layer of Earth where life exists.

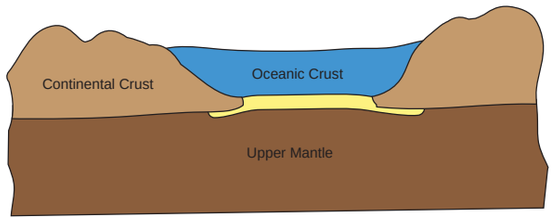
2 Structure of the Earth

The outer surface and inner core of the Earth are totally different in their nature and structure. The structure of the Earth's interior is divided into three layers namely **the crust, the mantle and the core.**



Crust

Crust is the outer layer of the Earth, where we live. It is the skin of our Earth, which ranges between **5 to 30 km**. It is the solid and rigid layer of the Earth. The thickness of the crust is greater below the continents than the ocean floor. The crust is classified as **continental crust** and **oceanic crust.** The major elements of crust are Silica **(Si)** and Aluminium **(Al)** and thus, it is termed as **SIAL.**



Continental Crust And Oceanic Crust

DO YOU KNOW?

The terms **'lithosphere'** and **'crust'** are not the same. The lithosphere includes the crust and the uppermost part of the mantle.

All terrestrial planets have lithosphere. The lithospheres of Mercury, Venus, and Mars are much thicker and more rigid than that of the Earth.

Mantle

The interior part beneath the crust is called mantle, which is about 2,900 km thick. The major elements of the mantle are Silica **(Si)** and Magnesium **(Mg)** and hence it is also termed as **SIMA**. In the upper part of the mantle, the rock remains solid, whereas in the lower part of the mantle, rocks are in molten form. This molten rock inside the Earth is called '**magma**'.

Core

The **core** is the innermost and hottest layer of the Earth which lies below the mantle. It is composed mainly of Nickel **(Ni)** and Iron **(Fe)**. Hence it is called **NIFE.** The core is divided into **Solid inner core** and **Liquid outer core.** The presence of large quantities of iron in the core is responsible

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for the Earth's gravitational force. As the Earth rotates on its axis, the liquid outer core spins over the solid inner core and generates the Earth's magnetic field. This is responsible for the functioning of the magnetic compass. Due to high pressure, the materials in the inner core are unable to move and hence remain solid.

The Deepest Place ever reached by human technology vary from time to time. Till 2011 **Kola Super Hole** (12,262m) in Murmansk, Russia was the deepest place. But in 2012, **Z-44 Chavyo Well** (12,376m) broke the record, and is supposed to be 15 times the height of **Burj Khalifa in Dubai**. The exploration of Earth's interior continues.

3 Rocks

The crust is a storehouse of rocks. An aggregate of minerals on the Earth's crust is called 'rock'. It may be hard and compact like 'granite' or soft as 'clay' or loose as 'sand'.

Types of Rock

Based on formation, rocks are classified as:

- Igneous,
- Sedimentary and
- Metamorphic.

Fact

The ancient city of Petra in Jordan is an example of an entire city carved out of rocks. There are many specimens of magnificent rock-cut architecture in India, like the Ajanta and Ellora caves in Maharashtra, the Aihole and Badami temples in Karnataka, the Konark temple in Odisha and Mamallapuram in Tamil Nadu.

DATA ON THE EARTH'S INTERIOR

Layers	Thickness (km)	Top density (g/cm3	Bottom density (g/cm3)	Types of rock found
Crust	30	2.2	-	Silicic Rocks
			2.9	Andesite, Basalt at base, Aluminum
Upper mantle	720	3.4		Peridodite, Eclogite, Olivine, Spinel, Garnet, Pyroxene
		-	4.4	Perovskite, Oxides
Lower mantle	2,171	4.4	-	Magnesium and Silicon oxides
		-	5.6	
Outer core	2,259	9.9	-	
	-		12.2	Iron oxides, Sulphur, Nickel Alloy
Inner core	1,221	12.8	-	Iron oxide, Sulphur, Nickel Alloy
Total Thickness	6,401			

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Igneous Rocks

The word 'igneous' is derived from the Latin word **Ignis** meaning **'Fire'.** The interior of the Earth contains very hot molten material called '**Magma**'. When the magma reaches the Earth's surface, it is referred to as **'Lava'.** The lava on the surface cools down and gets solidified as rocks called igneous rocks. Granite and basalt are examples of such rocks. Igneous rocks are also called **Primary or Mother rocks** because all other rocks are directly or indirectly formed from them.

Sedimentary Rocks

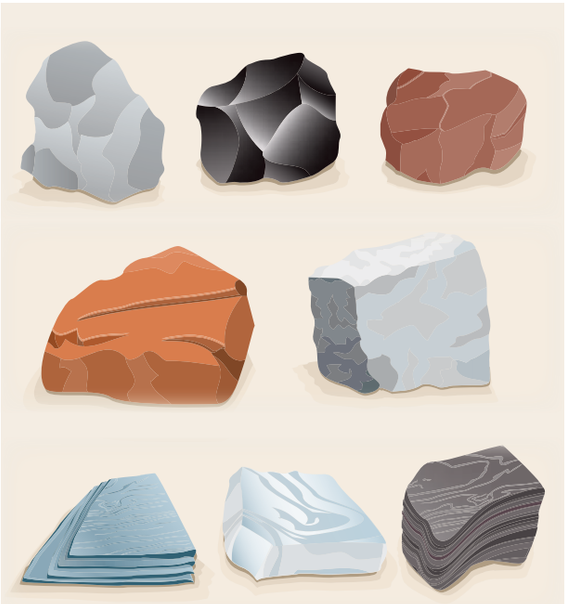
These sedimentary rocks are named after the latin word 'sediment' meaning ' settle. Rivers, glaciers and winds carry bits of rock and soil and deposit them in layers. After a few million years, these deposits harden into compact rocks and are called **Sedimentary rocks.**

The bodies of plants and animals that fall on the deposits get embedded in the layers and form **Fossils**. Sandstone, limestone, chalk, gypsum, coal and conglomerate are examples of sedimentary rocks.

Metamorphic Rocks

The term 'metamorphic' is derived from the word 'metamorphosis', which means, 'change of form'. When igneous or sedimentary rocks are subjected to extreme heat and pressure, they undergo a complete change in their form and character .i.e., in course of time, granite may get transformed to gneiss, basalt to schist, limestone to marble and sandstone to quartzite.

Types of Rocks	Examples	Uses
Igneous	Granite	Construction work
	Basalt	Laying roads
Sedimentary	Gypsum	Manufacturing of wall board, cement, plaster of Paris etc.
	Limestone	Construction and purification of Iron in blast furnaces
Metamorphic	Diamond	Jewellery making
	Marble	Sculpture and Construction



Types of Rocks

Activity

Collect a few rock samples from your area and classify them on the basis of what you have learnt.

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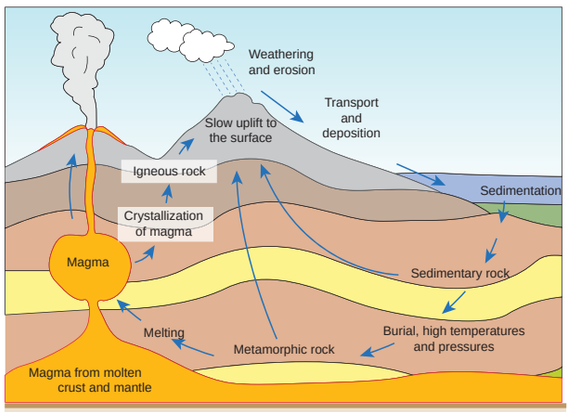
Rock Cycle

The Rock cycle is a continuous process through which igneous, sedimentary and metamorphic rocks are transformed from one form to another.



Activity

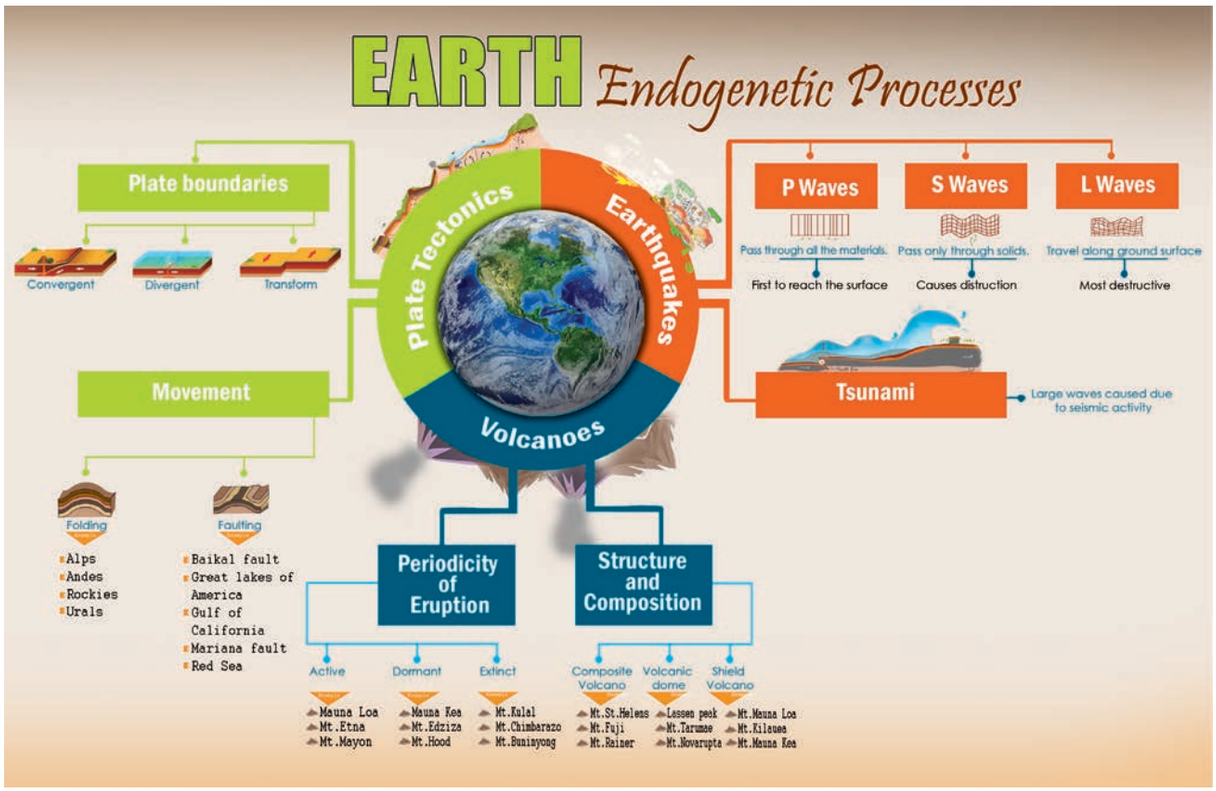
Narrate the processes involved in the given rock cycle diagram in your own words.

4 Geomorphic Processes

The formation and deformation of landforms on the surface of the Earth is a continuous activity of two broad processes i.e. internal and external. These processes cause stress and deformation on Earth materials and finally bring changes on the surface of the Earth. These are referred as **Geomorphic Processes**.

The forces that act from the Earth's interior towards the Earth's surface are called **Internal processess** or **Endogenetic processes**. These forces build the landscape and create topographic relief.

The forces that act on the surface of the Earth due to natural agents like running water, glacier, wind, waves etc. are called **External processes** or **Exogenetic processes**. These external processes tear the landscape down into relatively low elevated plains.



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Internal Processes

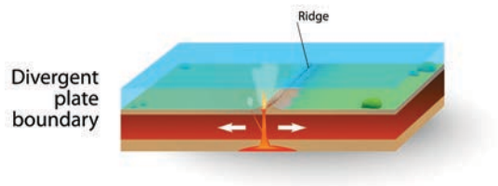
The internal processes generate heat and eject materials from deep below the Earth's crust. **Internal radioactivity** is the principal source of power for this process.

FDL6XI

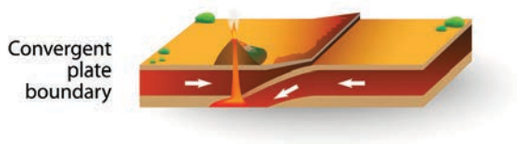
Plate Tectonics

The lithosphere is divided into a number of huge slabs of rocks called '**Tectonic plates**.' These tectonic plates are divided into major and minor plates. These plates float independently over the mantle. Collisions of these plates produce mountain ranges and other irregular surface features, both on land and the ocean floor. This phenomenon is called '**plate tectonics**'. The movement of tectonic plates is due to thermal energy from the mantle. Now we have a better understanding about the plate movements and its relation to Earthquake and volcanic activities.

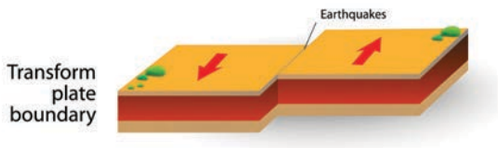
where the sinking of a plate occurs is called a subduction zone.



Divergent Boundary – Here the plates pull away from each other as magma pushes up from the mantle.



Transform Boundary – Here the plates slide horizontally past each other.



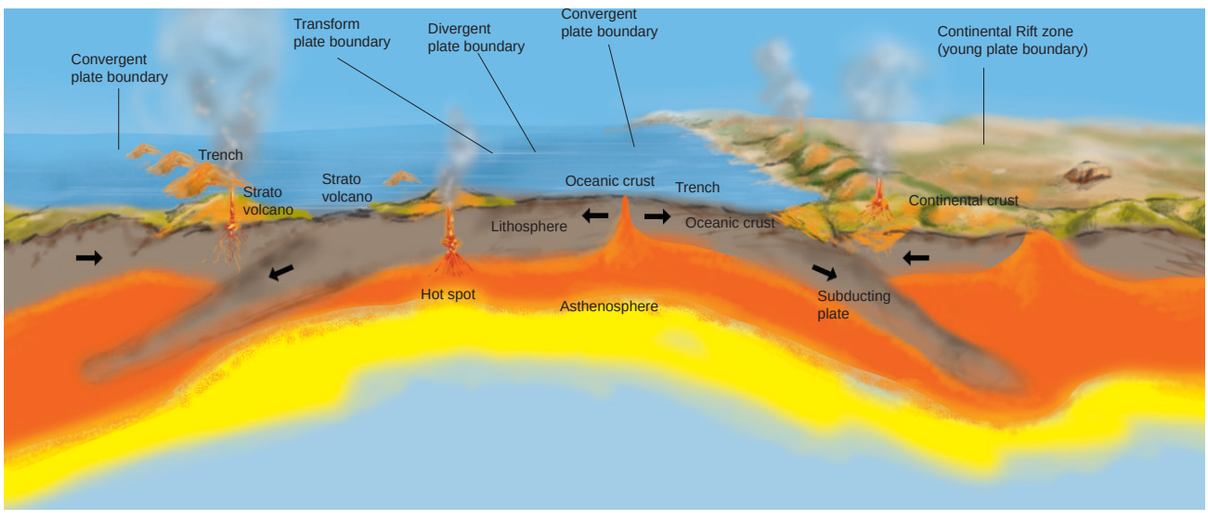


Plate boundaries and associated features

Types of Plate Boundaries

Convergent Boundary - Here the plate moves toward each other and sometimes, a plate sinks under another. The location

Movements of Continental Plates

Due to lateral compressional forces, the plates are forced to move upwards and downwards. This is called '**Folding**'.

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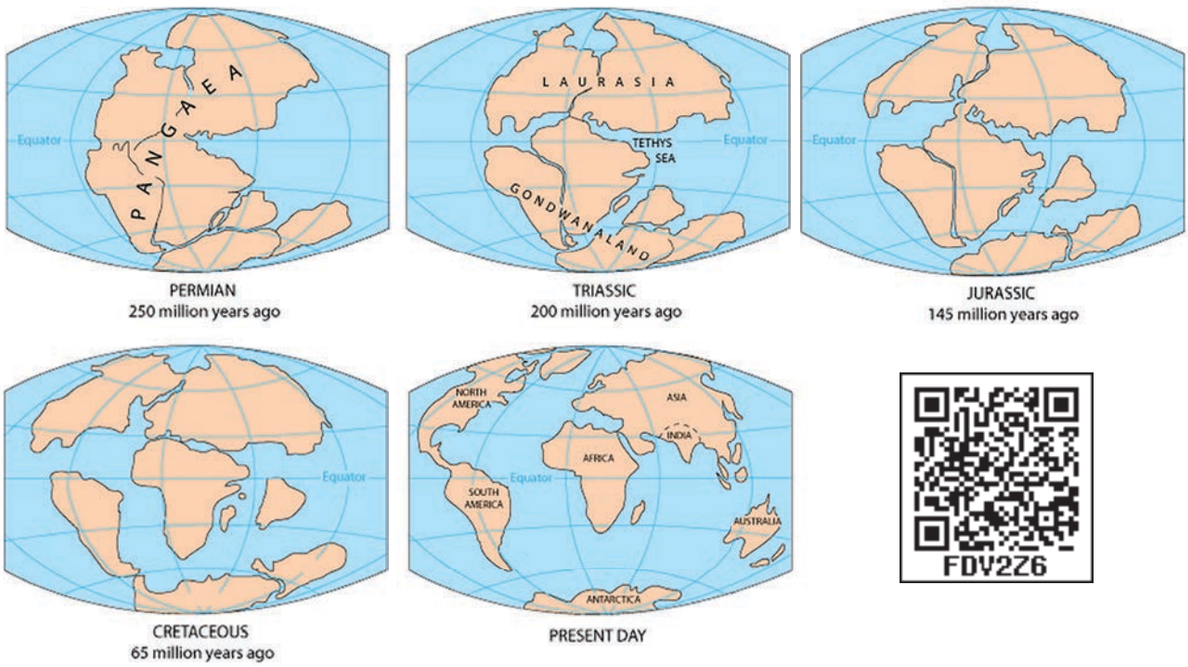

Mountains formed by folding are called fold mountains. the Process of folding creates lofty mountain ranges such as the Himalayas and the Alps

The movement of plates also create stress and tension in the rocks, causing them to stretch and crack. This is called '**Faulting**'. The great rift valley of East Africa is a notable example for the process of faulting. The process of folding and faulting together with volcanoes and Earthquakes continually reshape the continents and seafloor.

Folding

According to plate tectonics, the plates are in constant motion with an average rate of few centimetres per year. The movement might seem slow, but over millions of years, the plates and the continents riding on them move a long way. For example, about 250 million years ago, the Indian Plate was a part of the **Gondwana** land, which comprised of modern Africa, Australia, Antarctica, and South America.

Approximately 140 million years ago, the Indian plate broke away from the ancient super continent 'Gondwana' and began moving north and collided with Asia. The collision with the Eurasian Plate along the boundary between India and Nepal formed the **Orogenic** belt that created the Tibetan Plateau and the mighty Himalayan Mountains.

Activity

Here is a list of a few mountains.

- Ural Mountains, Andes Mountains, Vindhya Range, Alps mountains,
- Satpura range, Rocky Mountains, Sierra Nevada.
- Identify and Locate with help of atlas

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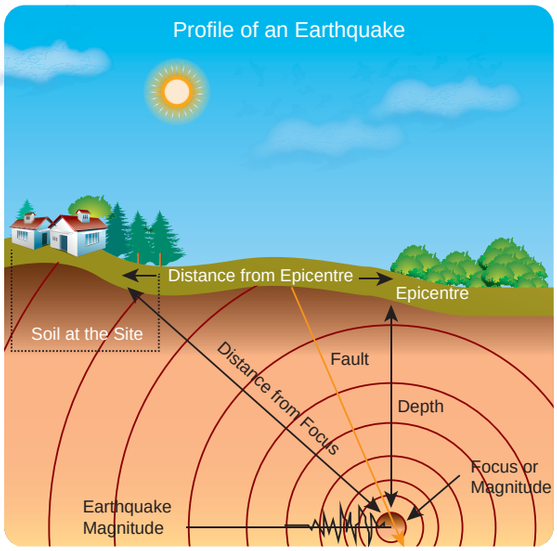
Earthquake

Earthquakes are generally caused by the sudden vibrations in the Earth's crust, which spreads outward in all directions as waves from the source of disturbance.

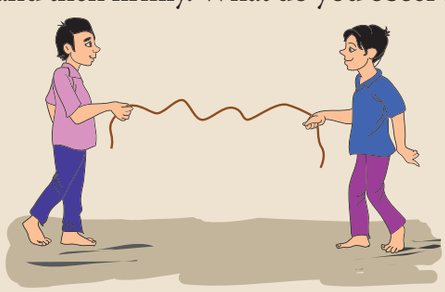


The point of origin of an Earthquake is called **'Focus' (Hypocenter)** which generates a series of elastic waves. **'Epicentre'** is a point on the Earth's surface that lies directly above the focus. The impact of the Earthquake is felt the most at the epicentre.

Activity

1) Arrange a few books one above the other on a table. Just shake the table and observe what happens.

2) Ask two students to hold two ends of a rope. Instruct one of them to shake the rope, while the other holds it lightly and then firmly. What do you observe?



Seismic Waves

Earthquakes generate **seismic waves**. The nature, force and speed of these seismic waves depend on the nature of the medium through which it passes. Accordingly, there are three major types of waves.

Fact

C.F. Richter devised a scale to measure the magnitude of Earthquakes. This scale relates to the energy released at the epicentre and provides an estimation of the severity of an Earthquake. It is an open ended scale. The highest magnitude ever recorded is 9.5 on Richter scale (Bio-Bio, Chile in 1960).

Primary or P-waves are the fastest of all the Earthquake waves and the first to reach the epicentre. These waves pass through solids, liquids and gases, either through push or pull with an average velocity of 5.3km per second to 10.6 km per second.

Secondary or S-waves travel only through solids. These transverse waves shake the ground perpendicular to the direction in which they propagate. The average velocity of these waves is 1Km per second to 8 km per second.

Surface Waves (or) L-waves are similar to P-waves but they travel primarily along the ground surface. These waves travel comparatively slower and are the most destructive waves. The average velocity of these waves are 1 km per second to 5 km per second.

The instrument which records the Earthquake waves is called 'seismograph' or 'seismometer'. The science that deals with Earthquakes is called 'seismology'.

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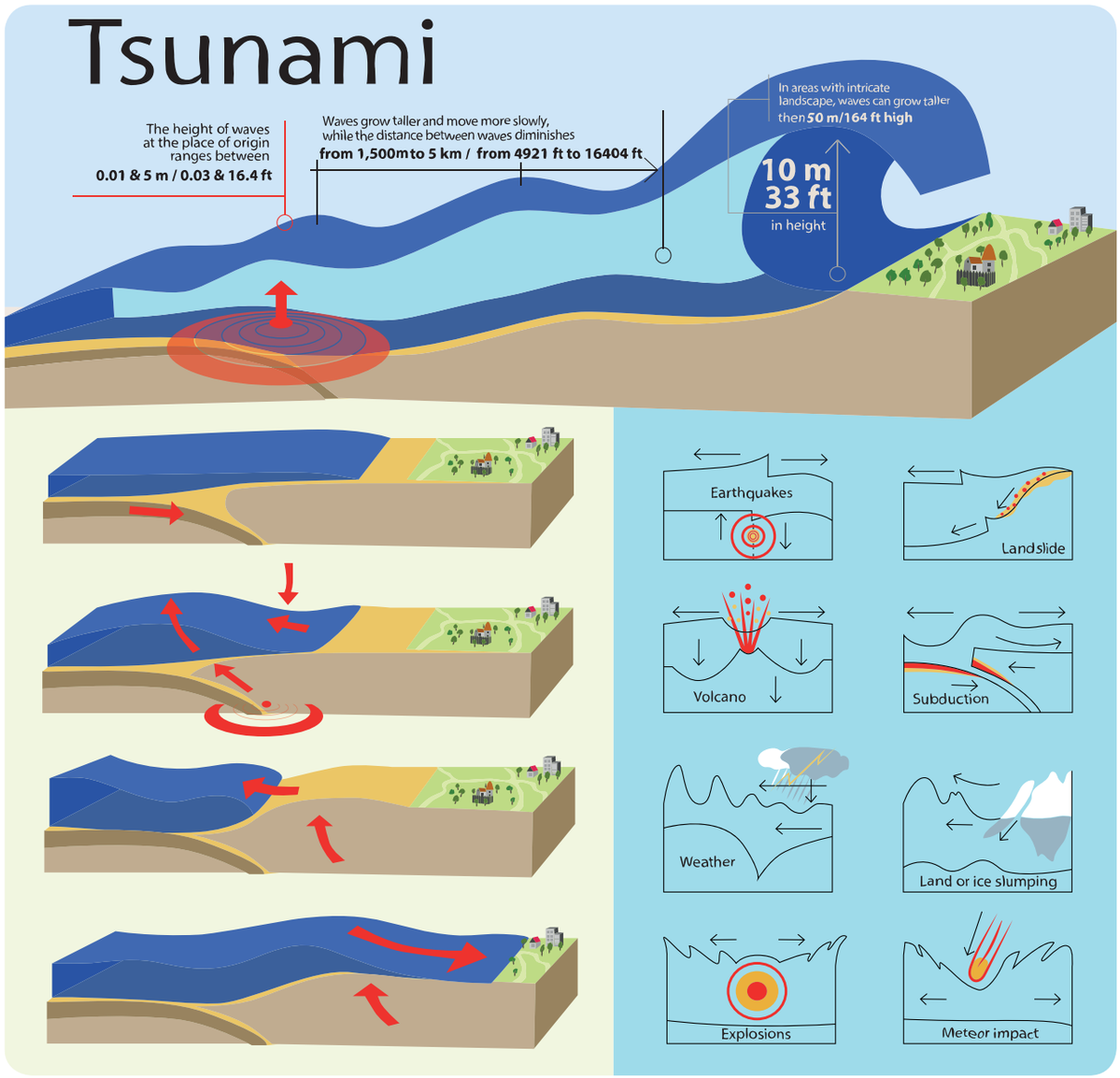
Tsunami

The word 'Tsunami' is a Japanese term, meaning harbour waves. It is adopted to describe large seismically generated sea waves caused by Earthquakes, submarine explosions and landslides. These waves travel at a great speed (more than 500 km per hour) and the length of the waves exceeds 600 km. These waves reach to a height of more than 15 m near the sea shore and are capable of causing destruction along the coastal area.

The 2004 Indian Ocean Earthquake that caused tsunami is the sixth-deadliest natural disaster which travelled at a speed of 600 km per hour with an estimated death toll of 2,80,000. The Earthquake which occurred near Indonesia at 00.58 hours took nearly 7 hours to reach Chennai.

DO YOU KNOW?

On 26 December 2004 a tsunami occurred in the Indian Ocean. It was the **result** of the Indio-Australian Plate **subducting** below the Eurasian Plate. It was caused by an Earthquake **measuring** a magnitude of above 9 in the Richter scale. The Earthquake caused the **seafloor** to **uplift**, displacing the seawater above.



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Volcanoes

A volcano is a vent or an opening on the surface of the Earth crust, through which hot solid, liquid and gaseous materials (**Magma**) erupt out to the surface from the Earth's interior. Magma rises up and ejects on the surface as **Lava**. Volcanoes are also formed when plates move apart.

Volcanoes generally have the following major components. They are:

i. Magma chamber - a large pool of liquid rock found beneath the surface of the Earth

ii. Vents - an opening serving as an outlet for air, smoke, fumes, magma etc

iii. Volcanic cone - a landform built by the magma ejected from the vent in the shape of a cone.

iv. Crater - a bowl shaped depression found at the top of the volcano through which the magma flows out.

Based on the periodicity **of eruptions**, volcanoes are classified into

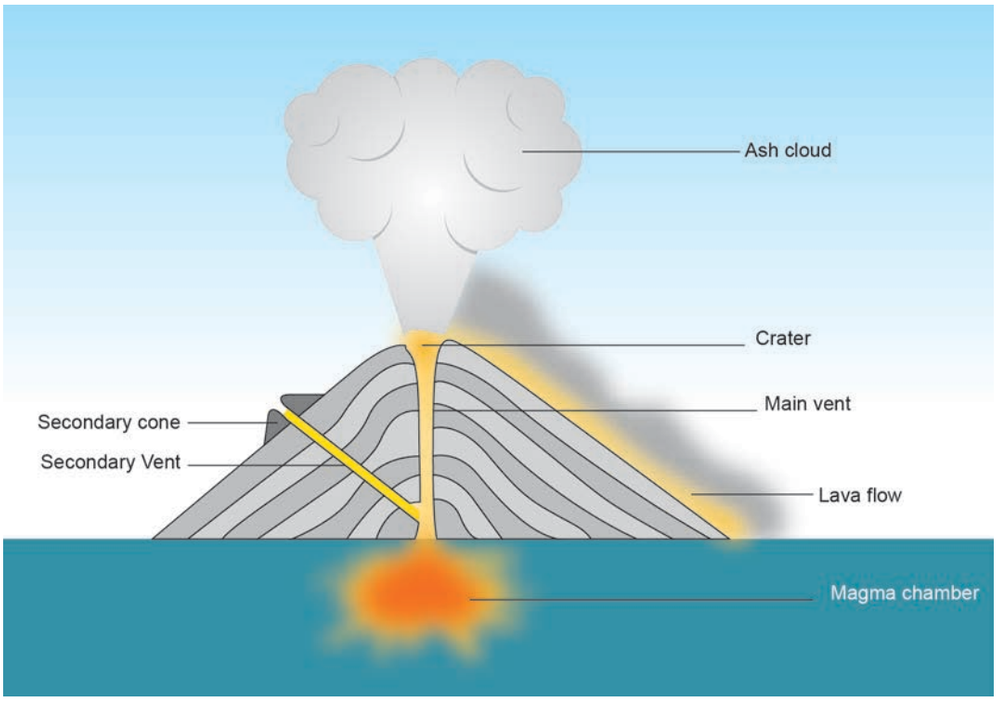
(i) Active volcano, (ii) Dormant volcano, (iii) Extinct volcano.

❍ Active Volcano

Active volcanoes are those which constantly eject volcanic lava, gases and fragmented materials. (eg.) Mount St. Helens in the United States.

Do you know?

The term 'volcano' is derived from the Latin term VULCAN, which is the name of Roman "God of Fire".



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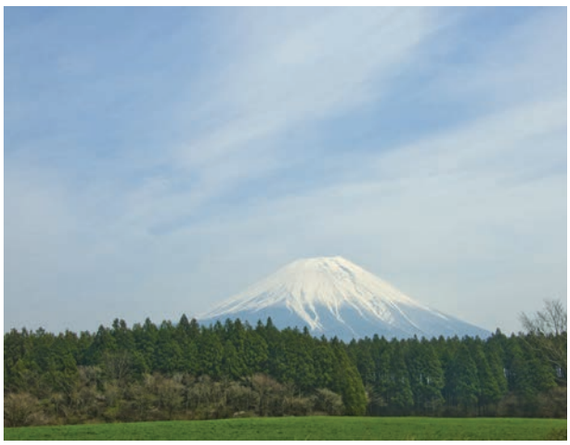
❍ Dormant Volcano

Volcanoes that do not show any sign of volcanic activity for a long period of time are known as dormant volcanoes. Sometimes there may be a sudden explosion which may cause unimaginable loss to life and property (e.g.) Mt. Fuji , Japan



❍ Extinct or Dead Volcano

When a volcano permanently stops its volcanic activity, then it is called as extinct or dead volcano (e.g.) Mt. Kilimanjaro, Tanzania

Activity

Take a bottle filled with soda. Give it a few shakes. Now twist the cap open. What do you observe?

Volcanoes can also be classified based on their **structure and composition as** composite volcano, shield volcano and dome volcano

❍ Composite Volcano

Composite volcano, also known as strata volcano, is a conical volcano built by many layers of hardened lava, pumice and volcanic ash. These are commonly found in the Pacific Ocean Eg. Mt. Fuji, Japan

❍ Volcanic Dome

A lava dome or volcanic dome is roughly a circular mound formed due to the slow ejection of viscous lava from a volcano. As the lava is rich in silica with intense viscosity, it is prevented from flowing far from its vent. e.g. Parícutin, Mexico

Hots

Pacific Ring of Fire — Most seismically and volcanically active. Why?

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❍ *Shield Volcano*

Shield volcanoes are formed by intense viscous lava.

These are shallow depositions with gently sloping sides.

Hence the lava flows out in all directions to create a shield.

E.g., Mauna Loa, Hawaii

Distribution of Earthquakes and Volcanoes

Most Earthquakes and volcanic eruptions do not strike randomly, but occur along the plate boundaries. One such area is the circum-***Pacific Ring of Fire,*** where the Pacific Plate meets many surrounding plates. The Ring of Fire is the most seismically and volcanically active zone in the world. The other distinctive major belts are Mid-Oceanic Ridges and Mid-Continental Belts.

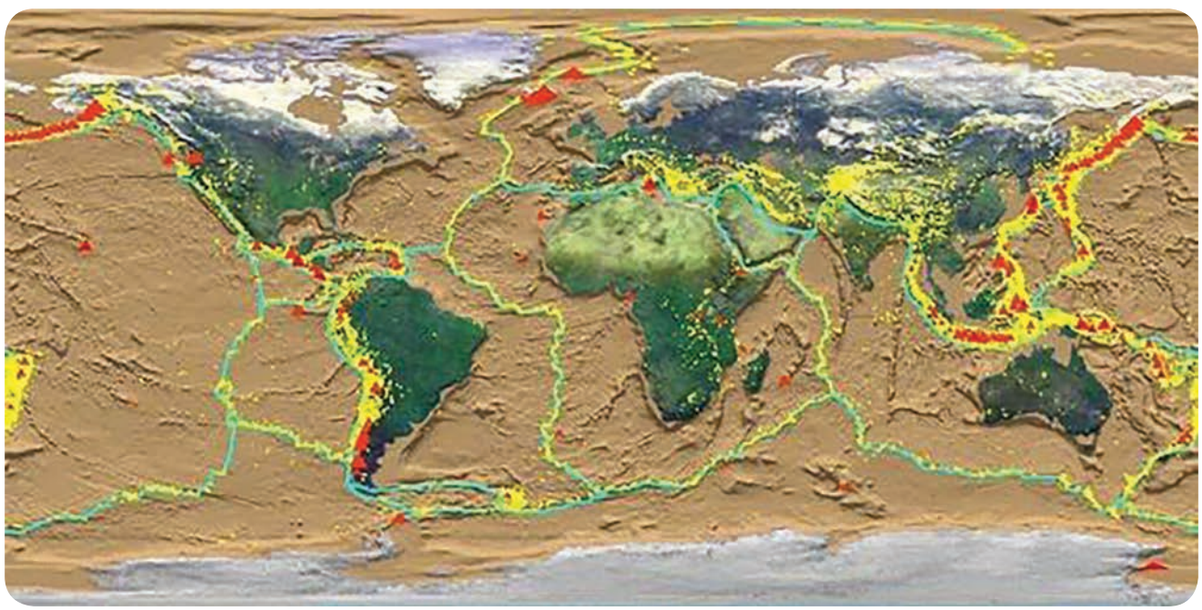
EFFECT OF VOLCANOES

Constructive Effects

Volcanic materials enrich the soil fertility that promotes agricultural activities. The hot volcanic region helps in generating geothermal energy. Many dormant and active volcanoes are the most attractive tourist spots of the world. Most of the volcanic materials are used as building materials.

Destructive Effects

Volcanic eruption causes Earthquakes, fast floods, mud slide and rock fall. Lava can travel very far and burn, bury, or damage anything in its path. The large amount of dust and ash makes breathing hard and irritable. Volcanic eruptions can alter the weather conditions and disrupt transport (Iceland volcanic eruption) in and around the volcanic region.



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Recap

- The spheres of the Earth are the lithosphere, atmosphere, hydrosphere and biosphere.
- Earth's interior is divided into three layers - Crust, Mantle and Core.
- Based on composition, the crust, mantle and core are referred to as SIAL, SIMA and NIFE respectively.
- The formation and deformation of landforms on the surface of the Earth are due to continuous internal and external processes.
- The lithosphere is composed of major and minor tectonic plates.
- Earthquake is the shaking or trembling of the Earth's crust.
- Earthquake and volcanoes are useful to understand the Earth's interior.

A-Z GLOSSARY

Asthenosphere — upper layer of the earth's mantle below the lithosphere.

Continental drift — the gradual movement of the Earth's continents on the surface of the planet

Pangea — a super continent that existed during the late Palaeozoic and early Mesozoic eras.

Panthalasa — super ocean that surrounded Pangaea.

Orogeny — mountain building process due to lateral compression of the crust.

Internal Radioactivity — radiations emitted from radioactive metals inside the earth and act as a driving force for the earth's tectonics.

Eruption — the ejection of molten rock, steam, etc. from a volcano or geyser.

Pacific ring of fire — The Pacific Ring of fire is an arc around the Pacific Ocean where many volcanoes are found.

Geology — The science that deals with the physical structure and substances of the earth, their history and the processes which act on them.

EXERCISE

FE4Y1T

I Choose the correct answer

1. The is the rigid outer layer of the Earth.
   a. core b. mantle
   c. Crust d. inner core
2. _____ layer is made up of liquid iron
   a. Inner core b. Outer core
   c. Mantle d. Crust
3. Magma is found in the _____
   a. crust b. mantle
   c. core d. None of the above
4. Diastrophism is connected to
   a. volcanism b. earthquakes
   c. tectonics d. fold/fault
5. The movement of tectonic plates is induced by _____ energy.
   a. hydel b. thermal
   c. wave d. tidal
6. In the ancient period, Gondwana land moved towards _____ direction.
   a. north b. south
   c. east d. west
7. Many million years ago , India was a part of the super continent _____
   a. Gondwana b. Laurasia
   c. Panthalasa d. Pangea.

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8. The movement of plates that creates stress and tension in the rocks causing them to stretch and cracks result in _____.
   a. fold b. fault
   c. mountain d. earthquake
9. _____ refers to a bowl-shaped depression found at the top of the volcano.
   a. crater b. vent
   c. chamber d. volcanic cone
10. The point of origin of an Earthquake is called the _____
   a. epicentre b. focus
   c. seismic wave d. magnitude

II. Match the following

1. Endogenetic process — Seismograph
2. Mantle — Subduction Zone
3. Convergent boundaries — Volcanic Eruption
4. Earthquake — Pacific Ocean
5. Composite volcano — SIMA

III. Consider the given statements:

1. i Mt. Fuji is a dormant volcano
   ii Mt. Kilimanjaro is a dormant volcano
   iii Mt. Tanzania is a dormant volcano
   Which of the statement(s) is are true
   a. i is true
   b. ii is true
   c. iii is true
   d. I, ii, iii are true

2. Statement: Magma gushes out when it finds vents.
   Reason: Interior of the Earth contains compressed hot magma
   Which of the statement(s) is are true
   a. Statements & reason are true
   b. Statements is true, reason is false
   c. Statement is false reason is true
   d. Statement & reason are false
3. Statement I: Mountain ranges are formed by the collision of tectonic plates
   Statement II: The movement of tectonic plates is due to the thermal energy from the mantle
   a. Statement I is false II is true
   b. Statement I and II are false
   c. Statement I is true II is false
   d. Statement I and II are true

IV. Answer the following in one or two sentences

1. Write a brief note on the various spheres of the Earth.
2. Mention the layers of the interior of the Earth.
3. What is pedosphere?
4. Define Plate tectonics.
5. Write a note on Fold and fault?
6. What is Tsunami?
7. What is a Volcano? Mention its major components.
8. What is an Earthquake and how it occurs?
9. What are seismic waves and mention its types?
10. Write about the Pacific Ring of fire.

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V. Give Reasons for the following:

1. SIAL floats over SIMA.
2. Igneous rocks are also called Primary Rocks or Mother rocks.

VI. Distinguish between

1. Core and crust.
2. Epicentre and Hypocentre
3. Divergent and convergent boundaries.
4. Primary waves and Secondary waves.
5. Shield volcano and volcanic Dome.

VII. Write answers in a Paragraph

1. Describe the structure of the Earth.
2. Write a note on the internal and external processes of Earth.
3. How are volcanoes classified based on the periodicity of their eruptions?
4. Explain the effects of Volcanoes.

VIII. Map Skill

On the given outline map of the world, mark the following:

a. Pacific Ring of fire
b. Earthquake prone zones (any two)
c. Locate any two active volcanoes of the world.
d. Himalayas and Alps ranges
e. Rift valley of East Africa.

IX. Higher Order Thinking Questions (Hots)

1. Consider the various sources of information related to the Earth's Interior. Classify the above as DIRECT & INDIRECT sources of information. Give reasons

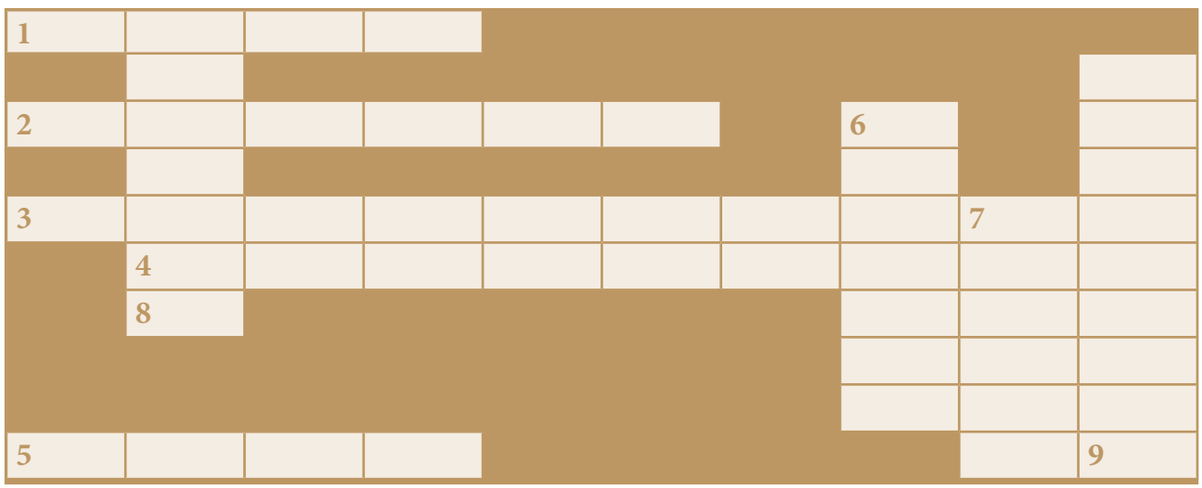
- ✦ Seismic activity
- ✦ Earth 's magnetism
- ✦ Volcanoes
- ✦ Mined rocks
- ✦ Gravitational force
- ✦ Meteors

2. Scientists use GPS to measure the rate of Tectonic Plate movements. Discuss.

X. Life Skills

Imagine that you feel tremors or shocks in your locality. What will be your role in saving lives from destruction? List out the Do's and Don'ts.

XI. Try It



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Across:

1. The major elements of mantle.
2. Fractures that are formed when crustal rocks are displaced.
3. These waves are the most destructive seismic waves.
4. The other name of Core.
5. These waves are generated when Earth quake occurs.

Down:

6. This occurs due to endogenic movements.
7. Bowl shaped depression found at the top of a volcano.

Up:

8. The point on the Earth's surface where the Earthquake is measured.
9. Large seismically generated sea waves.

REFERENCE BOOKS

(Unit 1 and Unit2)

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3. Fundamentals Of Physical Geography, Briggs/Smithson/Ball Copp Clarik Pitman Ltd, A Longman Company, Toronto
4. Physical Geography, Dr. R.n. Tikkha Kedar Nath Ram Nath & Company Meerut- 250 001 (U.p)

INTERNET RESOURCES

www.nationalgeographic.org

www.usgs.gov

www.nasa.gov

NOTES:

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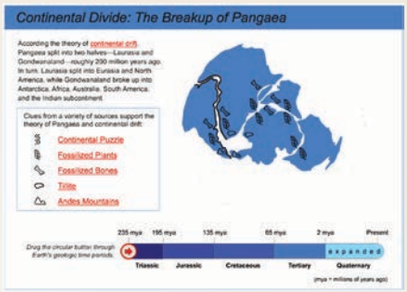
ICT CORNER

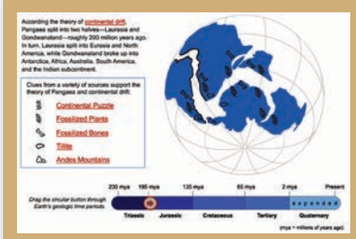
Cast Away!

Through this activity you will be able to understand the continental drift.



Steps

- Use the URL to reach the '**Continental Divide – The Breakup of Pangea**' page.
- Drag the circular arrow button, on the bottom, through the Earth's geological time period to view the placement of the plates on the corresponding period.
- Click the fossilized bones and plants icons on the plates to get the details of importance about the fossils.
- Click '**Tillite**' and '**Andes mountains**' icons and get the details about the movements and relations between the plates.



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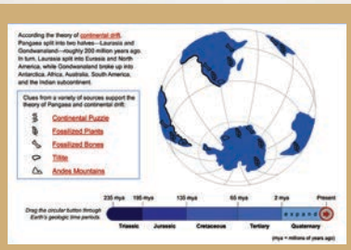

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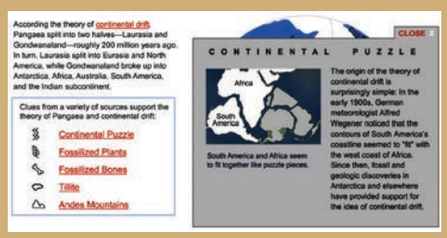

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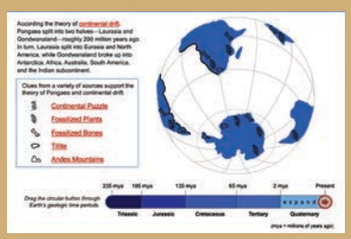

Step 4

Website URL:

https://www.pbslearningmedia.org/asset/lsps07_int_biogeography/

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UNIT 2

Lithosphere – II Exogenetic Processes

Learning Objectives

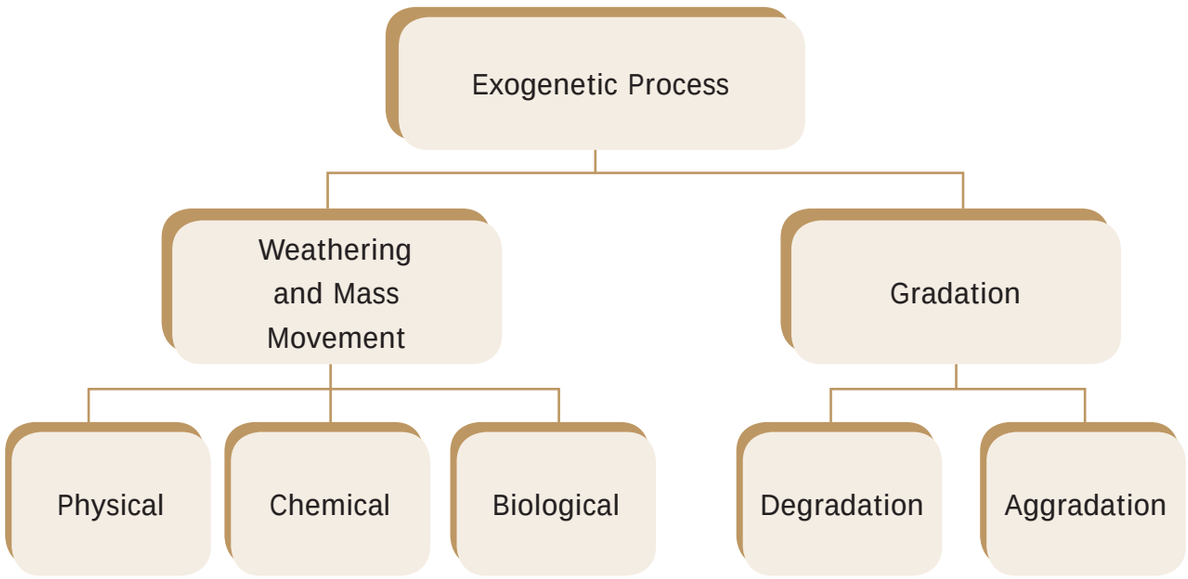
FEDU3G

- To comprehend the various external processes of the Earth
- To study the different types of weathering and the resultant features
- To learn how the weathered materials are transported by mass movement
- To study about the erosional and depositional landform features associated with rivers, underground water, glaciers, winds and waves

Pathway

While travelling, we come across a variety of titled, broken and twisted landforms. How were these landforms formed, and how are they related to one another? All deformation on the face of the Earth is due to the continuous influence of various forces on the earth's surface. In this lesson, we will study about the role of external forces in shaping the earth's crust and the evolution of landscapes.

The Earth is a dynamic system that undergoes various changes due to internal and external processes. The continuous interaction of these two processes controls the structure of the earth's surface.



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The external processes are the consequence of solar energy and gravitational forces, whereas the internal processes are an outcome of the earth's internal heat.

1 Weathering and Mass Movement

Weathering is the disintegration and decomposition of materials of the earth's crust by their exposure to atmosphere.

Movement of huge volumes of weathered rock material down the slope due to gravity is called **mass movement** or **mass wastage**. Example: rock slide, land slide, debris fall, mud flow.

The nature and magnitude of weathering differs from place to place and region to region. Weathering is affected and controlled by factors such as temperature, rock structure, land slope and vegetation. There are three types of weathering

- Physical weathering,
- Chemical weathering and
- Biological weathering

Physical weathering

It is the breakdown of rocks without changing their chemical composition, through the action of physical forces. The constant freezing and thawing of rocks during the night and day leads to the expansion and contraction of rocks. Cracks are formed and disintegration occurs eventually. Exfoliation, block disintegration, granular disintegration etc., are the different types of weathering.

Exfoliation

The alternate heating and cooling on rounded rock surfaces leads to the peeling of rocks, layer by layer like an onion. This is called **exfoliation**. **Sheeting** and shattering are the other forms of exfoliation.

Granular Disintegration:

Granular disintegration takes place in crystalline rocks where the grains of the rocks become loose and fall out. This is due to the action **of temperature** and frost.

Block Disintegration:

Repeated expansion and contraction of rocks during day and night respectively causes stress on the joints of the rocks which results in block disintegration

Hots

Is weathering a pre-requisite in the formation of soil?

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Fact

The disintegrated rock materials, in due course of time, are weathered further, to form soil. Soil is a mixture of disintegrated rock material and decayed organic matter called humus.

Chemical Weathering

Disintegration and decomposition of rocks due to chemical reactions is called Chemical Weathering. This is predominantly high in the hot and humid regions such as the equatorial, tropical and sub tropical zones. Chemical weathering takes place through the processes of oxidation, carbonation, solution, and hydration. The agents of Chemical weathering are Oxygen, Carbon-dioxide and Hydrogen.

Oxidation

Oxygen in the atmosphere reacts with the iron found in rocks, thus leads to the formation of iron oxide. This process is known as oxidation, which results in the weakening of rocks.

Carbonation

Carbonation is the mixing of water with the atmospheric carbon-dioxide, forming carbonic acid. Carbonation is important in the formation of caves, in limestone region. When the carbonic acid reacts with the carbonate rocks, the rocks get disintegrated.

Solution

The process of dissolution of rock substances in water result in the loosening of the rock particles. This inturn breaks down the rocks.

Hydration

Certain chemicals in the rock enlarge in size in humid conditions. These minerals found in the rock swell and this results in the development of cracks and the rock wears down. This type of weathering is called hydration.

Biological Weathering

Biological weathering occurs due to the penetration and expansion of plant roots, earthworms, burrowing animals (rabbits, rats) and some human activities.

2 Gradation

Gradation is the process of levelling of the land by means of natural agents like rivers, ground water, winds, glaciers, and sea waves. These agents produce various gradational relief features in due course of time. Gradation takes place in two ways: **degradation** and **aggradation**

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Exogenetic Processes

Weathering and Mass Movement

Physical Weathering

- Exfoliation
- Granular disintegration
- Block disintegration

Chemical weathering

- Oxidation
- Carbonation
- Solution
- Hydration

Biological weathering

- Penetration of plant roots and earthworms.
- Expansion by plant roots.
- Burrowing animals
- Human activities

Mass movement

- Rock slide
- Land slide
- Debris fall
- Mud flow
- Avalanche

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Degradation or denudation is the wearing down of the land surface by various natural agents.

Aggradation is building up of landforms due to natural agents.

Gradation = Erosion + Transportation + Deposition

Agents of Gradation

Running water (River)

The work of running water (rivers) is the most extensive among all the other agents of gradation. Rivers originate on higher landforms like, mountains, hills and plateaus that receive water from various sources like the rain, glaciers, springs, lakes, etc.The place where the river originates is called its source and where it joins the sea is known as its mouth.

FEMQ54

The primary functions of a river are (i) erosion (ii) transportation and (iii) deposition. The work of a river depends on various factors such as volume of water, velocity of the river, slope of land, load of sediment and structure of rock, and load of sediment.

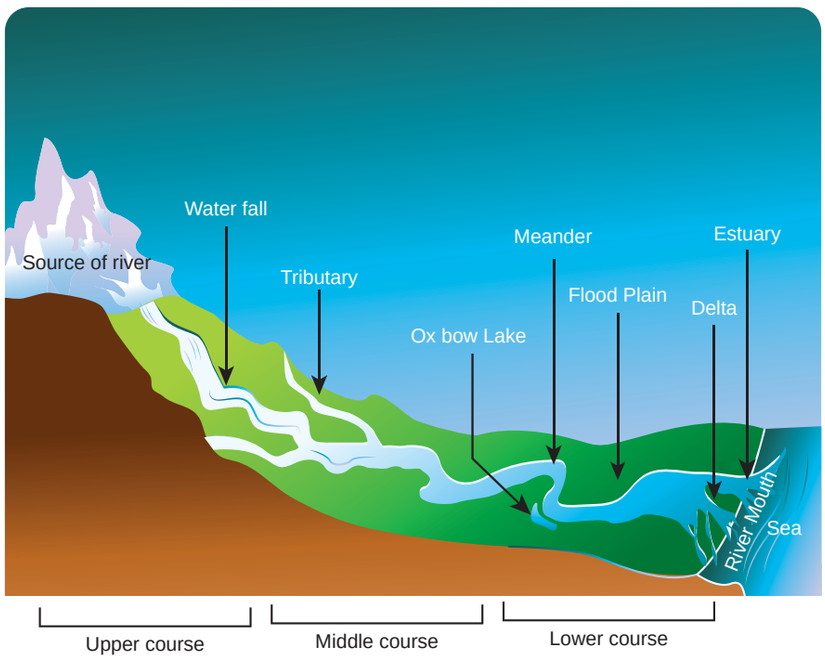
Courses of River:

Rivers generally originate from mountains and end in a sea or lake. The whole path that a river flows through is called its course. The course of a river is divided into:

i. The upper course
ii. The middle course and
iii. The lower course

i. The Upper Course

Erosion is the most dominant action of river in the upper course. In this course, a river usually tumbles down the steep mountain slopes. The steep gradient increases the velocity and the river channel performs erosion with great force to widen and deepen its valley. The land features carved by a river in its upper course are V- shaped valleys, gorges, canyons, rapids, pot holes, spurs, and waterfalls.



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ii. The Middle Course-

The river enters the plain in its middle course. The volume of water increases with the confluence of many tributaries and thus increases the load of the river. Thus, the predominant action of a river is **transportation**. Deposition also occurs due to the sudden decrease in velocity. The river in the middle course develops some typical landforms like alluvial fans, flood plains, meanders, ox-bow lakes etc.,

iii. The Lower course

The river, moving downstream across a broad, level plain is loaded with debris, brought down from its upper and middle courses. Large deposits of sediments are found at the level bed and the river, splits into a number of channels called distributaries. The main work of the river here is **deposition** and it develops typical landforms like delta and estuary.

- **Tributary** – Small streams that join the main river. Eg. River Bhavani
- **Distributary** – River channels that get separated from the main river. E.g., River Kollidam.

Erosional Landforms of River

Gorges and Canyons:

When the river flows through a mountainous region made up of hard rocks, it forms a valley with almost vertical sides called gorge. In India, deep gorges have been formed by Brahmaputra and Indus in the Himalayas.

A deep gorge with steep sides that runs for hundreds of kilometres is referred to as canyon e.g. Grand Canyon of the river Colorado in the U.S.A.

Canyon

Waterfall

When a river flows in a region where hard rocks lie over soft rocks horizontally, the soft rocks get eroded quickly and the hard rocks projects outwards. Thus, the river falls vertically from a steep slope to form a **waterfall**. When the water falls with great force, it erodes the rock material beneath and creates a depression called a **plunge pool**. Shallow fast flowing water in a stream is called a **rapid**.

The highest waterfalls in the world is Angel falls (979 m) in Venezuela.

Rapid

V-shaped valley

A 'V'- shaped valley is formed by the vertical erosion of the river where the valley is deepened and widened.

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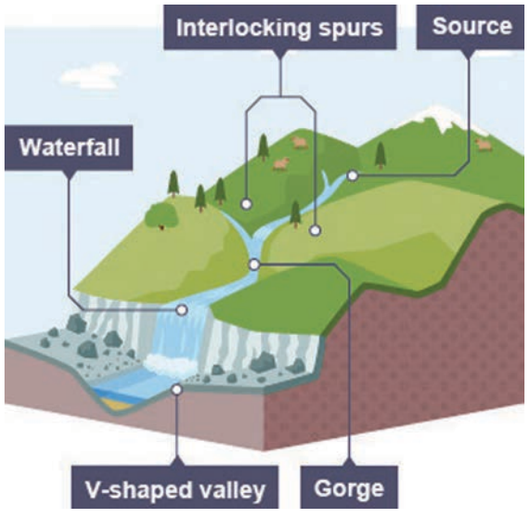

Pot hole

Due to the river action, cylindrical holes are drilled vertically in the river bed, with varying depth and diametre. These are called **pot holes**.

Pot holes

Meander

As the river loaded with debris flows slowly, it forms sweeping loops and bends. It is referred to as meanders.

Ox bow lake

Meanders in due course of time become almost a complete circle with narrow necks. This in turn gets abandoned and forms a lake. This is called an Ox-bow lake.

The world's largest oxbow lake is Lake Chicot is Arkansas of USA. Lake Kanwar in Bihar (India) is Asia's largest fresh water ox bow lake.

Depositional Landforms of River

Alluvial Fan

A fan shaped deposition made by the river at the foothills is called an alluvial plain

Flood Plain

Fine sediments are deposited on river banks when a river floods. These sediments make the region rich and fertile. This is called a flood plain. As the height of the river banks gets increases due to continuous deposition of a flooded river, levees are formed.

Estuary: Estuary is formed where the rives meets the sea. Deposition of silt by the river is not possible here in the estuaries like delta as if the waves keep on eroding the deposits. Ex. River Narmada and Tapti.

Delta

A triangular shaped low lying area formed by the river at its mouth is called delta. Deltas have fine deposits of sediments enriched with minerals. Eg. Cauvery Delta, Tamil Nadu.

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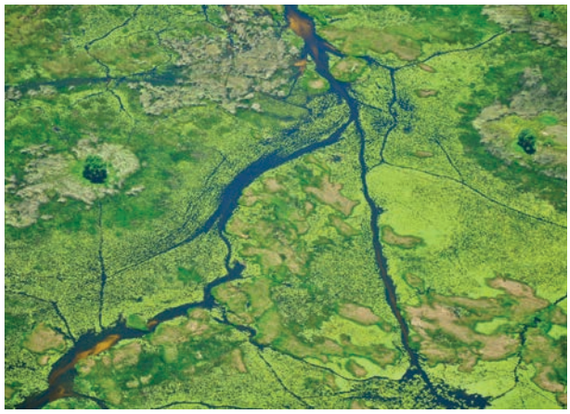


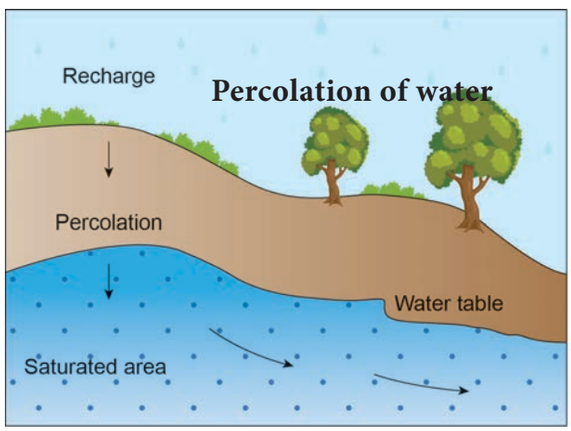
Fact

The Greek letter (△)pronounced delta closely resembles the triangular delta of the river Nile. The Ganga-Brahmaputra Delta is the largest delta in the world.

Groundwater

Water that percolates through the pores and fissures of rocks gets collected beneath the earth's surface. This is normally referred to as **groundwater or sub-surface water**. The rate of percolation depends on the nature of the rocks.

- The rocks that allow water to percolate are called porous rocks or permeable rocks.
- The rocks that does not allow water to seep through them are called **non-porous rocks or impermeable rocks**.



The percolated water in course of time returns back to the surface in the form of springs, geysers, hot springs, wells, tanks, artesian wells etc. that are useful for human activities.

The world's best known geyser is the Old Faithful geyser in the Yellowstone National Park in Wyoming, U.S.A

As an agent of gradation, underground water creates distinct landforms in limestone regions called Karst Topography.

Karst Topography

Ground water is an active agent in limestone regions. Karst topography is formed due to the dissolution of soluble rocks such as limestone, dolomite and gypsum.

FEWL6R

Limestone topography of Western Slovenia extends for a distance of 480 km in length and 80 km in width which is termed as Karst in the Slavic language. The world's largest karst area is the Nullarbar located on the Great Australian Coast.

Karst regions are also found in Southern France, Spain, Mexico, Jamaica, Western Cuba, Central New Guinea, Sri Lanka and Myanmar.

Karst topography also exhibits both erosional and depositional features.

Fact

Karst Areas in India

Guptadham caves - Western Bihar, Robert cave and Tapkeshwar temple - Uttarakhand. Pandav caves Pachmari - Madhya Pradesh, Kutumsar - Bastar district in Chattisgarh, Borra caves of Visakhapatnam - Andhra Pradesh

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Erosional Landforms of Underground Water

Most of erosion takes place due to the process of solution. When rain water mixes with carbon-di- oxide and enters into a limestone region, it dissolves and destroys much of the limestone. As a result, landforms such as Terra rossa, Lappies, sinkholes, swallow holes, dolines, uvalas, poljes, caves and caverns are formed.

Terra Rossa (Italian term for Red soil)

Deposition of red clay soil on the surface of the Earth is due to the dissolution of limestone content in rocks. The redness of the soil is due to the presence of iron oxide.

Lappies

When the joints of limestone rocks are corrugated by groundwater, long furrows are formed and these are called LAPPIES.

Sinkhole

A funnel shaped depressions formed due to dissolution of limestone rock is called sinkholes. Their average depth ranges between three and nine meters

DO YOU KNOW?

The World's deepest sinkhole is China's xianozhai Tienkang at 2172 feet. There are as many as 15000 Sinkholes in Illinois

Activity

Take a trough filled with sand. empty a portion of sand in the middle and fill it with sugar. Now level the sand over the sugar. Pour water into the trough and observe what happens. The sugar dissolves and forms a depression. This is similar to the formation of sinkhole.

Caves and Caverns

Caves and caverns are subterranean features of karst topography. Caves are hollows that are formed by the dissolution of limestone rocks when carbon di oxide in air turns into carbonic acid after its reaction with water. They vary in size and shape. Caverns are the caves with irregular floors. Eg. Guptadham caves in Western Bihar.

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All types of deposits in the caves and caverns are collectively called **speleothems** which **includes travertines, tufa, dripstones**.

Swallow Holes, Uvalas, Dolines, Poljis are other erossional Features of karst regions predominant in other parts of the world.

cave

Fact

GeoConnect

Cave insects lose their senses of sight and develop extraordinary long antenna to compensate the loss of sight

Depositional Landforms Underground Water

It is interesting to know that a variety of depositional features are formed on the floor, ceiling and walls of the caves and caverns of the Karst Topography.

Stalactite, Stalagmite and Column

When the water containing dissolved calcite gradually drips from the ceiling of the caves, water evaporates and the remaining calcite hangs from the ceiling. Thus **Stalactites** are formed. When the calcite deposits rises upward like a pillar **Stalagmites** are formed. Sometimes, Stalactites and Stalagmites meet together to form **Columns and Pillars**.

Glaciers:

A Glacier is a large mass of ice that moves slowly over the land, from its place of accumulation. It is also known as 'River of ice'. The place of accumulation is called snowfield. **The height above which there is a permanent snow cover in the higher altitude or latitude is called snowline.** Higher the latitude, lower the snowline from sea level.

FF6H8E

Hots

Snowline of Alps is 2700 metre where as the snowline of Greenland is just 600 metre. Find out the reason.

Activity

Fake Snow

Materials needed

* Cup of Baking Soda
* Shaving Cream

Method

* Pour one cup of baking soda
* Spray the shaving cream

The snow will start forming almost immediately.

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The gradual transformation of snow into granular ice is called 'firn' or ' neve' and finally it becomes solid glacial ice.

Movement of Glacier

The large mass of ice creates pressure at its bottom and generates heat. Due to this, the glacier melts a little and starts to move .The rate of movement of a glacier varies from a few centimetres to several hundred meters a day. The movement of glaciers depends on slope, volume of the glacier, thickness, roughness at the bottom (friction) etc., and Temperature. Like the rivers, glaciers also carry out erosion, transportation and deposition.

Types of Glacier

Glaciers are broadly divided into two types based on the place of occurrence, such as Continental glacier and valley **glacier.**

Erosional Landforms of glacier

Glaciers are powerful erosive agents. Some of the important erosional landforms are Cirque, Aretes, Matterhorn, U-shaped valley, Hanging valley, Fiords etc., Most of these glacial features are predominantly seen in countries like Switzerland, Norway etc.,

Cirque

The glacier erodes the steep side walls of the mountain and forms a bowl-shaped armchair like depression, it is termed as Cirque

Arete

Aretes are narrow ridges formed when two cirque walls joined together back to back, and forms narrow knife like ridges.

Matterhorn

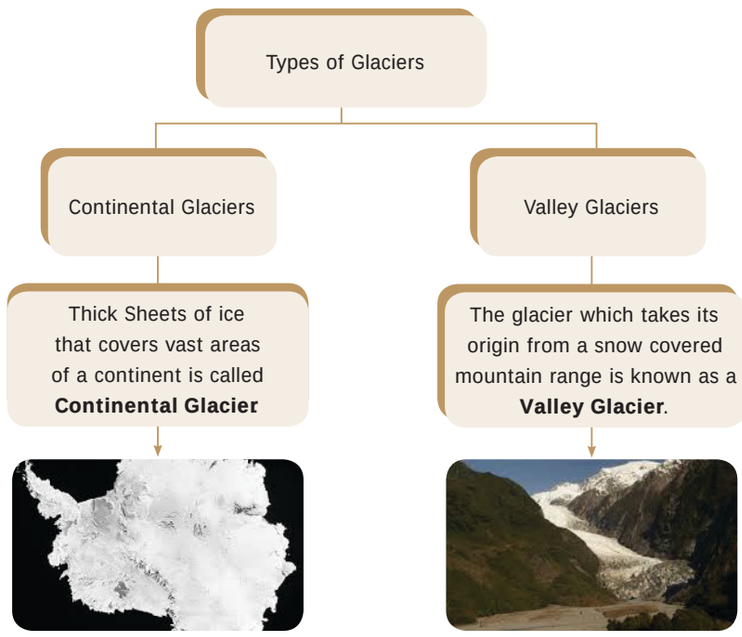
The pyramidal peaks formed when three or more cirques meet together, are referred as Matterhorns.

U-Shaped Valley

When the glacier moves down along a river valley, the valley further gets eroded deep and wide to form a 'U' shaped valley.

Hots

Glaciers do not form deep narrow valleys. Why?



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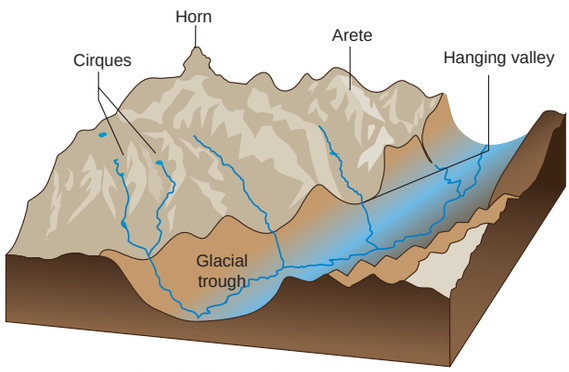
Hanging Valley

These are valleys eroded by tributary glacier and that hangs over the main valley.



Glaciated topography

Fjord

Fjords are glacial valleys that are partly submerged in the sea.

Depositional Landforms of glacier

After getting eroded, fragments of rocks and boulders along with dirt form **glacial debris**. Glacial debris gets deposited in the low lying areas and form depositional features like moraines, drumlins, eskers, kames and outwash plains.

Moraine

Landforms formed by the glacial deposits of valley or continental glaciers are termed as moraines. They are of various shapes and sizes, like ground, terminal and lateral moraines etc

Drumlin

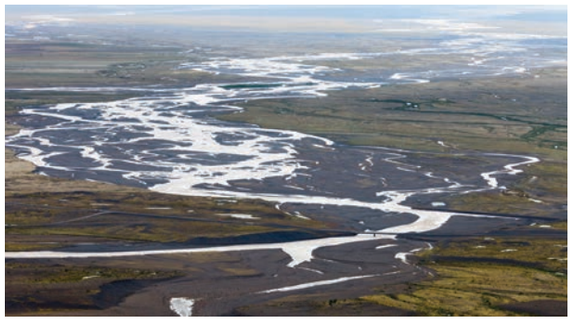
Drumlins are deposits of glacial moraines that resemble giant inverted teaspoons or half cut eggs.

Esker

Long narrow ridges composed of boulders gravel and sand deposited by streams of melting water which run parallel to a glacier are called eskers.

Outwash Plain

An outwash plain consists of glacial sediments deposited by the melting ice at the terminus of a glacier. It appears as an extensive accumulation of sand, gravel and silt.



Activity

Discuss in a small groups about the effects of global warming.

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Wind

When air blows horizontally at or near the earth's surface is called wind. The erosional, transportational and depositional action of wind is predominant in arid regions. This is called as Aeolian Process.

Erosional Landforms of wind

Some of the erosional landforms of wind are mushroom rocks, Inselbergs and yardangs.

Mushroom Rock

Rocks are made up of hard and soft layers. When a rock's bottom is soft, the sand-laden winds blow against it and wear it down. By the constant wearing down action of the wind, the bottom gets eroded away to form a mushroom like structure. This is called a mushroom or pedestal rock. Such rocks are found near Jodhpur in Rajasthan.

Inselberg

Inselberg is a German term which means an island mountain. Certain hard rocks like igneous rocks are more resistant to wind action. Such isolated residual hills rising abruptly from their surroundings are termed as inselbergs. Eg. Uluru or Ayers Rock, Australia.

Yardang

In arid regions, certain rocks have hard and soft layers arranged vertically. When winds blow over these rocks, the soft layers get eroded leaving irregular crests. These are called yardangs.

Depositional Landforms of wind

Deposition occurs when the speed of wind is reduced by the presence of obstacles like bushes, forests and rock structures. The sediments carried by wind get deposited on both the wind ward and leeward sides of these obstacles.

Some of the depositional landforms are sand dunes, barchans and loess.

Sand Dune

In deserts, during sandstorms, wind carries loads of sand. When the speed of wind decreases, huge amount of sand gets deposited. These mounds or hills of sand

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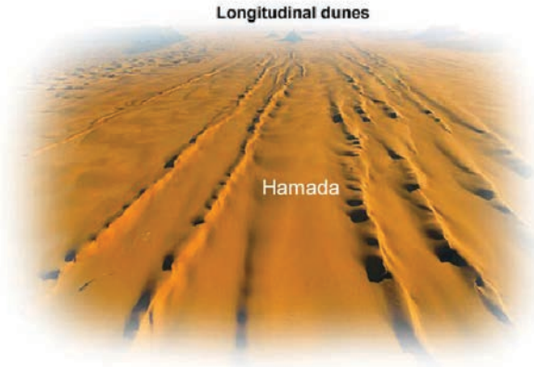
are called sand dunes. There are different types of sand dunes.

Barchan

Barchans are isolated, crescent shaped sand dunes. They have gentle slopes on the windward side and steep slopes on the leeward side.

Transverse Dunes

Transverse dunes are asymmetrical in shape. They are formed by alternate slow and fast winds that blow from the same direction.



Longitudinal Dunes

Longitudinal dunes are long narrow ridges of sand, which extend in a direction parallel to the prevailing winds. These dunes are called Seifs in Sahara

Loess

The term loess refers to the deposits of fine silt and porous sand over a vast region. Extensive loess deposits are found in Northern and Western China, the Pampas of Argentina, in Ukraine and in the Mississippi Valley of the United States.

DO YOU KNOW?

The thickest known deposit of loess is, 335 metre found in the loess plateau in China.

Wave

A steady up (crest) and down (trough) movement of surface water are called waves. Sea waves are the most powerful agents of gradation and their erosional, transportational and depositional processes are confined to a very narrow belt along coastal areas.

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Erosional Land Forms of Waves

Some of the erosional landforms of sea waves are sea cliff, sea cave, arch, stack, beach, bar and spit and wave cut platform.

Sea Cave

Prolonged wave attack on the base of a cliff erodes rock materials, which result in the formation of **caves**.

Sea Arch

When two caves approach one another from either side of a headland and unite, they form an **arch**. (Eg.) Neil Island, Andaman and Nicobar.

Sea Stack

Further erosion by waves ultimately leads to the total collapse of the arch. The seaward portion of the headland will remain as a pillar of rock known as **stack**. Eg the Old man of Hoy in Scotland.

Sea Cliffs

Sea cliffs are steep rock faces formed when sea waves dash against them. The rocks get eroded to form steep vertical walls.

Wave Cut Platforms

Flat surface found at the foot of sea cliffs are called as wave cut platforms. Wave cut platform is also referred as beach, shelf, terrace and plain.

Depositional Landforms of Waves

Beach

Sand and gravel are moved and deposited by waves along the shore to form **beaches**. This is the most dominant and constructive work of the sea. (Eg.) Juhu beach along Mumbai coast, Puri beach in Odisha and Marina beach in Chennai.

Do you remember?

Major land forms

• First order land form - continents and oceans. • Second order land form – Mountains, plateaus and plains in both continents and oceans.

Minor Land Forms

Third order land forms – deltas, fjords coasts, sand dunes, beaches valleys, cirques, Mushroom rocks, limestone caves.

Bar

A bar is an elongated deposit of sand, shingle or mud found in the sea, almost parallel to the shoreline.

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Spit

A spit is a ridge or embankment of sediment, attached to the land on one end and terminating in open water on the other end. Spits are common at the mouth of estuaries. Eg. Kakinada spit

Recap

- Levelling of uneven landform is called gradation.
- Weathering is the breaking down of the rocks.
- Physical, chemical and biological are the three types of weathering.
- Weathered rock materials carried away by gravity is called mass movement.
- Running water, glacier, underground water, wind and waves are agents of weathering.
- Soil is the top covering of the earth's surface formed by weathering.

A-Z GLOSSARY

Weathering — the disintegration or decomposition of solid rocks

Aggradations — process through which low lying areas are elevated

Degradation — process of lowering of highlands by wearing them down

Gradation — leveling of the Earth's surface by natural agents.

Landslides — rapid downward movement of a rock mass

Erosion — the process in which earth's surface is worn away, often by water, wind or ice.

Delta — the triangular depositional features of the river at its mouth.

Meanders — the curving motion of the river in its middle course.

terminus — End of a glacier

Headland — A coastal landform that extends out into a nearby waterbody

EXERCISE

FFFDA2

I. Choose the best answer:

1. The disintegration or decomposition of rocks is generally called as _____
   a. weathering
   b. erosion
   c. transportation
   d. deposition
2. The process of the levelling up of land by means of natural agents.
   a. aggradation
   b. degradation
   c. gradation
   d. none
3. _____ is seen in the lower course of the river.
   a. Rapids b. Alluvial fan
   c. Delta d. Gorges
4. Karst topography is formed due to the action of _____
   a. Glacier b. Wind
   c. Sea waves d. Ground water.

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5. Which one of the following is not a depositional feature of a glacier?
   a. cirque b. Moraines
   c. Drumlins d. Eskers
6. Deposits of fine silt blown by wind is called as
   a. Loess b. Barchans
   c. Hamada d. Ripples
7. Stacks are formed by _____
   a. Wave erosion
   b. River erosion
   c. Glacial erosion
   d. Wind deposion
8. _____ erosion is responsible for the formation of cirque
   a. wind b. glacial
   c. river d. underground water.
9. Which one of the following is a second order land form?
   a. Asia b. Deccan Plateau
   c. Kulu valley d. Marina Beach.

II. Match the following:

1.	Distributaries	–	glacial action
2.	Mushroom rock	–	action of sea wave
3.	Eskers	–	Lower course of river
4.	Stalactites	–	Aeolian process
5.	Cliff	–	karst topography

III. Answer in brief:

1. Define weathering.
2. What do you mean by biological weathering?
3. Mention the three courses of a river with any two land forms associated to each course.
4. What are ox-bow lakes?
5. How does a cave differ from a sea arch?
6. List out any four karst topographical areas found in India.
7. What do you mean by a hanging valley?
8. Define: a) Moraine b) Drumlin c) Esker.
9. Mention the various features formed by wind erosion.
10. What are wave cut platforms?

IV. Distinguish between:

1. Physical and chemical weathering.
2. Delta and Estuary
3. Stalactite and stalagmite.
4. Longitudinal and Transverse sand dunes.
5. Inselbergs and yardangs
6. Continental glaciers and Valley glaciers.
7. Spit and bar.

V. Give Reasons:

1. Chemical weathering is predominant in hot and humid zones.
2. Silt deposits are less at estuaries than deltas.
3. The snow line is at the sea level in Polar regions.
4. Wind can possibly erode the rocks from all sides.
5. In limestone regions, surface drainage is rarely found.

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VI. Answer in Paragraph:

1. Write a note on weathering classify and explain.
2. Explain the erosional landforms formed by underground water.
3. What is a glacier? Explain its types.
4. Describe the depositional work of winds.
5. Give a detailed account on the three orders of land forms.

VII. Consider the given statements and choose the right option given below

i 1. 'I' Shaped valley is an erosional feature of the river

2. 'U' Shaped valley is an erosional feature of the glacier

3. 'V' Shaped valley is an erosional feature of the glacier

a. i, ii & iii are right

b. i & ii are right

c. i & iii are right

d. only I is right

ii **Statement I:** Running water is an important agent of gradation

Statement II: The work of the river depends on the slop of land on which if flows

a. Statement I is false II is true

b. Statement I and II are false

c. Statement I is true II is false

d. Statement I and II are true

iii **Statement:** Limestone regions have less underground water.

Reason: Water does not percolate through limestone

a. The statement is right reason is wrong.

b. The statement is wrong Reason is right.

c. The statement and reason are wrong.

d. The statement and reason are right.

VIII. HOTS

1. Is wind the only gradational agent in the desert?
2. Underground water is more common in limestone areas than surface run off. Why?
3. The river channels in the lower course are wider than the upper course.

IX. Map Skill:

On the given outline map of the world, mark the following.

1. Any two deltas
2. A Karst region
3. Any two hot and cold deserts
4. An area of continental glaciers.

X. Give geographical terms for the following:

a. Chemical alternation of carbonate rocks on lime stone region.
b. Flat surfaces near cliffs.
c. Erosion + Transportation + Deposition =
d. The bottom line of a snow field.
e. Valley cut by glaciers.

INTERNET RESOURCES

1. www.usgs.gov.in
2. www.nasa.gov.in
3. https://www.isro.gov.in
4. https://www.india.gov.in

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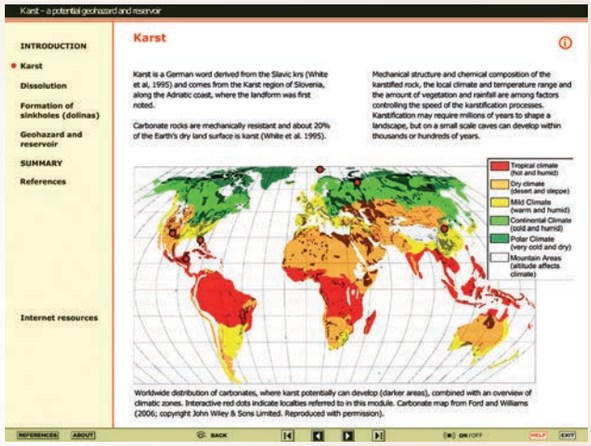
ICT CORNER

Karst Topography

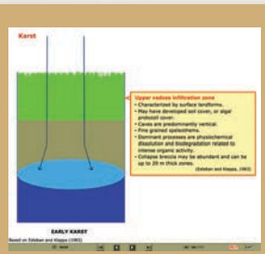
Through this activity you will explore **Karst formation.**



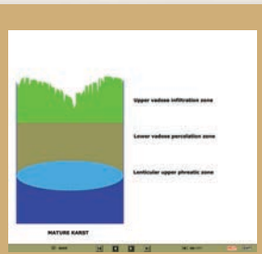
Steps

- Use the URL to reach '**Karst Topography**' page. Allow flash player to play, if it asks.
- Click '**Next**' button in the bottom of the page to proceed to the next page and explore the animation.
- Select '**Dissolution**' option from the left and explore.
- Use the arrow keys to move forward and backward to the animation.

Step 1



Step 2



Step 3

Step 4

Website URL:

http://folk.uio.no/hanakrem/svalex/E-learning/Karst/

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UNIT 3

Atmosphere

Learning Objectives

- To understand the composition of atmosphere.
- To differentiate weather and climate.
- To correlate the factors influencing weather and climate.
- To recognize the classification of Clouds, wind and rainfall.

FFP9BP

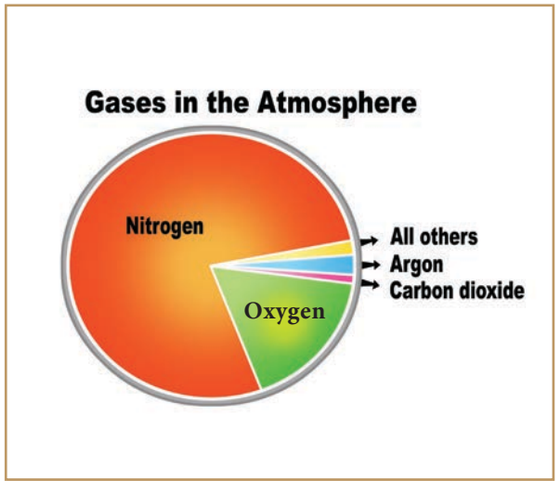
Pathway

The atmosphere is a vital structure that creates climate zones and weather patterns around the earth. In this unit, we focus on the layers of atmosphere, the fundamental processes that cause atmospheric circulation and disturbances and how atmosphere helps to regulate Earth's weather and climate.

Earth is a unique planet where life is found. Can you imagine life on the earth without air? No. The air is essential for the survival of all forms of life. The blanket of air that surrounds the Earth is called the atmosphere. It is held close to the earth by gravitational attraction.

1 Composition of the Atmosphere

Atmosphere is a mixture of gases, water vapour and dust particles in different proportions. Nitrogen (78%) and Oxygen (21%) are permanent gases of the atmosphere. They constitute 99% of the total composition and their percentages always remain the same without any change. The remaining one percentage is occupied by Argon (0.93%), Carbon-di-oxide, (0.03%), Neon (0.0018%), Helium (0.0005%), Ozone (0.00006%) and Hydrogen (0.00005%). Krypton, Xenon and Methane are also present in trace. Water vapour (0 - 0.4%) is also found in the atmosphere, which plays an important role in predicting weather phenomenon. The other solid particles present in the atmosphere includes dust particles, salt particles, pollen grains, smoke, soot, volcanic ashes etc.,.



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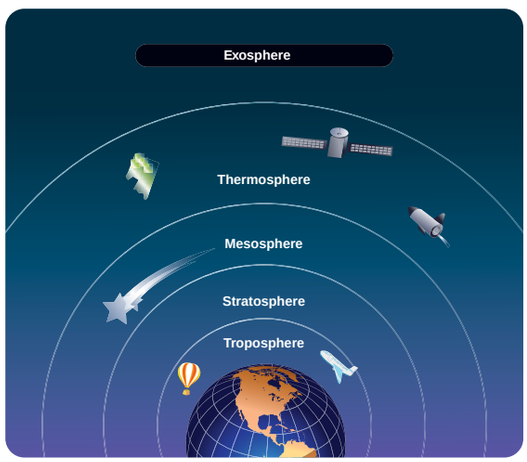
Fact

In 1772 CE Daniel Rutherford discovered Nitrogen in atmosphere. In 1774 Joseph priestly discovered oxygen in atmosphere

Oxygen is most important for living organisms. CO_2 absorbs heat and keeps the atmosphere warm by insulation and radiation. Nitrogen acts as a diluent and is chemically inactive. Ozone helps in protecting the earth from radiation. The solid particles in the atmosphere acts as nuclei on which water vapour condense to form precipitation.

2 Structure of the Atmosphere

The atmosphere is thick near the earth surface and thins out until it eventually merges with space. The five atmospheric layers are: Troposphere, stratosphere, Mesosphere, Thermosphere and Exosphere.



Troposphere:

The lowest layer of the atmosphere is the troposphere. The Greek word 'tropos' means 'turn' or change. The layer extends up to 8 kms at the poles and up to 18 kms at the Equator. The temperature decreases with increasing height. Almost all weather phenomenon take place in this layer. Hence it is called weather making layer. The upper limit of the troposphere is called as tropopause.

Stratosphere

Stratosphere lies above the troposphere. It extends to a height of about 50km above earth surface. Since this layer is a concentration of ozone molecules, it is also referred as ozonosphere. The temperature increases with increase in height in this layer. Large jet planes normally fly here. The upper limit of the stratosphere is called as stratopause.

Mesosphere

Mesosphere extends between 50km and 80km. The temperature increases with increasing height. Radio waves transmitted from earth are reflected back to earth from this layer. Most of the meteors nearing the earth, get burned here. The upper most limit of the mesosphere is the mesopause.

Thermosphere

Thermosphere exists above the mesosphere. It extends to about 600 km. The composition of gases in the lower thermosphere is more or less uniform, hence it is called

Fact

Magnetosphere lies beyond the exosphere. It is the earth's magnetic belt, where proton and electrons, coming out from the sun are trapped by the earth. The magnetic field extends to around 64,000 km above the Earth.

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"Homosphere". The upper portion of the thermosphere has uneven composition of gases and hence it is referred as "Heterosphere". Here the temperature increases with increasing height. Ionosphere is a layer of the thermosphere that contains Ions and free electrons.

Exosphere

The uppermost layer of the atmosphere is called exosphere. This layer is extremely rarefied with gases and gradually merges with the outer space. This zone is characterized by aurora Australis and aurora borealis.

DO YOU KNOW?

Auroras are cosmic glowing lights produced by a stream of electrons discharged from the Sun's surface due to magnetic storms that are seen as unique multicoloured fireworks hanging in the polar sky during midnight

Weather and Climate

Weather and climate are the terms that are related to the atmospheric conditions. Weather denotes the way the atmosphere behaves every day and climate reveals the average of weather conditions over relatively long periods of time. The difference between the two may be clearly understood with the following table.

Hots

Why is Troposphere called as weather making layer?

Weather		Climate	
Partly sunny	1. Weather is the study of atmospheric conditions for short duration over small areas.	1. Climate is the study of the average weather condition observed over a long period of time for a larger area.	Warm Climate
Windy	2. The weather changes very often ; hour to hour and day to day	2. Climate is more or less permanent and remains the same always.	Monsoon
Rainy	3. A place can experience different types of weather conditions in a day. Eg. A day with hot morning can have a rainy noon.	3. A place can experience almost the same type of climate	Wet climate

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Weather		Climate	
Chilly	4. Weather data is collected every day in the observatories	4. Climate is average of the weather data.	Extreme Climate
Stormy	5. Study of weather is called Meteorology	5. Study of climate is called Climatology	cyclone

2. There are many factors that influence weather and climate.

- Distance from the equator
- Altitude
- Nearness to the sea
- Nature of the prevailing winds
- Mountain barrier
- Cloud cover
- Ocean currents
- Natural vegetation

QR Code

Distance from the Equator

The sun's rays fall vertically on the equator. The rays are inclined on the regions away from the equator and near the poles due to the spherical shape of the earth. The vertical rays heat up the earth more than the inclined rays. Thus, the places near the equator are warmer than the places which are far away from the equator.

Activity

Connect the following places with their latitudes and the temperature observed

City	Latitude	Temperature [In August]
Kanyakumari – Tamil Nadu		
Delhi-India		
Moscow – Russia		

Altitude:

Altitude refers to the height above sea level. The temperature decreases at the rate of 1° C for every 165 mt of height.

Activity

Connect the following places with Altitude and the temperature

City	Altitude (height)	Temperature [In May]
Madurai-Tamilnadu		
Uthagamandalam – Tamilnadu		
Simla -Himachal Pradesh		

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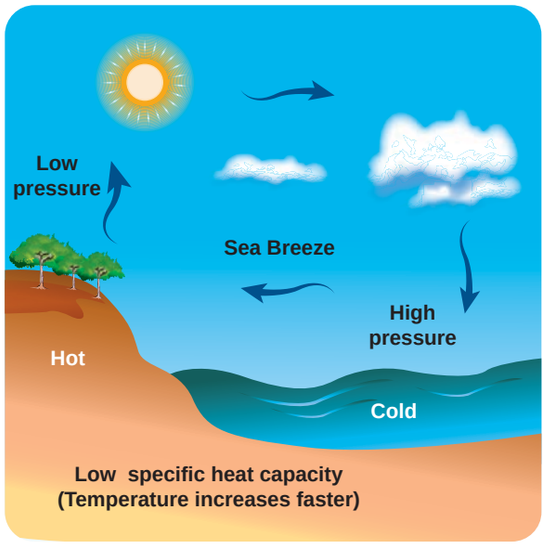
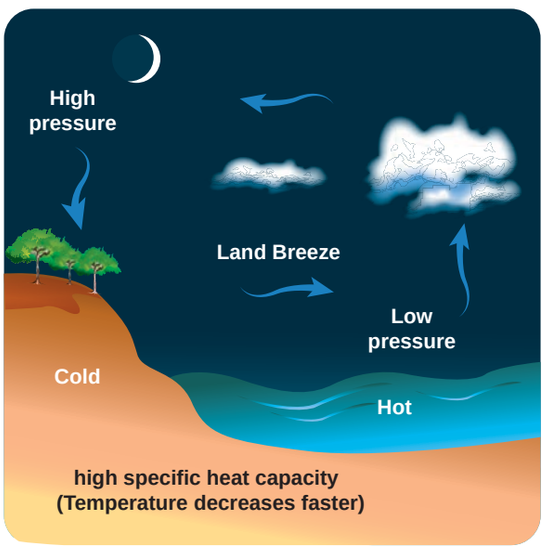
This is called **Normal lapse rate**. So, places at the higher altitude have a lower temperature.

Nearness to the sea:

The climate of a place, varies according to its nearness to the sea. Places near the coast experience equable climate due to the influence of the winds from the sea. Places located in the land, far from the sea, does not experience the moderating influence of the sea, such places experience a continental type of climate.





Fact

During the day, the land masses get heated more rapidly than the oceans. Heated air ascends and this causes low pressure on the adjoining ocean. Therefore, the wind blows from ocean to land in the afternoon. This is called sea breeze. **Sea breeze** helps in reducing the temperature of the coastal region especially during the summer season.

During the night, the land cools more rapidly than the ocean. Cool air sinks and forms high pressure. The wind blows from land to sea during the night, this is called **land breeze**.

Nature of the Prevailing Winds

The winds change the climate of a place based on, from where they blow. When wind blows from a warm region, it makes the place warm and cold, when blows from a colder region. The on-shore winds cause rainfall making the place cool whereas the off-shore winds bring dry weather.

Mountains barriers

The location of the mountains influence the climate of a place. The mountain chains act as natural barrier for the wind. Sometimes they prevent the entry of cold winds into the country or the escape

DO YOU KNOW?

The windward is the side of a mountain which faces the prevailing wind. It receives heavy rainfall.

The leeward side of the mountain is the side sheltered from the wind. It receives very less rainfall.

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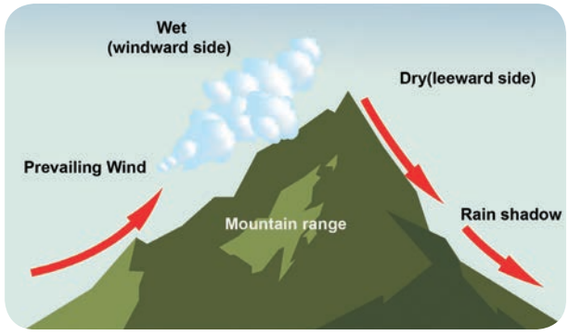

of monsoon winds, thus having a great influence over the climate.

Cloud Cover

Clouds reflect a large amount of radiation from the sun. This prevents the entry of heat to the earth's surface. So, in areas generally of cloudless sky like the deserts, temperature is very high. On the other hand under cloudy sky, the temperature is low.

Ocean currents

The warm ocean currents raise the temperature of the nearby coastal areas, while the cold current lower the temperature of aw place.

Natural vegetation

The trees release water vapour into the air and makes it cool. Thus forest areas have lower range of temperature throughout the year in contrast to non-forested areas.

3 Elements of Weather and Climate

- Temperature
- Pressure
- Wind
- Cloud
- Precipitation
- Humidity

QR Code

Temperature:

Temperature is a measure of the warmth of an object expressed in terms of Celsius or Fahrenheit, measured with **thermometer**. Sun is the chief source of energy for the Earth.

DO YOU KNOW?

Heat is the energy which makes objects hot, while temperature measures the intensity of heat.

The atmosphere acts as an insulator and maintains the temperature of the earth. Without atmosphere, the earth would experience great extremes of temperatures during day and night. Some of the processes that are responsible for atmospheric heat are radiation, Conduction, Convection and Advection.

Fact

- The amount of heat received from the sun in the form of short waves is called Insolation or Incoming Solar Radiation.
- The outgoing heat from the earth to space in the form of long waves is called terrestrial radiation. This is also called as re-radiation
- Albedo is the fraction of solar energy reflected from the earth back into space without reaching or heating the earth surface.
- There is a balance between insolation and radiation. This balance is termed as a heat budget of the earth.

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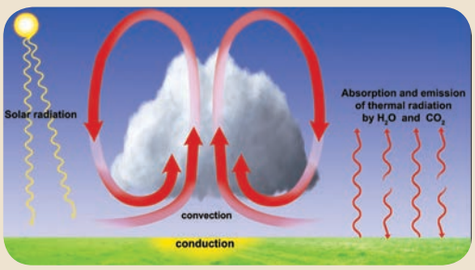
Isotherms are imaginary lines drawn on maps, connecting points that have equal temperatures. Temperature varies from place to place, season to season and continent to continent. The average global surface temperature is about 13 °C.

Fact

- **Conduction** is the transfer of heat from hot body to a cold body through contact.
- **Convection** is transfer of heat by movement or circulation of air in a mass.
- **Advection** is the transfer of heat through the horizontal movement of air.



Heat Zones

Based on the amount of insolation received from the sun and the heat, Earth is classified into three heat zones namely torrid zone, temperate zone and frigid zone.

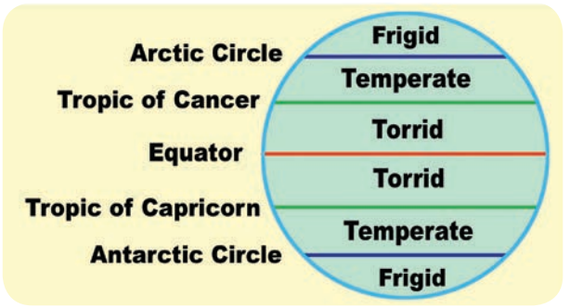
Torrid Zone

This largest thermal zone covers almost 50% of the earth's surface. It is located between the Tropic of Cancer (23½°N) and Tropic of Capricorn (23½°S). Torrid Zone experiences vertical sun rays almost throughout the year and is hot.

Temperate Zones

The Temperate Zone stretches out between Tropic of Cancer (23½°N) and Arctic Circle (66½°N) in the northern hemisphere and between Tropic of Capricorn (23½° S) and Antarctic Circle (66½° S) in the southern hemisphere. The sun's rays never fall vertical in this region.

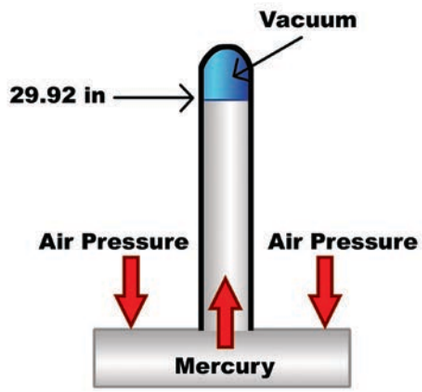
Frigid Zones



The Frigid Zone is found between Arctic Circle (66½°N) and North Pole (90° N)in the northern hemisphere and stretches out between Antarctic Circle (66½° S) and South Pole (90°S) in the southern hemisphere. The sun's rays fall slanting in this zone. These are the coldest regions of the world. The surface remains permanently frozen under thick snow.

Pressure

The atmospheric pressure is the weight exerted by air on a particular area of the earth surface. It is measured with a mercury barometer and the unit of measurement is **millibar** (mb).



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DO YOU KNOW?

An isobar is an imaginary line drawn through places having equal atmospheric pressure reduced to sea level.

The distribution of atmospheric pressure on the surface of the earth is not uniform. It varies both vertically and horizontally.

Vertical distribution of atmospheric pressure:

Air pressure decreases with altitude. The air molecules become scattered and more widely spaced at higher altitudes. The air pressure decreases by 34 millibars per 300 metres increase in height.

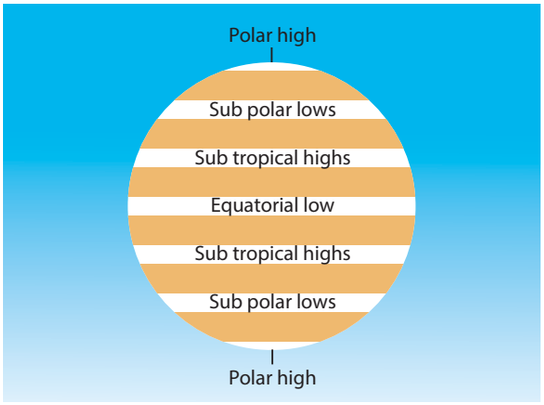
DO YOU KNOW?

At the top of Mount Everest (elevation 8848m), the air pressure is only about one third the pressure at sea level. When we fly in aircraft or travel fast on road to hill stations, our ears pop as they adjust to a rapid change in pressure when ascending or descending.

Horizontal distribution of atmospheric pressure:

The horizontal distribution of atmospheric pressure in the world is not uniform. It varies from time to time and place to place due to (i) air temperature (ii) the earth's rotation (iii) presence of water vapour etc., The **pressure belts** along the latitudes are characterized by alternate high or low pressure belts. The pressure belts of the world are:

- Equatorial low
- Sub tropical highs
- Sub polar lows
- Polar highs



The Equatorial Low Pressure Belt:

This belt extends from equator to 5° N and 5° S latitudes. At the equator, the earth gets heated by the vertical sun rays and in turn heats the air in contact with it. The heated air expands and raises upwards resulting in a low pressure belt. This belt is called **doldrums** due to virtual absence of surface winds.

DO YOU KNOW?

ITCZ and Doldrums

The Inter Tropical Convergence Zone (ITCZ) is the belt of converging winds and rising air encircling Earth near the Equator.

Doldrums (the zone of calm) lies in the equatorial region with calms, light unpredictable winds and sudden cyclones

The Subtropical High Pressure Belts:

The sub-tropical high pressure belts extend from the tropics to about 35° latitudes in both the hemispheres. The air that raises in the equatorial region, becomes cold and heavy, and starts to descend in the Sub Tropical regions. This result in sub tropical high pressure belts referred as the Horse latitude.

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HORSE LATITUDE:

In olden days vessels with cargo of horses passing through sub tropical high pressure belts found difficulty in sailing under calm conditions. With little water and food left for the humans, sailors used to throw the horses in to the sea in order to make the vessels lighter. Henceforth these belts or latitudes are also called 'horse latitudes'.

The Sub-polar Low Pressure Belts:

The sub-polar low pressure belts extend between 45°N and the Arctic Circle in the northern hemisphere and between 45°S and the Antarctic Circle in the southern hemisphere. The air present in this layer moves to the sub tropical high pressure belt and polar high pressure belt making it free from air pressure forming the sub polar low pressure belt. This is made possible by the rotation of the earth.

The Polar High Pressure Belts:

Sun rays are always slanting at poles resulting in low temperatures. Because of low temperature, air compresses and its density increases. Hence, high pressure is found here. Winds from these belts blow towards sub-polar low pressure belts.

Winds

The horizontal movement of air along the surface of the earth is called the "Wind' while the vertical movement of air is a called an "Air Current". The winds always blow from a high pressure area to a low pressure area. Wind is mostly named after the direction from which it blows. For example, the wind blowing from the east is known as the easterly wind.

An "anemometer" records wind speed while a "wind vane" measures the direction of the wind. The unit of measurement is kilometre per hour or knots

Anemometer

Wind vane

Types of Winds

Winds are generally classified into the following four major types:

- Planetary winds
- Periodic winds
- Variable wind
- Local wind

Planetary winds:

The winds which constantly blow in the same direction throughout the year are called the Planetary winds. They are also called as permanent winds or the prevailing winds. These winds include Trade winds, Westerlies and Polar Easterlies

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Trade Winds

Trade winds blow from the subtropical high pressure belt to the Equatorial low pressure belt in both the hemispheres. They blow with great regularity, force and in a constant direction throughout the year. These winds were very helpful to traders who depended on the winds while sailing in the seas. And so, they are named as Trade winds. As they travel over vast oceans, they collect more moisture and bring heavy rainfall to the East Coast of the continents of the tropics. As they move westwards, they become dry and do not give rainfall.

Activity

Find the correlation between the Trade Winds and the location of prominent deserts like Sahara, Atacama etc.

Westerlies

Westerlies are the permanent winds that blow from the tropical high pressure belt to the sub polar low pressure belt in both the hemispheres. They blow from South West to North East in the northern hemisphere and North West to South East in the southern hemisphere. The velocity of westerlies become so vigorous and fast to be called **Roaring Forties** at 40^0, **Furious Fifties** at 50^0 and **Screaming Sixties** at 60^0 latitudes.

Polar Easterlies:

Polar easterlies are cold and dry polar winds that blow from the polar high pressure belt to the sub polar low pressure belt. These are weak winds blowing from North East direction in the Northern Hemisphere and South East direction in the Southern Hemisphere.

Periodic winds

The periodic winds are the seasonal winds that change their direction periodically. These winds are caused by the differential heating of land and ocean.

Winds which reverse their direction with the change of seasons are called monsoons. Tropical Monsoon winds of Indian subcontinent is a best example.

Fact

G.G.Coriolis

The rotation of the Earth causes deflection of winds from their original path, called the "Coriolis effect". Winds are deflected to the right in the northen hemisphere and to the left in the southern hemisphere which is known as "Ferrel's law". This was profounded by William Ferrel. He used "Coriolis force" named after G.G Coriolis (1792-1843) for proving Ferrel's Law

Variable winds

The disturbance and the changes in the local weather cause variations in the prevailing winds. These winds are known as the variable winds. Variable winds usually end up with the development of cyclones, anticyclones and storms.

Cyclones

The term cyclone is a Greek word meaning "coil of a snake". Cyclones are centres of low pressure where, winds from the surrounding high pressure area converge towards the centre in a spiral form. Due to the rotation of the earth, the cyclonic winds in the northern hemisphere move in anti clock wise direction, where as they move in clockwise direction in the southern hemisphere.

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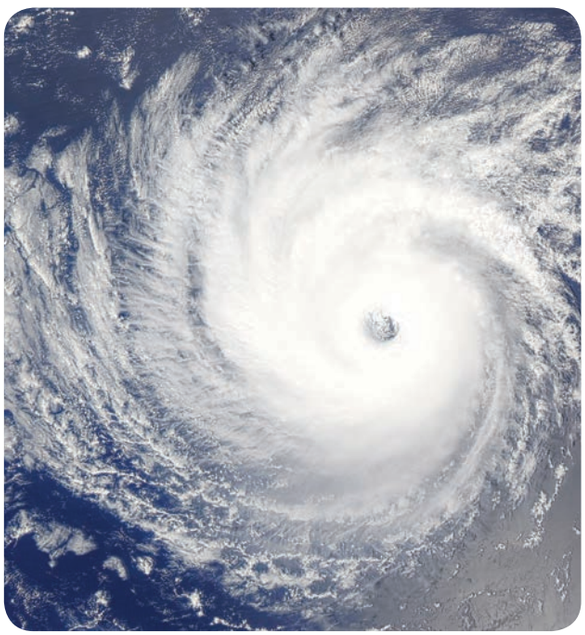
Cyclones can be classified into

Tropical cyclones
Temperate cyclones
Extra tropical cyclones

Tropical cyclones:

Tropical cyclones develop in the Inter tropical convergence zone [ITCZ]. They are formed due to the differential heating of land and sea.

Tropical cyclones are known as '**cyclones**' in Indian ocean, '**typhoons**' in the western pacific ocean, '**hurricanes**' in the Atlantic and eastern Pacific ocean, '**baguios**' in Phillipines and '**willy willy**' in Australia. Tropical cyclones often cause heavy loss of life and property on the coasts and become weak after reaching the landmasses.



Fact

Super Cyclone

A violent cyclone that hit Odisha, on Friday, 29 October 1999, was one of the most devastating and strongest storm to hit the Indian coast. Winds of up to 260 kph raged for over 36 hours. The winds caused a seven-metre tidal wave that swept more than 20 km inland and brought massive destruction and death to a number of coastal districts in the state of Odisha. It is estimated that more than 10 million people in 12 coastal belt districts were affected by the cyclone. More than 10,000 people lost their lives.

Temperate cyclones:

Temperate cyclones are formed along a front where hot and cold air masses meet in mid-latitudes between 35° and 65°N and S. Temperate cyclones do not become weak like the tropical cyclones on reaching the land. Temperate cyclone commonly occurs over the North Atlantic Ocean, North West Europe, Mediterranean basin. Mediterranean basin's temperate cyclones extend up to Russia and India in winter. In India it is as called western disturbances.

A front is the boundary separating warm and cold air masses. One type of airmass is usually denser than the other, with different temperatures and humidity. This meeting of airmass causes rain, snow, cold days, hot days, and windy days.

Extra tropical cyclones:

Extra tropical cyclones occur in the latitudes between 30° and 60° in both the hemispheres. They are also called as **mid-latitude cyclones**. They collect energy from temperature differences which are found in higher latitudes. Extra tropical cyclones produce mild showers to heavy gales, thunderstorms, blizzards, and tornadoes.

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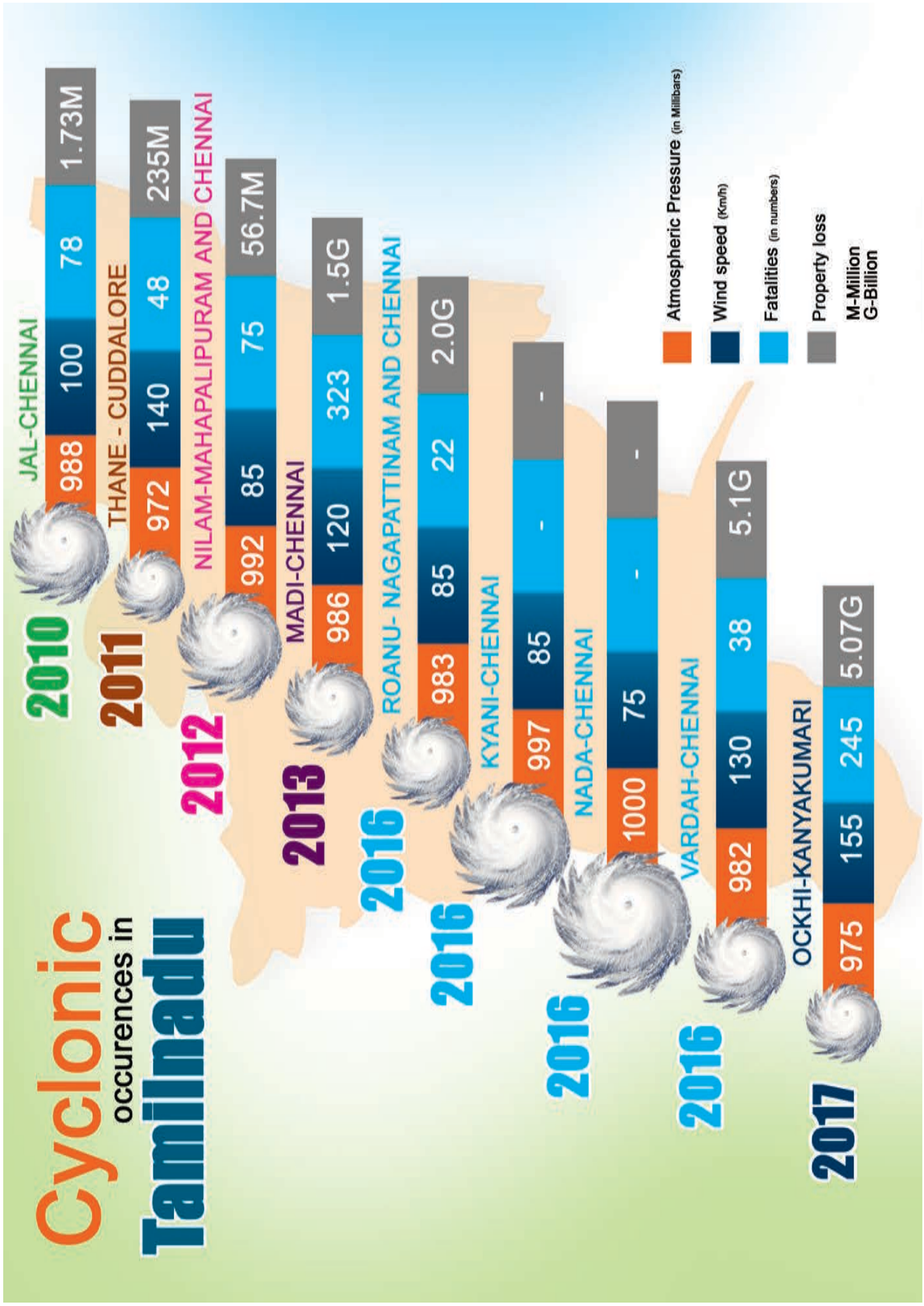

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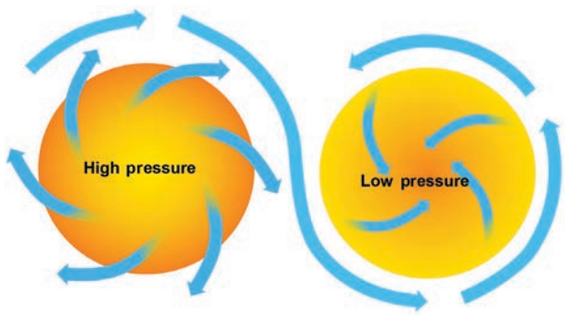
DO YOU KNOW?

Deliberations for naming cyclones in the Indian ocean region began in 2000 and a formula was agreed upon in 2004. Eight countries in the region Bangladesh, India, Maldives, Myanmar, Oman, Pakistan, Srilanka, and Thailand contributed a set of names which our assigned sequentially whenever a cyclonic storm develops.

Hots

Cuddalore and Nagapattinam are always affected by cyclones. Why?

Anticyclone and Cyclone



Anticyclones:

Anticyclones are the opposite of cyclones. Here an area of high pressure region is found in the centre surrounded by low pressure on all sides. The wind from the high pressure region move outwards to the low pressure regions in a spiral form. Anticyclones are often accompanied by cold and heat waves.

Local Winds:

Local winds are the winds that blow only in a particular locality for a short period of time, The effect of these local winds are experienced only in that particular area. They are mostly seasonal and have local names like....

- Foehn (Alps-Europe)
- Sirocco (North coast of Africa)
- Chinook (Rockies-North America)
- Loo (Thar Desert- India)
- Mistral (Mediterranean sea in France)
- Bora (Mediterranean sea in Italy)

5 Clouds

Large amount of water evaporates each day from the surface of the sea. This is the principal source of atmospheric moisture. Cool moisture laden air, gets collected around particles like dust, salt content from the sea, smoke etc., and forms clouds. Sometimes, mixing of warmer and cooler air also produces clouds. A visible mass of condensed water vapour floating in the air above the ground level is called a cloud. The three layers of atmosphere such as troposphere, stratosphere and mesosphere are specific locations of clouds.

According to their height, clouds are classified into the following types

- High clouds (6-20km Height)
- Middle clouds (2.5km-6km Height)
- Low clouds (ground surface to 25 km height)

These major types of clouds are further divided into different types on the basis of shape and structure.

High clouds

Cirrus: Detached clouds in the form of white delicate fibrous silky filaments formed at the high sky (8000 meters to 12000 meters) are called Cirrus clouds. These clouds are dry and do not give rainfall.

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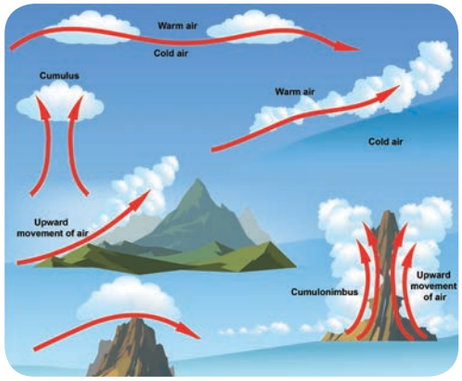

Cirro-cumulus: White patched, sheet or layer like clouds composed of ice crystals.

Cirro-stratus: Smooth milky transparent whitish clouds composed of tiny ice crystals.

DO YOU KNOW?

During sunset cirrus clouds look colourful hence they are called as "Mare's Tails".

Middle clouds

Alto-stratus: Thin sheets of grey or blue coloured clouds in uniform appearance. consisting of frozen water droplets

Alto-cumulus: clouds fitted closely together in parallel bands, called as 'Sheep clouds' or wool pack clouds.

Nimbo stratus: These are clouds of dark colour very close to the ground surface associated with rain, snow or sleet.

DO YOU KNOW?

The only sphere which contains all clouds in the atmosphere is troposphere

Low clouds

Strato-cumulus:- Greyorwhitishlayer of non-fibrous low clouds found in rounded patches at an height of 2500 to 3000 metres, associated with fair or clear weather

Stratus:- Dense, low lying fog-like clouds associated with rain or snow

Cumulus:- Dome-shaped with a flat base often resembling a cauliflower, associated with fair weather

Cumulo-nimbus:- Fluffy thick towering thunderstorm cloud capable of producing heavy rain, snow, hailstorm or tornadoes

Precipitation

Falling down of condensed water vapour in different forms is called Precipitation. When the dew point is reached in the cloud water droplets become saturated and start to fall. Hence, they fall on the earth as Precipitation.

The climatic conditions/ factors influencing the forms of precipitation mainly are:

- Temperature.
- Altitude
- Cloud type.
- Atmospheric conditions.
- Precipitation process.

The main forms of precipitation include **drizzle, rain, sleet, snow, hail etc.**

Drizzle

Falling of numerous uniform minute droplets of water with diameter of less than 0.5 is called a drizzle.mm from low clouds. Sometimes drizzles are combined with fog and hence reduce visibility.

Rain

Rain is the most widespread and important form of precipitation in places having temperature above the freezing point. It occurs only when there is abundant

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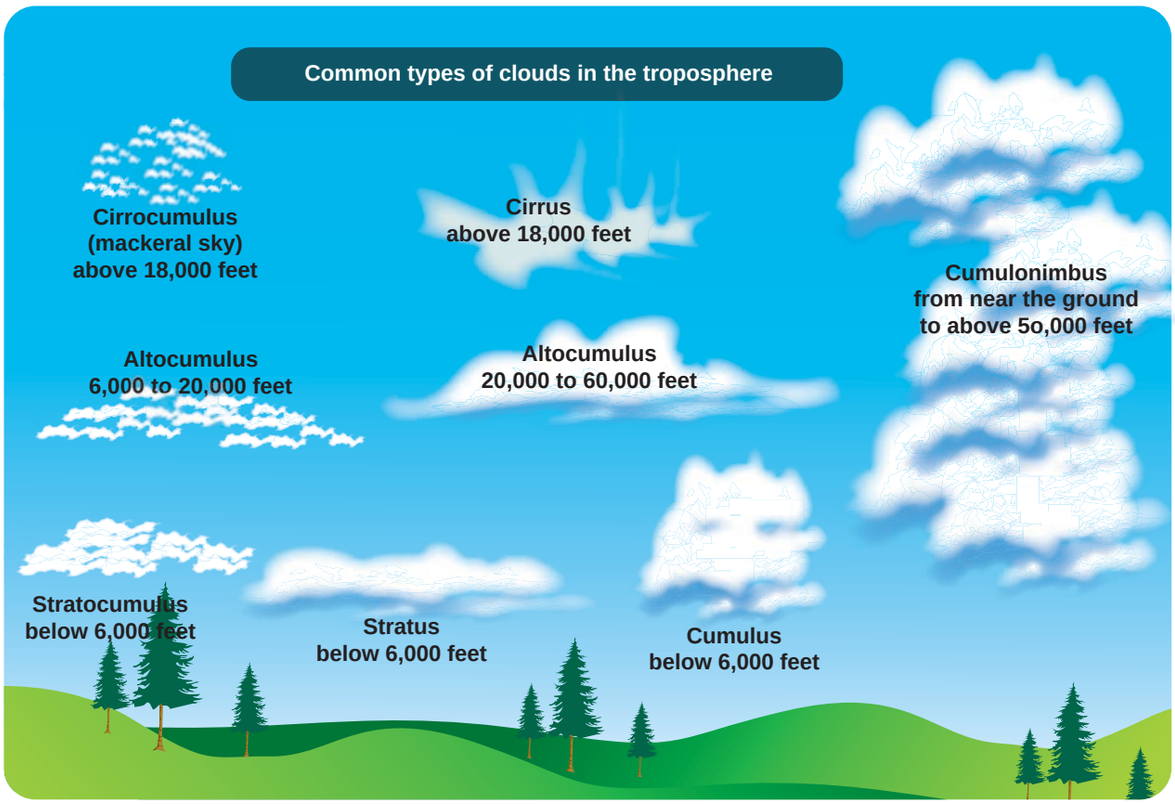

moisture in the air. The diameter of a rain drop is more than 5mm.

Sleet

Sleet refers to a precipitation, in the form of pellets made up of transparent and translucent ice. This precipitation is a mixture of snow and rain

Snow

Snow is formed when condensation occurs below freezing point. It is the precipitation of opaque and semi opaque ice crystals. When these ice crystals collide and stick together, it becomes snowflakes.

Hails

Hails are chunks of ice (greater than 2cm in diameter) falling from the sky, during a rainstorm or thunderstorm.

Hailstones are a form of solid precipitation where small pieces of ice fall downwards. These are destructive and dreaded forms of solid precipitation because they destroy agricultural crops and human lives.

Fact

Any thunderstorm which is associated with fall of hail stones is known as hailstorm. Hailstorm is one of the most feared weather phenomenon because it has the potential to destroy plant, trees, crops, animals and human life.

6 Rainfall

Rainfall is the most predominant type of Precipitation. Moisture laden air masses raise upwards, forms clouds and bring

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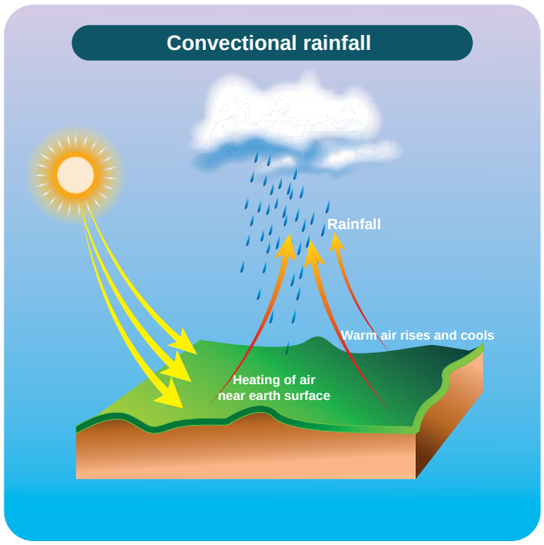
rainfall. Based on the mechanisms of raising the air, there are three types of rainfall.

Convectional rainfall
Frontal or cyclonic rainfall
Orographic rainfall.

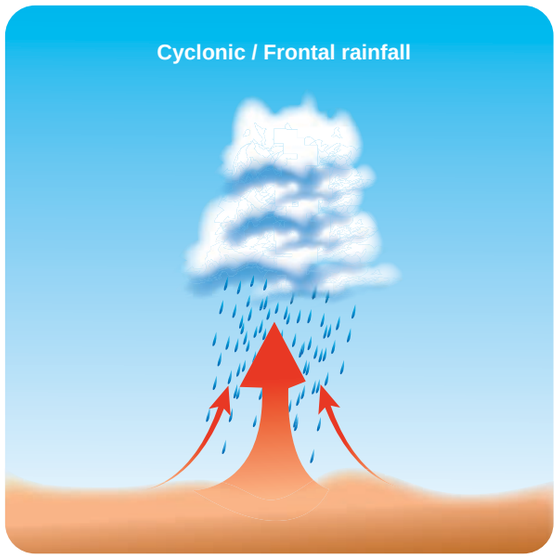
Convectional rainfall

Earth surface is intensely heated through solar radiation during the day time. When the air near the earth surface is heated, it rises and expands. This heating results is the formation of **convectional air currents**. Thus the ascending moist air cools, condenses and results in convectional rainfall. **Convectional rainfall** occurs regularly in the equatorial region in the evenings. It is also experienced in tropical, sub-tropical and temperate regions in the summer months and on warmer days.



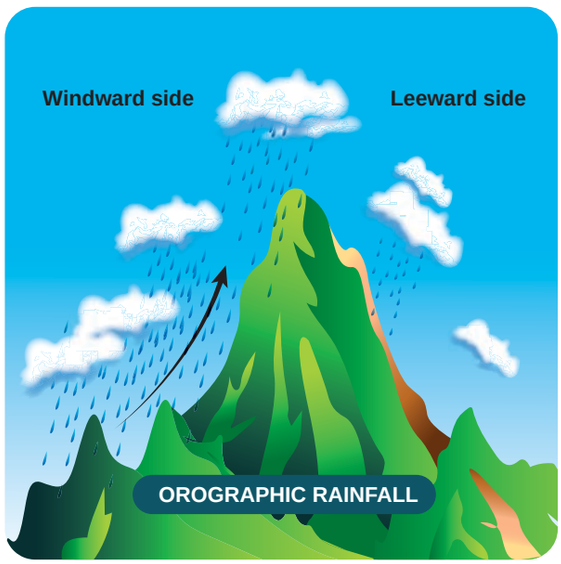
Cyclonic rainfall:

Cyclonic precipitation occurs during cyclones when air masses are made to converge and move upward so that adiabatic cooling occurs. Cyclonic rainfall occurs in tropical as well as temperate regions. When warm and cold air masses converge, condensation and precipitation takes place on the boundary between warm and cold air masses called as Frontal rainfall.



Orographic rainfall

Orographic rainfall, also called relief rainfall, is caused when air is forced to rise against a high mountain. The mountain barriers lying across the direction of air flow, force the moisture laden air rise along the mountain slope. This results in the cooling of the air, which leads to the formation of clouds and rain. This rainfall



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Do you know?

Mawsynram is the wettest place of India as it is located in the windward side of the Purvachal hills, whereas Shillong lies on the leeward side and thus receives less rainfall. This is the same, in the case of Mumbai and Pune.

is called Orographic rainfall. The side of the mountain facing the wind is called the windward side and receives heavy rainfall. It is called the rainfed region. The other side of the mountain that does not face the wind is called the leeward side and receives less rainfall becomes rain shadow region.

6. Humidity:

Humidity is an important aspect of the atmosphere because it affects both weather and climate. The amount of water vapour present in the atmosphere is referred to as humidity. Humidity of the atmosphere is high when it has large quantities of water vapour. The amount of water vapour in the atmosphere is called absolute humidity. The ratio between the amount of water vapour in the atmosphere and the amount of water vapour it can hold is relative humidity Hot air can hold more water vapour then cold air. Relative humidity increases when air gets cold and decreases when air gets heated up.

Absolute humidity is expressed in terms of grams of water vapour present per cubic metre of air.

Relative humidity is expressed in percentage.

Do you know?

When the relative humidity of the air is 100%, the air is said to be saturated. Saturated air will not absorb any more water vapour.

The temperature at which air gets saturated is called dew point.

Humidity of the atmosphere is measured by the wet and dry bulb thermometer also called the Hygrometer

Recap

- Atmosphere is a thin layer of gases that surrounds the earth.
- The major gases in the atmosphere are Nitrogen (78%) and oxygen (21%)
- Five Layers of the atmosphere are Troposphere, stratosphere, mesosphere, thermosphere and exosphere
- Atmosphere gets heated through conduction.
- The Earth has been divided into 3 heat zones (thermal) Torrid, Temperature and Frigid.
- Air exerts Pressure on all objects on the Earth's surface.
- The major pressure belts are equatorial low, sub-tropical high, and sub - polar low and polar high.
- Wind is the horizontal movement of air
- Wind blows from high pressure belt to low pressure belt.
- The 4 types of winds are permanent (planetary), periodic, local and variable winds.
- Cyclone is an area of low pressure surrounded by high pressure

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- Anticyclone is an area of high pressure area surrounded by low pressure.
- Clouds: A visible mass of Condensed water vapour floating in the air
- All precipitation occurs from clouds
- According to height clouds are classified into High clouds Middle clouds and low-clouds
- The main forms of precipitation are drizzle, rain, snow, sleet, hail etc.

A-Z GLOSSARY

Insolation — The amount of solar radiation reaching a given area.

Isotherm — An imaginary line on a map connecting points having the same temperature

Knots — A knot is a measuring unit of wind speed.

Anemometer — A measuring device of wind speed.

Wind vane — Also known as windcock. It is a device to find out the direction of wind.

Normal Lapse rate — decrease of temperature at the rate of 1°C for every 165 m increase in altitude.

Condensation — Process of change of state of water from gaseous to liquid.

Coriolis Force — deflection of winds from their original path due to Earth's rotation.

Doldrums — The equatorial low pressure belt, extending between 5°N and 5°S.

Air current — movement of air when it rises upward or sinks down.

EXERCISE

J1WER6

I. Choose The Best Answers:

1. _____ is the most important gas for the survival of living organisms.
   a. Helium b. carbon-di-oxide
   c. oxygen d. methane
2. The lowest layer of the atmosphere is _____
   a. Troposphere b. Stratosphere
   c. Exosphere d. Mesosphere
3. _____ reflects radio waves.
   a. Exosphere b. Ionosphere
   c. Mesosphere d. Stratosphere
4. The average global surface temperature is _____
   a. 12°c b. 13°c
   c. 14°c d. 15°c
5. Temperature _____ from the equator to pole.
   a. Increases b. no change
   c. decreases d. stable.
6. The process of change of state of water from gaseous to liquid state is called _____
   a. Precipitation b. evaporation
   c. transpiration d. condensation.
7. The _____ is the chief energy source of the Earth.
   a. Sun b. Moon
   c. Stars d. Clouds.
8. The _____ pressure belt extends from 5°N and 5°S latitudes.
   a. Equatorial low
   b. Subtropical high
   c. sub-polar low d. polar high

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9. All types of clouds are found in the _____
   a. Troposphere b. Ionosphere
   c. Mesosphere d. Exosphere

10. _____ clouds are called 'Sheep clouds'
   a. Alto-cumulus b. Alto-Stratus
   c. Nimbo - stratus d. Cirro-stratus.

11. The Monsoons are _____
   a. Prevailing winds
   b. Periodic winds
   c. local winds
   d. none of the above.

12. Dew in the form of ice crystals is called _____
   a. frost b. fog
   c. mist d. sleet.

13. _____ is called the eye of the storm.
   a. Pressure
   b. wind
   c. cyclones
   d. snow.

14. The vertical movement of air is called _____
   a. Wind b. storm
   c. Air current d. drift.

II. Match the following:

1. Meteorology — wind speed
2. Climatology — direction of wind
3. Anemometer — cirrus
4. Wind Vane — study of climate
5. Mare's Tail — study of weather
6. Leeward side — Australia
7. Willy willy — rain shadow region

III. Answer the following Questions Briefly:

1. Define atmosphere
2. Name the different atmospheric layers
3. Mention the factors that affect the climate?
4. What are the units used to measure the temperature?
5. What is insulation?
6. What are isotherms?
7. Write short note on Lapse rate.
8. What are the processes responsible for heating the atmosphere?
9. How is the atmospheric Pressure measured?
10. Polar Easterlies are cold and dry. Why it is so?
11. Mention the Planetary wind system of the earth.
12. Write short note on:
   a. Trade winds.
   b. Roaring Forties
13. How are clouds formed?
14. What are the different types of rainfall?
15. What is Precipitation? What are the different forms of precipitation?
16. Write short notes on:
   a. drizzle b. rain
   c. sleet d. snow
   e. heat
17. How are Cyclones classified?

IV. Distinguish between the following:

1. Weather and climate
2. Insulation and temperature
3. Land breeze and sea breeze
4. Windward side and Leeward side.

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5. Tropical cyclone and Temperate cyclones.

V. Give reason:

1. The equatorial low pressure belt is an area of calm.
2. Cyclones cause huge loss of life and property.
3. Cloudy days are warmer than cloudless days.
4. Fog is dangerous for traffic.
5. Convectional rainfall is also called 4'0 clock rain.
6. Polar Easterlies are cold and dry. Why it is so?

VI. Paragraph Questions:

1. Write a paragraph about the structure of the atmosphere.
2. Explain the different types of Permanent winds.
3. How are clouds classified? Explain them.
4. How are cyclones formed? How are they classified?
6. Explain the different forms of precipitation

VII. Activity:

1. **Preparing chart of** clouds at various atmospheric layers.
2. **Collecting Proverbs** clouds and rain related Proverbs
3. **Poem on** 'clouds', 'rain'
4. **Report writing** observe the clouds for a week. Write your report about the shape and colours ofclouds.
5. **Working models** a) Rain Gauge b) Wind vane
6. **Preparing bar diagram**
   a. Collect the **data of temperature** of Kanyakumari, Delhi, Allahabad, and Itanagar for a day.Also collect the data of **rainfall received** by Jaisalmer (Rajasthan), Mawsynram (Meghalaya), Nagapattinam, Coimbatore for a day.
7. **Become a budding Meterologist:**
   Record the local weather condition of your place for a week.

Meteorologist name:			**Class:**	
	Day	**Date**	**Local weather**	**Draw related image**
Sunday				
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				

INTERNET RESOURCES

1. www.imd.gov.in
2. www.imdpune.gov.in
3. https://www.isro.gov.in
4. https://www.india.gov.in

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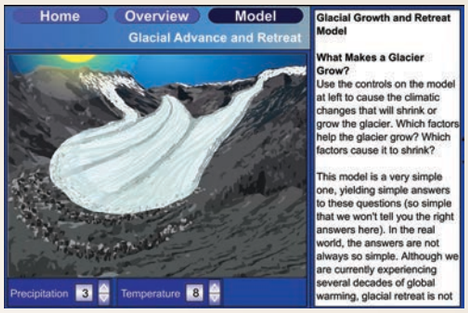
ICT CORNER

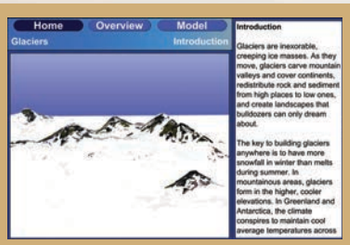
Melting point

Through this activity you will observe the land forms formed by glaciers.



Steps

1. Use the URL to download the '**Glaciers**' flash file.
2. Select the '**Glacier type**' from bottom and change them using arrows to see the different land forms affected by it.
3. Select '**Anatomy of Glaciers**' from top of the page and animate the activity to observe the glacier formation.
4. Select '**Glacier Erosion**' and press '**Move Glacier**' button to observe erosion made by glaciers.



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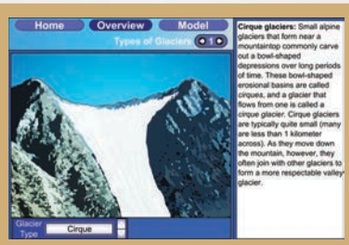

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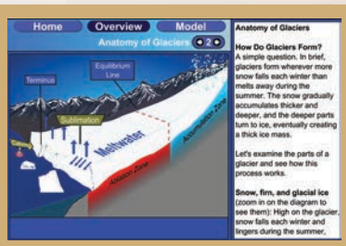

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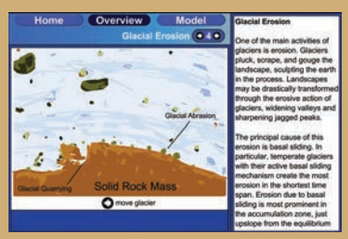

Step 4

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Geography – Class IX
List of Authors and Reviewers

Domain Expert

Dr. R. Bavani.
Associate Professor, HOD, Dept of Geography,
Queen Mary's College, Chennai.

Reviewer

Dr. R. Geetha
Asst. Professor,
Queen Mary's College, Chennai.

Dr. K. Balasubramani
Asst. Professor,
Central University of Tamil Nadu,
Thiruvarur.

Academic Co ordinator

M. Sujatha
Senior Lecturer
DIET, Chennai.

ICT Co ordinator

A.Anu Ranjith,
Computer Teacher,
Kamlavathi HSS (CBSE), Thoothukudi Dist.

Authors

S. Kalpana.
Asst. Professor, Queen Mary's College,
Chennai

S. Mohammad Rabeek
Senior Lecturer
DIET, Vanaramutti, Thoothukudi Dist.

S. Juditha Pandia Chitra
B.T Asst, GHS, Sakkottai
Sivagangai.

T. Vijayalakshmi
B.T.Asst , Lady Sivasamy Ayyar GGHSS,
Chennai.

R.Rajeswari
B.T, Asst, Bharathiyar Vidhya Bhavan HSS,
Thandal, Erode.

G. Theresa Catherine
B.T.Asst., Sri Varadham GGHSS,
Cuddalore.

J. Jeba Punitha
B.T.Asst., MCC Matic Hr.sec.school,
Chetpet, Chennai

Art and Design Team

Chief Co-ordinator and Creative Head

Srinivasan Natarajan

Illustration

K.T.Gandhi Rajan
Tamil Virtual University, Kotturpuram, Chennai
Sakthi

Art Teachers, Government of Tamil Nadu.
Students, Government College of Fine Arts,
Chennai & Kumbakonam.

In-House

Layout & QC

Gopu Rasuvel
Karthik Kalaiarasu
Jerald Wilson

Co-ordination

Ramesh Munisamy

Typist

D. Alphonsa Mary,

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UNIT 1

Forms of Government and Democracy

Learning Objectives

- Know the forms of government
- Understand the meaning of democracy
- Know the merits and demerits of democracy
- Know the challenges to Indian democracy

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Introduction

We are going to learn from this lesson how various forms of government have developed globally. Today, many countries of the world follow different types of governments, but the modern world prefers democracy.

1. Forms of Government

The governance of nations differs significantly based on who has power. There are different forms of government: aristocracy, monarchy, autocracy, oligarchy, theocracy, democracy and republic.

1.1 Aristocracy

A form of government in which power is held by the nobility.

Example: United Kingdom, Spain

1.2 Monarchy

A system of government in which one person reigns supreme, usually a king or queen(constitutional monarchy).

Example: Bhutan, Oman, Qatar

1.3 Autocracy

A system of government by one person with absolute power.

Example: North Korea, Saudi Arabia

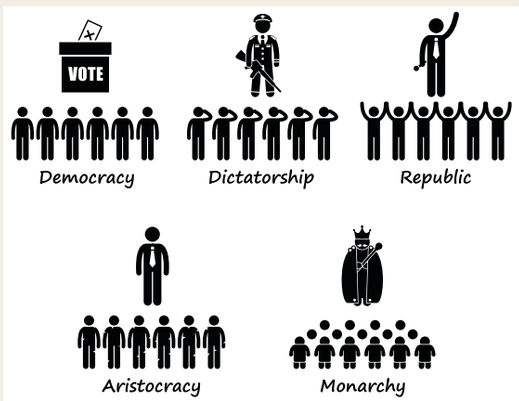
1.4 Oligarchy

A small group of people having control of a country or organisation.

Example: Former Soviet Union, China, Venezuela

1.5 Theocracy

A system of government in which religious doctrines form the basis of government



Forms of Government

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headed by a priest who rules in the name of God or proclaims himself as a God.

Example: Vatican.

1.6 Democracy

A system of government in which eligible members in the population vote to elect their elected representatives, and the party or individual who obtains the majority votes forms the government.

Example: India, USA, France

1.7 Republic

A state in which supreme power is held by the people and their elected representatives and which has an elected or nominated President rather than a monarch.

Example: India, Australia

The term 'republic' was first coined in 500 BCE in Rome. It is derived from *res publica*, a Latin word meaning public matter.

India became a Republic on 26 January 1950. It is governed in accordance with the Constitution adopted on 26 November 1949, which came into force on 26 January 1950.

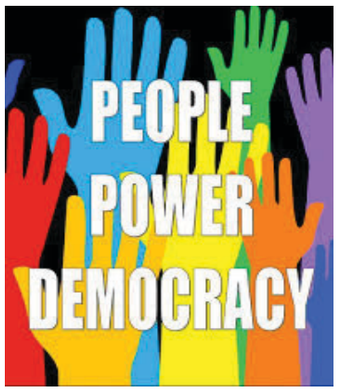
2. What Is Democracy?

- Democracy is a form of government that allows people to choose their rulers.
- Only leaders elected by people should rule the country.
- People have the freedom to express views, freedom to organise and freedom to protest.

The term 'democracy' is derived from two Greek words: *demos* meaning people and *cratia* meaning power. Thus, literally democracy means "the power of the people".

2.1 Meaning of Democracy

Democracy is a system of government in which the supreme power is vested in the people of a country and people elect their representatives either directly or indirectly through fair and free elections, which are usually held periodically.



2.2 Definition

According to Mahatma Gandhi, "True democracy cannot be worked by twenty men sitting at the centre. It has to be worked from below by the people of every village."

Abraham Lincoln, one of the Presidents of USA, defines democracy as a government of the people, by the people and for the people.

Abraham Lincoln

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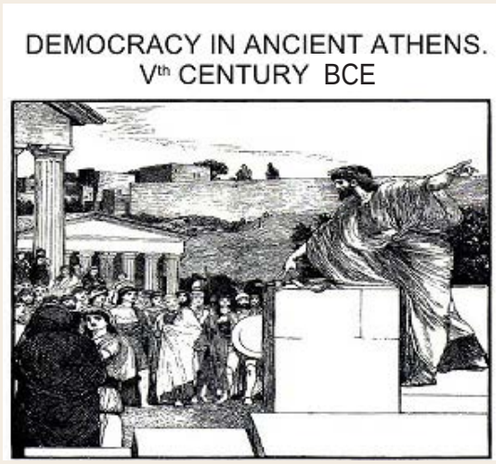
2.3 Salient Features of Democracy

1. Elected representatives of people and final decision-making power to the representatives.
2. Free and fair elections.
3. Universal adult franchise with each vote having equal value.
4. Fundamental rights and protection of individual freedom.

2.4 Evolution of Democracy

Democracy began 2,500 years ago in some of the city-states of ancient Greece. It is important to know that democratic institutions existed in India as early as the Vedic period. Chanakya's *Arthashastra* tells us that in ancient India, an autonomous village community was the basic unit of the local government. In ancient Tamil Nadu, Kudavolai system was a very notable and unique feature of the village administration of the Cholas. The evolution towards a democracy is represented by the following values: freedom, equality, liberty, accountability, transparency and trust.



2.6 Types of Democracy

There are two types of democracies:

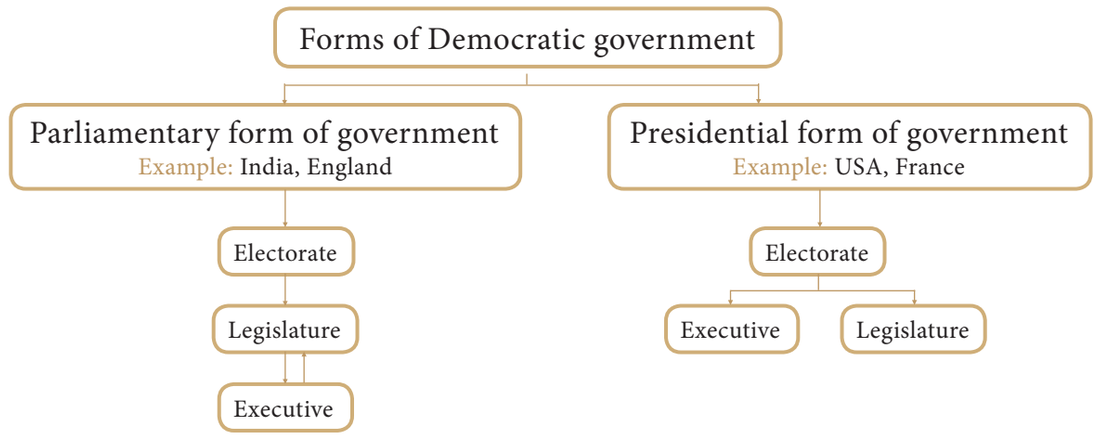
1. Direct democracy
2. Indirect (representative) democracy

The types of democracy refers to the kind of government or social structures which allow people to participate equally.

2.6.1 Direct Democracy

When the people themselves directly express their will on public affairs, the type of government is called pure or direct democracy.

2.5 Forms of Democratic government



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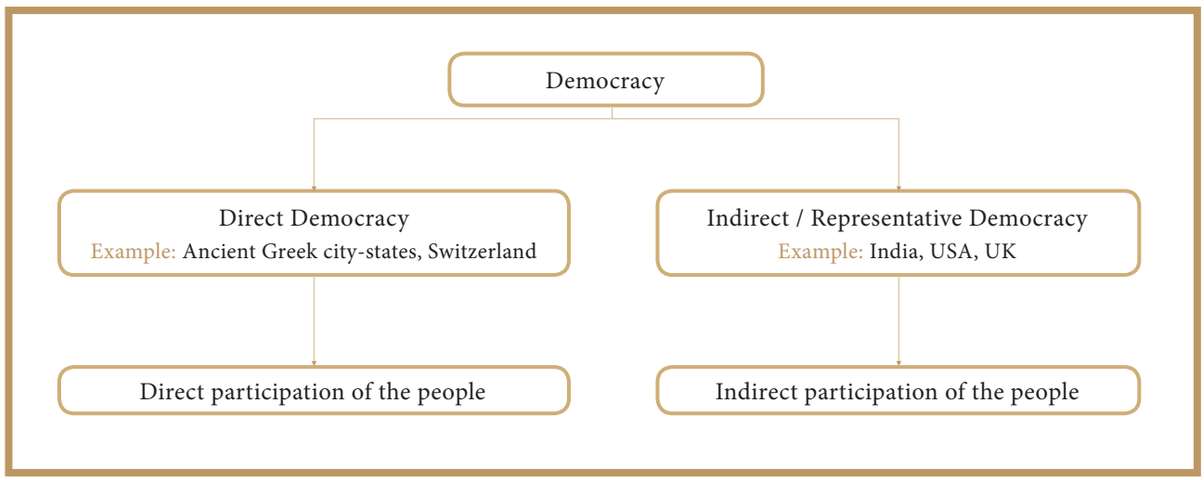

Example: Ancient Greek city-states, Switzerland

2.6.2 Indirect Democracy / Representative Democracy

When the people express their will on public affairs, through their elected representatives, the type of government is called indirect or representative democracy.

Example: The prevailing system of democracy in India, USA and UK

2.7 Democracy in India

India has a parliamentary form of democracy. The Indian Parliament comprises the elected representatives of people and makes the laws for the country. The participation of people in the decision making and the consent of citizens are the two important elements of the parliamentary form of government in India.

Parliament of India

India is the largest democratic country in the world. Democracy in India works on five basic principles. These are sovereign, socialist, secular, democratic, republic.

Every person who is a citizen of India and who is not less than 18 years of age can exercise their right to vote in India, based on universal adult suffrage. There is no discrimination based on a person's caste, creed, religion, region, gender and education when it comes to providing the right to vote.

2.8 Merits and Demerits of Democracy

Merits

1. Responsible and accountable government
2. Equality and fraternity
3. Sense of responsibility among common people
4. Local self-government
5. Development and prosperity for all
6. Popular sovereignty
7. Sense of cooperation and fraternal feeling

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Demerits

1. Indirect or representative nature of democracy
2. Lack of interest in democratic process and hence lower turnout in elections
3. Instability in governance due to fractured mandate
4. Delay in decision-making process.

2.9 Elections in India

India has a quasi-federal government, with elected representatives at the federal, state and local levels. The general elections are conducted by the Election Commission of India. At the national level, the President of India, appoints the Prime Minister, who enjoys majority in the Lok Sabha, the lower house of the Parliament of India.

All members of the Lok Sabha are directly elected through general elections, which take place once in every five years, in normal circumstances. Two Anglo Indian members can be nominated by the President of India to the Lok Sabha.

Members of the Rajya Sabha, the Upper House of the Indian Parliament, are elected by an electoral college consisting of elected members of the legislative assemblies of the states and the Union Territories of India. The President of India nominates 12 members for their contributions to art, literature, science and social services.

DO YOU KNOW?

Two Houses of Parliament	
Lok Sabha / Lower House / House of People	Rajya Sabha / Upper House / Council of States

DO YOU KNOW?

The Parliament House in India was designed by the British architects Edwin Lutyens and Herbert Baker in 1912-13 and construction began in 1921 and ended in 1927

2.10 The First Elections in Democratic India

General elections to the first Lok Sabha since independence Were held in India between 25 October 1951 and 21 February 1952. The Indian National Congress emerged victorious by winning 364 of the 489 seats. Jawaharlal Nehru became the first democratically elected Prime Minister of the country.

Elections in India

1952 – India's First General Elections

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DO YOU KNOW?

British India –General elections, 1920

General elections were held in British India in 1920 to elect members to the Imperial Legislative Council and the Provincial Councils. They were the first elections in the country's history.

2.11 Major challenges to Indian Democracy

Democracy is the dominant form of government in the contemporary world. It has not faced a serious challenge or a rival so far. In the last hundred years, there has been an expansion of democracy all over the world. The various aspects of democracy and its challenges are:

1. Illiteracy
2. Poverty
3. Gender discrimination
4. Regionalism
5. Casteism, communalism and religious fundamentalism
6. Corruption
7. Criminalisation of politics
8. Political violence

2.12 Conditions for the Success of Democracy in India

- Empowerment of the poor and illiterates to enjoy the goodness of democracy.
- Willingness among the elected people not to misuse their powerful position and public wealth.
- Eradication of social evils and dangers from which democracy suffers.
- An impartial and efficient press to form public opinion.
- Presence of strong public opinion.
- Feeling of tolerance and communal harmony among the people.
- Awareness among the people of the fundamental rights that they are entitled to enjoy.
- Conscious check and vigilance on the working of the elected representatives.
- Powerful and responsible opposition.

Though democracy in India has been appreciated worldwide for its working, there is still a lot of scope for improvement. The above-mentioned steps must be taken to ensure smooth functioning of democracy in the country.

Indian democracy can be successful and vibrant only when its citizens imbibe and reflect in their behavior the basic democratic values like equality, freedom, social justice, accountability and respect for all. Their mindset, thinking and behavior are expected to be in tune with the essential conditions of democracy. They have to appreciate the opportunities for their desired roles like participation, making the system accountable, fulfilling obligations, and playing proactive roles to actualize the goals of democracy.

Recap

- Government is a group of people who govern a community or unit.
- Monarchy is a system of government in which one person reigns supreme, usually a king or queen.
- Types of democracy refer to kind of government or social structures which allow people to participate equally, either directly or indirectly.
- When the people themselves directly express their will on public affairs, the type of government is called pure or direct democracy.
- Based on universal adult suffrage, every Indian citizen, above 18 years of age, can exercise the right to vote in India.

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A-Z GLOSSARY

Community	- a group of people living in the same place of having particular characteristics in common.
Representatives	- a person chosen or appointed to act or speak for another or others.
Sovereign	- free from the interference or control of any foreign power.
Socialist	- providing social and economic equality to all citizens.
Secular	- freedom to practice any religion or reject all.
Democratic	- the government is elected by its citizens.
Republic	- the head of the state is elected directly or indirectly.
Government	- the group of people with the authority to govern a country or state; a particular ministry in office.

EXERCISE

J2P2W4

I. Choose the correct answer:

1. A system of government in which one person reigns supreme, usually a king or queen, is called_____
   (a) autocracy
   (b) monarchy
   (c) democracy
   (d) republic
2. A system of government by one person with absolute power.
   (a) Aristocracy
   (b) Theocracy
   (c) Democracy
   (d) Autocracy
3. When a country is governed by a few privileged, the form of government is called
   (a) Oligarchy
   (b) Parliamentary
   (c) Democracy
   (d) Republic
4. Former Soviet Union is an example for _____.
   (a) aristocracy
   (b) theocracy
   (c) oligarchy
   (d) republic
5. Select the odd one
   (a) India
   (b) USA
   (c) France
   (d) Vatican
6. Abraham Lincoln was the President of the _____.
   (a) USA
   (b) UK
   (c) USSR
   (d) India

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7. Kudavolai system was followed by
(a) Cheras
(b) Pandyas
(c) Cholas
(d) Kalabhras

8. Direct Democracy in olden times existed
(a) In the republics of ancient India
(b) Among the USA
(c) In the city-state of ancient Athens
(d) Among the UK

9. In which country has democracy originated?
(a) India
(b) Switzerland
(c) USA
(d) Athens

10. From which language was the term "Democracy" derived?
(a) Greek
(b) Latin
(c) Persian
(d) Arabic

11. In democracy the final authority rests with
(a) The Parliament
(b) The People
(c) The council of Ministers
(d) The President

12. Which one of the country has Presidential form of government
(a) India
(b) Britain
(c) Canada
(d) USA

13. The largest democratic country in the world is
(a) Canada
(b) India
(c) USA
(d) China

14. Assertion (A) : Direct democracy is practised in Switzerland.
Reason(R):Peopledirectlyparticipates in decision making.
(a) Both (A) and (R) are true and (R) explains (A)
(b) Both (A) and (R) are true and (R) does not explain (A)
(c) (A) is correct and (R) is false
(d) (A) is false and (R) is true

15. Assertion (A) : India has parliamentary form of democracy.
Reason (R) : Indian parliament comprises two houses.
(a) Both (A) and (R) are true and (R) explains (A)
(b) Both (A) and (R) are true and (R) does not explain (A)
(c) (A) is correct and (R) is false
(d) (A) is false and (R) is true

16. The meaning of Franchise is
(a) Right to elect
(b) Right to vote for the poor
(c) Right to vote
(d) Right to vote for the rich

17. The grant of universal franchise creates
(a) Social equality
(b) Economic equality
(c) Political equality
(d) Legal equality

18. Prime Minister of India is appointed by
(a) Lok Sabha
(b) Rajya Sabha
(c) Speaker
(d) President

19. The President of India can nominate
(a) 12 members to Lok Sabha
(b) 2 members of Rajya Sabha
(c) 12 members to Rajya Sabha
(d) 14 members of Rajya Sabha

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20. The First general elections after independence in India were held in
(a) 1948
(b) 1952
(c) 1957
(d) 1947

II. Fill in the blanks:

1. The Constitution of India was finally adopted on _____
2. The two types of democracy are _____ and _____
3. An example for direct democracy is _____
4. India has a _____form of democracy.
5. _____ was the first Prime Minister of independent India.
6. The first general elections were held in British India in the year _____
7. The Parliament House in India was designed by _____ and _____

III. Match the following:

1.	Autocracy	-	18
2.	Right to vote	-	Arthashastra
3.	Chanakya	-	Vatican
4.	Theocracy	-	North Korea

IV. Give short answers:

1. Give Abraham Lincoln's definition for democracy.
2. Mention the forms of democracy.
3. Distinguish between direct and indirect democracy.

V. Answer in detail:

1. What are the challenges to democracy? explain.
2. Explain the conditions necessary for the success of democracy in India.
3. What is your opinion about democracy in India?

VI. Project and Activity

1. Discuss in the class what is universal adult franchise? Why is it important?
2. "Democracy is the power of majority which respects minority." Discuss.
3. Conduct a mock election in your class.
4. A group discussion on the merits and demerits of democracy of India in the classroom.

VII. HOTS

1. Will you have the right to equality under dictatorship? What would be the attitude regarding public opinion in such a country?
2. How does democracy lead to a peaceful and a harmonious life among the citizens? Explain.

VIII. Life Skills

Select a group of countries. Research each country and tell what type of government it has: Aristocracy, Monarchy, Autocracy, Oligarchy, Theocracy, Democracy, Republic. Then, provide characteristics of this country that helped you determine the type of government.

Country name	Type of government	Characteristics of the country's government

INTERNET RESOURCES

https://en.wikipedia.org/wiki/Government

http://eci.nic.in/eci/eci.html (The Election Commission of India)

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ICT CORNER

Child Help Line

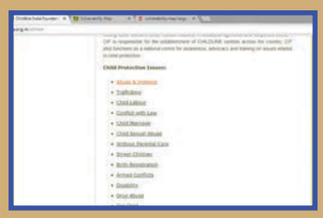
Explore child helpline
1098

Steps:

- Type the URL link given below in the browser OR scan the QR code. You can also download the “child line” from the given URL.
- Under report a child click a child in distress.
- On the menu bar select vulnerability map.
- When you click on download section you can get and download songs and videos about helpline.

Step1

Step2



Step3

Step4

Child help line

http://www.childlineindia.org.in/1098/b1a-telehelpline.htm

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UNIT 2

Election, Political Parties and Pressure Groups

Learning Objectives

- Know about the electoral system in India.
- Know the different types of elections in India.
- Understands the meaning of political party.
- Know the functions of state party and national party.
- Understand the pressure groups in India.

J2XXXR

Introduction

An election is a formal decision-making process by which a people chooses an individual to hold public office by voting.

1 Electoral System in India

The electoral system in India has been adapted from the system followed in the United Kingdom. India is a socialist, secular, democratic republic and the largest democracy in the world. The modern Indian nation state came into existence on 15August1947.

Articles 324 to 329 in part XV of the Constitution make the following provisions with regard to the electoral system in our country.

(i) Article 324 of the Indian Constitution provides for an independent Election Commission in order to ensure free and fair elections in the country. At present, the commission consists of a Chief Election Commissioner and two Election Commissioners.

(ii) The Parliament may make provision with respect to all matters relating to elections to the Parliament including the preparation of electoral rolls, the delimitation of constituencies and all other matters necessary for securing their due constitution.

(iii) The state legislatures can also make provisions with respect to all matters relating to elections to the state legislatures including the preparation of electoral rolls and all other matters necessary for securing their due constitution.

DO YOU KNOW?

Kudavolai was the system of voting followed during the Chola period in Tamil Nadu

Kudavolai

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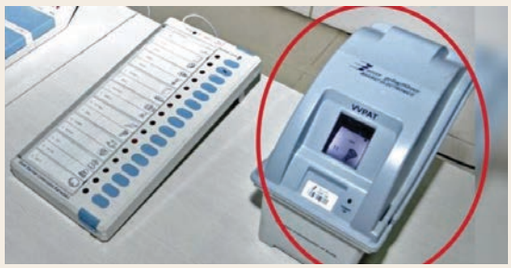
DO YOU KNOW?

We celebrate National Voters Day on 25th January in India.

1.1 Election Process

At the national level, the head of government, the Prime Minister, is elected by members of the Lok Sabha, the lower house of the Parliament in India. In representative democracy like ours, elections are extremely important. Voting in elections are the best way to make your 'voice' heard.



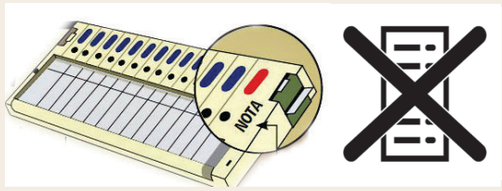
Voters Verified Paper Audit Trail (VVPAT)

DO YOU KNOW?

Voters Verified Paper Audit Trail (VVPAT) is the way forward to enhance credibility and transparency of the election process. This system was first introduced in the 2014 General Election.

1.2 Introduction of the NOTA Option

If the people in a democratic country are not willing to elect any candidate, they can vote for the option called NOTA (None Of The Above). Rule 49-O in the Conduct of Elections Rules, 1961, of India describes this procedure.



Symbol used with NOTA option on electronic voting machines in India

DO YOU KNOW?

NOTA was first introduced in the General Elections held in 2014. India is the 14th country in the world to introduce NOTA.

1.3 Types of Elections in India

Elections are classified into two types: direct and indirect elections.

1.3.1 Direct Elections

People directly vote for the candidates in the fray and elect their representatives. The following are examples of direct elections in which people over the age of 18 years participate in the electoral process by casting their votes.

(i) Lok Sabha elections, in which the Members of Parliament are elected.

(ii) Elections to the state Legislative Assemblies, in which the Members of Legislative Assemblies are elected.

(iii) Elections to the local governing bodies, in which members of the local governing bodies like the municipal corporation or the panchayat are elected.

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1.3.1.1 Merits

(i) As the voters elect their representatives directly, direct elections are considered to be a more democratic method of election.

(ii) It educates people regarding the government activities and helps in choosing the appropriate candidates. Also, it encourages people to play an active role in politics.

(iii) It empowers people and makes the rulers accountable for their actions.

1.3.1.2 Demerits

(i) Direct elections are very expensive.

(ii) Illiterate voters sometimes get misguided by false propaganda and sometimes campaigning based on caste, religious and various other sectarian consideration spose serious challenges.

(iii) Since conducting direct elections is a massive exercise, ensuring free and fair elections at every polling station is a major challenge to the Election Commission.

(iv) There are instances of some political candidates influencing the voters through payments in the form of cash, goods or services.

(v) Election campaigns sometimes results in violence, tension, law and order problems and affects the day-to-day life of people.

1.3.2 Indirect Elections

Voters elect their representatives, who, in turn, elect their representatives to formal offices like the President's office.

1.3.2.1 Merits

(i) Indirect elections are less expensive.

(ii) It is more suited to elections in large countries.

1.3.2.2 Demerits

(i) If the number of voters is very small, there exists the possibility of corruption, bribery, horse trading and other unfair activities.

(ii) It is less democratic because people do not have a direct opportunity to elect, but they instead do it through their representatives. So, this may not reflect the true will of the people.

How is the President of India elected?

The President of India is elected by the members of an electoral college consisting of

1. The elected members of both Houses of Parliament
2. The elected members of the Legislative Assemblies of all the states and Union territories in India

NOTE: The members nominated to either House of Parliament or the Legislative Assemblies of states are not eligible to be included in the electoral college.

2. Political Parties

Political parties are an essential part of democracy. Parties are the link between government and the people.

2.1 Meaning of Political Party

A political party is an organisation formed by a group of people with a certain ideology and agenda to contest elections and hold power in the government. A political party has three

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components: a leader, active members and the followers.

2.2 Types of a Party System

There are three types of party system in the world namely.

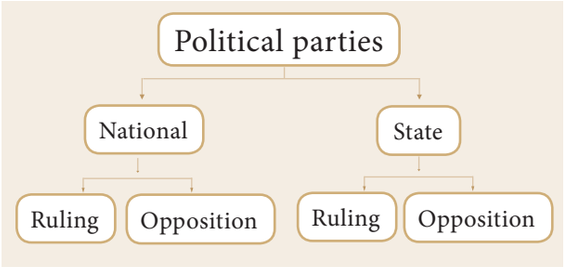
i. Single-party system in which one ruling party exists and no opposition is permitted. China, Cuba, the former USSR (Union of Soviet Socialist Republics) are the examples for the single-party system.

ii. Two-party system in which only two major parties exist, for example, USA, UK.

iii. Multi-party system in which there are more than two political parties, for example, India, Sri Lanka, France and Italy.

2.3 Types of Political Parties

Political parties in India are classified according to their area of influence into two main types:(1) national and (2) state parties.



2.3.1 National Parties

A party which is recognised as a state party in at least four states is recognised as a national party. Every party in the country has to register with the Election Commission while the Commission treats all the parties equally. It offers some special facilities to state and national parties. These parties are given a unique symbol. Only the official candidate of the party can use that election symbol. In 2017, there were seven recognised national parties.

2.3.2 State Parties

Other than the seven national parties, most of the major parties of the country are classified by the Election Commission as 'state parties'. These are commonly referred to as regional parties. A party is recognised as a state party by the Election Commission of India based on certain percentage of votes secured or a certain number of seats won in the Assembly or Lok Sabha elections.

2.3.3 Recognition to the Parties

For getting recognition as 'national party', a party has to fulfill any one of the following criteria:

i. At least 6% votes in at least four states and members to the Lok Sabha.

ii. In the election of Lok Sabha, at least 2% members from at least three states are elected to Lok Sabha.

iii. Recognition as a state party at least four states.

2.3.4 Functions of Political Parties

- Parties contest elections. In most democracies, elections are fought mainly among the candidates put up by political parties.
- Parties put forward their policies and programmes before the electorate to consider and choose.
- Parties play a decisive role in making laws for a country. Formally, laws are debated and passed in the legislature.
- Parties form and run the governments.
- Those parties that lose in the elections play the role of the Opposition to the party or a group of coalition parties in power, by voicing different views

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and criticising the government for its failures or wrong policies.

- Parties shape public opinion. They raise and highlight issues of importance.
- Parties function as the useful link between people and the government machinery.

2.4 Role of Opposition Parties in a Democracy

In a democracy, there may be a two-party system like in the USA or a multi-party system like in India and France. The ruling party may have received the mandate of the majority people and the Opposition party represented the remaining people. The Leader of the Opposition party occupied a prominent place in all democratic forms of the government. He enjoys the rank of a Cabinet Minister. He opposes the wrong policies of the ruling party, which affects the general public. As the Chairman of the Public Accounts Committee questions the functioning of the government departments and examines the public money used for the well-being of the people. Similarly, he plays an important role to select the Chairman and members of the Central Vigilance Commission, Chairperson and members of the Information Commission. The Opposition Parties reflect genuine demands and concern of the people to play a constructive role in a democracy.

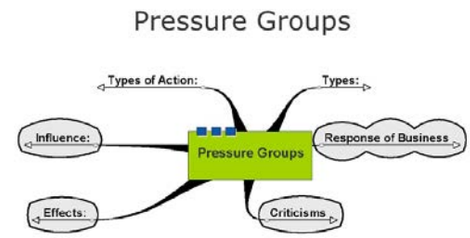
3. Pressure Groups

The term 'pressure group' originated in the USA. A pressure group is a group of people who are organised actively for promoting and defending their common interest. It is so called as it attempts to bring a change in the public policy by exerting pressure on the government.

The pressure groups are also called 'interest groups' or vested groups. They are different from the political parties in that they neither contest elections nor try to capture political power.

3.1 Pressure Groups in India

A large number of pressure groups exist in India. But, they are not developed to the same extent as in the USA or the Western countries like Britain, France, Germany and so on.



The pressure groups in India can be broadly classified into the following categories:

J3GQ22

1. Business groups
2. Trade unions
3. Agrarian groups
4. Professional associations
5. Student organisations
6. Religious organisations
7. Tribal organisations
8. Linguistic groups
9. Ideology-based groups
10. Environmental protection groups

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DO YOU KNOW?

Examples for Pressure Groups

1. Federation of Indian Chamber of Commerce and Industry (FICCI)
2. All India Trade Union Congress (AITUC)
3. All India Kisan Sabha
4. Indian Medical Association (IMA)
5. All India Students Federation (AISF)
6. All India Sikh Students Federation
7. Young Badaga Association
8. Tamil Sangam
9. Tamil Nadu Vivasayigal Sangam
10. Narmada Bachao Andolan

3.1.1 Functions of Pressure Groups in India

Pressure groups are the interest groups that work to secure certain interest by influencing the public policy. They are non-aligned with any political party and work as an indirect yet powerful group to influence the policy decisions. Pressure groups carry out a range of functions including representation, political participation, education, policy formulation and policy implementation.

3.1.1.1 Political Participation

Pressure groups can be called the informal face of politics. They exert influence precisely by mobilising popular support through activities such as petitions, marches, demonstrations and other forms of political protest. Such forms of political participation have been particularly attractive to young people.

3.1.1.2 Education

Many pressure groups devote significant resources by carrying out research, maintaining websites, commenting on government policy and using high-profile academics, scientists and even celebrities to get their views across, with an emphasis to cultivate expert authority.

3.1.1.3 Policy Formulation

Though the pressure groups themselves are not policy-makers, yet it does not prevent many of them from participating in the policy-making process. Many pressure groups are vital sources of information and render advice to the government and therefore they are regularly consulted in the process of policy formulation.

4 Mobilisation and People's Participation

4.1 Mobilisation

Mobilising people towards socially productive activities that lead to the overall betterment of people's lives is essential. Sometimes earthquakes, tsunamis, floods and other such natural disasters on a massive scale occur and people's immediate mobilisation for evacuation and emergency relief becomes most essential.

4.2 Democratic Participation

Democracy can succeed only when smaller local groups and, in fact, every citizen can take action that supports the tax and revenue collection systems, observance of national norms in environmental protection, cleanliness, health and hygiene, sanitary drives and immunisation programmes like pulse polio.

However, we must keep ion mind that there is no better form of government than Democratic government. To create a better society and nation, the people of India along with the union and state governments should come together to fight against the miseries of human life.

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Recap

- The Prime Minister is elected by members of the Lok Sabha.
- There are two types of elections: direct and indirect elections.
- A political party has three components: a leader, active members and the followers.
- Political parties in India are classified into two types: (1) National Parties, (2)State Parties.
- In 2017, there were seven recognised national parties.
- The term 'pressure group' originated in the USA.
- A large number of pressure groups exist in India.

GLOSSARY

1. Legislature – the legislative body of a country or state.
2. Constituency – a group of votes in a specified area who elect a representative to a legislative body.
3. NOTA– the people in a democratic country are not willing to elect any candidate; they can vote for the option called NOTA (None Of The Above).
4. Pressure groups – a group of people who are organised actively for promoting and defending their common interest.

EXERCISE

J3QL3P

I. Choose the correct answer:

1. India has adapted the electoral system followed in the
   (a) USA
   (b) United Kingdom
   (c) Canada
   (d) Russia
2. The Election Commission of India is a / an
   (a) Independent body
   (b) Statutory body
   (c) Private body
   (d) Public corporation
3. Which Article of the Constitution provides for an Election Commission?
   (a) Article 280
   (b) Article 315
   (c) Article 324
   (d) Article 325
4. Which part of the constitution of India says about the election commission?
   (a) Part III
   (b) Part XV
   (c) Part XX
   (d) Part XXII
5. Who accords recognition to various political parties as national or regional parties?
   (a) The President
   (b) The Election Commission
   (c) The Parliament
   (d) The President in consultation with the Election Commission

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6. Assertion (A) : Indian Constitution provides for an independent Election Commission

   Reason (R): To ensure free and fair elections in the country.

   (a) Both (A) and (R) are true and (R) explains (A)

   (b) Both (A) and (R) are true and (R) does not explain (A)

   (c) (A) is correct and (R) is false

   (d) (A) is false and (R) is true

7. NOTA was introduced in the year

   (a) 2012 (b)2013

   (c) 2014 (d)2015

8. The term pressure groups originated in _____.

   (a) USA (b) UK

   (c) USSR (d) India

9. Assertion (A): A large number of pressure groups exist in India.

   Reason (R): Pressure Groups are not developed in India to the same extent as in the USA

   (a) Both (A) and (R) are true and (R) explains (A)

   (b) Both (A) and (R) are true and (R) does not explain (A)

   (c) (A) is correct and (R) is false

   (d) (A) is false and (R) is true

II. Fill in the blanks:

1. The Election Commission of India is a body of _____members.
2. National Voters day has been celebrated on_____.
3. In India _____ party system is followed.
4. In 2017, there were _____ recognised national parties.
5. Narmada Bachao Andolan is a _____.

III. Match the following:

1. National party	-	a. Trade unions
2. Single-party system	-	b. USA
3. Two-party system	-	c. China
4. Pressure groups	-	d. Seven

IV. Give short answers:

1. Explain the electoral system in India.
2. Give the meaning of a political party.
3. Distinguish between two-party system and the multi-party system.
4. What is a pressure group?

V. Answer in detail:

1. Discuss merits and demerits of direct elections?
2. What are the functions of political parties?
3. What are the function of Pressure groups in India?

VI. Project and Activity

1. Compare the policies, programmes and achievements of a national party and a state party.

VII. HOTS

1. "Elections are considered essential for any representative democracy". Why?
2. What is the principle of universal adult franchise? What is its importance?
3. Discuss merits and demerits of democracy.
4. Discuss the multi-party system.

VIII. Life Skill

1. Conduct a mock poll in your classroom.

INTERNET RESOURCES

eci.nic.in (The Election Commission of India)

https://en.wikipedia.org/wiki/List_of_political_parties_in_India

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CIVICS – Class IX
List of Authors and Reviewers

Domain Experts

Dr. D. Devanathan
Associate professor and Head
Dept. of Political Sciences and Public administration
Annamalai University, Chidambaram

Reviewer

Dr. K. Kottai Rajan
Asst. Professor
Dept. of Political Science
Periyar Govt. Arts College, Cuddalore

Academic Co-ordinator

P. Suresh
P.G.Assistant, G.G.H.S.School,
Attur, Salem.
ICT Coordinator

M. JanakiRaman
B.T.Asst (English)
PUMS, Mattayampatti,
Tharamangalam (Block), Salem Dt.

Authors

D. Suganthi
B.T. Assistant
Govt Kallar High School, Annanji, Theni Dt.

S. Krishnaveni
B.T. Assistant, Kamlavathi Hr.Sec.School,
Sahupuram, Thoothukudi Dt.

Rajalakshmi Parthasarathy
B.T. Assistant, Sitadevi Garodia Hindu Vidyalaya Mat. Hr. Sec. School
East Tambaram, Chennai.

Art and Design Team

Chief Co-ordinator and Creative Head

Srinivasan Natarajan

Illustration

K.T.Gandhi Rajan
Tamil Virtual University, Kotturpuram, Chennai
Sakthi

Art Teachers, Government of Tamil Nadu.
Students, Government College of Fine Arts,
Chennai & Kumbakonam.

In-House

Layout & QC

Gopu Rasuvel
Karthik Kalaiarasu
Jerald Wilson

Co-ordination

Ramesh Munisamy

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STANDARD NINE

ECONOMICS

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UNIT 1

Understanding Development: Perspectives, Measurement and Sustainability

Learning Objectives

- To know the meaning of development from different perspectives
- To know the indicators of economic development
- Understand the meaning of economic development
- To know the policies for sustainable development

J3ZH5C

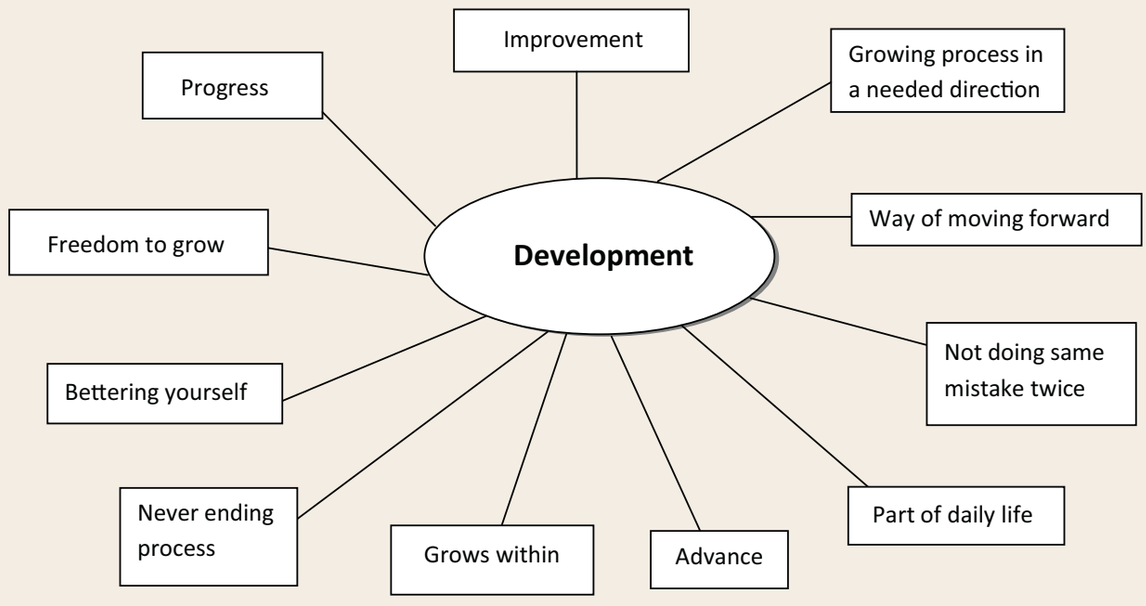
Introduction

The word 'development' is used widely. It refers to the progress of a particular field or a particular person. Similarly, the economic progress of a country is known as 'economic development'. However, the interpretation of the concept development keeps on changing from time to time, from person to person and its meaning gets extended further.

1 Different Perspectives About Development

Every human being has an ambition or desire of his or her own to achieve progress in life. Similarly, we have ideas about how a country should progress. If our thinking turns towards progress and about the ways to achieve the many goals for progress, it leads to development.

Let us try to imagine what development means to different people.



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From the above diagram, you will notice that other than income, people seek freedom to grow on their own. Thus, development refers to the improvement in quality of life such as higher income, better education, better health and nutrition, less poverty and more equal opportunity.

The term 'economic development' refers to the overall growth of all sectors of the economy by adoption of new technologies. Economic development improves the living standards of the people as well as the status of the country.

2 Indicators of Economic Development

The major indicators to measure the level of economic development are Net National Product (NNP), Per Capita Income (PCI), Purchasing Power Parity (PPP) and Human Development Index (HDI).

DO YOU KNOW?

Final value of total goods and services produced with in the geographic boundaries of a country during a specified period of time, normaly a year is known as Gross Domestic Product (GDP).

2.1 Net National Product

The Net National Product (NNP) is considered as a true measure of national output. It is also known as national income. A rise in per capita income means an increase in aggregate real output. Hence, this is a better indicator than national income for measuring development.

DO YOU KNOW?

Afghanistan Bangladesh Bhutan India

Maldives Nepal Pakistan Sri Lanka

G8 Countries	GDP per capita (Value in US dollars)	SAARC Countries	GDP per capita (Value in US dollars)
UK	40,03,000	Afghanistan	610.24
Russia	10,63,000	Bangladesh	1,66,000
Canada	47,66,000	Bhutan	3,22,000
France	42,42,000	India	1,99,000
USA	61,69,000	Maldives	132,000
Italy	33,73,000	Nepal	882.93
Japan	40,06,000	Pakistan	NA
Germany	47,54,000	Sri Lanka	4,05,000

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DO YOU KNOW?

BRICS Countries	GDP per capita (Value in US dollars)
Brazil	10,51,000
Russia	10,63,000
India	1,99,000
China	9,38,000
South Africa	6,29,000

Source: www.imf.org

For measuring a country's development, its income is considered to be one of the most important factors. Countries with higher income are considered to be more developed than those with lesser income. So, income itself is considered to be one of the indicators of economic development.

2.2 Per Capita Income

However, for comparing the development of various countries, total income is not an useful measure. Since countries have different populations, comparing total income will not be suggestive of what an average person is likely to earn. Are people in one country better off than others in a different country? The average income is calculated by dividing the country's total income by its total population. The average income is also called per capita income. Calculations on the per capita income of all countries are calculated only in the US dollar in order to compare International level.

DO YOU KNOW?

Per Capita Income

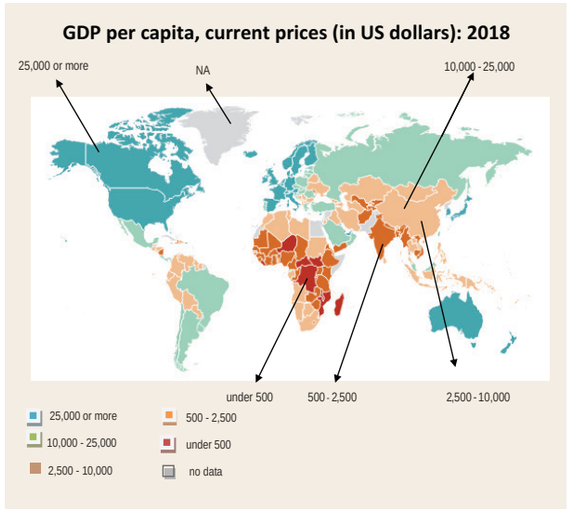
According to the World Bank report, new income measurements of countries are classified as below (2017–18)

S. No.	Types of Countries	Per Capita Income (US Dollar)
1	Low Income	< 1005
2	Lower Middle Income	1006–3955
3	Upper Middle Income	3956–12,235
4	High Income	> 12,235

Source: www.worldbank.org

2.3 Purchasing Power Parity

Purchasing power parity is defined as the number of units of a country's currency required to buy the same amount of goods



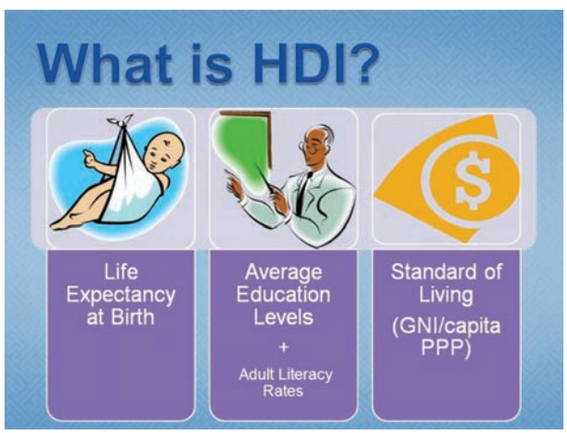
and services in the domestic market as one dollar would buy in the US.

The technique of purchasing power parity allows us to estimate what exchange between two currencies is needed to express the accurate purchasing power of the two currencies in the respective countries. Recently, India became the third largest economy in terms of PPP. China became the largest defeating the US to the second position.

2.4 Human Development

Human resource is necessary for the progress of any country. The term 'human resources' refers to the collective abilities of people, which can be utilised in the production sector.

Human resource development means the development of a person's physical and mental abilities through education, health care and training. Therefore, investment in education and health of people can result in a high rate of returns in the future for a country. For example, if a child is invested with good education and health, he or she may turn to be very productive in future in the form of higher earnings and greater contribution to the society. Human Development Index (HDI) Which indicates



DO YOU KNOW?

The Ministry of Human Resource Development is responsible for the development of human resources in India. Its headquarters is situated at Shastri Bhavan in New Delhi.

all round development of the people in the society.

In the past, economists believed that the rate of economic growth of nations could be increased only by increasing investment in physical capital. But they have realised over time that investment

DO YOU KNOW?

Human Development Report of the world prepared and released by UNDP

Human Development Index

S.No.	Country	HDI in 2010	HDI in 2015
1	India	0.580	0.624
2	Russia	0.785	0.804
3	China	0.700	0.738
4	Pakistan	0.525	0.550
5	Nepal	0.529	0.558
6	Bangladesh	0.545	0.579
7	South Africa	0.638	0.666
8	Sri Lanka	0.746	0.766

Source: hdr.undp.org/en/composite/trends

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S. No	Parameter	States						
		Andhra Pradesh	Karnataka	Kerala	Gujarat	Uttar Pradesh	Tamil Nadu	India
1	Literacy Rate % (2011)	67.02	75.36	94	78.03	69.72	**80.09**	**74.04**
2	Sex Ratio (Females per 1000 Males) (2011)	993	973	1084	919	912	**996**	**943**
3	Enrolment in Higher Education% (2015–16)	30.8	26.1	30.8	20.7	24.5	**44.3**	**24.5**

Source: Niti Aayog

in human capital is as important as investment in physical capital.

3 Sustainability of Development

Sustainable economic development is taken to mean development without damaging the environment and not compromising with the needs of the future generation.

The consequences of environmental degradation do not respect national or state boundaries. Sustainability of development is comparatively a new area of knowledge in which scientists, economists, philosophers and other social scientists are working together.

Natural resources can be divided into renewable resources and non-renewable resources.

Groundwater is an example of a renewable resource. The question arises as to how sustainable development is possible if the resources are over-used rather than getting replenished. Non-renewable resources get exhausted after certain number of years of extracting and using them and they cannot be replenished.

J5G5RB

DO YOU KNOW?

Literacy rate of Tamil Nadu is the second highest among the southern states. Tamil Nadu's literacy rate is higher than the national average.

The enrolment for higher education in Tamil Nadu is the highest in India.

"We have not inherited the world from our forefathers. We have borrowed it from our children."

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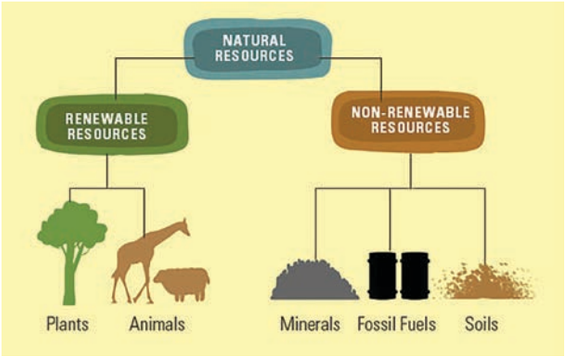

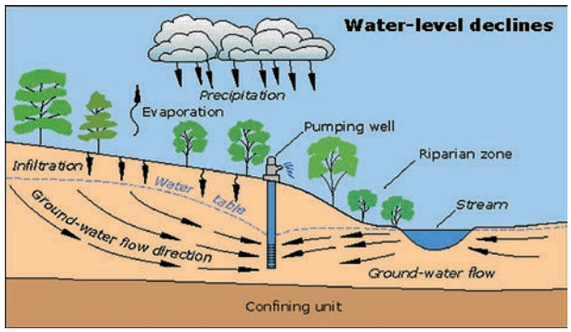

Renewable resources	Non-renewable resources
Renewable resources are pollution free and environment friendly. These resources take a short time for renewal. Example: Solar energy, wind energy, water, wood, paper.	Non-renewable resources pollute and damage the environment. Million of years are needed for the formation of these resources. Example: Metals, glass, fossil fuels (coal, petroleum, natural gas, diesel)

To achieve real sustainability, we need to balance economic, social and environmental sustainability in equal harmony.

In general, the question of development or progress is continuous. At all times, as a member of society and as individuals, we need to ask where we want to go, what we wish to become and what our goals are.

4 Policies for Sustainable Development

Use of Non-conventional Sources of Energy

India depends on thermal and hydro power plants to meet its power needs. Both these sources have an adverse environmental impact. Thermal power plants emit large quantities of carbon dioxide, which pollute the environment.

Solar Power in India

Solar power is the conversion of energy from sunlight into electricity either directly using photovoltaic cells or indirectly using concentrated solar power.

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Solar panels absorb the sunlight as a source of energy to generate electricity. A solar electric system can reliably produce electricity for our home and offices. These distributed solar systems are often installed by home and business owners to reduce their electricity costs. Solar power in India is a fast-developing industry.

Tamil Nadu is the state with highest installed solar capacity in India. Tamil Nadu is one of the leading solar power producing states in India. As on 31 July 2017, the total installed capacity in Tamil Nadu is 1,697 MW.

J5Q1SY

5 Environmental Policies in India

Environmental policies in India have been evolved considerably over the past three decades. These policies have covered a wide range of issues such as air, water pollution, waste management and biodiversity conservation.

India faces challenges in economic development, which has to be achieved with limited resources, minimum externalities and in the presence of an uncertain climate. One of the approaches to overcome this challenge is through the path of sustainable development.

The Supreme Court of India has interpreted and introduced new changes in environmental protection through a series of directions and judgements.

List of Environmental Acts in India

S. No	Act	Action
1	National Green Tribunal Act, 2010	Environmental protection and conservation of forests and other natural resources
2	Biological Diversity Act, 2002	To provide for conservation of biological diversity
3	The Environment (Protection) Act, 1986	Providing for the protection and improvement of the environment.
4	Forest (Conservation) Act, 1980	Check deforestation and encourage afforestation of non-forest areas.
5	Water (Prevention and control of pollution) Act, 1974	Provides maintenance and restoration and quality of all types of surface and groundwater.
6	Wildlife Protection Act, 1972	Providing protection to wild animals and birds.

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The Growth Story of Tamil Nadu

Tamil Nadu is one of the states that achieving rapid progress over a relatively short period, though it started from appalling levels of poverty, deprivation and inequality.

It is during that period, Tamil Nadu is much to the consternation of many economists, initiated bold social programmes such as universal midday meals in primary schools and started putting in place an extensive social infrastructure – schools, health centres, roads, public transport, water supply, electricity connections, and much more. Today, Tamil Nadu has some of the best public services among all Indian states, and many of them are accessible to all on a non-discriminatory basis.

First, active social policies constitute an important aspect of this shared experience. This is particularly striking in the vigour of public education, but it also extends to other domains, such as health care, social security and public amenities.

Second, these states have typically followed universalistic principles in the provision of essential public services. This is especially noticeable in the case of Tamil Nadu.

Third, these efforts have been greatly facilitated by a functioning and comparatively efficient administration. The governments involved have delivered their services in traditional lines and these 'old fashioned' public institutions-functioning schools, health centres, government offices, Gram Panchayat and co-operatives have left much room for private initiatives at a later stage of development.

Fourth, dealing with social inequality has also been an important part of these shared experiences. In each case, the historical burden of social inequality has been significantly reduced in one way or another. In Kerala, Tamil Nadu and Himachal Pradesh, principles of equal citizenship and universal entitlements were forged through sustained social reform movements as well as fierce struggles for equality on the part of under-privileged groups-especially Dalits,.

Fifth, these experiences of rapid social progress are not just a reflection of constructive state policies but also of people's active involvement in democratic politics. The social movements that fought traditional inequalities are part of this larger pattern.

Last but not least, there is no evidence that the cultivation of human capability has been at the cost of conventional economic success, such as fast economic growth. Tamil Nadu have some of the highest per capita incomes and lowest poverty rates among all Indian states. Economic growth, in turn, has enabled these states to sustain and consolidate active social policies. This is an important example of the complementarity between economic growth and public support.

Source: *An Uncertain Glory* by Nobel laureate **Prof. Amartya Sen**.

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Article 51A(g) of the Constitution states that "it shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures."

Development increases the quality of life. This means that people will have higher incomes, better education, better health and nutrition, less poverty and more equality of opportunity.

Recap

- Development refers to the progress of a particular field or a particular person.
- Economic development means overall growth of all sectors of the economy.
- The major indicators of economic development are Per Capita Income, Net National Product, Purchasing Power Parity and Human Development Index.
- Human resource is necessary for the progress of any country.
- Sustainable development means development should take place without damaging the environment and preserve it for the future.
- The Wildlife Protection Act 1972 is aimed at protection to wild animals and birds.
- Thermal power plants emit large quantity of carbon dioxide, which is harmful to the environment.

A-Z GLOSSARY

Embodied	—	within	**Depletion**	—	exhaustion; using up.
Replenish	—	restore			
Perspective	—	outlook	**Conserve**	—	protect
Sustainability	—	avoidance of depletion			

EXERCISE

I. Choose the correct answer:

1. Assertion (A): Development increases the quality of life.

   Reason (R): People will have higher incomes, better education, better health and nutrition, less poverty.

   a. Both (A) and (R) are true and (R) explains (A)

   b. Both (A) and (R) are true and (R) does not explain (A)

   c. (A) is correct and (R) is false

   d. (A) is false and (R) is true

2. The term 'Human resources' refers to

   a. investment on poor people

   b. expenditure on agriculture

   c. investment on assests

   d. collective abilities of people

3. For comparing development between countries, their _____ is considered to be one of the most important attributes.

   a. growth b. income

   c. expenditure d. savings

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4. _____ is considered a true measure of national income.
   a. GNP b. GDP
   c. NNP d. NDP
5. The _____ income is also called per capita income.
   a. average b. total
   c. people d. monthly
6. Which one of the following country is not a G-8 country
   a. Japan b. Canada
   c. Russia d. India
7. Which one of the following country is not a member of SAARC
   a. India b. Pakistan
   c. China d. Bhutan
8. Assertion (A): The Net National Product (NNP) is considered as a true measure of national output.
   Reason (R): It is also known as national income.
   a. Both (A) and (R) are true and (R) explains (A)
   b. Both (A) and (R) are true and (R) does not explain (A)
   c. (A) is correct and (R) is false
   d. (A) is false and (R) is true
9. Assertion (A): Human resource is necessary for the progress of any country.
   Reason (R): Investment in education and health of people can result in a high rate of returns in the future for a country.
   a. Both (A) and (R) are true and (R) explains (A)
   b. Both (A) and (R) are true and (R) does not explain (A)
   c. (A) is correct and (R) is false
   d. (A) is false and (R) is true
10. The Human Development Index (HDI) does not take into account the following dimension in its calculation
    a. Gender b. Health
    c. Education d. Income
11. Among the following states which state have the literacy rate (2011) higher than national average
    a. Andhra Pradesh
    b. Uttar Pradesh
    c. Tamil Nadu
    d. None of these
12. Sex-ratio means
    a. the ratio between adult-male and adult female in a population
    b. the ratio between female and male in a population
    c. the relationship between male of female
    d. the number of females per thousand males
13. Inter-generational equality is ensured under the process of
    a. Industrial progress
    b. Economic development
    c. Sustainable development
    d. Economic growth
14. Find the odd one
    a. Solar energy b. Wind energy
    c. Paper d. Natural gas
15. _____ is the state with highest installed solar capacity in India.
    a. Tamil Nadu b. West Bengal
    c. Kerala d. Andhra Pradesh
16. _____ resources are those which will get exhausted after years of use.
    a. Natural b. Renewable
    c. Non-Renewable d. New
17. Thermal plant emits large quantity of _____, which pollutes the environment.
    a. Oxygen b. Nitrogen
    c. Carbon d. Carbon dioxide

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II. Fill in the blanks:

1. Economic progress of any country is known as _____
2. The head quarters of HRD Ministry is in _____
3. The state having the highest literacy rate in India is _____
4. Human Development Report of the world prepared and released by _____
5. Groundwater is an example of_____ resource.
6. The book *An Uncertain Glory* was written by_____

III. Match the following:

1. Development	—	Wild life Protection Act
2. Human resource	—	Renewable resources
3. Solar energy	—	Part of daily life
4. 1972	—	Education

IV. Give Short answers:

1. What do you mean by development?
2. What are the indicators of development?
3. Why NNP is not considered as an useful measure to compare a country's development with other countries?
4. Why human resources is considered as the foremost resource of any country?
5. Expand the following:1. PPP 2. HDI
6. Expand the following: 1. NNP 2. PCI
7. What is 'Solar Power'?

V. Answer in detail:

1. Discuss the policies for sustainable development.
2. Describe in detail about environmental policies in India.
3. Differentiate between renewable and non-renewable resources.
4. Mention any five environmental acts and their action.

VI. Projects and Activities

List the various ways in which the problems of garbage and emissions are being dealt with around the world.

VII. HOTS

Write in detail what kind of environmental problems you face in your locality.

VIII. Life Skill

How is the Per Capita income calculated?

INTERNET RESOURCES

www.imf.org (The International Monetary Fund)
https://en.wikipedia.org/wiki/Sustainable_development
www.worldbank.org
Niti Aayog
hdr.undp.org/en/composite/trends (The United Nations Development Programme)
http://vikaspedia.in/energy/policy-support/environment-1/forests/general-environmental-acts

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UNIT 2

Employment in India and Tamil Nadu

Learning Objectives

- To know the employment structure in India
- Understand the organised and unorganised sector
- Understand the distinction between public sector and private sector
- Understand the changing employment pattern
- To appreciate the case study format

Introduction

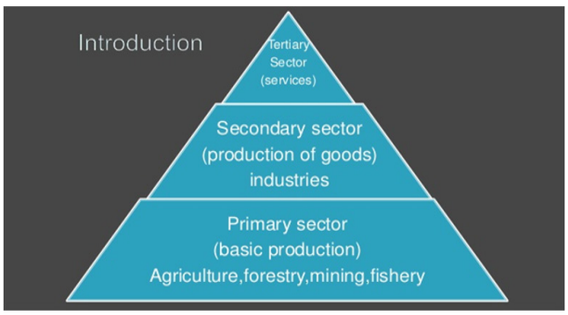
You know the basic needs of every human being are food, clothes and shelter. In the present world, one more essential need has to be added in this list. That is employment. To survive in the world, we all need employment to earn money. Those who are engaged in economic activities, in whatever capacity– high or low – are called employees. People who employ these workers and pay rewards for their work are called the employers.

Labour force of the economy is the number of people in the country who work and also capable of working. We take the age group of 15–60 years for the computation of workforce. Persons who are less than 15 years are considered as children, and person who have crossed 60 years of age are excluded as they are not physically fit to undertake productive occupation. If larger percentage of population is accounted by children and old-age persons, then the progress of the country would be very slow as the working force is very small. Besides, the small working force will have to maintain larger non-working force for feeding out of the small national product.

1 Employment Structure in India

The nature of employment in India is multi-dimensional. Some get employment throughout the year; some others get employed for only a few months in a year.

The economy is classified into three sectors: primary or agriculture sector, secondary or industrial sector and tertiary or service sector.



Employment Structure

The structure of employment denotes the number of workers engaged in different sectors of the economy. Though the occupational pattern varies from one country to another, one can find in

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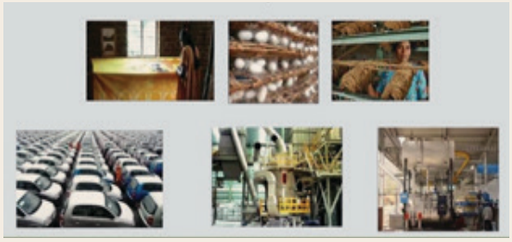
Primary sector

Agriculture, forestry animal husbandry, poultry, dairy farming, fishing etc.

Primary Sector

Secondary sector

Manufacturing, small and large-scale industries and constructional activities.



Secondary Sector

Tertiary sector

Transport, insurance, banking, trade, communication, real estate, government and non-government services.

Tertiary Sector

developing countries like India that a large work force will be engaged in primary sector, while a small proportion in secondary and tertiary sectors. Whereas, in well-developed countries, the proportion of workforce engaged in agriculture will be very small and a majority of labour force will be in the industrial and tertiary sectors.

Employment has always featured as an important element of development policy in India.

Employment growth has increased at an average rate of 2% during the past four decades since 1972–73.

In the medieval period, Feroz Shah Thuglaq, the Sultan of Delhi, had set up an 'Employment Bureau' to solve the unemployment problem.

Activity

Govindan resides in a village called Vallam near Thanjavur. He has two sons named Subbiah and Kumaran. He has three acres of land and a bullock cart of his own. They grow paddy and groundnuts in their land. Subbiah is helping his father in agricultural activities. Kumaran, the other son, is working in an insurance company as a development officer. Their mother Kamala is working as a teacher in a school in the same village. Govindan's neighbour Gopal's son Pandian is working in SIDCO Industrial Estate in Chennai.

1. How many members in Govindan's family are working in the services sector? Name them.
2. In which sector do Subbiah and his father work?
3. Is Pandian working in a primary sector?

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2 Types of Employment: Organised and Unorganised Sectors

2.1 Organised Sector

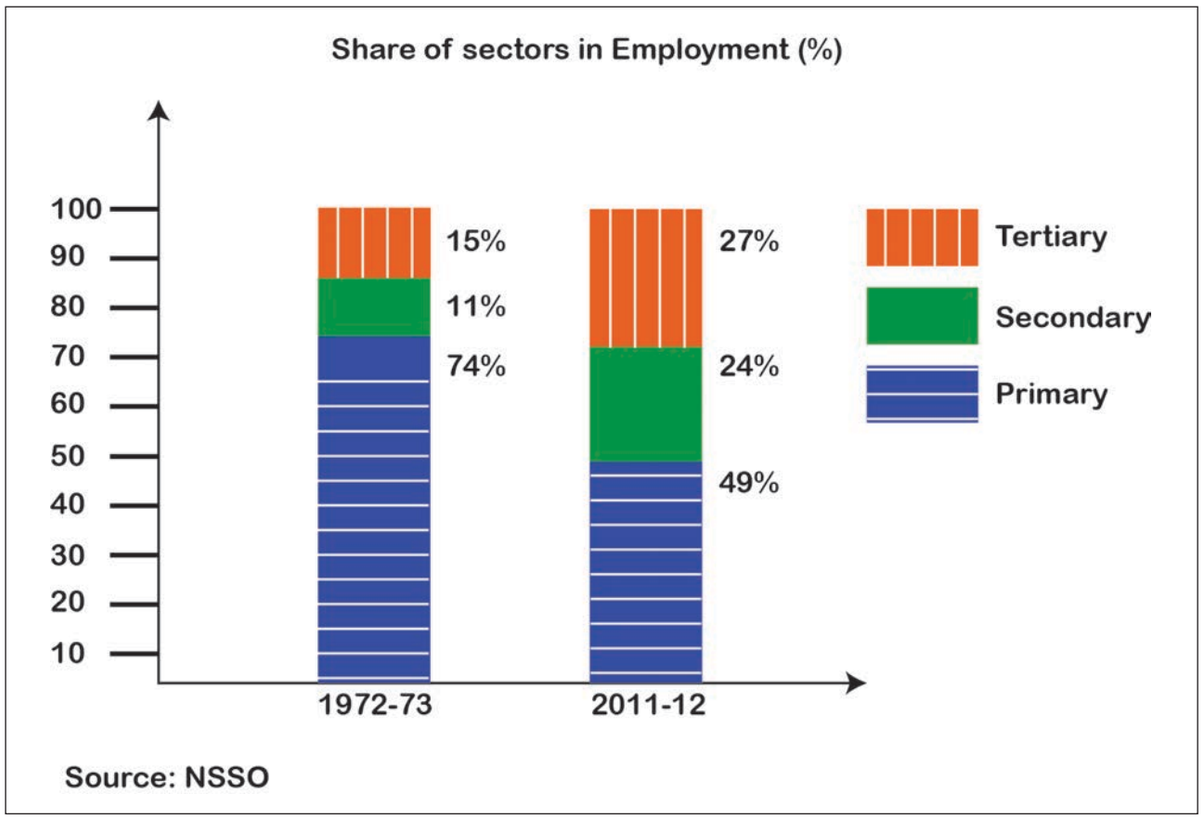
The organised sector is one that is incorporated with the appropriate authority or government and follows its rules and regulations. In India employees of central and state governments, banks, railways, insurance, industry and so on can be called as organised sector. This sector works according to certain rules and regulations given in the law. Organised sector has some formal processes and procedures. The employees in this sector are provided with job security and receive higher wages than those of the unorganised sectors.

Organised sector gives good salary, fixed working hours, paid holidays and provides medical allowance and insurance also.

2.2 Unorganised Sector

The unorganised sector of the economy characterised by the household manufacturing activity and small-scale industry. Jobs here are low paid and often not regular, Mostly, they do not have paid leave, holiday, leave due to sickness and so on. Employment is not secure. When there is no work, people are asked to leave the job. This sector includes a large number of people who are employed on their own doing small jobs such as selling on the street, doing repair work and so on.

In the unorganised sector, the employment terms are not fixed and regular. They do not enjoy any special benefits or job security. These enterprises are not registered with the government.



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2.3 Public Sector vs Private Sector

Economic activities are classified into public and private sector based on who owns assets and is responsible for the delivery of services.

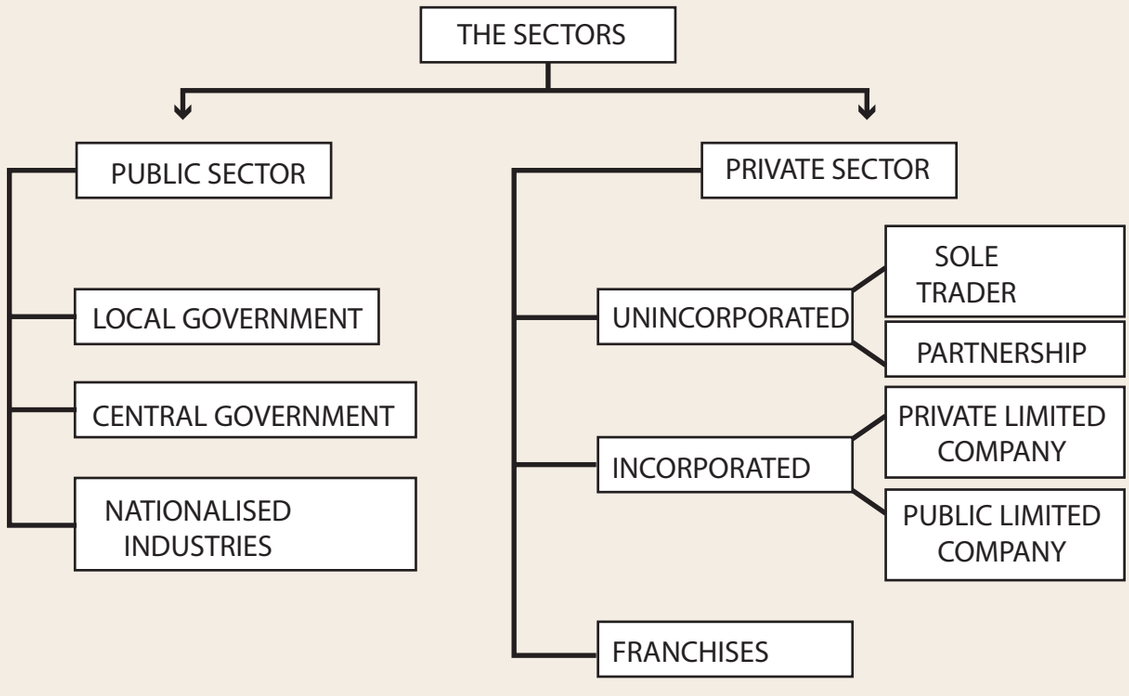
J6HNXH

DO YOU KNOW?

Public Sector	Private Sector
NLC	TVS Motors
SAIL	Ashok Leyland
BSNL	TATA Steel

Differences between the Public Sector and Private Sector

S. No.	Public Sector	Private Sector
1	Service motive	Profit motive
2	Government owns the assets	Private individuals own the assets
3	Wages are paid by the government	Wages are paid by the owner of private enterprises.



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3 Employment Pattern

In recent years, there has been a change in the employment pattern and this has helped the employers to develop more flexible working patterns among their employees. The trends are (a) increasing self-employment (b) firms using fewer full-time employees and tending to offer more short-term contracts (c) there has been a growth in part-time employment. This may be due to lifestyle of the people.

3.1 Employment Trends in Tamil Nadu

Agriculture, despite a sharp decline in gross domestic product, continues to be the largest employer in Tamil Nadu. This is because the non-agriculture sectors are yet to generate enough employment to affect a shift of labour force. Most of the employment growth in Tamil Nadu has been contributed by the unorganised and informal sectors.

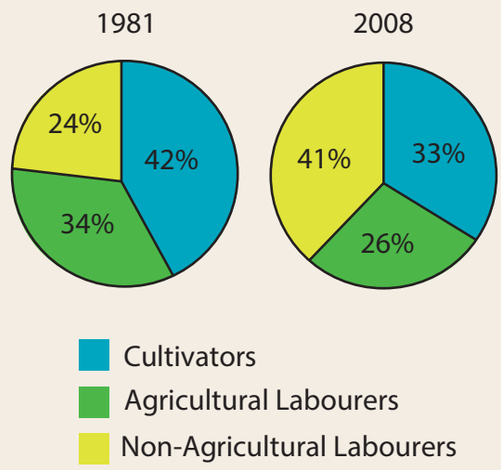
Employment in Iruvelpattu: A case study

What is happening in the employment scenario can be understood not only from national or state level, but also from the study of the village economy. Iruvelpattu is one such village in Villupuram district in Tamil Nadu. This village has been studied for more than 100 years by many scholars. This village is also called Slater village as Gilbert Slater was the first scholar working in the University of Madras to go with his students to study this village in 1916.Over the years, many scholars surveyed the occupation of villagers and collected many more details of each person in the village.

It was clearly observed that the government brought social security awareness among the people of the village through primary health care, provision of schools and maintenance of public distribution system. Though this village underwent many changes, it in still dependent on agriculture as the main occupation.Look at the following table or chart.You will notice that during 1981, out of 100 families, 24 were engaged in non-agriculture employment.In 2008, the member of families engaged in such employment increased to 41.During 1981–2008, the proportion of families engaged in agriculture has declined– both as agriculture labourers and as cultivators.

Employment details of households in Iruvelpattu (in %)

Occupation	% of Households	
	1981	2008
Cultivators	42	33
Agricultural labourers	34	26
Non-agricultural labourers	24	41
All households	100	100



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Activity

1. Why did people shift from agriculture to non-agriculture jobs in Iruvelpattu? What could have been the reasons?
2. Do you think it is easy to move from agriculture to non-agriculture jobs? Talk to your teachers and parents and discuss in the class.
3. Collect details of main occupations of 20 families in your locality. Prepare a table or chart as given above and discuss in the class.

Recap

- Labour force is the number of people in the country who work and also capable of working.
- Structure of employment denotes number of workers engaged in different sectors of the economy.
- The employment growth rate of India increased at an average rate of 2% during past four decades from 1972-73.
- Organised sector provides job security and other benefits like insurance to its employees.
- Public sector means government undertakings.
- Employment pattern changes due to lifestyle of the people.

GLOSSARY

- Primary sector–raw materials
- Secondary sector–manufacturing
- Tertiary sector–services
- Occupation– job or profession
- Cultivator–peasant

J6RJZJ

EXERCISE

I. Choose the correct answer:

1. We take age group _____ years for computation of the workforce.
   a. 12–60 b. 15–60
   c. 21–65 d. 5–14
2. Which is the correct sequence of various sectors in GDP of India in the descending order?
   a. Primary sector, Secondary sector, Tertiary sector
   b. Primary sector, Tertiary sector, Secondary sector
   c. Tertiary sector, Secondary sector, Primary sector
   d. Secondary sector, Tertiary sector, Primary sector
3. Which one of the following sectors is the largest employer in India.
   a. Primary Sector
   b. Secondary Sector
   c. Tertiary Sector
   d. Public sector
4. Which one of the following is not in Primary Sector

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a. Agriculture b. Manufacturing
c. Mining d. Fishery

5. Which one of the following is not in the Secondary Sector?
   a. Construction
   b. Manufacturing
   c. Small Scale Industry
   d. Forestry

6. Tertiary Sector include/s
   a. Transport b. Insurance
   c. Banking d. All of these

7. Match the List I with List II using the codes given below:

I	II
a. Agriculture, Forestry, Fishery and Mining	1. Unorganised sector
b. Manufacturing, Electricity Gas and Water Supply	2. Service Sector
c. Trade, Transport and Communication	3. Secondary sector
d. Unincorporated Enterprises and Household industries	4. Primary Sector

	(A)	(B)	(C)	(D)
a.	1	2	3	4
b.	4	3	2	1
c.	2	3	1	4
d.	3	2	4	1

8. Which sector is not included in the occupational pattern?
   a. Primary sector
   b. Secondary sector
   c. Tertiary sector
   d. Private sector

9. Which Delhi Sultan of medieval India formed 'Employment Bureau' to solve the unemployment problem.
   a. Muhamad Bin Tugluq
   b. Allauddin Khilji
   c. Feroz Shah Tugluq
   d. Balban

10. _____ sector is registered and follows government rules.
    a. Agriculture
    b. Organised
    c. Unorganised
    d. Private

11. _____ sector provides job security and higher wages
    a. Public sector
    b. Organised sector
    c. Unorganised sector
    d. Private sector

12. Find the odd one
    a. Banking
    b. Railways
    c. Insurance
    d. Small Scale Industry

13. The sectors are classified into Public and Private sectors on the basis of
    a. number of workers employed
    b. nature of economic activity
    c. ownership of enterprises
    d. employment conditions

14. Assertion (A) : The unorganised sector of the economy characterised by the household manufacturing activity and small-scale industry.

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Reason (R) : Jobs here are low paid and often not regular

a. Both (A) and (R) are true and (R) explains (A)

b. Both (A) and (R) are true and (R) does not explain (A)

c. (A) is correct and (R) is false

d. (A) is false and (R) is true

15. People who employ workers and pay rewards for their work is termed as _____.

a employee

b. employer

c. labour

d. caretaker

16. _____ continues to be the largest employer in Tamil Nadu.

a. Agriculture

b. Manufacturing

c. Banking

d. Small Scale Industry

II. Fill in the blanks:

1. In _____ sector, the employment terms are not fixed and regular.
2. Economic activities are classified into _____ and _____ sectors.
3. _____ has always featured as an important element of development policy in India.
4. Employment pattern changes due to _____
5. The nature of employment in India is _____.
6. _____ of the economy is the number of people in the country, who work and also capable of working.
7. Public sector means _____

III. Match the following:

1. Public sector	—	a. Banking
2. Private sector	—	b. Poultry
3. Primary sector	—	c. Profit motive
4. Tertiary sector	—	d. Service motive

IV. Give Short answers:

1. What is labour force of the economy?
2. Why are children and old age (above 60 years) are not considered for computation of workforce?
3. What are the three sectors of an economy?
4. Agriculture, despite a sharp decline in Gross Domestic Product, continues to be the largest employer in Tamil Nadu. Give reason.

V. Answer in detail:

1. Explain: (a) primary sector; (b) secondary sector; (c)tertiary sector.
2. Explain the employment structure of India.
3. Compare the employment conditions prevailing in the organised and unorganised sectors.
4. Distinguish between the Public sector and the Private sector.

VI. Projects and Activities

1. Make a long list of all kinds of work that you find adults around you. In what way can you classify them?
2. A research scholar looked at the working people in the city of Chennai and found the following:

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Place of work	Nature of employment	Percentage of working people
In offices and factories registered with the government	Organised	15
Own shops, office, clinics in marketplaces with formal license		20
People working on the street, construction workers, domestic workers		25
Working in small workshops usually not registered with the government		

3. Classify the following list of occupations under primary, secondary and tertiary sectors.

   Milk vendor, tailor, teacher, doctor, farmer, postman, engineer, potter, fisherman, artisans, policeman, banker, driver, carpenter.

Primary	Secondary	Tertiary

VII. HOTS

Tertiary sector is in top position in the world now. Justify

VIII. Life Skill

Discuss the sectors of your village economy.

REFERENCE AND INTERNET RESOURCES

1. Iruvelpattu (1916–2008), Economic and Political Weekly, July 31, 2010, vol. XLV, No.31, pp.47–61.
2. https://villageinfo.in
3. https://quickonomics.com
4. https://study.com

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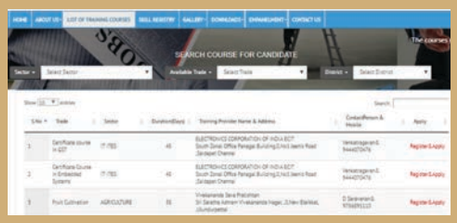
ICT CORNER

Employment in India and Tamil Nadu

Explore **TNSDC** to know opportunities for various skills

Steps:

- Type the URL given (or) Scan the QR Code. Tamilnadu skill development corporation webpage will open.
- Click on the '**List of Training Courses**'. Select accordingly in the corresponding boxes. A list of training will appear.
- Click **New Registration** and select '**TNSDC LOGIN**' and type your username and password.
- Click '**Downloads**' to get important G.O.'s about skill developments. Click the '**Important Links**' to get other important links.



Step1

Step2

Step3

Timeline Project's URL:

https://www.tnskill.tn.gov.in/

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List of Authors and Reviewers

Domain Experts

M.V. Srinivasan
Associate Professor
Department of Education in Social Science,
NCERT, New Delhi.

Reviewer

Dr. P.Anbalagan,
Associate Professor,
Department of Economics,
Presidency College, Chennai.

Academic Co-ordinator

P. Suresh
P.G.Assistant,
G.G.H.S.School, Attur, Salem.

Authors

P. Sundaravadivelu
P.G.Assistant in Economics
Govt. Boys Hr. Sec. School
Attur Tk, Salem Dt.

S. Mala
Vice Principal
Shri Anand Jain Vidyalaya M.H.S.School
West Tambaram, Chennai.

Art and Design Team

Chief Co-ordinator and Creative Head

Srinivasan Natarajan

Illustration

K.T.Gandhi Rajan
Tamil Virtual University, Kotturpuram, Chennai
Sakthi

Art Teachers, Government of Tamil Nadu.
Students, Government College of Fine Arts,
Chennai & Kumbakonam.

In-House

Layout & QC

Gopu Rasuvel
Karthik Kalaiarasu
Jerald Wilson

Co-ordination

Ramesh Munisamy

Typist

D. Alphonsa Mary

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