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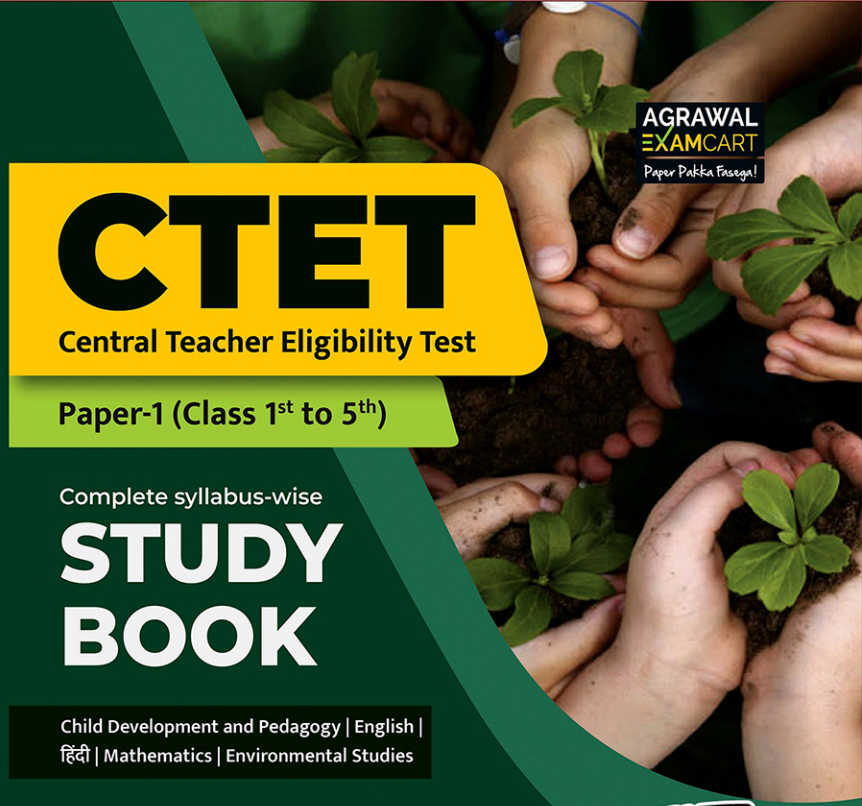

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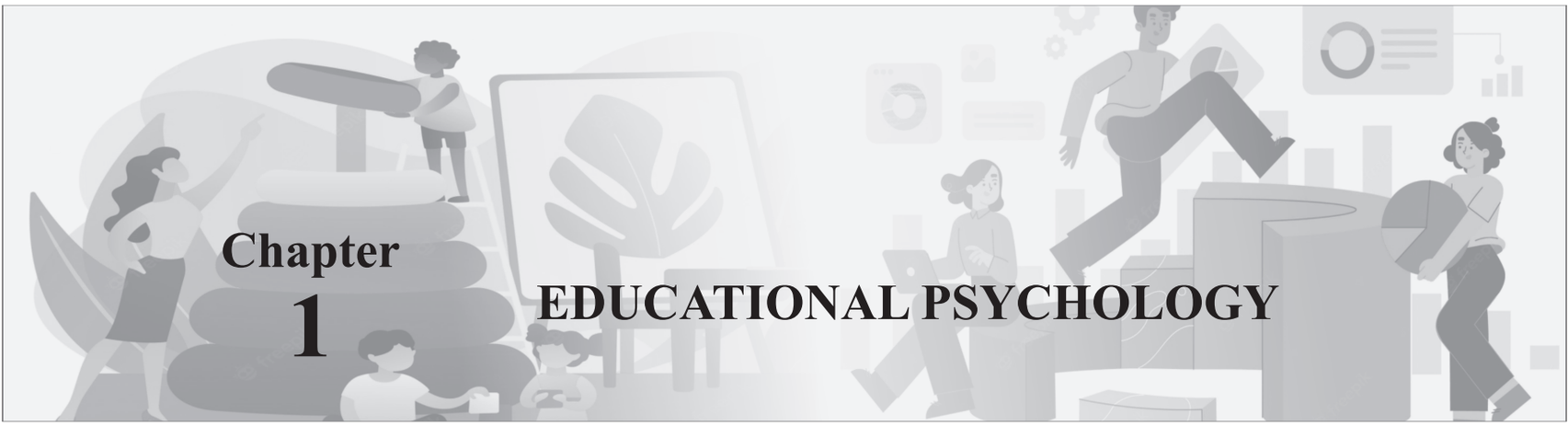


Chapter 1 EDUCATIONAL PSYCHOLOGY

1. Introduction

- According to the American Psychological Association, Psychology is the study of the mind and behaviour. It is the study of the mind, how it works, and how it affects behaviour.
- There are different types of psychology, such as cognitive, forensic, social, and developmental psychology.
- A person with a condition that affects their mental health may benefitted by assessment and treatment by a psychologist.
- A psychologist may offer treatment that focuses on behavioural adaptations.
- A psychiatrist is a medical doctor who is more likely to focus on medical management of mental health issues.

2. What is Psychology?

- Psychology is the study of behaviour and the mind, or mental processes. It explores both internal cognition and emotions as well as outward, observable behaviours.
- Wilhelm Wundt opened the first experimental psychology lab in Germany in 1879, which was instrumental in psychology becoming its own scientific discipline. As a science, psychology relies on research and experimental testing to understand the causes behind what humans do, feel, think, and say, as well as to predict human behaviour.
- A wide array of topics are encompassed in the study of psychology including the biological foundations of behaviour, neurotransmitters and the brain, human development and diversity, emotions, cognition, intelligence, theories of learning and behaviours, and personality.
- It also covers research methods and statistics, and the ethical standards that accompany them. Finally, psychology is concerned with the causes and diagnoses of mental health disorders, as well as the most effective and evidence-based treatment methods.
- Psychology is both a thriving academic discipline and a vital professional practice. (The British Psychological Society)
- The scientific study of the behaviour of individuals and their mental processes. (American Psychological Association)

3. The Origin of Psychology

- The term "psychology" itself comes from the Greek word "psyche" which means to breath, soul, or mind, and "logos" which means science. What we consider psychology today is a relatively new field of study, but psychology has its origins in ancient cultures and has connections to the fields of philosophy, medicine, and biology.
- Psychology was considered as a branch of "Philosophy" centuries ago.
- To make psychology an independent subject, it began to be defined.
- On the basis of its literal meaning, psychology was first considered by Plato, Aristotle and Descartes as "Science of soul".
- Due to the lack of a clear definition of the word 'soul', the definition became invalid at the end of the 16th century.
- In the 17th century, Italian psychologist Pomponozzi considered psychology to be "the science of the mind". Later this definition also became invalid.
- In the 19th century, psychology was considered the "science of consciousness" by William Wundt, William James, Wives and James Sully etc.
- In the 20th century, psychology was considered the "science of behaviour" and this definition is prevalent till date.
- The main psychologists who believe in the science of behaviour are Watson, Woodworth, Skinner, Thorndike and McDougall.
- William Wundt established the first "psychological laboratory" in 1879 AD at "Leipzig" in Germany, so he is considered as the "father of experimental psychology".
- William McDougall in his book "Outline psychology" has strongly condemned the word "consciousness."
- **Definition of psychology:**
  - "Psychology is the pure science of behaviour" – Watson.
  - "Any boy you give me, I'll make him the way I want him to be" – Watson.
  - "Psychology first gave up its soul, then the mind, then gave up consciousness, and today psychology accepts the nature of the method of behaviour." – Woodworth.
- **Ancient Roots of Psychology:**
  - The Ebers Papyrus, an Egyptian document from 1550 BCE, is the earliest known medical text and includes information on psychological disorders.
  - The ancient Greek philosophers Socrates (469–399 BCE), Plato (428–348 BCE), and Aristotle (384–322 BCE) discussed and debated important ideas about the relationship between the body, brain, and mental processes, and the origins of knowledge.
  - Much of what these philosophers discussed thousands of years ago are still part of debates in psychology today. The Greek physician Hippocrates (460–375 BCE) also speculated about the biological origins of temperament.

- **Birth of Modern Psychology:**
  - In addition to the ancient philosophers and physicians, there have been several influential figures who have contributed to the development of psychology and proposed ideas related to the field.
  - One of these was a philosopher and mathematician René Descartes (1596–1650) who promoted the concept of dualism, the idea that the mind and the body are separate and distinct entities.
  - Significantly, he theorized that the mind and the body communicate with one another. John Locke (1632–1704) was a British philosopher who disagreed with his idea of dualism. He also wrote An Essay Concerning Human Understanding which presented his famous concept of the mind as a tabula rasa, or a "blank slate", at birth.
  - It was during the second half of the 19th century that several key events occurred that led to the birth of modern-day psychology.
  - In 1879, Wilhelm Wundt, founded psychology as an independent experimental field of study. He set up the first laboratory that carried out psychological research exclusively at Leipzig University. Wundt is known as the father of psychology.
  - In 1890, an American philosopher, William James, published a book entitled Principles of Psychology. It was discussed by psychologists worldwide for many decades.
  - In 1890, the American Psychological Association (APA) was founded, under the leadership of G. Stanley Hall.
  - Hermann Ebbinghaus, (1850 1909), who worked at the University of Berlin, was the first psychologist to study memory extensively.
  - Ivan Pavlov, (1849 to 1936), carried out the famous experiment which showed that dogs salivated when they expected food, introducing the concept of "conditioning."
  - The Austrian Sigmund Freud, (1856 to 1939), introduced the field of psychoanalysis, a type of psychotherapy. He used interpretive methods, introspection, and clinical observations to gain understanding of the mind.
  - He focused on resolving unconscious conflict, mental distress, and psychopathology. Freud argued that the unconsciousness was responsible for most of people's thoughts and behaviour, and for mental health problems.
  - E. B Titchener, an American, strongly believed in structuralism, which focuses on the question: "What is consciousness?"
  - William James and John Dewey were strong believers in functionalism, who addressed the "What is consciousness for?"
  - The debate between the functionalists and structuralists led to a rapid growth in interest in psychology in the United States and elsewhere, and the establishment of the first psychology laboratory at Johns Hopkins University, (U.S.)

  The following chart lists some of the most significant moments in the evolution of psychology as we know it.

1848	Phineas Gage was injured when a steel pole went through his eye socket and up through the frontal lobe of his brain. Though he survived the incident, his personality changed drastically, a fact that has provided insight into the relationship between the brain and personality.
1879	Wilhelm Wundt established the first psychology lab in Leipzig, Germany. This became a place for psychology students from around the world to come and learn. Wundt was also the first person to refer himself as a psychologist and is often referred to as the father of psychology.
1883	G. Stanley Hall, a student of Wundt, got a psychology lab established at Johns Hopkins University. He was the first such laboratory in the United States. Hall was also the first American to obtain a Ph.D. in psychology.
1890	William James published the first psychology textbook, The Principles of Psychology.
1890S	Ivan Pavlov conducted experiments with dogs and discovered classical conditioning.
1892	The American Psychological Association (APA) was founded by G. Stanley Hall.
1894	Margaret Floy Washburn was the first woman to receive a psychology Ph.D. in psychology.
1899	Sigmund Freud, the founder of psychoanalysis, published his book The Interpretation of Dreams.
1903	Mary Whiton Calkins became the first woman to be president of the APA.

4. Major Schools of Thought in Psychology

Following are some of the major schools of thought in psychology:

- **Structuralism:** Wundt and Titchener's structuralism was the earliest school of thought, but others soon began to emerge.
- **Functionalism:** The early psychologist and philosopher William James became associated with a school of thought known as functionalism, which focused its attention on the purpose of human consciousness and behaviour.
- **Psychoanalysis:** Soon, these initial schools of thought gave way to several dominant and influential approaches to psychology. Sigmund Freud's psychoanalysis centered on how the unconscious mind impacted human behaviour.
- **Behaviourism:** In 1913 an American psychologist, John B. Watson, founded a new movement that changed the focus of psychology. Behaviour, he argued, is not the result of internal mental processes, but the result of how we respond to the environment. Behaviourism focused on how people learn new behaviour from the environment.

- **Humanism:** Humanists viewed behaviourism and psychoanalytic theory as too dehumanizing. Rather than being victims of the environment or the unconscious, they proposed that humans are innately good and that our own mental processes played an active role in our behaviour. The humanist movement puts high value on the emotions, free will, and a subjective view of experience.
- **Cognitive theory:** Introduced in the 1970s, this is seen as the most recent school of thought in psychology. Cognitive theorists believe that we get information from our environment through our senses and then process the data mentally by organizing, manipulating, remembering, and relating it to the information we have already stored. Cognitive theory is applied to language, memory, learning, perceptual systems, mental disorders, and dreams.
- Now a days, psychologists study all these approaches and choose what appears to be best from each approach for a particular situation.

5. Main branches or fields of psychology

- General Psychology
- Abnormal Psychology
- Comparative Psychology
- Experimental Psychology
- Social Psychology
- Industrial Psychology
- Child Psychology
- Adolescent Psychology
- Adult Psychology
- Developmental Psychology
- Education Psychology
- Diagnostic or Remedial or Clinical Psychology
- Parapsychology (the latest branch)
- Animal Psychology
- Psychology is a broad and diverse field that encompasses the study of human thought, behaviour, development, personality, emotion, motivation, and more. As a result, some different subfields and specialty areas have emerged. Following are some of the major areas of research and application within psychology:
  - **Abnormal psychology** is the study of abnormal behaviour and psychopathology. This specialty area is focused on research and treatment of a variety of mental disorders and is linked to psychotherapy and clinical psychology.
  - **Biological psychology** (biopsychology) studies how biological processes influence the mind and behaviour. This area is closely linked to neuroscience and utilizes tools such as MRI and PET scans to look at brain injury or brain abnormalities.
  - **Clinical psychology** is focused on the assessment, diagnosis, and treatment of mental disorders.
  - **Cognitive psychology** is the study of human thought processes including attention, memory, perception, decision-making, problem-solving, and language acquisition.
  - **Comparative psychology** is the branch of psychology concerned with the study of animal behaviour.
  - **Developmental psychology** is an area that looks at human growth and development over the lifespan including cognitive abilities, morality, social functioning, identity, and other life areas.
  - **Forensic psychology** is an applied field focused on using psychological research and principles in the legal and criminal justice system.
  - **Industrial-organizational** psychology is a field that uses psychological research to enhance work performance and select employees.
  - **Personality psychology** focuses on understanding how personality develops as well as the patterns of thoughts, behaviours, and characteristics that make each individual unique.
  - **Social psychology** focuses on group behaviour, social influences on individual behaviour, attitudes, prejudice, conformity, aggression, and related topics.

6. Psychologists at Work

- Psychologists today work in a variety of settings where they can apply psychological principles for teaching and training people to cope effectively with the problems of their lives. Often referred to as "human service areas" they include clinical, counselling, community, school and organisational psychology. Clinical psychologists specialise in helping clients with behavioural problems by providing therapy for various mental disorders and in cases of anxiety or fear, or with stresses at home or at work.
- They work either as private practitioners or at hospitals, mental institutions, or with social agencies. They may be involved in conducting interviews and administering psychological tests to diagnose the client's problems, and use psychological methods for their treatment and rehabilitation.
- Job opportunities in clinical psychology attract quite a few to this field of psychology. Counselling psychologists work with persons who suffer from motivational and emotional problems. The problems of their clients are less serious than those of the clinical psychologists.
- A counselling psychologist may be involved in vocational rehabilitation programmes, or helping persons in making professional choices or in adjusting to new and difficult situations of life. Counselling psychologists work for public agencies such as mental health centers, hospitals, schools, colleges and universities.
- Community psychologists generally focus on problems related to community mental health. They work for mental health agencies, private organisations and state governments. They help the community and its institutions in addressing physical and mental health problems.
- In rural areas they may work to establish a mental health centre. In urban areas they may design a drug rehabilitation

programme. Many community psychologists also work with special populations such as the elderly or the physically or mentally challenged.

- Besides the redirection and evaluation of various programmes and plans, community based rehabilitation (CBR) is of major interest to community psychologists. School psychologists work in educational systems, and their roles vary according to the levels of their training.
- For example, some school psychologists only administer tests, whereas others also interpret test results to help students with their problems. They also help in the formulation of school policies.
- They facilitate communication between parents, teachers and administrators, and also provide teachers and parents with information about the academic progress of a student.
- Organisational psychologists render valuable help in dealing with problems that the executives and employees of an organisation tend to face in their respective roles.
- They provide organisations with consultancy services and organise skill training programmes in order to enhance their efficiency and effectiveness.
- Some organisational psychologists specialise in Human Resource Development (HRD), while others in Organisational Development and Change Management programmes.

7. Uses of Psychology

- The most obvious application for psychology is in the field of mental health where psychologists use principles, research, and clinical findings to help clients manage and overcome symptoms of mental distress and psychological illness. Some of the additional applications for psychology include:
  - Developing educational programs
  - Ergonomics
  - Informing public policy
  - Mental health treatment
  - Performance enhancement
  - Personal health and well-being
  - Psychological research
  - Self-help
  - Social program design
  - Understanding child development

8. Impact of Psychology

- Psychology is both an applied and academic field that benefits both individuals and society as a whole. A large part of psychology is devoted to the diagnosis and treatment of mental health issues, but that's just the tip of the iceberg when it comes to the impact of psychology.
- Some of the ways that psychology contributes to individuals and society include:
  - Improving our understanding of why people behave as they do
  - Understanding the different factors that can impact the human mind and behaviour
  - Understanding issues that impact health, daily life, and well-being
  - Improving ergonomics to improve product design
  - Creating safer and more efficient workspaces
  - Helping motivate people to achieve their goals
  - Improving productivity
- Psychologists accomplish these things by using objective scientific methods to understand, explain, and predict human behaviour. Psychological studies are highly structured, beginning with a hypothesis that is then empirically tested.

9. What is Educational Psychology?

- We know not everyone learns and retains information in different ways, so what can we do to make sure that everyone benefits from their education?
- The aim of research in educational psychology is to optimize learning, and educational psychologists study and identify new educational methods to benefit teachers, students, and anyone trying to learn a new skill.
- You can apply educational psychology to any human learning, not just to formal learning in a classroom. Educational psychology examples include:
  - Studying the most effective methods for teaching people with specific learning challenges like attention deficit hyperactivity disorder (ADHD), dyscalculia, or dyslexia
  - Researching how well people learn in different settings
  - Evaluating and analyzing teaching methods and addressing barriers to learning
  - Studying how factors like genetics, environment, socio-economic class, and culture affect learning
- **The literal meaning of educational psychology:** Educational psychology means that it is the science that studies human behaviour in the process of education. To analyze the meaning of educational psychology, Skinner has presented the following facts :
  - Human behaviour is central to educational psychology.
  - Educational psychology collects the facts obtained from discovery and observation.
  - Educational psychology gives a theory to the accumulated knowledge.
  - Educational psychology provides methods to solve the problems of education.
- **Definitions of Educational Psychology:**
  - **Skinner:** The whole behaviour and personality related to education comes under educational psychology.
  - **Crow and Crow:** Educational psychology describes and explains the learning experiences of an individual from birth to old age
  - **Callsnik:** Educational psychology is the application of the principles and research of psychology in education.

- **Stephen:** Educational psychology is the systematic study of educational development.
- **Sawrey and Telford:** The main relation of education psychology is with learning. It is that part of psychology, which is particularly concerned with the scientific exploration of the psychological aspects of education.

- **On the basis of the above definitions, it can be said that:**
  - Educational psychology studies human behaviour in educational situations.
  - Educational psychology makes the process of teaching-learning more simple and easy.
  - Educational psychology is scientific in nature, because scientific methods are used in its study.
  - The principles and methods of psychology are used in educational psychology.
- General Goals of Educational Psychology
  - **Understanding:**
    - A deep understanding of the educational phenomenon is one of the goals of educational psychology.
    - A good understanding of educational phenomena and the study of available variables and the search for relationships among them, in addition to the causes, motives, and motivations that result from this phenomenon, all of this contributes to the continuity of the success of the educational process and its harmonization of different educational situations.
    - Understanding students' behaviour and meeting their interim, mental, and psychological needs, understanding the reasons behind each behaviour issued in the educational environment, classifying them according to common mental factors and providing instructional methods for each group according to their capabilities, all these are the basic objectives of educational psychology.
  - **Forecasting**
    - Forecasting is the expectation of a specific phenomenon occurring at a specific time, based on the variables available before they occur, and thus studying the relationship between the variables, and making assumptions on their basis, in addition to predicting their occurrence and their results, such as predicting specializations that will be available to students according to their academic achievement in high school.
    - Also, the prediction in the field of educational psychology may not be inevitable results, but it is an important process in this field, it can contribute to solving many educational and vocational problems that occur in its different circumstances, when the gifted students are classified from ordinary students to underachieving students.
    - It is possible to predict student's needs. For example, talented students need enrichment programs that satisfy their mental abilities, as attaching them to educational programs provides many behavioural problems resulting from the inadequacy of the educational material for this group of students.
  - **Controlling**
    - Controlling is some of the actions that the organizer of the educational process takes towards some causal variables, studying the relationships between them, trying to control them, adjusting educational outputs and outcomes according to the requirements as much as possible, and being able to complete the educational process successfully.
    - However, due to a large number of variables, their interactions, and their circumstances, it is possible that the adjustment process becomes somewhat impossible in some cases, such as the appearance of some surprising variables, which cannot be controlled, such as different weather conditions, or sudden illness.
- **Special Goals of Educational Psychology**
  - As for the sub-goals or special ones, they are concerned with the important elements in the educational process, and all the variables affecting them, the causes that contributed to the emergence of a phenomenon, or an understanding of educational and vocational problems, and thus finding appropriate ways to solve them.
  - **The two main goals are as follows:**
    - Theoretical knowledge of the interpretation of human behaviour, through the study of theories of behavioural psychology, and its views on the interpretation of individual behaviour in educational situations, the foundations, principles and theoretical frameworks for them.
    - Applying this knowledge in a practical way, and training people in charge of the educational process to use it in educational and classroom situations, thus achieving an effective learning process more efficiently, and with the least possible number of problems.

10. Methods of Educational Psychology

- Different types of techniques are used by researchers to collect data and conduct research studies. With the increasing use of educational technology in education, psychology and other social sciences, new research strategies are evolved.
- The important methods and techniques of collecting data are:
  1. Introspection
  2. Observation
  3. Clinical method
  4. Case study
  5. Survey or differential methods
  6. Scientific or experimental method
- **Introspection**
  - Historically introspection is the oldest method of all. It was formerly used in philosophy, and then in psychology to collect data about the conscious experience of the subject. Introspection means to see with in one self or

self observation. To understand one's own mental health and the state of mind. This method was developed by the structuralists in psychology who defined psychology as the study of conscious experiences of the individual. Introspection has some advantages and disadvantages;

- **Merits:**
  - It gives information about one's own self which is difficult by other methods.
  - It is an easy method and needs no equipment
  - It makes a base for other methods such as experimental and observation method
- **Demerits:**
  - This method is subjective in nature and lacks scientific objectivity
  - The most serious objection against this method is that human mind is not static like inanimate objects such as stone or chairs etc. Our mental process is under constant changes so when one attempts to introspect, the state of mental process disappears and it becomes a retrospect.
  - The human mind is divided in two parts. One is his own mental operation and the other is the object to which this mental operation is directed. To expect any individual to attend the workings of his own mind during a mental process, specially in a complex and emotional state such as anger or fear, is a mistaken idea. Ross comment on the limitation of introspection and said, " The observer and the observed are the same, the mind is both the field and the instrument of observation."
  - Introspection can not be employed on children and insane propel.
  - There are conflicting reports, as regarding the findings collected from different introspectionists.

- **Observation**
  - With the development of psychology as an objective science of behaviour, the method of introspection was replaced by careful observation of human and animal behaviour. Observation literally means looking outside oneself. It is a very important method for collecting data in almost all type of research studies. Different type of Observation are used in research, direct or indirect, scheduled or unscheduled, natural or artificial, participant and non-participant. But there are two basic types of observation. They are:
  - **Natural observation:** In natural observation the observer observe the specific behavioural and characteristics of subjects in natural settings and the subject is not aware of the fact that their behaviour is being observed by someone. The teacher can observe the behaviour of his student in the playground or in any other social gathering without making him conscious. Natural observation can be done any where with out any tools.
  - **Participant observation:** In participant observation the observer becomes the part of the group which he wants to observe. Observational study is particularly very important and produces significant results on developmental characteristics of children. No doubt that observation is a scientific technique of collecting data, the result of which can be verified and relied upon to locate behavioural problems.
  - **Merits:**
    - This type of observation is a natural and normal way of knowing not only the external world but also the mind of the subject
    - This method is objective in nature and free form personal bias and prejudice.
    - Through this method we can observe as many children as we like
    - This method is quite suitable for children and abnormal person who can not be examined through introspection.
    - This can be used at any time and anywhere.
  - **Demerits:**
    - Observation is useful only for collecting data about overt behaviour which is manifested in a number of activities. This overt behaviour does not provide reliable information regarding internal mental process. We can only guess the mental state of the individual on the basis of behaviour which may or may not be true. It becomes very difficult to draw any conclusion in case of adults who can hide their actual behaviour in the presence of the observer.
    - Subjectivity of interpretation is another limitation of this method. The observer may interpret his sensation of external stimulus based on his past experience. He may be biased in his interpretation. It has also been found in some studies that strong personal interests tend to make researcher see only those things which he wants to see.
    - Observation is subject to two types of errors, sampling error and observer error. Sampling error occurs because of inadequacies of selecting situation to be observed. The observer error may be due to knowledge and background of the situation to be observed. Because sometimes the observer is not familiar with the total situation and hence he may commit error.

- **Experimental Method**
  - This method has been developed in psychology by the continuous efforts by psychologists to make objective and scientific study of human behaviour. One of the major contributions of the behaviourism is the development of experimental method to understand, control and predict behaviour. It is the most precise and, planned systematic observation. The experimental method uses a systematic procedure called experimental design. Experimental design provides important guide lines to the researcher to carry out his research systematically. The lay out of the design depends on the nature of the problem that an investigator wants to investigate. The lay out or design of the experimental method is as follows:
    - Selecting a research topic

- Formulating hypotheses
- Selecting an appropriate design
- Collecting data
- Analyzing and interpreting data
- Discussion and conclusions

- Experiments may be conducted in a laboratory or in a classroom or anywhere else in the community. Experimentation involves comparison between behaviour of a control group and that of an experimental group.

  Hypotheses have a rational base or they emerge from a frame work of theory or preliminary experimentation. An experiment involves two or more variables for example; incentives have a measurable impact on learning. The variables whose effects are being studied are called independent variable.

- **Merits:**
  - This method is the most systematic procedure of solving problems. It provides reliable information.
  - It is a revisable method
  - It makes psychology a scientific study
  - It provides objective and precise information about the problems.
  - It give observer easy approach to the mind of an individual
  - It provides innovative ideas for further experimentation
  - It enable us to control and direct human behaviour
  - It is applicable in educational, individual and social problems
- **Demerits:**
  - It is arranged in a laboratory-like situation. This situation is artificially arranged. Behaviour is a natural phenomena and it may change under artificial environment.
  - This method is time consuming and costly. Moreover it requires specialized knowledge and skills.
  - Psychologists have been criticized the fact that mostly the experiments have been conducted on rats, cats and dogs. The results are conducted and then applied on human beings.
  - It some times interferes with the very thing that we are trying to observe.

- **Clinical Method:** This method is primarily used to collect detailed information on the behaviour problems of maladjusted and deviant cases. The main objective of this method is to study individual case or cases of group to detect and diagnose their specific problems and to suggest therapeutic measures to rehabilitate them in their environment. It involves the following steps:
  - Interview
  - Information gathering
  - A hypothesis formulate
  - Diagnoses are made
  - Planning a treatment programme

- **Case Study:** Case study is in-depth study of the subject. It is the in-depth analysis of a person, group, or phenomenon. A variety of techniques are employed including personal interviews, psychometric tests, direct observation, and archival records. Case studies are most often used in psychology in clinical research to describe the rare events and conditions of the subject; Case study is specially used in education psychology. It deals with the following problems:
  - Lack of interest in students
  - Aggressive behaviour in student
  - Day dreaming
  - Poor academic performance
  - Emotional problem
  - Social problems
  - Empathetic understanding
  - Find the problem
  - Establish report
  - Treatment

11. Educational Psychology – Importance for Teachers & Education

- **Importance of Educational Psychology for Teachers:** Teacher is like a philosopher who guides his students. He is responsible for being aware about the growth and development of the students. It is educational psychology which enables the teacher to use various techniques. The importance of educational psychology and teachers has the following points:
  - Educational Psychology helps teachers to know how learning takes place.
  - It enables a teacher to know how the learning process should be initiated, motivated, memorized or learned.
  - It helps teachers to guide the students in the right direction in order to channel student's abilities in the right direction.
  - It informs a teacher about the nature of the learners and his potential.
  - It helps a teacher to develop the personality of a student because the whole educational process is for student's personality development.
  - It helps a teacher to adjust his methodologies of learning to the nature / demand of the learner.
  - It enables a teacher to know the problems of individual differences and treat every student on his / her merit.
  - It helps a teacher to solve the learning problems of a student.
  - It helps a teacher to evaluate whether the purpose of teaching & learning has been achieved by the students.
- **Importance of Educational Psychology in Education:** Following are the points which show the importance of educational psychology in education. It also shows how educational psychology and education have importance for another.
  - **Learner:** Educational Psychology studies various factors

which impacts students. It may include home environment, social groupings, peer groups, his / her emotional sentiments, and mental hygiene etc. Various methods are used in order to get the desired data about the learner in order to know about his / her mentality and behaviour and his manifestations.

- **The Learning Process:** Educational psychology investigates how information and knowledge can be transferred and what kinds of methodologies should be used for this purpose.
- **Learning Situation:** Educational Psychology studies the factors which are situational in nature and how environment of classroom be managed and how discipline be maintained. Beside, it studies various Audio Video Aids and its role in facilitating the teaching learning process.
- **Curriculum Development:** Educational psychology helps curriculum developers that what kind of curriculum should be made and what kind of content should be given to teachers to transfer to the next generation.
- **Evaluation Techniques:** Educational psychology helps educators in what kinds of evaluation techniques should be used to test the learners and to what extend information and concept have been transferred.

12. Factors that affect the Success or Failure of the Educational Process and the Achievement of Its Objectives

- Methods and strategies of learning and suitability for the categories of students.
- Their sensitivity to individual differences.
- Student's personality.
- Social circumstances.
- Level of mental and cognitive maturity.
- The amount of motivation for the learning process.
- The general and emotional atmosphere of the classroom.

Important Questions

1. What role does education play in the development of the person ?

I. It imparts teaching skills to the students which makes them physically, mentally and socially ready to work in life.

II. Higher education hepls in maintaining a healthy society that education prepares health, care, consumers and professionals.

(A) Only I
(B) Neither I nor II
(C) Both I and II
(D) Only II

2. Who among the following proposed that the people have also created 'psychological tools' to master their own behaviour ?
(A) Jean Piaget
(B) Friedrich Engels
(C) Vygotsky
(D) Albert Bandura

3. Which criterion doesn't fall under psychological aspect ?
(A) Motivation
(B) Level
(C) Literary devices
(D) Illustrations/layout

4. Educational technology is useful because:
(A) It is the need of the hour
(B) It is adopted by famous in stitutions
(C) It makes teaching and learning activities
(D) It attracts students to wards teaching and learning activities

5. Which of the following is not the characteristic of educational technology?
(A) It is based on application of scientific knowledge
(B) It helps making teaching process objective
(C) It encourages learning by coontrolling the environment
(D) It makes the teaching process monotonous

6. Use of educational technology is advantageous over many other methods because :
(A) It allows time for thinking
(B) It provides wider range of sensory involvement
(C) It allows proper guidance
(D) It provides scope for understanding

7. Which of these technology-aided learning methods could be a good substitute for a field trip ?
(A) Interactive learning programme
(B) Telephonic interviews
(C) Web seminar
(D) Internet

8. An effective teacher must communicate to students that she/he is aware of everything that is happening in the classroom that she/he is not missing anything. This technique of preventing roblems in the class is :
(A) Withitness
(B) Overalapping
(C) Group Focussing
(D) Movement management

9. Which of the following practice do you consider least important to reduce achievement differences among students ?
(A) Not giving students autonomy to choose their own activities during class
(B) Having high expectations from all students and to reward them for their accomplishment
(C) Interesting teaching incorporating a variety of learning aids
(D) Promoting student engagement and involvement in school.

10. With respect to Educational Psychology, which one of the following completely describes punishment ?
(A) Introduction of positive as well as negative reinforcer
(B) Introduction of positive reinforcer and withdrawal of negative reinforcer

(C) Withdrawal of positiver reinforcer and introduction of negative reinforcer

(D) Withdrawal of positive as well as negative reinforcer

11. Which of the following are important barriers in the equalisation of educational opportunities ?

(a) Differences in economic states of learner

(b) Gender disparities

(c) Common school system

(d) Difference in the standards of educational institutions

Code :

(A) (a) and (d)

(B) (a), (b) and (c)

(C) (a), (b) and (d)

(D) (a), (b), (c) and (d)

12. "To educate according to nature" means—

(A) To return to the natural as opposed of artificial in life

(B) To educate according to natural laws of human development

(C) To study natural laws and apply them to the educational process

(D) All of the above

Answer Key

1. (C) **2.** (C) **3.** (B) **4.** (C) **5.** (D) **6.** (B)
7. (A) **8.** (D) **9.** (A) **10.** (B) **11.** (C) **12.** (C)

Chapter 1 Number System

1. IMPORTANT TERMINOLOGY

1.1 Digits—0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 are defined as digits in Mathematics. We can create many numbers by using these digits. For example : 10, 123, 456, 789 etc.

1.2 Number System—There are mainly two types defined in the number system. These are :

I. Decimal Number System—It contains 0 to 9 digits. That's why it is called *decimal number system*. In this system, the numbers is read and written in two ways—Indian number system and International number system.

In the Indian number system or Hindi-Arabic system, the numbers are read and written as per their place values. These numbers are read as per the following table.

Periods	Crores		Lakhs		Thousands		Ones		
Values	10,00,00,000 (Ten Crores)	1,00,00,000 (Crore)	10,00,000 (Ten Lakhs)	1,00,000 (Lakh)	10,000 (Ten Thousands)	1,000 (Thousand)	100 (Hundred)	10 (Ten)	1 (One)
	10^8	10^7	10^6	10^5	10^4	10^3	10^2	10^1	10^0

Example : Number 51,45,42,786 can be read as Fifty-one Crores Forty-five Lakhs Forty-two Thousands Seven Hundred and Eighty-six. It is also called number name.

Unit Conversions :

- 1 tens = 10 units
- 1 Hundred = 10 tens = 100 units
- 1 Thousand = 10 Hundreds = 100 tens = 1000 units
- 1 Lakh = 10 Thousands = 100 Hundreds = 1000 tens
- 1 Crore = 10 Lakhs = 100 Thousands = 1000 Hundreds

In International number system, the numbers are read and written as per the following table.

Periods	Millions			Thousands			Ones		
Values	100,000,000 (Hundred Millions)	10,000,000 (Ten Millions)	10,00,000 (Million)	100,000 (Hundred Thousands)	10,000 (Ten Thousands)	1,000 (Thousand)	100 (Hundred)	10 (Ten)	1 (One)
	10^8	10^7	10^6	10^5	10^4	10^3	10^2	10^1	10^0

Example : Number 14,542,786 can be read as Fourteen Millions Five Hundred Forty-two Thousand Seven Hundred Eighty-six.

II. Roman Number System—In this system, numbers are represented by Latin alphabets. The Roman numerals used in, are based on seven symbols or letters.

Roman System	I	V	X	L	C	D	M
Hindu-Arabic System	1	5	10	50	100	500	1000

Example : 25 can be written as XXV and 101 as CI.

Note

- A letter repeats its value that many times (XXX = 30, CC = 200 etc.). A letter can only be repeated three times.
- If one or more letters are placed after another letter of greater value, add that amount.

  For example,

  VII = 7 (5 + 1 + 1); LXI = 61 (50 + 10 + 1); MCC = 1200 (1000 + 100 + 100)
- If a letter is placed before another letter of greater value, subtract that amount.

  For example,

  IV = 4 (5 – 1); XIV = 14 (10 + 5 – 1); CM = 900 (1000 – 100)
- Only subtract powers of ten (I, X, or C, but not V or L).
- Only subtract one number from another.
- Do not subtract a number from one that is more than 10 times greater (that is, you can subtract 1 from 10 [IX] but not 1 from 20—there is no such number as IXX.)
- A bar placed on top of a letter or string of letters increases the numeral's value by 1,000 times.

  For example, XII = 12 whether $\overline{XII}$ = 12000.

2. DIGITS OF NUMBER

- **Units**—Digit 0 to 9 are called Unit digits. The smallest and the largest number of 1-digit are 0 and 9 respectively.
- **Tens**—The numbers from 10 to 99 are called ten numbers. The smallest and the largest number of 2-digits are 10 and 99 respectively.
- **Hundreds**—The numbers from 100 to 999 are called hundred numbers. The smallest and the largest number of 3-digits are 100 and 999 respectively.

- **Thousands**—The numbers from 1,000 to 9,999 are called thousand numbers. The smallest and the largest number of 4-digits are 1000 and 9999 respectively.
- **Ten thousands**—The numbers from 10,000 to 99,999 are called ten thousand numbers. The smallest and the largest number of 5-digits are 10,000 and 99,999 respectively.
- **Lakhs**—The numbers from 1,00,000 to 9,99,999 are called lakh numbers. The smallest and the largest number of 6-digits are 1,00,000 and 9,99,999 respectively.
- **Ten Lakhs**—The numbers from 10,00,000 to 99,99,999 are called ten lakh numbers. The smallest and the largest number of 7-digits are 10,00,000 and 99,99,999 respectively.
- **Crores**—The numbers from 1,00,00,000 to 9,99,99,999 are called crore numbers. The smallest and the largest number of 8-digits are 1,00,00,000 and 9,99,99,999 respectively.

3. VALUE OF DIGITS

- **Place Value**—Place value helps us determine the value of numbers. Our (base-10) number system contains numerals or digits only from 0 to 9, but we often need to use numbers greater than 9. We show numbers greater than 9 by using place value. Place value refers to the value of each digit in a number.

  Example : In a number 489765, place value of 7 will be 7 × 100 units, *i.e.*, 700. Similarly, the place value of 8 will be 8 × 10,000 = 80,000.

- **Face Value**—The actual value of a digit in a number is the digit itself. The place value of the digit is ignored in the number.

  Example : In a number 59,438, the face value of 4 is 4, face value of 9 is 9 etc.

Note

If x and y be the tens digit and unit digit respectively, then the 2-digit number formed by these digits will be $10x + y$.

4. COMPARISON OF NUMBERS

- **When both numbers have unequal number of digits**

  The number having more digits is greater. It means

  ..... 5-digit number > 4-digit number > 3-digit number .....

  Example : Find out which is greater 5429683 or 65245893 ?

  Solution : Since, the first number 5429683 is of 7-digit number whether the second number 65245893 is of 8-digit. Therefore, the second number is greater than the first number.

- **When both numbers have equal number of digits**

  In case of the equal number of digits, we have to check the place value of the left-most digit of both numbers. If the digits of both numbers are also equal, then we move to its next digit placed on the right side and repeat the process until we get the desired result.

  Example : Arrange the following numbers in ascending order.

  5403100, 5460860, 5458087, 5420378

  Solution : At first, we check the place value of the leftmost digit of each number. Then repeat the same process until we get the answer. Here, in each number, two leftmost digits are equal. After that, we check ten thousand place values and then arrange the digits in ascending order. Hence, we get

  5403100 < **54**20378 < **545**8087 < **546**0860

5. CLASSIFICATION OF NUMBERS

There are several types of numbers exist in the number system for different purposes. These numbers are classified into different groups according to their properties. These are :

- **Natural Numbers**—Counting numbers starting from 1, 2, 3…, etc. are called natural numbers. It is represented by capital letter **N**. Its set is shown as

  $$N = \{1, 2, 3, 4, 5\ldots\}$$

- **Whole Numbers**—All natural numbers along with 0 is known as whole numbers. It is represented by capital letter **W**. Its set is shown as

  $$W = \{0, 1, 2, 3, 4\ldots\}$$

- **Even and Odd Numbers**—A number is even if it is a multiple of two, and is odd otherwise. Even numbers are denoted by capital letter **E** and odd numbers are denoted by capital letter **O**.

  $E = \{2, 4, 6, 8\ldots\}$ and $O = \{1, 3, 5, 7\ldots\}$

- **Integers**—Positive and negative counting numbers, as well as zero are called integers. Integers are denoted by capital letter Z.

  $$Z = \{\ldots -3, -2, -1, 0, 1, 2, 3\ldots\}$$

- **Prime Numbers**—An integer with exactly two positive divisors : itself and 1, is called prime number. For example : 2, 3, 5, 7, 11, 13…etc. are few prime numbers. 2 is the smallest prime number.
- **Composite Numbers**—All those numbers greater than 1 that are not prime are called composite numbers. For example : 4, 6, 8, 9, 10 etc. are few composite numbers.
- **Rational Numbers**—Numbers that can be expressed as a ratio of an integer to a non-zero integer. Rational numbers are denoted by capital letter **Q**. All integers are rational, but the converse is not true.

  $$Q = \left\{\ldots -\frac{1}{2}, -1, 0, \frac{1}{4}, \frac{1}{2}\ldots\right\}$$

- **Irrational Numbers**—All the real numbers that are not rational are called irrational numbers. Irrational numbers are denoted by **I**.

  $$I = \left\{\ldots \frac{2}{3}, \sqrt{2}, \sqrt{3}\ldots\right\}$$

Note

π is an irrational number because we often take $\frac{22}{7}$ as an appropriate value for x. But $\pi \neq \frac{22}{7}$, so π is an irrational value.

- **Real Numbers**—They can be positive, negative or zero. All rational numbers are real, but the converse is not true.

6. APPROXIMATE VALUES OF NUMBERS

Place values are considered to be the base to find approximation values in numbers. Approximation value of few place values is determined by the following methods.

- **Approximate value nearest tens place**—If the number at units place is less than 5 then it is rounded of zero otherwise add 1 to the tens place and keeps unit place as zero.

  Example : 73 can be rounded off to 70, 156 can be rounded off to 160 and 4265 can be rounded off to 4270.

- **Approximate value nearest hundred place**—If the number at tens place is less than 5 then it is rounded of zero otherwise add 1 to the hundred place and keeps tens place and unit place as zero.

  Example : 510 can be rounded off to 500, 9573 can be rounded off to 9600 and 53650 can be rounded off to 53700.

- **Approximate value nearest thousand place**—If the number at hundred place is less than 5 then it is rounded of zero otherwise add 1 to the thousand place and keeps hundred place, tens place and unit place as zero.

  Example : 6240 can be rounded off to 6000, 17573 can be rounded off to 18000 and 553650 can be rounded off to 554000.

7. DIVISIBILITY TEST OF NUMBERS

- **Divisibility by 2 :**

  If the unit digit of a number is any of 0, 2, 4, 6, 8, then the given number is divisible by 2.

  Example : 84, 786, 282, 1008, 5000……, etc. are divisible by 2.

- **Divisibility by 3 :**

  A number is divisible by 3, if the sum of all digits of the number is divisible by 3.

  Example : 786, here 7 + 8 + 6 = 21 (completely divisible by 3)

  So, the number 786 will be divisible by 3.

- **Divisibility by 4 :**

  A number is divisible by 4, if the last two-digits of the number is divisible by 4.

  Example : 3464, here 64 is the last two-digit number which is divisible by 4.

  So, the number 3464 will be divisible by 4.

- **Divisibility by 5 :**

  A number is divisible by 5, if the unit digit of the number is either 0 or 5.

  Example : 3125, 2010, 2015, 6580……, etc. are divisible by 5.

- **Divisibility by 6 :**

  A number is divisible by 6, if the number is divisible by the numbers 2 and 3.

  Example : Test whether number 8202 is divisible by 6.

  Solution : (i) the unit digit of the number is 2 which is divisible by 2.

  (ii) the sum of digits of the number = 8 + 2 + 0 + 2 = 12 (divisible by 3)

  Since, it is clear from (i) and (ii) that the number 8202 is divisible by both 2 and 3. So, the number will be divisible by 6.

- **Divisibility by 7 :**

  Take the last digit of the given number and double it. Subtract this number from the rest of the digits in the original number. If this new number is either 0 or if it is a number that is divisible by 7, then the given number is also divisible by 7.

  Example : Test whether number 2492 is divisible by 7.

  Solution : Here, the unit digit of the number = 2

  $249 - 2 \times 2 = 245$ (divisible by 7). So, the number will be divisible by 7.

- **Divisibility by 8 :**

  A number is divisible by 8, if the last three-digit of the number is divisible by 8.

  Example : Test whether number 6288 is divisible by 8.

  Solution : Here, in the given number, 288 is the last three-digit number which is completely divisible by 8.

  So, the number 6288 will be divisible by 8.

- **Divisibility by 9 :**

  A number is divisible by 9, if the sum of its digits is divisible by 9.

  Example : Test whether number 7074 is divisible by 9.

  Solution : Sum of all digits of the number = 7 + 0 + 7 + 4 = 18 (divisible by 9).

  So, the number 7074 will be divisible by 9.

- **Divisibility by 11 :**

  A number is divisible by 11, if difference between the sum of digits at odd places and the sum of digits at even places, is divisible by 11.

  Example : Test whether number 86460 is divisible by 11.

Solution : Sum of the all digits at even places in the number = 6 + 6 = 12

Sum of the all digits at odd places in the number = 8 + 4 + 0 = 12

Their difference = 12 – 12 = 0. So, the number 86460 will be divisible by 11.

8. WHOLE NUMBERS

We start counting from the number 1. Hence 1 is the first natural number and the next natural number is 2 which is obtained by adding 1 to the first number. Hence, numbers are represented in two ways according to their orderliness :

- **Predecessor** —The natural number immediately preceding a natural number is its predecessor.

  Example : Predecessor number of 65 = 65 – 1 = 64

  Predecessor number of 127 = 127 – 1 = 126

- **Successor** —The natural number immediately next to any natural number is its successor.

  Example : Successor number of 785 = 785 + 1 = 786

  Successor number of 109 = 109 + 1 = 110

8.1 Whole Numbers—Natural numbers combine with zeroes to form whole numbers. When operations (addition, subtraction, multiplication, division) are used on whole numbers, many properties are revealed.

8.2 Characteristics of Whole Numbers

- All properties of natural numbers are true for the whole numbers.
- The smallest whole number is '0' (zero).

8.3 Properties of Whole Numbers

I. Closure property – If a and b be two whole numbers, then $a + b$ and $a * b$ will also be whole numbers.

Example :

- 4 + 5 = 9, a whole number
- 4 × 5 = 20, a whole number
- 4 – 5 = – 1, not a whole number
- 4 ÷ 5 = 0.8, not a whole number

Hence, whole numbers don't follow the subtraction and division operations for closure property.

II. Communicative property—Addition and multiplication operations are both communicative for whole numbers.

Example :

- 4 + 5 = 9 = 5 + 4, a whole number
- 4 × 5 = 20 = 5 × 4, a whole number
- 4 – 5 = – 1 ≠ 5 – 4 = 1, not a whole number
- 4 ÷ 5 = 0.8 ≠ 5 ÷ 4 = 1.25, not a whole number

Hence, whole numbers don't follow the subtraction and division operations for communicative property.

III. Associative property—Addition and multiplication operations are both associative for whole numbers.

Example : 4 + (5 + 6) = 4 + 11 = 15

(4 + 5) + 6 = 9 + 6 = 15

∴ 4 + (5 + 6) = (4 + 5) + 6

IV. Distributive property—

$a \times (b + c) = a \times b + a \times c$

or $(a + b) \times c = a \times c + b \times c$

Example : $4 \times (5 + 8) = 4 \times 5 + 4 \times 8$

$4 \times 13 = 20 + 32$

$52 = 52$

It is clear from the example that it is called distribution property of multiplication on addition operation.

V. Identity element—

- **Additive identity**—'0' is called additive identity because it is only the element its addition with any number gives the same number.

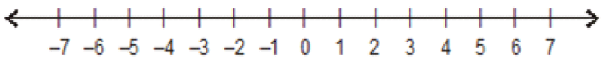
  Example : 5 + 0 = 5, and 7 + 0 = 7 etc.

- **Multiplicative identity**—'1' is called multiplicative identity because it is only the element its multiplication with any number gives the same number.

  Example : 6 × 1 = 6, and 7 × 1 = 7 etc.

8.4 Integers—The set of all negative numbers and positive numbers on either side of the zero marked on the number line is called an integer.

–5, – 4, – 3, –2, –1, 0, 1, 2, 3, 4, and 5 all are the integers. On the number line, integers are represented as follows :



- **Properties of integers**

  ❖ **Closure property**—If a and b be two whole numbers, then $a + b$ and $a * b$ will also be whole numbers.

  Example :
  - (+ 4) + (+ 5) = + 9, an integer
  - (– 4) × (+ 5) = – 20, an integer

  ❖ **Communicative property**—Addition and multiplication operations are both communicative for whole numbers.

  Example :
  - (+4) + (+5) = +9 = (+5) + (+4), an integer
  - (–4) × (+5) = –20 = (+5) × (–4), an integer

  ❖ **Associative property—**Addition and multiplication operations are both associative for whole numbers.

  Example :
  - 7 + (5 –3) = 7 + 2 = 9
  - (7 + 5) –3 = 12 – 3 = 9
  - 7 + (5 –3) = (7 + 5) –3

  ❖ **Distributive property—**$a \times (b + c) = a \times b + a \times c$

  or $(a + b) \times c = a \times c + b \times c$

- **Identity element—**'0' is called additive identity and '1' is called multiplicative identity.

8. Important Examples

Ex. 1. What is the difference between place value and face value of 7 in 867943?
[SSC MTS Exam, 2010]
(A) 943
(B) 7936
(C) 6993
(D) None of these

Sol. (C) : Place value of 7 in 867943 = 7000
Face value of 7 in 867943 = 7
∴ Required difference
7000 – 7 = 6993

Ex. 2. The sum of all prime numbers which is not greater than 17 is :
[SSC CPO (Re) Exam, 2016]
(A) 59
(B) 58
(C) 41
(D) 42

Sol. (B): Required sum
= 2 + 3 + 5 + 7 + 11 + 13 + 17
= 58

Important Questions

1. Write the following in ascending order :
11023, 11032, 12031, 12013
(A) 11023, 12031, 12013, 11032
(B) 11032, 12013, 11023, 12031
(C) 11023, 11032, 12013, 12031
(D) 11032, 11023, 12013, 12031

2. What is that smallest number made up of by using the digits 4, 5, 0 and 3 (The repitition of digits is possible) ?
(A) 30450 (B) 30045
(C) 34500 (D) 30540

3. The difference between the nearest thousands value of 14510 and the nearest Hundreds value of 8849 is :
(A) 5200 (B) 5700
(C) 6200 (D) 6150

4. If (place value of 5 in 15201) + (place value of 6 in 2659) = 8 × x, then find the value of x.
(A) 80 (B) 70
(C) 800 (D) 700

5. If 112 units + 12 thousands = 11012 + x tens, then find the value of x.
(A) 110 (B) 101
(C) 112 (D) 111

6. How many numbers from 100 to 300 are divisible from 7?
(A) 42 (B) 28
(C) 35 (D) 31

7. 19 thousands + 19 hundreds + 19 units is equal to :
(A) 21090 (B) 20919
(C) 19919 (D) 191919

8. Round off 37507 to the nearest hundreds is :
(A) 37500 (B) 37000
(C) 38000 (D) 30000

9. Find the difference between the number 36490 and the number obtained by interchanging the places of 6 and 9.
(A) 2970 (B) 3030
(C) 2070 (D) 2790

10. Find the greatest number that will divide 37, 56, 93 leaving remainder 1, 2 and 3 respectively.
(A) 9 (B) 18
(C) 15 (D) 12

11. Find the difference between the greatest and the least number that can be written using the digits 6, 2, 7, 4, 3 each only once.
(A) 52965 (B) 53965
(C) 52956 (D) 52659

12. Whole numbers are closed under which operation ?
(A) Subtraction
(B) Division
(C) Multiplication
(D) All of these

13. If 112 units + 12 thousands = 11012 + x tens, then find the value of x.
(A) 110 (B) 101
(C) 112 (D) 111

14. Find the difference between largest 5-digit number and the smallest 6-digit number.
(A) 90,000 (B) 90,001
(C) 9 (D) 1

15. Place value of 1 in the number 0.0159 is—
(A) 1 (B) 1/10
(C) 1/100 (D) 1/1000

16. Which of the following is divisible by 25?
(A) 4855 (B) 5685
(C) 6790 (D) 7150

17. What will be the least value of * in 6735*1 so that the obtained number will be exactly divided by 9?
(A) 7 (B) 9
(C) 5 (D) 4

18. How many numbers from 100 to 300 are divisible from 7?
(A) 42 (B) 28
(C) 35 (D) 31

19. If '3' is replaced by '1' in the number 49375, then how much will the number be reduced?
(A) 20 (B) 200
(C) 2 (D) 100

20. Find the difference between place value of 6 and face value of 4 in the number 56431?
(A) 6500 (B) 5600
(C) 5996 (D) 6600

21. Fill the smallest digit that will make 93856 ? 294 divisible by 9.
(A) 0 (B) 4
(C) 5 (D) 8

22. The product of all prime numbers between 80 and 90 will be :
(A) 83 (B) 89
(C) 7387 (D) 598347

23. Which of the following statements is not correct ?
(A) Every natural number is a real number
(B) Every real number is a rational number
(C) Every integer is a rational number
(D) Every natural number is an integer.

24. How many composite numbers are there between 67 and 101 ?
(A) 27 (B) 26
(C) 24 (D) 23

25. What is the value of Z if number 417Z8 is divisible by 9 ?
(A) 7 (B) 9
(C) 3 (D) 6

26. What is the remainder when we divide 3^{1989} by 7 ?
(A) 8 (B) 7
(C) 6 (D) 0

27. What is the digit unit of (378 × 236 × 459 × 312)
(A) 6 (B) 8
(C) 2 (D) 4

28. If 31P5 is multiple of 3, where P is ten's digit, then the greatest value of P is :
(A) 9 (B) 3
(C) 6 (D) 5

29. Multiplication of place values of 3, 4 and 5 in the number 60321045 is equal to :

(A) 60 (B) 600000
(C) 60000 (D) 60000000

30. Sum of place values of 7, 6 and 9 in the number 17065809 is equal to :
(A) 706009 (B) 7006009
(C) 7060009 (D) 70060009

31. Prime factors of number 840 are :
(A) $7 \times 5 \times 4 \times 3 \times 2$
(B) $7 \times 5 \times 3 \times 2 \times 2 \times 2$
(C) $7 \times 5 \times 3 \times 3 \times 2$
(D) $7 \times 5 \times 3 \times 2 \times 2$

32. The prime factors of the number 720 are :
(A) $2 \times 2 \times 3 \times 3 \times 2 \times 5$
(B) $2 \times 3 \times 4 \times 5 \times 6$
(C) $3 \times 3 \times 4 \times 4 \times 5$
(D) $2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5$

Solutions

1. (C) Required ascending order of given numbers : 11023 < 11032 < 12013 < 12031

2. (B) Smallest 5-digit number using the digits 4, 5, 0 and 3 (Repeitition is possible) = 30045

3. (C) Number of 14510 nearest 1000
= 15000
Number of 8849 nearest 100 = 8800
∴ Required difference
= 15000 – 8800
= 6200

4. (D) (Place value of 5 in 15201) + (Place value of 6 in 2659) = $8x$
$\Rightarrow$ $5000 + 600 = 8x$
$\Rightarrow$ $8x = 5600$
$\Rightarrow$ $x = \frac{5600}{8}$
$= 700$

5. (A) 112 units + 12 thousand = 11012 + x tens
$112 + 12000 = 11012 + 10x$
$12112 = 11012 + 10x$
$10x = 12112 - 11012$
$10x = 1100$ or $x = 110$

6. (B) Numbers having multiples of 7 between 100 and 300
$= 15 \times 7, 16 \times 7, 17 \times 7, \ldots 42 \times 7$
So, total numbers divisible by 7
$= 42 - 15 + 1 = 28$

7. (B) 19 thousands + 19 hundreds + 19 units
= 19000 + 1900 + 19
= 20919

8. (A) Nearest hundred value of 37507
= 37500

9. (A) Required diff. = 39460 – 36490
= 2970

10. (B) On subtracting remainder 1, 2 and 3 respectively from numbers 37, 56 and 93
Numbers : (37 – 1), (56 – 2), (93 – 3)
36, 54, 90
H.C.F of 36, 54 and 90

9	36. 54, 90
2	4, 6, 10
	2, 3, 5

Hence, HCF = 9 × 2
= 18

11. (A) Largest number using 6, 2, 7, 4, 3
= 76432
Smallest number using these number
= 23467
∴ Required difference
= 76432 – 23467 = 52965

12. (C) Whole numbers are closed under addition and multiplication. Since, if we add or multiply two whole numbers, the result always whole number. *e.g.*, 4 + 1 or 1 + 4 = 5 and 2 × 3 or 3 × 2 = 6 both 5 and 6 are whole numbers.
Whole numbers are not closed under subtraction and division *e.g.*, 4 – 7 = – 3 and – 3 is not a whole number.
Similarly, $\frac{4}{7}$ and $\frac{1}{2} = 0.5$.
Here, $\frac{4}{7}$ and 0.5 are not whole numbers.

13. (A) 112 units + 12 thousand = 11012 + x tens
$112 + 12000 = 11012 + 10x$
$12112 = 11012 + 10x$
$10x = 12112 - 11012$
$10x = 1100$ or $x = 110$

14. (D) Smallest 6-digits number = 100000
Largest 5-digit number = 99999
∴ Difference = 100000 – 99999 = 1

15. (C) Place value of 1 in 0·0159
$= 0{\cdot}01 = \frac{1}{100}$

16. (D) If last two digits are divisible by 25, then the entire number will also divisible by 25.
∴ Required number = 7150

17. (C) 6735*1 = 6 + 7 + 3 + 5 + * + 1 = 22 + *.
For the exact division, 5 will be the least value to put in place of *.

18. (B) Numbers having multiples of 7 between 100 and 300
$= 15 \times 7, 16 \times 7, 17 \times 7, \ldots 42 \times 7$
So, Total numbers divisible by 7
= 42 – 15 + 1 = 28

19. (B) Obtained number after replacing the digit 3 by 1 in 49375 = 49175
So, the required difference
= 49375 – 49175 = 200

20. (C) Difference = 6000 – 4
= 5996

21. (D) By the divisibility rule of 9, if the sum of all digits of the given number is divisible by 9, then the number will also be divisible by 9
So, (9 + 3 + 8 + 5 + 6 + ? + 2 + 9 + 4) / 9
$\Rightarrow \frac{46 + ?}{9}$
∴ On putting minimum value 8 in place of ?, the number will divisible by 9.

22. (C) Prime numbers between 80 and 90
= 83, 89
So, Product = 83 × 89
= 7387

23. (D) Every natural number is not an integer.

24. (A) (68, 69, 70, 72, 74, 75 .... 100)
Numbers greater than 1, which are not prime, are called "composite number".
So, Numbers = 27

25. (A) A number is divisible by 9 i of the sum of the digit of the number is divisible by 9
hence, In number 417Z8,
(4 + 1 + 7 + Z + 8) = (20 + Z)
Clearly, number which is greater than 20 and divisible by 9
= 27,
∴ (20 + Z) = 27
$\Rightarrow$ Z = (27 – 20) = 7

26. (C) $\frac{3^{1989}}{7} = \frac{(3^3)^{663}}{7}$
$= \frac{(20+7)^{663}}{7} = \frac{20}{7}$
Hence Remainder = 6

27. (D) Unit digit of product of given expression $(378 \times 236 \times 459 \times 312)$

=Unit digit of product of $(8 \times 6 \times 9 \times 2)$

=Unit digit of product of (48×18)

=Unit digit of product of (8×8)

$\therefore$ Unit digit in 64 is 4

28. (A) If 31P5 is a multiple of 3 then the sum of these digits is also divisible by 3.

$3 + 1 + P + 5 = 9 + P$

Putting the maximum value of P as 9, the sum of its digit 18 will also be divisible by 3,

Hence the value of P will be 9

29. (D) 60321045

place value of 3 = 300,000

place value of 4 = 40

place value of 5 = 5

Hence required multiplication

$= 3,00,000 \times 40 \times 5$

$= 60000000$

30. (C) Required sum

$= 7000000 + 60000 + 9$

$= 7060009$

31. (B) Prime factor of 840,

2	840
2	420
2	210
3	105
5	35
7	7
	1

Hence: $840 = 2 \times 2 \times 2 \times 3 \times 5 \times 7$

32. (D) prime factor of 720,

$= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5$

2	720
2	360
2	180
2	90
3	45
3	15
5	5
	1

❑❑

Chapter

1 Nature of Mathematics / Logical Thinking

1. Introduction

- Mathematics finds a very important place in human progress and development.
- If we observe our day to day life, mathematics is inseparable from every walk of our life.
- Our simple daily activities like simple calculations, the proportion of items in our cooking, our monthly expenses, our body size, our normal breathing count etc. need mathematics to keep track of it.
- Further if we move on to some advanced uses like our profession, mathematics is an integral part in a big way. Hence it can be understood that nothing in this world can work without the use of mathematics.
- Hence it is very essential that one understands and internalises mathematics at a very early age.
- In order to understand mathematics, one should be aware of its nature and also its scope.
- This makes the learning of mathematics meaningful and useful. Here, us try to understand the meaning of Mathematics, its nature and scope

2. Meaning of Mathematics

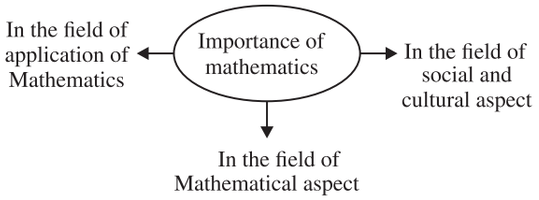
- Etymologically the word „Mathematics " has been derived from the Greek „mathema‟ which means “Science, Knowledge or Learning”. Mathematics has been defined by different dictionaries as follows:
  - Mathematics is the science of number and space
  - The science of measurement, quantity and magnitude
  - Study of figures and numbers
  - Study of patterns of structure, change and space.
- The definitions clearly indicate that Mathematics is an accepted science which deals with quantitative aspects of our life and knowledge.
- Comte defined mathematics as “The science of indirect measurement”.
- According to Kant “Mathematics is the indispensable instrument of all physical researchers”.
- Gauss stated “Mathematics is the Queen of Sciences and arithmetic is the queen of all mathematics.”
- Bacon said “Mathematics is the gateway and key to all sciences.”
- Mathematics in the real sense is a science of space and quantity that helps us in solving the problems of life needing numeration and calculations. It provides an opportunity for the intellectual gymnastics of the man‟s internal powers. It is an exact science and involves high cognitive abilities and powers.
- J.B. Shaw stated, “Mathematics is engaged, in fact, in the profound study of art and the expression of beauty.” According to Shaw there are four significant methods of mathematics which give more insight into the nature of mathematics.
  - Scientific, leading to generalisations of widening scope.
  - Intuitive, leading to an insight into subtler depths.
  - Deductive, leading to a permanent statement and rigorous form.
  - Inventive, leading to the ideal element and creation of new realms.
- According to I. B. Shaw "Mathematics is engaged in fact in the profound study of art and expression of beauty"
- According to Maxwell "Mathematics is the art of saying the same thing in many different ways".
- According to Bertrand Russel "Mathematics may be defined as "The subject in which we never know what we are talking about, nor whether what we are saying is true"
- According to Gauss "Mathematics is the queen of science and arithmetic is the queen of all mathematics".
- According to Descrutes "Mathematics is a science of order and measure".
- According to Loyce "Mathematics is a way to settle in the mind a habit of reasoning"..
- The National Policy on Education 1986, mentions-
  - "Mathematics should be visualised as the vehicle to train a child to think, reason, analyse and to articulate logically.
  - Mathematics is the science of patterns and forms in numbers and space. The thrill of mathematics lies in the discovery of these patterns.
  - Mathematics is both an experimental and deductive science. While proofs are important, the discovery of patterns is even more important and is certainly more exciting.

3. Nature of Mathematics

- On the basis of various thoughts of the greatest mathematical scientists of all times the following aspects on the nature of mathematics have emerged.
- **As a science of reasoning :**
  - According to Locke 'Mathematics is a way to settle in mind a hibite of reasoning'. Mathematics is based on logical reasoning. This logic helps us to come to a conclusion or to prove a statement. The reasoning may be of two types
    - inductive reasoning–based on observation and experience of individual cases to arrive at a generalised conclusion
    - inductive reasoning–where generalisation is made on the basis of predetermined axioms or postulates.
  - Laws of deductive logic are the basis of valid reasoning. These laws are
    - Law of identity
    - Law of excluded middle and
    - Law of contradiction.
  - So mathematics is regarded as a highly disciplined model of thinking.
- **Mathematics as a science of symbols-**
  - Symbols are plenty in mathematics.
  - Each symbol has a definite meaning. These symbols are accepted as universal.
  - The main characteristics of mathematical languages are simplicity, accuracy and very precious.
- **Mathematics as an Abstract science-**
  - Scientific theories, laws etc are expressed also in mathematical language which become abstract.
- **Mathematics as a study of structure-**
  - Mathematical structure is a mathematical system obtained by some sort of arrangement, formation or putting together of parts.
  - For this we apply the properties like commutative, associative and distributive operations.
  - Plane analytic geometry is considered as a superstructure based on the structure known as real number system.
  - Similarly, the number system, group, field, ring, vector etc, are examples of mathematical structures.
- **Mathematics as a science of precision and accuracy-**
  - Mathematical results are exact and precise.
  - It may be either right or wrong, accepted or rejected.
  - There is no in between the might and wrong.
  - Sometimes we have to give emphasis on approximation in mathematical results but that also depends on the degree of accuracy.
- **Mathematics as a deductive science-**
  - In deductive reasoning we proceed in the following way :
    - if something is true which is considered as a fundamental assumption, then the subsequent deduction based on accepted assumptions must be true.
- **Mathematics as an inductive science-**
  - Inductive reasoning is based on the principle that if a relationship holds good for few particular cases and even for any similar case then the relationship can be generalised into a rule or formula.
- **Hierarchical Nature of mathematics-**
  - Hierarchical Nature shows that the concepts in mathematics are arranged in a predefined order where skipping the previous concept may lead to an ambiguity in the later one.
    - For example if we don't understand natural numbers, we will certainly not be comfortable with whole numbers.
    - Similarly, if the subtraction and multiplication operations are not strengthened, division cannot be introduced.
    - So, to understand each of these abstract concepts, we need to understand every concept that comes before it in the stepwise build-up of ideas. Such a stepwise build-up is a hierarchy.

4. Importance of Mathematics

- In the words of Young "Mathematical is the only subject that encourages and develops logical thinking.
- It enables the student to discriminate between essential and non essential.
- It helps them to shift facts, to draw conclusions without ambiguity and that is the subject by which they may learn what is meant by rigid reasoning."
- The importance of mathematics is multidimensional and widespread. So being numberate is becoming more important than being literate.
- The importance of mathematica can be judged from three aspects namely
  - Social aspect,
  - Application aspect and
  - Mathematical aspect.



- **Importance of Mathematical from social aspect:**
  - Daily life activities of man demand mastery of number and mathematical vocabulary like commission, discount, profit and loss, percent and like.
  - The study of mathematics helps to develop logical thinking and reasoning, and creative imagination.
  - Mathematics enhances the ability to apply mathematical ideas in other branches of knowledge and even in daily life situations.
  - Many vocations require mathematical skills.
  - Mathematics helps man to discover the mysteries of the universe and to overcome superstitions.
- **Importance of Mathematics from application aspect-**
  - Mathematics provides sufficient skills to meet the demand of daily life.
  - It provides a clear understanding of laws of nature.
  - Various cultural art like painting, drawing and sculpture are based on mathematical knowledge.
  - Music utilises mathematics.
  - Mathematical Quizzes, puzzles, magic squares, tools are both entertaining and challenging to develop power reasoning.
  - Mathematics has a positive correlation with other frames of science as well as with social sciences and also with languages-mathematics in use as tools of other subjects.
  - Lofly A Zadeh has discovered two types of fuzzy set namely Intuitionistic and Neutrosophic fuzzy set which has revolutionised the application areas of mathematics.
- **Importance of Mathematics from mathematical aspect-**
  - Mathematical contents are gradually increasing and other related subjects are also developed by mathematics.
  - Mathematics improves the ability to perform calculations with speed and accuracy. It also develops the concepts of symmetry, similarity and the skill to use instruments with precision.
  - **Mathematics improves the power of**
    - estimation and approximation of results more actuality.
    - being more systematic in finding relationships, drawing conclusions.
    - interpretation of numerical data using graphs etc.
    - taking independent decisions in administrative and social issues.
    - thinking alternative methods of solving problems.

5. Building Blocks of Mathematical System

- **Undefined Terms Of Assumptions:** Undefined terms in mathematics which are accepted and used on the logic that it is not possible to define everything and one has to start from something that goes undefined with a clear cut assumption of its existence.
- **Definitions:** Technical terms that are defined using the undefined terms.
- **Postulates:** The statements which are accepted as true in a particular system without stressing on their proofs are labelled as postulates.
- **Propositions:** A proposition may be defined as something proposed or offered for consideration or acceptance
- **Axioms:** An axiom is a proposition regarded as a self-evident truth.
- **Hypothesis:** a tentative assumption made in order to draw out and test its logical or empirical consequences.
- **Open Questions:** There are situations arising in the study of mathematics and also in our day to day life where we are confronted with or have to make use of the declarative statements expressed in meaningful sentences that can be proved both true or false. These sentences are referred to as open sentences and stand as quite free and open for being accepted, rejected or accepted as well as rejected in the or the other circumstances.
- **Quantifiers:** There are two types of quantifiers: universal quantifier and existential quantifier. While universal quantifiers provide universal quantification, the existential quantification is provided through existential quantifiers.
- **Mathematical Theorem:** Logical valid conclusion drawn from a set of premises, axioms and already established theorems of mathematics.
- **Variants of Mathematical Theorem:** A mathematical theorem □ → □ can be found to have its variants in the form of
  - Converse of the theorem (● → ●)
  - Inverse of the theorem (●) → (●)
  - Contrapositive of the theorem (●) → (●)

6. Aims and Objectives of Teaching Mathematics in Elementary and Secondary Schools

- We know that education is meant to acquire 3 Rs reading, writing and Arithmetic.

- The National policy in Education (1986 NPE) has mentioned that Mathematics should be taught to fulfil the aim that each learner is trained to think, reason, analyse and articulate logically.
- As far as possible the discovery approach is to the following.
- The skills of drawing, measuring and estimation have to be developed.
- To remember the knowledge of terms, concepts, principles, processes and symbols. To respect the contribution of great mathematicians.
- To develop the skills in handling devices like calculators, Computers etc.
- To help the learner to utilise the knowledge of Mathematics and skills to solve problems of daily life.
- To be fit to understand the content of higher Mathematics.
- The aims of teaching Mathematics are the goals, targets or universal purpose that may be fulfilled by the teaching of Mathematics. So aims are like ideals.
- Their attainment needs stepwise phase wise long-term planning.
- Objectives are the short-term or immediate goals that may be attained within specified classroom activities

Aims of teaching Mathematics

Besides helping the students to acquire mathematical knowledge, the teaching of Mathematics also helps the students to attain the broad aims of Mathematics.

- Disciplinary aim : The teaching of Mathematics will provide the learner to think logically and will develop the intellectual habits.
- Utilitarianism aim - The students will be given mathematical knowledge to solve real life problems also. Thus the study of Mathematics will be functional and purposeful.
- Social aim- The knowledge of Mathematics will serve both the individual in particular as well as the society in general.
- Moral aim- The continental and the process solution will imbibe morality.
- Aesthetic aim- The teaching of mathematics will create intervest and the learners will remain engaged even if their leisure time
- Cultural aim- The teaching of Mathematics will also help the learner to understand the contribution of Mathematics in development culture.
- Vocational aim- It will help the learner to be fit for any location of his choice.
- Inter disciplinary aim- The learner will realise the application of Mathematics in different subjects.

Objectives of Teaching Mathematics

The objectives of teaching mathematics at the whole school stage may be classified as follows :

- Knowledge and understanding objectives
- Skill objectives
- Application objectives
- Attitude objectives
- Appreciation and interest objectives

Knowledge And Understanding

- Language of Mathematics – symbols, formula, terms, definitions statements etc
- Different mathematical concepts like numbers, sets, measurements, directions etc
- Mathematical process and relationships
- Development of Mathematics and contribution of mathematicians
- The nature of Mathematics and its scope
- Interrelationship between different branches of Mathematics and with different subjects

Skill Objectives

Skill means the ability to perform a given act with case and precision. The teaching Mathematics helps the learners to develop the following skills

- He acquires and develops speed, neatness, accuracy and precision is mathematical calculations
- He develops skill in the use and understanding mathematical language
- He develops the ability to estimate, check and verify results
- He develops the ability to perform calculations orally and mentally
- The learner develops the ability to think correctly, to draw conclusions, generalisations and inferences.
- He develops skills to use mathematical tools and apparatuses skillfully.
- He develops skill in drawing, meaning, weighing and use of different mathematical tools.
- He develops necessary skills in drawing geometrical figures and mathematical concept maps.

Application Objectives

It is the ability to apply learned knowledge, concepts, principles and skills in new and similar situations. It involves the application of abstract learning in real life situations. Learning Outcomes is this area that requires a higher level of understanding of mathematical concepts. The students are enable to :

- Analyse, draw inferences, generalise from collected data.
- Use mathematical concepts in everyday life
- Solve mathematical problems independently by
- Applying mathematics is his fortune in vocational life.
- Make use of mathematics to learn other subjects and equip yourself for higher education.

Attitude Objectives

The development of Mathematics attitude makes learner open minded, helps him to make critical observation and to develop curiosity and impartial thinking The students will be able to

- To analyse the problem independently
- Develop the habit of systematic thinking and reasoning
- Develop heuristic attitude
- Develop originality, independent thinking and creativity
- Develop mathematical perspective while observing real life physical phenomena.

Appreciation And Interest Objectives

The students will be able to appreciate

- The value of mathematics as the science of all sciences and art of all arts.
- The recreational value of mathematics and the utility for leisure time activities.
- Actively participate in mathematical debates, contests, quiz, and quests.
- The role of Mathematics in everyday life.
- The student will develop interest in mathematical learning and activities.

7. Objectives of Teaching Mathematics at the Elementary Stage

The main objectives at the elementary stage are the following :

Knowledge And Understanding Objectives:

- Develop The knowledge and understanding of mathematical concepts of number, units of measurement, shape, size, direction, distance, fractions, equal, grouping and subgrouping etc.
- Develops the knowledge, understanding of mathematical terms, symbols, digits, fractions, percentages etc
- Develops the knowledge and understanding of mathematical facts like four fundamental operations, percentage, unitary method, mensuration etc
- Develops the knowledge and understanding of mathematical relationships, notations etc.

Skill Objectives:

The learner develops the following skills

- Skill of four fundamental operations with speed and accuracy
- Ability in counting, reading, writing numbers and simple calculations
- Skill in the use of mathematical tables
- Proficenary in making estimates of size, distance and weights.

Application Objectives

- The learner is able to solve both oral and simple writtens mathematical problems independently.
- Trying to apply elementary mathematical knowledge every day is a real life situation
- Try to estimate the length, mass of visible objects.

Attitude Objectives

- To solve a problem, he tries to follow the systematic steps of solving the problem like reading the verbal problems carefully, analyse the facts, collect data and draw tentative inferences.
- Develop gradually the habit of logical thinking and reasoning
- Develops the habits of neatness, honesty and regularity.
- Gradually develops self-confidence for solving elementary mathematical problems.

Appreciation and Interest Objectives.

- Appreciating the knowledge of Mathematics is solving problems of daily life.
- Appreciates the recreational value of Mathematics and tries to utilise his leisure time.
- Develops interest in the learning of Mathematics.
- Appreciates the contribution of mathematicians and gets inspired.

8. Objectives at the Secondary Stage

Knowledge And Understanding Objectives

- He understands the relationship of concepts, formulas, axioms and properties in the field of mathematics.
- Gudge sufficiency, superfluency, relevance, inconsistency is the given data.
- Detects errors in definitions, concepts, principles, process etc.
- Translate mathematical relationships into symbolic forms and vice-versa.
- Interpret graphs, charts, tables etc.

Skill Objectives

- He develops skill in solving the same problem by various methods but with reasonable speed.
- Make readings from the label quickly and correctly.
- Draw the geometrical figures nearly and systematically.
- Check the calculation quickly and can use the instruments and appliances.

Application Objectives

- He learns the application of Mathematics in daily life, vocational, occupational and recreational life.
- Formulate hypotheses from observed data and then draw inference.
- Develop designs using mathematical relationships and principles
- Solve new problems

Attitude Objectives

- Develops interest and positive attitude towards learning of Mathematics
- Learner gains confidence in the learning of Mathematics
- Observe mathematical relationship is the environment
- Accept mistakes and point out errors unhesitatingly.

Appreciation And Interest Objectives

- He enjoys solving mathematical problems of different types
- Derive pleasure is observing, finding, interpreting mathematical relationship
- Express joy and pride over the great contribution of mathematicians
- Regards, great mathematicians and mathematics teachers with respect.

9. Objectives According to National Curriculum Framework

- The National Curriculum Framework has put forward the objectives of teaching school Mathematics as follows Developing Children's abilities for mathematisation is the main goal of mathematics education.
- The narrow aim of school mathematics is to develop useful capabilities particularly those relating to numeracy-numbers, number operation, measurement, decimals and percentages.
- The higher aim is to develop the child's resources to think and reason mathematically, to pursue assumptions to logical conclusions and to handle obstruction.
- It includes a way of doing things and the ability and the attitude to formulate and solve problems.
- **Accordingly the vision for school Mathematics are :**
  - children learn to enjoy mathematics rather than fear it.
  - children learn important mathematics.
  - Mathematics is more than formulas and mechanical procedures.
  - Children see Mathematics as something to talk about, to communicate, to discuss among themselves, to work togethers on.
  - Children pose and solve meaningful problems.
  - Children use abstractions to perceive relationships, to see structure, to reason out things, to argue the truth or falsity of statements.
  - Teachers engage every child in class with the conviction that everyone can learn mathematics.

10. Objectives of teaching Mathematics by Dr. Benjamin S. Bloom

- As we all know Objectives point out at the specific changes in behaviour or the specific learning experiences that a pupil will have during a learning process. Now let us go through the objectives of teaching mathematics.
- Dr. Benjamin S. Bloom (1956) has classified the changes of behaviour in three categories or Domains
  - Cognitive Domain
  - Affective Domain
  - Psychomotor Domain
- Dr. B.S. Bloom and his associates in the University of Chicago gave the classification of objectives of all the three domains.
  - Classification of cognitive domain or objectives by Bloom (1956)
  - Affective domain by Krathwohl (1964)
  - Psychomotor Domain by Simpson (1986)
- Dr. Bloom concentrated on the study of cognitive Domains.
- He assumed that in thinking about a problem a hierarchy of cognitive processes is involved.
- While teaching, a teacher follows this hierarchical order.
- This classification of objectives is known as „Taxonomy of Educational Objectives" or "Bloom's Taxonomy" of objectives.

Taxonomy of Teaching Objectives

S.No.	Cognitive Domain Category	Affective Domain Category	Psychomotor Domain Category
	Dr. B. S. Bloom (1956)	**Krathwohl (1964)**	**Simpson (1969)**
1.	Knowledge	Receiving	Impulsion
2.	Comprehension	Responding	Manipulation
3.	Application	Valuing	Control
4.	Analysis	Conceptualization	Co-ordination
5.	Synthesis	Organization	Naturalization
6.	Evaluation	Characterization	Habit Formation

- **Cognitive Objectives:** Cognitive Objectives stress that the pupils should acquire more and more knowledge. It was defined to include all those activities which deal with the recall or recognition of knowledge and the development of intellectual abilities and skills.
- **Affective Objective:** Affective objective is concerned with the attitude, interest, emotions, values and mental tendencies of the pupils. This part of the taxonomy also includes appreciations and social adjustment of the child.
- **Psychomotor Objective:** This third part of taxonomy includes the manipulative and motor-skill areas. The physical actions involved in handwriting, playing, using equipment, making outlines, drawing figures and many others are in the psycho-motor domain.

11. Creative Thinking In Mathematics

- In Mathematics, the thinking that helps students tackle problems having one correct answer is termed as inductive thinking.
- You would agree that convergent thinking does not help children much to develop their cognitive abilities.
- In a way we are restricting the thinking styles of children.
- Being teachers, instead of limiting their thinking, we should organise situations that help children think in multiple ways.
- This would help children in divergent thinking.
- The opposite of convergent thinking is divergent thinking, which leads to development of creative responses called creativity.
- Creative thinking has a major role in mathematical reasoning. It is creative thinking that has led to the invention of new ideas and knowledge, not only in Mathematics, but also in other subject areas.
- "Creative thinking involves being able to break away from routines and stereotype methods to think flexibly, and to generate new ideas and approaches to problems.
- The opposite of creativity is rigidity and fixation" (Haylock, 2010).The following are the major components of creativity:
  - **Divergent Thinking:** Engagement with different possibilities and not just proceeding on a predefined path
  - **Fluency:** Being able to decide the mathematical process to be followed as quickly as possible
  - **Flexibility:** Having courage to change the process without getting bogged down
  - **Originality:** Ability to think independently and not just repeat the steps shown by others
  - Appropriateness: Follow paths which match with the conditions of the problem and not just follow any steps and hope to fit them somehow or the other.

12. Constructivist Approach For Teaching Learning Mathematics

- As we discussed, constructivism assumes that knowledge cannot be transmitted to the learner but is constructed by him/her.
- It is constructed by the learner on the basis of experiences.
- In the process of knowledge generation, new experiences, talking to others and reflective thinking could be helpful. Many times learning includes change in existing conception.
- There are three ways for meaningful learning to take place which are as follows:
  - Addition to the existing knowledge,
  - Small modification to the existing knowledge,
  - Major changes in the existing knowledge.
- Conceptual change does not take place easily. For conceptual change three conditions are necessary, which are as follow:
  - Learner must encounter a situation which he/she is not able to understand using existing knowledge, thereby producing dissatisfaction in the learner.
  - Learner must come across some knowledge, which is intelligible to him/her and seems plausible.
  - The new knowledge helps the learner to understand some new situations which were beyond his/her reach earlier.
- There are many shades of constructivism. It is not a unique monolith philosophy.
- As we discussed, Piaget the first constructivist laid emphasis on action by the learner on the object which results in accommodation and assimilation.

- Vygotsky, another important constructivist, is a proponent of socio-cultural perspective. For him, zones of proximal development, scaffolding and peer learning are three important considerations.
- Zone of Proximal Development (ZPD) is that stage of development of a child where he cannot solve a problem of his/her own but a slight hint and help by teacher or some other able person, is sufficient to enable him to solve the problem.
- Scaffolding is the support provided by an expert to a novice in the initial stage of learning.
- Slowly as the progress is made by the learner, support is withdrawn gradually.
- Peer learning could take place in three ways: peer tutoring, cooperative learning and peer collaboration.
- As a constructive teacher, you should have a clear idea about learners' previous knowledge. You can use appropriate strategies to assess the previous knowledge since this will be very important for designing suitable activities for working in their ZPD.
- Whenever learners find difficulties within the zone, it is the duty of the teacher to provide assistance or support in the process. This can either be done by the teacher or with the help of a more competent peer. This process of assisting is technically known as scaffolding.
- Thus a constructivist teacher is required to create opportunities for peer scaffolding and teacher-directed scaffolding in order to stimulate knowledge construction.
- The important task of a teacher is to design appropriate activities so that the learners can work on it and construct expected knowledge with confidence and a feeling of success. This of course needs ingenuity and creativity.
- Creation of a learning environment which is stimulating, interactive, and enlightening for the learners is the most challenging task of a constructivist teacher.

13. Strategies For Teaching Learning Mathematics

- We have discussed the constructivist approach of teaching learning of Mathematics. There are some strategies of teaching Mathematics like inductive – deductive, analysis-synthesis , problem solving, discovery, activity etc. which help the learner in constructing their knowledge.
- The purpose of these strategies is to make teaching-learning more interactive as well as effective. You can select a particular strategy based on the needs of learners as well as its relevance to the content.
- Some strategies of teaching learning Mathematics are as follows:

Inductive – Deductive

It is a combination of inductive and deductive approach. Let us first discuss the Inductive approach.

- **Inductive Approach**
  - Inductive approach is based on the process of induction i.e. reasoning from specific facts to general principles. Therefore, it proceeds from particular to general, from concrete to abstract.
  - It is a method of constructing a formula with the help of a sufficient number of concrete and specific examples.
  - Learners arrive at the formula or general rule through the examples of particular cases.
  - It is based on actual observation and experiments. Inductive approach is a much more learner-centred approach.
  - The learners are encouraged to devise the formula on their own.
  - This approach is psychological in nature.
  - It develops scientific attitude, comprehension ability and logical thinking among learners.
  - The teacher's role is only to facilitate the use of appropriate questions.
  - Inductive approach is suitable in the following situation:
    - Introduction of new topic
    - Formulation of rules
    - Derivation of formulas
    - Generalisation
- **Deductive Approach**
  - Deductive approach is based on deduction.
  - It is just the opposite of an inductive approach.
  - It proceeds from abstract to concrete, from general rule to particular or specific instances, and from formula to examples, from unknown to known.
  - This approach is relatively more teacher-centred.
  - In this approach, rules are initially given by teachers and then learners are asked to apply these rules to solve more problems of similar nature.
  - This approach is mainly used in Algebra, Geometry and Trigonometry because different relations, laws and formulae are used in these sub branches of Mathematics.
  - It is more useful for teaching Mathematics in higher classes.
  - This method is useful for revision and drill work.

- It enhances speed and efficiency.

Differences between Inductive and deductive approaches

S.N.	Inductive Approach	Deductive Approach
1.	Process of learning from specific facts to general principles.	Process of learning and reasoning from general principal to specific facts.
2.	Certain complex and complicated formulae cannot be generated so this method is limited in range and is not suitable for all topics.	It is suitable for all topics.
3.	It is time consuming and laborious method.	It is a short and time saving method.
4.	It is a scienfitic method.	It does not impart any training in scientific method.
5.	It does not burden the mind. Formula becomes easy to remember.	It puts more emphasis on memory.
6.	It is a learner centric approach.	Learners are only passive listeners. It is more teachercentric.
7.	It given new knowledge.	It does not give any new knowledge.
8.	It is a method discovery.	it is a method of verification.
9.	It is upward process of thought and leads to principles.	It is a downward process of thought and leads to useful results.

Analytic - Synthetic

We have seen that in its early stages, most mathematics originates in ideas and concepts in logico-deductive form. The ability to understand and work out a rigorous deductive structure using logic or reasoning is of great importance.

Analyses and synthesis are approaches which use reasoning and arguments to discover relationships. Let us discuss both the approaches separately.

- **Analytic Approach**
  - Analysis is the process of breaking a complex topic or substance into smaller parts in order to gain a better understanding of it.
  - In this method, a problem is analysed into smaller/ simpler problems. All the related facts are analysed to seek help in proceeding to the known conclusion.
  - The purpose of breaking it into smaller parts is to figure out the hidden aspects of the problem. So, basically this approach moves from unknown to known.
  - This method helps learners in discovering the things himself.
  - It is a psychological method based on the principle of interest, which inculcates the spirit of inquiry and investigation in the learners.
  - It facilitates comprehension and strengthens the urge to discover new facts.
  - It also provides opportunities to learners to tackle the problem confidently and intelligently. But it is not applicable equally well for all topics.
- **Synthetic Approach :**
  - Synthesis refers to a combination of two or more entities that together form something new.
  - In this method we move from known to unknown and from hypothesis to conclusion.
  - It is just the opposite of the analytic method.
  - It is an approach in which we collect and combine various facts to find out the unknown result. It presents the facts in a systematic way and can be applied to the majority of topics in teaching of Mathematics .
  - It is the process of putting together known bits of information to reach the point where unknown formation becomes obvious and true.

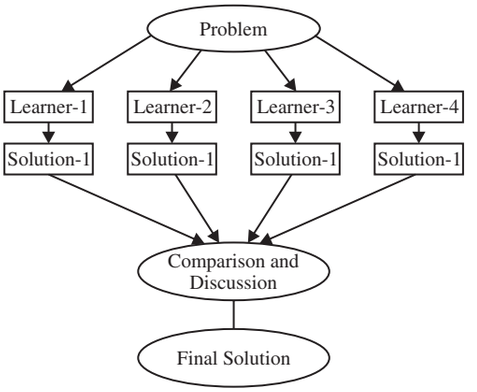
Differences between Analytic and Synthetic Methods

S.N.	Analytic Method	Synthetic Method
1.	This process refers to breaking down a bigger problem into smaller components.	This process combines many small known components to derive something new.
2.	It leads from unknown to known. in other words it leads from conclusions to hypothesis.	In leads from known to unknown. In other words it leads from hypothesis to conclusion.
3.	This approach is lengthy and time consuming.	It is short and time saving method.
4.	It is known as psychological method.	It is known as logical method.
5.	This method encourages thinking and reasoning. This approach promotes meaningful learning.	It puts more emphasis on rote learning. It promotes memory work.
6.	This approach is informal in nature and it is disorganized.	This approach is very formal and systematic.

S.N.	Analytic Method	Synthetic Method
7.	In this approach learners can recall and reconstruct and step easily, if forgotten.	It is very diffucult for the learners to reconstruct the steps, if forgotten.
8.	It is based on heuristic lines.	This approach doesn't cater to heuristic approach.

Problem Solving Approach:

- Learners learn mathematical thinking most effectively through applying concepts and skills in interesting and realistic contexts which are personally meaningful to them. Thus, Mathematics is best taught by helping learners to solve problems drawn from their own experience.
- Real-life problems are not always closed, nor do they necessarily have only one solution.
- The solutions to problems which are worth solving seldom involve only one item of mathematical understanding or only one skill.
- Rather than learners remembering the single correct method, problem solving requires them to search the information for clues and to make connections to the various pieces of Mathematics and other knowledge, experiences and skills that they have already learned. Such problems encourage thinking rather than mere recall.
- According to NCTM(2000) "Problem solving means engaging in a task for which the solution is not known in advance ". Any mathematical situation can be a problem for a learner if the learner has not previously learned about how to solve that. Once the learner learns how to solve a problem, it becomes an exercise. Teaching through problem solving and teaching problem solving are two different approaches. Teaching problem solving usually works on guess and check, working backward etc. methods.
- In teaching through problem solving, the teacher will set up the context and explain the problem. Now, learners work on the problem and the teacher monitors their progress. After stipulated time each learner of the class shares his/her ideas with the whole class and then they compare as to which idea is best for solving that particular problem.
- In this way the learner learns many new mathematical ideas and procedures.



IMPORTANT QUESTIONS

1. A teacher told her students to maintain a daily mathematics journal to note down the situations where in they use mathematics in their daily life. The objective is to :
(A) Prepare the class for a forth coming inspection.
(B) Help students improve computational skills.
(C) Help students connect classroom mathematics to that of the outside world.
(D) To test students understanding of their daily life.

2. Which of the following statements is NOT appropriate with regard to the nature of Mathematics ?
(A) It is hierarchical is nature.
(B) Mathematical concepts are abstract in nature.
(C) It is like science which is based on observation.
(D) It reveals the hidden patterns.

3. Which of the following is **NOT** true about nature of concepts in Mathematics ?
(A) Mathematical concepts are abstract in nature
(B) In Mathematics concepts are linearly arranged
(C) Mathematical concepts are logical in nature
(D) In Mathematics concepts are based on deductive reasoning

4. Which of the following is **NOT** true about the Nature of Mathematics ?
(A) Mathematical concepts are arranged in a hierarchical manner
(B) Mathematics is based on Inductive Reasoning
(C) Mathematical concepts are abstract in nature
(D) Mathematics has its own set of symbols, works and language

5. Which of the following statements is /are true about the nature of Mathematics ?
(a) Mathematics can be understood as science of patterns.
(b) Mathematics explores possible relationship among abstractions.
(c) As mathematics is based on logic, there is a very limited space for creativity in mathematics.
Choose the correct option :
(A) (a) and (b)
(B) only (c)
(C) (b) and (c)
(D) only (a)

6. Which of the following statements is NOT correct with regard to nature of mathematics ?
(A) Mathematics uses special vocabulary to communicate ideas precisely.
(B) Argumentation skill is important in constrcation of mathematical knowledge.

(C) Mathematical concepts are hierachical in nature.

(D) Primary level mathematics is concrete and does not require abstraction.

7. The main goal of Mathematics education is :

(A) to formulate theorems of Geometry and their proofs independently

(B) to help the students to understand mathematics

(C) to develop useful capabilities.

(D) to develop children's abilities for mathematisation.

8. Which one of the following is **not** true about the 'nature of concepts' in mathematics ?

(A) Abstract in nature

(B) Hierarchical in nature

(C) Logical in nature

(D) Concrete in nature

9. According to National Curriculum Framework (2005), which of the following most appropriately explains the meaning of 'Mathematisation of child's thought process' ?

(A) Knowing a lot of mathematics is mathematisation of the child's thought process

(B) Solving more questions in mathematics will mathematize child's thought process

(C) Knowledge of numbers and operations on them is mathematisation of child's thought process

(D) Making mathematics a part of child's life experience and day to day conversation is mathematisation of child's thought process

10. Which of the following statement is not correct about the nature of Mathematics ?

(A) It is a science of space, magnitude and measurement

(B) Mathematical knowledge is exact, systematic and logical

(C) Mathematical language is well defined and clear

(D) All axioms and postulates are proved facts in Mathematics.

11. Which among the following statements related to Mathematics is/are correct ?

(a) Mathematical problems should be solved by methods given in textbooks.

(b) Mathematics involves numbers and number concepts only

(c) Solving mathematical problems enhance critical thinking

Options :

(A) only (a)

(B) only (b)

(C) only (c)

(D) (a) only (c)

12. Which of the following statements are indicative of higher aims of teaching mathematics ?

(a) Mathematics education should turn out employable adults who contribute to economic and social development

(b) Mathematics education should develop child's inner resources like abstract thinking and drawing logical conclusions

(c) Children should see mathematics as a way of life like communicating, discussing and developing attitude for problem solving

(d) Mathematics education should focus on factual knowledge and procedural fluency.

(A) (a) and (c) (B) (b) and (c)

(C) (c) and (d) (D) (b) and (d)

13. Which of the following is not related to early number concept ?

(A) Conservation (B) Measurement

(C) Classification (D) Class inclusion

14. A middle school Mathematics teacher uses following strategies in her geometry classes :

(i) Using a set of wedges of about 15º to measure variety of angles.

(ii) Overlapping cut outs of various angles to find out angles with equal measures.

(iii) Measuring a straight line segment using pencils of different lengths.

The pedagogy used by the teacher focuses on.

(A) Teaching angle sum property of polygons.

(B) Non-Numerical comparison of angle sizes.

(C) Introducing the concept of line and line segments

(D) Using measurement activities with non-standard units to introduce standard units of measurement lat.

15. "A circle can be drawn with any center and any radius". According to Euclid, this statement is a/an :

(A) Axiom

(B) Postulate

(C) Theorem

(D) Hypothesis

16. Which of the following is most appropriate for the "Hierarchical Nature" of Mathematics ?

(A) Mathematics is considered as one of the most difficult subjects at middle school level.

(B) Concepts in mathematics follow a linear pattern

(C) Division cannot be introduced if the subtraction and multiplication operations are not strengthened

(D) Fractions can be introduced before introducing whole numbers.

17. In mathematics, a statement that is based on a pattern but is yet to be proven is call :

(A) An axiom

(B) A generalization

(C) Conjecture

(D) Deductive proof

18. A mathematical theorem is :

(A) a statement that has been proven by logical arguments based on axioms.

(B) a statement which is always true and doesn't need proof.

(C) a statement whose truth or falsity is not known

(D) is a statement without sufficient evidenence for proof.

19. Read the following statements :

a. Axioms arc propositions which are assumed.

b. Axioms are special theorems.

c. Axioms are definitions.

d. Axioms, when proved becomes theorems.

Which of the following statement(s) is correct ?

(A) a and d (B) Only b

(C) Only a (D) a and c

20. Consider the following statement :
"Every odd natural number is a prime number."
Which of the following methods of 'proof' can be used to prove/disprove the above statement ?

(A) Proof by contradiction

(B) Method of disproof

(C) Direct proof

(D) Proof by contrapositive

21. Consider the following statement :
"If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram".

This statement is a/an :

(A) axiom (B) proposition

(C) definition (D) theorem

22. Which one of the following practices is NOT suitable for teaching Mathematics at upper primary level ?

(A) Using mathemtical laboratories.

(B) Using Mathematical games and puzzles.

(C) Using open ended question.

(D) Using only formal algorithms.

23. To commemorate the birth anniversary of the legendry mathematician, Srinivasa Ramanujan, recently the celebrati of GANIT week in schools has been announced by CBSE.

'GANIT' stands for :

(A) Growing Aptitutde in Numerical Innovations and Training.

(B) Growing Ability in Numerical Innovations and Techniques

(C) Growing Aptitutde in Numerical Innovations and Techniques

(D) Growing Ability in Numerical Innovations and Training.

24. While teaching in a mathematics class, a teacher gives the statement "Common Divisor of two integers is a number which divides both the given integers". The statements is a :

(A) Proposition (B) Definition

(C) Axiom (D) Open sentence

25. Which one of the following is not a mathematical process ?

(A) Estimation (B) Measurement

(C) Visualization (D) Memorization

26. Out of the following , Mathematics in a strict sense is a

(A) Concrete Science

(B) Abstract Science

(C) Physical Science

(D) Relative Science

27. Out of the following which is not the characteristic of reasoning in Mathematics ?

(A) Accuracy

(B) Certainty of result

(C) Originality

(D) Subjectivity

28. Nature of mathematics is :

(A) It is logical

(B) It is difficult

(C) It is ornamental

(D) It is not for average students

29. Through mathematics teaching, children development skills to control which of the following emotions ?

(A) Logic

(B) Self-confidence

(C) Thinking power

(D) All of these

30. Which of the following statement is not related to nature of Mathematics ?

(A) Abstract elements are explained in Mathematics.

(B) Area of generalization is limited in Mathematics.

(C) Mathematics is a universal subject.

(D) Number, places, measurement etc. are the basis of Mathematics.

31. Which method is based on the principle of "To observe and learn" ?

(A) Inductive method

(B) Programmed Instruction method

(C) Laboratory method

(D) None of these

32. The best appropriate method for teaching the area of a circle is :

(A) Inductive method

(B) Deductive method

(C) Lecture method

(D) Laboratory method

33. Which system is not applicable for mathematics teaching through playway at primary level ?

(A) Montessori (B) Kindergarten

(C) Dalton (D) Lecture

34. Which of the following statements is not related to the nature of Mathematics ?

(A) Mathematics is study of numbers, places, measurements, etc.

(B) Mathematics has its own language terms, concepts, formulas, etc.

(C) The knowledge of Mathematics is not logical.

(D) The knowledge of Mathematics is the same in the whole world.

35. The knowledge of which of the following is most helpful in painting ?

(A) Geometry (B) Statistics

(C) Arithmetic (D) Function

36. In which method by moving from 'Particular to General', we generate formulas in Mathematics ?

(A) Deductive Method

(B) Lecture Method

(C) Inductive Method

(D) Project Method

37. Which method follows the principle of a process of combining different statements or parts to get something new ?

(A) Lecture method

(B) Heuristic method

(C) Analytic method

(D) Synthetic method

38. The knowledge of Mathematics is :

(A) Exact (B) Logical

(C) Systematic (D) All of these

39. 'William Kilpatrick' is the founder of which method of teaching mathematics ?

(A) Lecture method

(B) Demonstration method

(C) Project method

(D) Analytical method

40. Which teaching method follows the principles of 'Learning by doing' and 'Learning by observation' ?

(A) Inductive method

(B) Laboratory method

(C) Deductive method

(D) None of these

41. Mathematical statement whose truth has been proved is called :

(A) Theorem (B) Axiom

(C) Conjecture (D) Postulates

42. Mathematical propositon are.

(A) Always true

(B) Always false

(C) True as well as false

(D) Either true of false

43. As per NCF, Mathematics involves a particular way of thinking and reasoning. Then which of the following statement is incorrect regarding the given principle ?

(A) The presentation of materials according to textbooks

(B) Give the students formulae to solve the numerical questions

(C) The method by which it is taught.

(D) The activities and exercise should be according to the classroom.

44. As per NCF 2005, what is the meaning of nature of mathmatics?

(A) All of the given options

(B) Mathematics reveals hidden patterns that helps us to understand the word around us.

(C) Many concepts are needed to be learnt sequentially in mathematics.

(D) The basics of mathematics at secondary and higher secondary stages will hep children make better use of their time at school.

ANSWER KEY

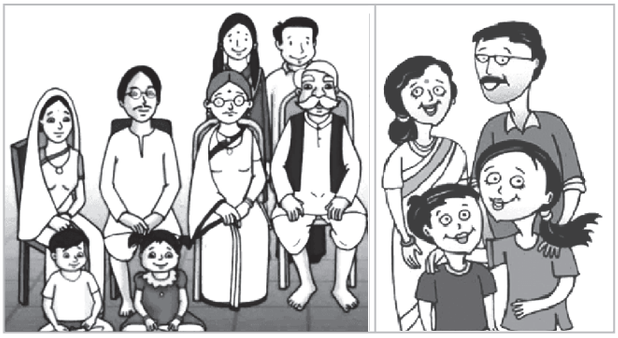
1. (C) **2.** (C) **3.** (B) **4.** (B) **5.** (A)
6. (D) **7.** (D) **8.** (D) **9.** (D) **10.** (D)
11. (C) **12.** (B) **13.** (B) **14.** (D) **15.** (B)
16. (C) **17.** (C) **18.** (D) **19.** (C) **20.** (D)
21. (B) **22.** (D) **23.** (A) **24.** (B) **25.** (D)
26. (B) **27.** (D) **28.** (A) **29.** (D) **30.** (B)
31. (C) **32.** (D) **33.** (D) **34.** (C) **35.** (A)
36. (C) **37.** (D) **38.** (D) **39.** (C) **40.** (B)
41. (A) **42.** (D) **43.** (B) **44.** (B)

Chapter 1

Family and Relations and Environment

1. Family

- A family is the smallest unit of a society. The society becomes prosperous with happy and thriving- families. Normally, a family has a husband and wife. The family then grows, as they become parents and have children. A family may even have people from three to four generations.
- A family is always the first school for the children. They learn good or bad habits here only. They also develop religious faith, lifestyle, eating habits and likes and dislikes as members of a family. Large family businesses usually develop with a family.
- **Types of Family -** There are two types of families - Joint family and Nuclear family.
  - **Joint Family -**
    - When people of several generations live together, then it is called a joint family. Even today,many people live in joint families.
    - Members of a joint family work together. Therefore, no one has any extra burden. Their expenses are also less e.g. expenses related to the kitchen and festivals.
    - All the property and wealth is jointly owned by them. The welfare of the entire family is given more importance than the welfare of one single person.
    - Yes, at times the behaviour of a member may not be liked by other members which creates ill-will. This can lead to some tension within the family.
  - **Nuclear Family -**
    - With the passage of time people started moving and settling at different places. This is how the nuclear family came into being. In the nuclear family you only have husband, wife and their unmarried children.
    - Most of the people in the cities live in a nuclear family.



Joint Family *Nuclear Family*

- **Features of Family**
  - Father, mother, children and other close relations live together in a family.
  - Individuals together make a family and families together make a society.
  - People with diversity in language, culture and habits live all over the world in families.
  - Family fulfils our basic needs like food, dress and shelter.
  - Family is like a beginning school for the development of physical, mental and moral growth of a person.
  - There are several values that bind the family members together. Such values are affection, respect, protection, and sharing.
  - Apart from our family members distant relations too come to our house. All the members meet during family festivals.

Do You Know?

- **Outsiders-**Apart from our relations, other people come to our house. Many outsiders like milkmen, vegetable vendors, and cylinder suppliers also come.
- **Neighbours-**Many families live near our home. We call them neighbours.
- Income and Expenditure is important for any family. We must spend according to our income. Basic needs should be fulfilled first. We must act according to the budget system. Economic crisis occur when expenditure exceeds income.

2. Relations

- **Maternal Relations -** People who are related through our mother are called Maternal Relations.
- **Paternal Relations -** People who are related through our father are called Paternal Relations

- **Importance of Relations -** Whether the family is joint or nuclear, whether members of the family live together or separately their relations continue to be the same. All members of the family depend on one another. They also fulfill their responsibilities towards one another. If the family relations are strong, the family remains happy and secure. The family relations are strong only when:
  - Every member of the family respects other members.
  - Every member is responsible towards other members.
  - A member doesn't hurt other members' feelings.
  - They help each other.
  - They settle their differences through discussion rather than quarrelling with each other.
- Good relations are necessary for the happiness of the family. If the family bond is strong, the family remains happy and protected.
- It is the responsibility of the parents (guardians) that the children are healthy, educated, talented, well-mannered and responsible citizens.

3. The status of Girls and Women in the Society

- Our society is a male-dominated society i.e. the status of girls and women is lower than that of boys and men. Girls are given less importance right from their birth.
- Bad practices like killing of girls (female infanticide), killing of the girl child before birth (female feticide), dowry for girls, festivities at the birth of a male child and distress at the birth of a girl child are still prevalent because of this orthodox thinking only.
- The difference is reflected in the upbringing, the diet, participation in sports and education of the girls. The girls do not get the same opportunities for growth which the boys get. To eradicate this disparity between women and men, and boys and girls, many measures have been taken. For example:
  - The government has made special laws for the welfare of women, like laws for equal rights in property, the law of getting an allowance from husband even after divorce, law of equal work- equal wages, law against domestic violence etc.
  - 33 percent of seats have been reserved for women in Panchayats and other local elections.
  - Now special emphasis is given on the education of the girls. For this many plans are being run by the government, for example, Sarva Shiksha Abhiyan, Ladlee Yojana, Kasturba Gandhi Balika Vidyalaya Yojana, Mahila Samakhaya etc.
  - There are also special programmes for increasing literacy among women such as Literacy India.
  - Women can lodge their complaints directly with the National Commission for Women. Similarly, there is a special rebate for women in filing the income tax. They also have to pay less stamp duty for getting their property registered. Seats are reserved for them in buses, trains etc. They also get concessionary tickets for travelling in buses and trains.
- **Measures for Raising Status of Women in the Society:** The status of women has risen because of the above mentioned facilities. Many of them have taken up jobs such as Anganwadi workers, teachers, nurses, doctors, engineers etc. Their literacy rate has also increased. Many women have been elected as Panch and Sarpanch of Panchayats. However, while many women have made good progress, there is a large number of women who are still very backward and deprived such as:
  - Many women are still deprived of their right to property.
  - They are exploited. They also face domestic violence.
  - They are discriminated against and not treated at par with boys in their upbringing.
  - The dowry system is still prevalent. Killing of girls (female feticide and infanticide) has not yet stopped despite several attempts.
  - Special laws have been made for the welfare of the women; however, these are not being followed properly.

4. Elders

- The elders are the backbone of a family. They have an important place in the family. They advise members of the family on how to do things in the right manner. They teach good practices to the children. Children feel more secure under their care.
- It is the responsibility of the family and the society to respect elders. They should be given nutritious food. Their health and safety should be taken care of. That is why the Government has taken several measures to provide them support, for example:
  - Reservation of seats for them in trains and buses etc. and concession in fares
  - Right to get living allowance from their children by law
  - Several plans have been made for older people, for example, Annapurna Yojana, Senior Citizen Savings Scheme, Mortgage Scheme *i.e.* getting living allowance after mortgaging their house etc., special insurance plans for the sick and Old-Age Pension plans etc.
  - Special rebate in income tax and no income tax after 80 years of age.
  - Higher rate of interest on their deposits in banks and post offices.

5. Physically and Mentally Challenged People

- There may be some people in the family and in society who are mentally or physically challenged. Some may not be able to speak or listen. Some may not be able to see; some are mentally weak.

- However, these people can also do many jobs well. They also have their own special qualities. Everybody has a right to live respectfully in society. The physically and mentally challenged people have been given opportunities for education and jobs, so that they can also contribute to the development of the society:
  - Special schools have been set up for physically and mentally weak children, where they are taught reading and writing, sports and skills for earning their livelihood.
  - The children who cannot speak or listenare taught how to communicate by sign language.
  - For the children who cannot see, study through tape or special types of books, These books have a lot of raised dots. These are read by running their fingers on the dots. This is known as the Braille script.
  - Special sports, painting and race competitions are organised for these people.
  - Seats have been reserved for them in schools and for jobs in the public sector. These children are also given special scholarships.

6. Meaning of Environment

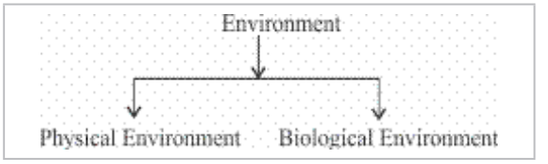
- A group of people living together at a place, sharing and caring for one another is called a 'family'. Apart from the family, there are many other things around us with which we are related like physical things, plants, animals and social and political atmosphere. All these things that are present around us make our 'environment'.
- Whatever we see around us is part of the environment. People, things in the house, animals, birds, plants, buildings, vehicles, roads, electric poles, ponds, water, air, soil, clouds, mountains etc. all together make our environment. All the things we can see or feel around us are our environment.

7. Environment of Different Places

- Different places have different environments. For example, the environment of a village is different from the environment of a city. A forest has a different type of environment.
- Different environments have different types of physical features, animals and plants.
- In deserts we find sand dunes, trees of Kikar, babool, palms and thorny bushes.
- Mountains are tall, rocky structures and have trees mainly of Pines, Deodar, chinar etc.
- Camels are common in deserts but mountains have animals like sheep, and yak. So, we find different environments in mountains, deserts, plains, sea-shores etc.

8. Physical and Biological Environment

- We can divide an environment into two parts - Physical and Biological.



- Air, water, soil, temperature, humidity, roads, vehicles, the sun, the moon, stars etc. form the physical environment.
- Different types of plants and trees (tall trees, shrubs, small plants, mushrooms etc.), and animals (large animals, small animals, birds etc.) insects, and human beings found at a place form the biological environment.
- Physical environment consists of those things which can be seen, heard, touched, tasted and smelled. Biological environment consists of those things which have life. They are insects and creatures, plants and trees, and other forms of vegetation.

9. Living Things

- Living things show signs of life. They eat, breathe and grow with age. They produce babies like themselves and have a limited life after which they die such as men, lion, elephant, fox, cow, buffalo, fish, tortoise, cock-hen, crow, pigeon, hawk, other birds, insects and creatures.
- Besides animals, plants are also living beings. They eat, breathe, grow and produce babies from their seeds. They have the ability to produce their own food from air and water. They produce a large amount of food which they use and also store in their different parts for others.
- Food-grains, fruits, vegetables-all of them are food produced and stored by plants. Plants also breathe and grow like us. They also produce plants similar to them. When the seeds of plants grow, they become like their parent-plants.

10. Non Living Things

- Non-living things are of two types - 'Natural' and 'Man Made'. That means they are either created by nature or made by human beings.
- The Sun, the Moon and the stars, tall snow-covered mountains, beautiful waterfalls, deserts, big oceans, small pebbles and grains of sand, all of these are gifts of nature. All these things are natural things. That means, they have been created by nature.
- Human beings have also been created by nature. They are the best creation of nature. With their intelligence and hard work, human beings have been able to progress and make many things. Men themselves have made many things which have made their lives happy and comfortable. Buildings, taps, drinking water, roads, dams, electricity, wheels, vehicles, gas stoves, medicines, buses and trains are all man made things.
- All those things, which have been made through man's wisdom and labour, are called man-made things.

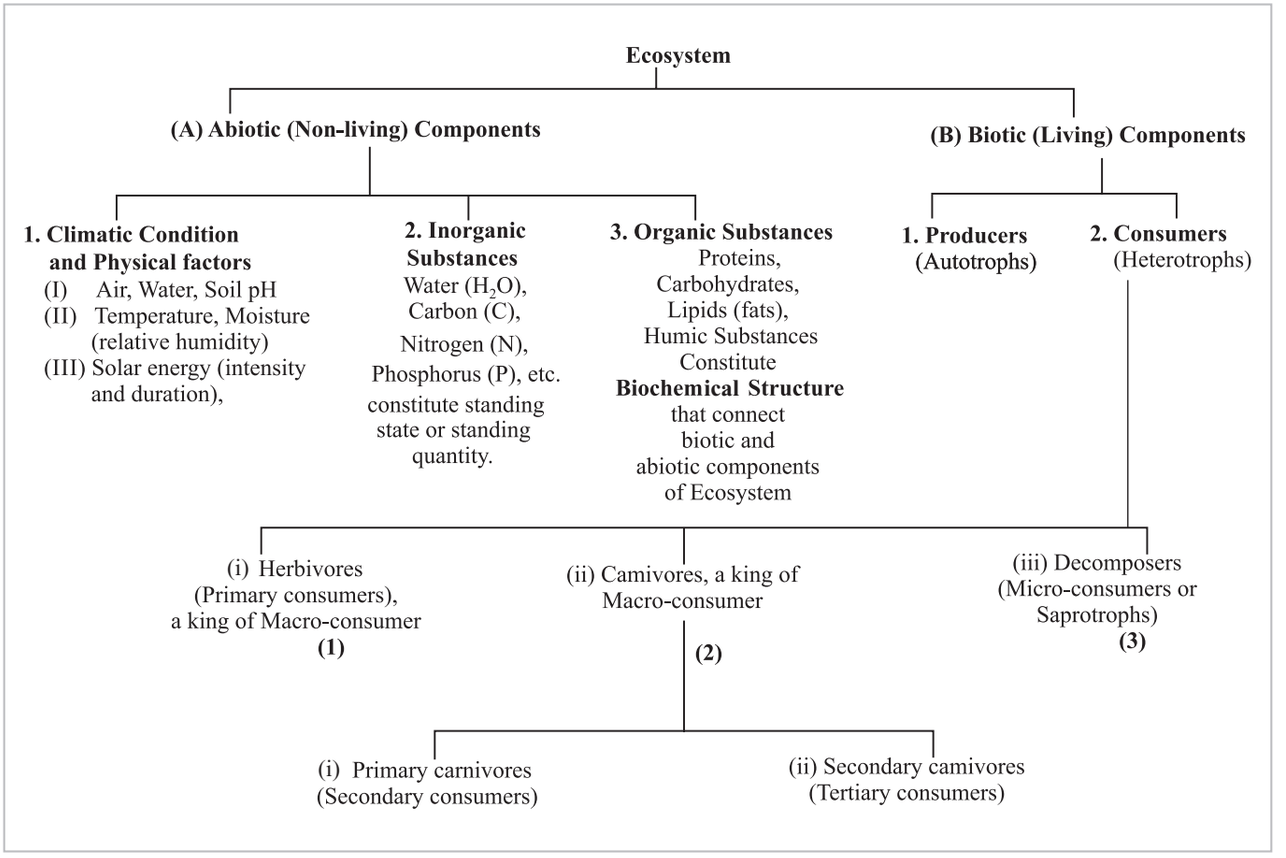
11. Ecosystem

- The structure formed due to the continuous interaction between the biotic and abiotic factors in the environment is called an ecosystem.
- Biotic Factors: Living factors - Plants, animals, microbes
- Abiotic Factors: Non - Living Factors - Air, water, sunlight, minerals, soil.
- When a large area has the same climate and abiotic factors, living organisms in those areas are also similar. Such large ecosystems are called 'Biomes'.
- In an ecosystem, the source of energy is sunlight. Major producers like plants, fungi use sunlight as energy and make organic matter using carbon-di-oxide and water.
- From Structural Viewpoint there are two components of an ecosystem: Abiotic Components and Biotic Components.
  - **Abiotic Component:** This component of the ecosystem includes the non-living substance of the environment. The abiotic component can be grouped into following three categories:
    - **Physical factors:** Sun light, temperature, rainfall, humidity and pressure. They sustain and limit the growth of organisms in an ecosystem.
    - **Inorganic substances:** Carbon dioxide, nitrogen, oxygen, phosphorus, sulphur, water, rock, soil and other minerals.
    - **Organic compounds:** Carbohydrates, proteins, lipids. They are the building blocks of living systems and therefore, make a link between the biotic and abiotic components.
  - **Biotic Component:** This includes a variety of living organisms such as microorganisms, plants and animals. The biotic component of an ecosystem can be further divided into producers, consumers and decomposers based on their capacity to sustain themselves.
    - **Producers:** Organisms that can produce or manufacture their own food are known as producers. Plants that have green pigments or chlorophyll, produce their own food in the presence of CO_2 in the atmosphere, water from the soil and sunlight through a process called 'photosynthesis'. These green plants are called 'autotrophs' (auto – self; trophs – nourishing) as they manufacture their own food.
    - **Consumers:** Consumers or Phagotrophs (Phago = to eat) are organisms that cannot manufacture their own food and get their food and nutrients from producers directly or from other organisms. They are called as 'heterotrophs' (hetero – others; trophs – nourshing). Consumers can be divided into primary, secondary and tertiary consumers.
      - **Primary Consumers:** Organisms that feed on producers (green plants) are called primary consumers. They are also called 'herbivores' or plant-eating organisms. Examples of terrestrial herbivores are grasshopper, sheep, goat, cow, rabbit, deer, elephant etc. Examples of aquatic herbivores are zooplankton, krill, squid, small fish, sea urchin, etc.
      - **Secondary Consumers:** Animals that kill and eat the herbivores or plant eating animals are called secondary consumers. They are also called 'carnivores', Example; lion, tiger, fox, frog, snake, spider, crocodile, etc.
      - The carnivores which feed directly upon herbivores (primary consumers) are called as Primary carnivores or second-order **consumers (*i.e.* Secondary consumers).** For example: Frog, birds, lizard, cat etc.
      - The animals which feed upon primary carnivores are called as Secondary carnivores or third-order consumers **(*i.e.* Tertiary consumers)**. For example, Hawk, tiger, lion etc. are secondary carnivores in the terrestrial ecosystem.
      - The larger carnivores such as, lion, tiger etc. which cannot be preyed upon further, occupy top position in the food-chain and are called as top carnivores (secondary carnivores). The Herbivores (Primary consumers), Primary carnivores (Secondary consumers) and Secondary carnivores (Tertiary consumers) constitute larger consumers and also called **Macro-consumers** in the ecosystem.
      - **Tertiary Consumers:** They are top predators in a food chain. They are carnivores at the topmost level in a food chain that feed on other carnivores or secondary consumers. Example: an owl eats a snake but an owl is eaten by a hawk, therefore a hawk is a tertiary consumer. Tertiary consumers that occupy the top trophic level, and are not predated by any other animals are called 'apex predators'. However, when they die their bodies will be consumed by scavengers besides the decomposers Example; alligator and hawk.
      - Some organisms eat both plants and animals. These animals are called **'Omnivores'**. Example; cockroach, fox, seagull and human.
      - Some omnivores are 'scavengers', which eat food that other animals have left behind Example; hyena and vultures.

- Plants and animals that live on or inside other plants or animals are called **'Parasites'.** Example; mistletoe live on other plants. Other examples are tapeworms, roundworms, lice, ticks, fleas etc.
- 'Detritivores' are consumers that feed on detritus. Detritus includes fallen leaves, parts of dead trees and faecal wastes of animals. Ants, termites, earthworms, millipedes, dung beetles, fiddler crabs and sea cucumbers are detritivores.

➢ **Decomposers:** Decomposers (Micro-Consumers) are organisms that help decompose dead or decaying organisms. Decomposers are also heterotrophs and known as **"Saprotrophs".** Decomposers are nature's built-in recycling system. By breaking down materials – decomposers return nutrients to the soil. They, in turn, create another food source for producers within the ecosystem. Mushrooms, yeast, mould, fungi and bacteria are common decomposers.

- In the natural environment, a balance or equilibrium exists among various organisms and the abiotic environment. This condition is known as ecological balance and the system is called **Balanced Ecosystem.**



Energy Components: All organisms in the biosphere use energy to work and convert one form of energy into another. The Sun is the ultimate source of energy for the biosphere as a whole. The solar energy gets transformed into other forms of energy through the various components in the ecosystem. The producers, consumers and the decomposers contribute a lot to the energy flow in an ecosystem.

12. Energy Flow in an Ecosystem

- Energy in an ecosystem flows from producers to consumers. The movement of energy in an ecosystem is termed as the energy flow in nature:
  - The producers absorb and convert solar energy into plant material.
  - The energy converted into biomass is used by consumers.
  - The total input of energy in the form of food is used for day to day activities and biomass.
  - The loss of energy occurs through respiration, heat, excretion.
  - The gross net production.
- The available energy in a food chain decreases with each step or trophic levels up in the food chain. So the transfer of energy is never 100%. The green plants trap

solar energy and convert it into chemical energy, they are the producers. They use some amount of energy for their own life processes. Therefore, only a small portion of the energy trapped by the producers is available to primary consumers. Animals move from place to place, so they require more energy. Therefore they transfer less amount of energy to the next trophic level. At every trophic level, a considerable amount of energy is lost to the surroundings in the form of heat. The amount of energy available to the next higher level is only 10%. As such, there is less energy available to support organisms at the top of the food chain. That is why the tertiary and quaternary consumers are far less in number in an ecosystem than organisms at lower trophic levels.

- **Productivity :** Productivity refers to the rate of organic matter accumulated in living components of an ecosystem in unit time. It may be primary (the rate at which the radiant energy of the sun is stored by photosynthesis and chemosynthesis of producers in the form of organic substances). Secondary (the rate of energy storage at consumer level). Gross primary (total rate of photosynthesis including the organic matter used up in respiration during the period of measurement also called total photosynthesis or total assimilation). Net primary productivity (rate of storage of organic matter in plants in excess of that utilized during the period of measurement, also called apparent photosynthesis or net assimilation. Net (rate of storage of organic matter not used by heterotrophs i.e. net primary production minus consumption by heterotrophs during the period).
  - The production at the autotroph level is said to be primary productivity.
  - The secondary productivity refers to the production at the heterotrophy level.

13. Biogeochemical Cycles in an Ecosystem

- Movement of nutrients move through the ecosystem in cycles. These cycles are called 'biogeochemical cycles'. A biogeochemical cycle is a circuit or pathway by which a chemical element moves through the biotic and the abiotic components of an ecosystem. The two basic types of biogeochemical cycles are:
  - **Gaseous type of Biogeochemical Cycles :** In this type of cycle, the Reservoir is the atmosphere (air) and Hydrosphere (water of oceans, seas, rivers, lakes, estuary etc). The most common examples of this type of cycle are - Carbon cycle, Oxygen cycle, Nitrogen cycle, Water cycle etc.
  - **Sedimentary type of Biogeochemical Cycles :** In this type of cycle, the reservoir is the earth crust (soil and sediments) which contain inorganic chemicals and nutrients. The most common examples of this type of cycle are-Phosphorus cycle, Iron cycle, Sulphur cycle etc.

14. Flora and Fauna

- The plants and animals found in a particular area are termed flora and fauna of that area respectively.
- India has a large variety of plants, about 45,000 species in number. Of these
  - Flowering plants - 15,000
  - Algae - 1,676
  - Lichens - 1,940
  - Fungi - 12,480
  - Gymnosperms-64
  - Bryophytes - 2,843
  - Pteridophytes - 1,012.
- India has a great variety of fauna numbering 81,251 species, which represent 6.67 % of the world's fauna. Of these,
  - Insects - 60,000
  - Mollusca - 5,000
  - Mammals - 372
  - Birds- 1,228
  - Reptiles - 446
  - Amphibians - 204
  - Fishes - 2, 546.
- Zoological Survey of India (ZSI) is responsible for carrying out surveys of the faunal resources of the country.

15. Species

- It is a group of populations which are capable of inter-breeding. These can produce offspring with the members of their own species, not others.
- **Endangered Species :**
  - Species that are less in number and are in considerable danger of becoming extinct are termed as Endangered Species.
  - Due to various reasons like environmental pollution, deforestation, loss of habitat, human interference, poaching and hunting many animals in India are extinct and many are endangered. Species which no longer exist on earth are called extinct species. For e.g., Dinosaurs, Dodo. An endangered species is an animal or a plant that is considered to be at the risk of extinction.
  - It is reported that nearly 132 species of plants and animals are critically endangered in India. Snow leopard, Bengal tiger, Asiatic lion, Purple frog and Indian giant squirrel are some of the endangered animals in India.
  - Many algae, fungi, bryophytes, ferns and gymnospermsare disappearing with the destruction of forests.

- Some of the endangered plants : Umbrella tree, Malabar lily, Rafflesia flower, Indian mallo Musli plant.
- Some of the endangered animals : Snow Leopard, Asiatic Lion, Lion tailed macaque, Indian Rhinoceros, Nilgiri Tahr.

- **Endemic Species :**
  - The species of plants and animals which are found in a particular area are known as Endemic Species. They are not naturally found anywhere else.
  - Such as Sal is the endemic flora and Bison is the endemic fauna of Pachmarhi area in Madhya Pradesh. Bison, Indian giant squirrel and flying squirrel are endemic fauna of this area.

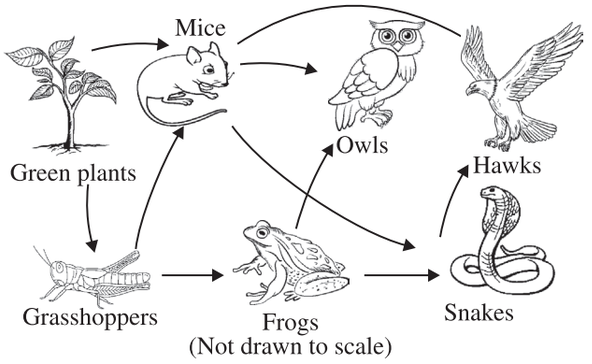
16. Food Chain and Food Web

- Every living being needs energy to live. They get this energy from the food they eat. Plants get energy from food that they make in the presence of sunlight. Some animals eat plants and get energy from this food.
- Others eat the flesh of animals and get energy from that food. For example, a bird eats grains and a cat in turn eats this bird. This forms a chain. The sequence in which one living organism eats the other is called a food chain. We see a number of food chains around us like-

  Grass → Grasshopper → rat → snake → eagle

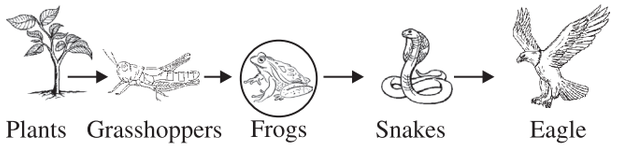
  Algae in water → fish → man

  Plants → rabbit → fox → lion
- When an animal dies, its flesh is eaten by scavengers like vulture, eagle, crabs, ants and other such insects. Whatever is left is converted by the bacteria and fungi into small particles.
- This way, energy (from food) keeps on getting transferred from one animal to another in a food chain. In our environment, a number of such food chains are interconnected to form a web-like structure. Such a web of interconnected food chains is called a food web.



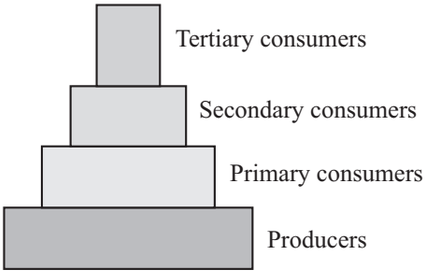
Food Web

- Plants make their own food from simple substances like air and water and in all food chains the first animal eats plants only. So plants and trees are very necessary. They are the starting points of almost every food chain. That is why they are essential for life on this earth.
- Animals are also dependent on one another even though they compete with one another. If one species of animal becomes extinct, the whole food chain gets disturbed.
- Let's take the example of one food chain - Mosquitoes lay eggs in water. A frog eats larvae of mosquitoes and other insects.In a pond, there are small insects that feed on leaves of plants. These insects are eaten by frogs. Frogs are eaten by snakes and snakes in turn are eaten by eagles and mongoose.



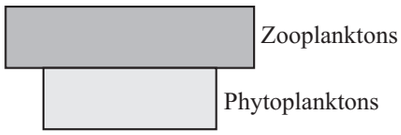
Food Chain

- Now if for any reason all the frogs vanish from the environment, what would happen to the number of grasshoppers and the number of snakes? The number of mosquitoes and other insects will increase.
- These insects will harm the fields, and malaria will spread due to mosquitoes. The number of grasshoppers will increase and they will eat up all the leaves of the plants, snakes will have to search for other food sources like rats, small birds etc. Eagles will also face the problem of food. So the whole food chain will get disturbed.
- Similarly if all the lions and tigers get extinct, the population of grass eating animals like deer, nilgai, zebra etc. will increase. They will destroy the fields and forests. When elephants don't get food in the jungle, they enter into our fields and destroy them. This will lead to shortage of plants and many food chains will get disturbed as a result.
- **Ecological Pyramid :** Ecologicalpyramids are the graphic representations of trophic levels in an ecosystem. The producers make the base of the pyramid and the subsequent tiers of the pyramid representherbivore, carnivore and top carnivore and top carnivore levels. These pyramids are of three types.
- **Pyramid of Number :** This represents the number oforganisms at each trophic level. For example in a grassland the number of grasses is more than the number of herbivores that feed on them and the number of herbivores is more than the number of carnivores. In some instances the pyramid of numbers may be inverted, i.e. herbivores are more than primary producers as you may observe that many catepillars and insects feed on a single tree.

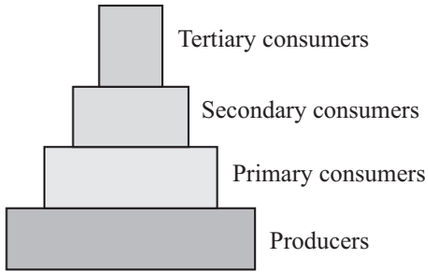


- **Pyramid of Biomass :** This represents the total standing crop biomass at each trophic level. Standing crop biomass is the amount of the living matter at any given time. It

is expressed as gm/unit ara or kilo cal/unit area. In most of the terrestrial ecosystems the pyramid of biomass is upright. However, in case of aquatic ecosystems the pyramid of biomass may be inverted e.g. in a pond phytoplankton are the main producers, they have very short life cycles and a rapid turnover rate (i.e. they are rapidly replaced by new plants). Thereore, their total biomass at any given time is less than the biomass of herbivores supported by them.



- **Pyramid of Energy :** This pyramid represents the total amount of energy at each trophic level. Energy is expressed in terms of rate such as kcal-unit area/unit time or cal/unit area/unit time. eg. in a lake autotroph energy is 20810 kcal/m/year. Energy pyramids are never inverted.



17. Balance in Nature

- If the number of flesh eating animals increases, they eat the maximum number of vegetarians, and the number of grass eating animals decreases. In that case, the flesh eating animals face the shortage of food. This leads to their starvation and death. So, it maintains balance between grass eating animals and flesh eating animals.
- They both are necessary to keep others limited and have a balance in their numbers. Similarly there is a balance between plants and plant eating animals. Less number of plants lead to shortage of food for the plant eating animals. Due to non-availability of food, the number of vegetarian animals also decreased.
- With a growing population, the needs of people are increasing but the earth is not increasing. We need to grow more crops to feed the growing population. This needs increasing production with the use of fertilizers and pesticides. All these chemicals pollute the soil, water and air. They kill many useful worms and other living organisms.
- A number of food chains get disturbed and this disturbance in the environment destabilizes the balance in nature. This problem needs to be solved and we should try our best to maintain a balance in nature.

18. Major Domains of the Earth

- Major domains of the earth is a basic concept in Geography. Solid (Lithosphere), gaseous (Atmosphere), liquid (Hydrosphere) and biosphere parts of the earth are not isolated, but they overlap with each other.
  - **Lithosphere:** The solid portion of the earth
  - **Atmosphere:** The gaseous layers that surround the earth
  - **Hydrosphere:** Water covers a very big area of the earth's surface and this area is called the Hydrosphere
  - **Biosphere:** It is the narrow zone where land, water and air together are found.

Do You Know?

- In the Greek language
- Lithos means Stone
- Atmos means Vapour
- Hudor means Water
- Bios means Life.

19. Lithosphere

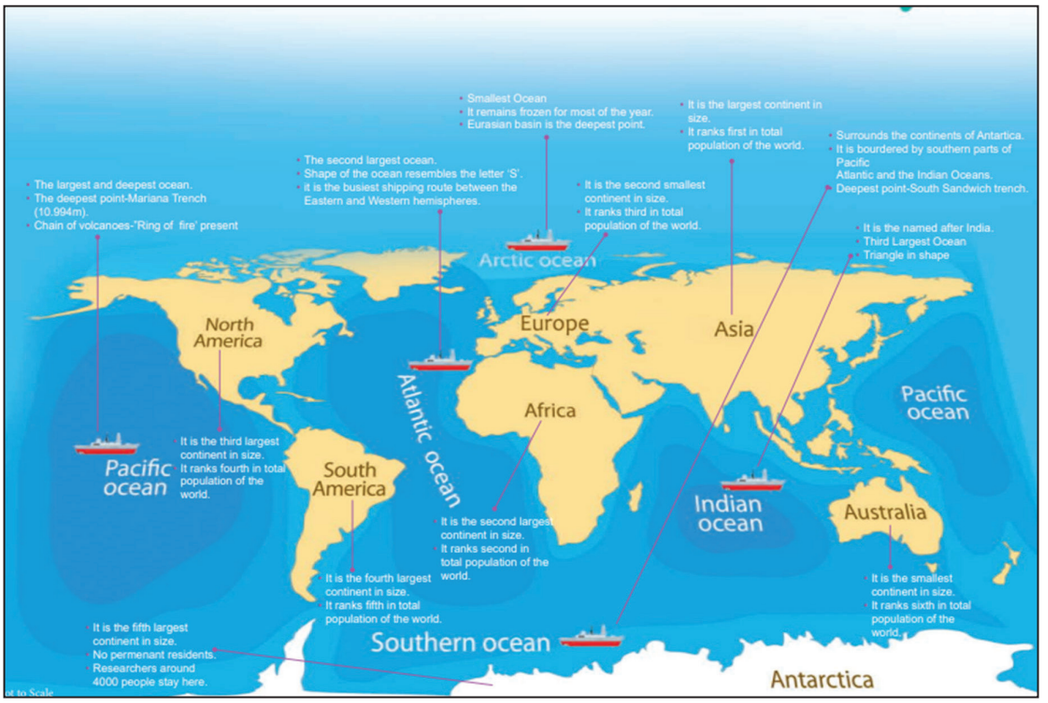
- The outermost part of the Earth which consists of the Upper Mantle and Crust of the Earth is known as the Lithosphere. Tectonic plates are a subdivision of the Lithosphere. Lithosphere has rigid mechanical properties. Pedosphere is the uppermost part of the lithosphere which reacts chemically with 3 other major domains of earth namely; hydrosphere, biosphere and atmosphere.
- Its thickness is about 100 km. There are Two Main Divisions of the Earth's Surface:
  - **Continents (The large landmasses):** The Highest Mountain Peak on this earth is Mount Everest. The current official elevation is 8,848 meters above sea level. The elevation was measured and established by an Indian survey conducted in 1955. The border between Nepal and China runs across its summit points. There are seven major continents and these are separated by large water bodies.
- **Asia :**
  - The largest continent on Earth is Asia. Asia is also the most populous continent on earth *i.e.* it is home to approximately 60% of the world's population as of 2019.
  - Asian continent occupies approximately 30% of the Earth's total land area. To the south of the Asian continent lies the Indian Ocean, to its North lies the Arctic Ocean and to its East lies the Pacific Ocean. Asia and Africa are separated by the Suez Canal. Asia and Europe are separated by the Black Sea and the Caspian Sea.
- **Africa :**
  - The 2nd largest continent on Earth in Africa. Africa covers 20% of the Earth's total land area. Africa is also the 2nd most populous country on Earth. A large part of Africa lies in the Northern Hemisphere.
  - The Equator, Tropic of Cancer and Tropic of Capricorn passes through Africa. It holds the distinction of the only continent having all 3 latitudes passing through it. World's longest river Nile is in Africa.

- It has 2 main tributaries and passes through 11 countries. It flows from Tanzania located in South of Africa and flows till Egypt located in the North of Africa. This is a Northward flowing river and is around 6650 km long.
- The largest hot desert on Earth is the Sahara Desert which is located in Africa. It extends from the Atlantic Ocean in the West, to the Red Sea located in the East. The Sahara Desert covers a large part of the African Continent. The Mediterranean Sea lies to the North of Sahara Desert.

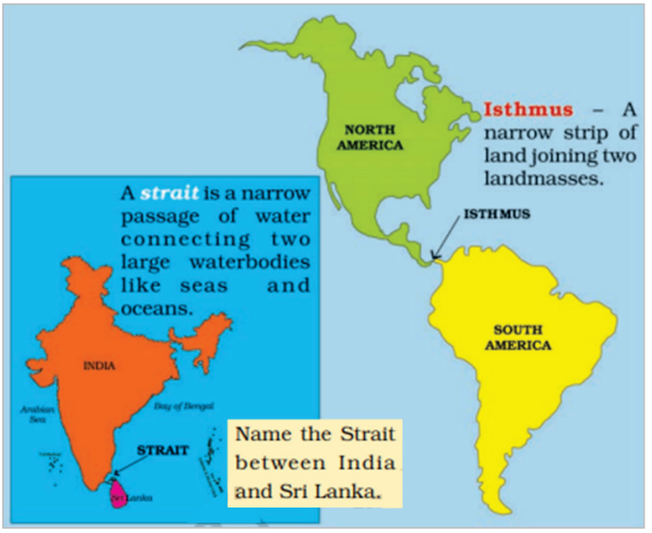
- **Europe :**
  - Europe is the 6th largest continent of Earth, occupying around 2% of the surface of the Earth. Russia is the largest country in the European continent. Western Civilization was born in Europe.
  - Atlantic Currents has the biggest influence on the European Continent. To the South of Europe lies the Atlantic Ocean, to the North of Europe lies the Arctic Ocean, to the West of Europe lies the Atlantic Ocean.
- **North America :**
  - North America is the third largest continent in the world. The continent lies completely in the Northern and Western Hemisphere. The Isthmus of Panama, a narrow strip that links North America and South America. This continent is surrounded by three oceans and they are the Atlantic Ocean, the Pacific Ocean, and the Arctic Ocean.
- **South America :**
  - There are 12 Sovereign States in South America. This Continent is located in the Southern Hemisphere. In terms of total area, South America is the 4th largest continent.
  - The Pacific Ocean is located to the West of South America. To the East of South America lies the Atlantic Ocean. Brazil is the most populous country in South America. The Andes Mountain is the world's longest above-water Mountain range and it is located in South America. The world's largest river is the Amazon River and it is located in South America.
- **Australia :**
  - Australia is the smallest continent that lies entirely in the Southern Hemisphere. It is surrounded on all sides by the oceans and seas. It is called an island continent.
- **Antarctica :**
  - Antarctica is a huge continent and lies completely in the Southern Hemisphere. The South Pole lies in the South Polar Region almost at the centre of this continent and is permanently covered with thick ice sheets. Various countries have their research stations here.
  - India also has its permanent research base stations here, namely Maitri, Dakshin Gangotri, and Bharati.

Do You Know?

- Edmund Hillary (New Zealand) and Tenzing Norgay Sherpa (India) were the first men to climb the highest mountain peak Mt. Everest on the planet earth on 29th May, 1953.
- Junko Tabei (Japan) was the first woman to reach the summit on 16th May, 1975.
- The first Indian woman to climb the highest peak on 23rd May, 1984 was Bachendri Pal.



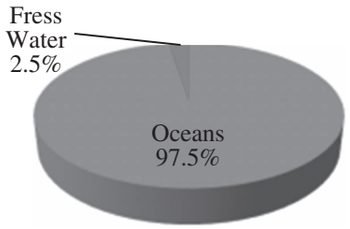
Continents and Oceans of the World



Difference between Strait and Isthmus

20. Hydrosphere

- The hydrosphere includes water on earth in Oceans, Seas, Rivers, and Lakes and even in frozen forms. Only 2.5% of Earth's water is freshwater. And even in this 2.5%; approximately 69% is in the form of snow and ice. 97.5% of Earth's water is salt water, which is unfit for human consumption. Approximately 71% of the Earth's surface is covered by oceans.



Distribution of Water on Earth

- **Ocean basins (The huge water bodies) :** Oceans are the major part of the hydrosphere and they are all interconnected. The Five Major Oceans in order of their size are:

  - **The Pacific Ocean :**

    - The Pacific Ocean is the largest and deepest ocean on the Earth. It covers about one-third of the Earth's total area and spreads for about 168.72 million sq.km. It is bounded by Asia and Australia in its west and North America and South America in its east. It stretches from the Arctic Ocean in the north to the Southern Ocean in the south.

    - This ocean's shape is roughly triangular with its apex in the north at the Bering Strait which connects the Pacific Ocean with the Arctic Ocean. The Bering Sea, the China Sea, the Sea of Japan, Tasman Sea and the Philippine Sea are some of the marginal seas of the Pacific Ocean.

    - Indonesia, Philippines, Japan, Hawaii, and New Zealand are some of the islands located in this Ocean. The deepest point of Mariana Trench is 10,994 m. and is located in the Pacific Ocean. A chain of volcanoes is located around the Pacific Ocean called the Pacific Ring of Fire.

Pacific Ocean

Do You Know?

- The Spanish navigator Ferdinand Magellan named the ocean Pacific, meaning calm or tranquil.

  - **The Atlantic Ocean :**

    - The Atlantic Ocean is the second largest ocean on the Earth. It covers one sixth of the Earth's total area and spreads for about 85.13 million sq.km. It is bounded by North America and South America in the west and Europe and Africa in the east.

Atlantic Ocean

- Like the Pacific, it stretches from the Arctic Ocean in the north to the Southern Ocean in the south. The shape of the Atlantic Ocean resembles the letter 'S'. The Strait of Gibraltar connects the Atlantic Ocean with the Mediterranean Sea.
- The Atlantic Ocean is the busiest shipping route between the Eastern and Western hemispheres. The deepest point is the Milwaukee Deep in the Puerto Rica Trench. It has a depth of about 8600 m.
- The Caribbean Sea, the Gulf of Mexico, the North Sea, the Gulf of Guinea and the Mediterranean Sea are important marginal seas of the Atlantic Ocean. St. Helena, Newfoundland, Iceland and Falkland are some of the islands found in this ocean.

Indented Coast Line

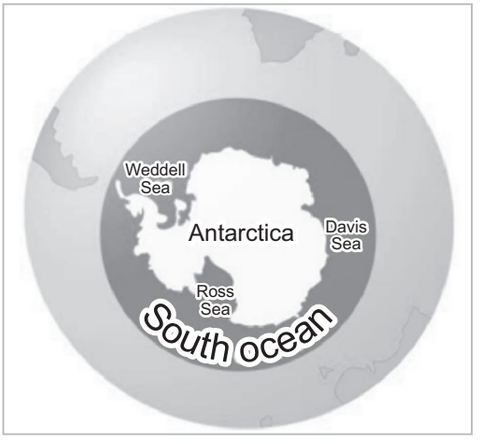
❖ **The Indian Ocean :**

- The Indian Ocean is the third largest ocean on the Earth's surface. It covers an area of about 70.56 million sq.km. It is named after India. It is triangular in shape and bounded by Africa in the west, Asia in the north and Australia in the east.
- The Andaman and Nicobar Islands, Lakshadweep, Maldives, Sri Lanka, Mauritius and the Reunion Islands are some of the islands located in the Indian Ocean. Malacca strait connects the Indian Ocean and the Pacific Ocean.
- The Bay of Bengal, the Arabian Sea, the Persian Gulf and the Red Sea are some of the important marginal seas of the Indian Ocean. The Java trench (7,725 m-) is the deepest point in the Indian Ocean.

Indian Ocean

The Southern Ocean :

- The Southern Ocean surrounds the continent of Antarctica and is enclosed by the 60°S latitude. It covers an area of 21.96 million sq.km. It is bordered by the southern parts of the Pacific, the Atlantic and the Indian Oceans. The Ross Sea, the Weddell Sea and the Davis Sea are the marginal seas of this Ocean.
- Farewell Island, Bowman Island and Hearst Island are some of the islands located in this ocean. The water in this ocean is very cold. Much of it is covered by sea ice. The deepest point in this ocean is South Sandwich Trench with a depth of 7,235 m.



Southern Ocean

❖ **The Arctic Ocean :**

- The Arctic Ocean is the smallest ocean. It covers an area of 15.56 million sq.km. It lies within the Arctic Circle. It remains frozen for most of the year.

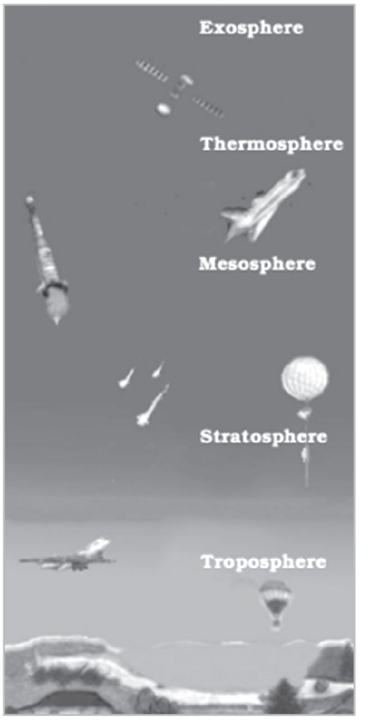
- The Norwegian Sea, the Greenland Sea, the East Siberian Sea and the Barents Sea are some of the marginal seas of this ocean. Greenland, New Siberian Island and Novaya Zemlya Island are some of the islands located in the Arctic Ocean. The North Pole is situated in the middle of the Arctic Ocean. The Eurasian Basin is the deepest point in the Arctic Ocean, which is about 5,449 m- in depth.

Arctic Ocean

- Mariana Trench is the deepest Oceanic trench on Earth. The deepest portion is at 11,034 metres. Mariana Trench is located in the Pacific Ocean. Mariana Trench is 69 km in width and 2550 km in length. Mariana Trench derives its name from the nearby Mariana Islands which is located at around 200 km from the Mariana Trench in the Pacific Ocean. The three chief movements of ocean waters are the waves, the tides and the ocean currents.

21. Atmosphere

- The earth is surrounded by a layer of gas called the atmosphere. It provides us with the air we breathe and protects us from the harmful effects of the sun's rays. The atmosphere is divided into five layers based on composition, temperature and other properties. These layers starting from earth's surface are called the troposphere, the stratosphere, the mesosphere, the thermosphere and the exosphere.
- The atmosphere is composed mainly of nitrogen and oxygen, which make up about 99% of clean, dry air. Nitrogen 78%, oxygen 21% and other gases like carbon dioxide, argon and others comprise 1% by volume.



Layers of the Atmosphere

- Oxygen is the breath of life while nitrogen helps in the growth of living organisms. Carbon dioxide, though present in a minute amount, is important as it absorbs heat radiated by the earth, thereby keeping the planet warm. It is also essential for the growth of plants.
- The density of the atmosphere varies with height. It is maximum at sea level and decreases rapidly as we go up. The temperature also decreases as we go upwards. The atmosphere exerts pressure on the earth. Air moves from high pressure to low pressure. Moving air is known as wind.
- The main greenhouse gasses whose concentrations are rising are carbon dioxide, methane, nitrous oxide, hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) and ozone in the lower atmosphere.

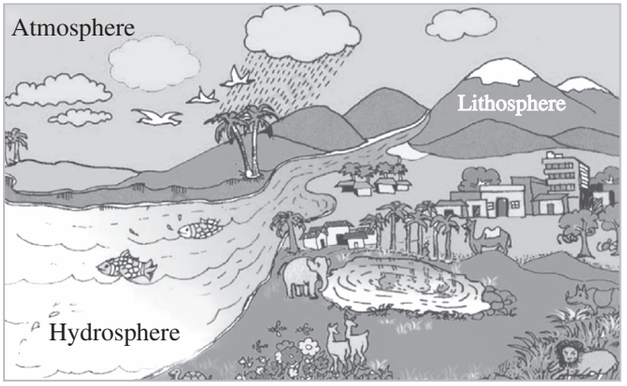
Do You Know?

- The Montreal Protocol is an international treaty designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. It was agreed on 16 September, 1987, and entered into force on 1 January, 1989.

22. Biosphere – The Domain of Life

- The biosphere is the narrow zone of contact between the land, water and air. It is in this zone that life, that is unique to this planet, exists. There are several species of organisms that vary in size from microbes and bacteria to huge mammals.

- All the living organisms including humans are linked to each other and to the biosphere for survival. The organisms in the biosphere are broadly divided into the plant kingdom and the animal kingdom.



Biosphere

- The three domains of the earth interact with each other and affect each other in some way or the other. For example, cutting of forests for fulfilling our needs of wood, or clearing land for agriculture may lead to fast removal of soil from slopes. Similarly, earth's surface may be changed due to natural calamities like earthquakes.
- Discharge of waste material into lakes and rivers makes the water unsuitable for human use. It also damages other forms of life. Emissions from industries, thermal power plants and vehicles, pollute the air.
- Carbon dioxide (CO_2) is an important constituent of air. But an increase in the amount of CO_2 leads to an increase in global temperatures. This is termed as global warming.

Do You Know?

- **December 11** International Mountain Day.
- **Erosion** is the process of removal of surface material from the Earth's crust. The eroded materials are transported and deposited on the low lying areas. This process is called Deposition.
- **Palk Strait** connects the Bay of Bengal and Palk Bay.
- **6° Channel** separates Indira Point and Indonesia.
- **8° Channel** separates Maldives and Minicoy islands.
- **9° Channel** separates Lakshadweep Islands and Minicoy islands.
- **10° Channel** separates Andaman and Nicobar Islands.
- **Island -** A land surrounded by water on all sides.
- **Bay -** A broad inlet of the sea where the land curves inwards.
- **Strait -** A narrow stretch of water linking two large water bodies.
- **Trench -** The deepest part of the ocean.
- **Peninsula -** The land surrounded by water on three sides.
- **Isthumus :** A narrow strip of land which connects two large landmasses.

23. Biomes

- A biome is a geographically extensive ecosystem where all flora and fauna are found collectively. It is the total assemblage of plant and animal life interacting within the biosphere. Biomes are defined by abiotic factors like, relief, climate, soils and vegetation. They are classified into two broad categories, terrestrial biomes and aquatic biomes.

❖ **Terrestrial Biomes :** Terrestrial biomes is a group of living organisms that live and interact with one another on land. They are mainly determined by temperature and rainfall. Some of the major terrestrial biomes of the world are as follows:

➢ **Tropical Forest Biomes :**

◆ The tropical forest biome consists of several sub-biomes, including evergreen rainforest, seasonal deciduous forest etc. This biome extends between 10° N and 10° S of the Equator. Central and South America possess half of the world's tropical forests.

◆ The climate in these biomes shows little seasonal variation with high annual rainfall and relatively constant, high temperature. This unique weather condition favours thick vegetative cover.

◆ Tropical forests have the highest biodiversity and primary productivity of any of the terrestrial biomes. The Amazon basin, Congo basin and Indonesian islands are the major regions of this biome. These regions have very dense forests and so have great economic importance.

◆ Human settlements are found scattered here. They sustain their livelihood through food gathering, fishing, lumbering and shifting cultivation.

◆ Due to the humid nature of this biome, the people get afflicted to tropical diseases like malaria, yellow fever etc. The chief trees found here are rubber, bamboo, ebony, etc. Bats, pheasants, jaguars, elephants, monkeys etc. are the important birds and animals found here.

Do You Know?

- The U.S. National Cancer Institute has identified about 70% of the plants used for treating cancer. Which are found only in rainforests. Eg. Lapacho.
- Of late, parts of the Savanna grasslands are being converted into farmlands, which pose a great threat to the wide range of fauna. For Eg. The population of the big cats like cheetah, lion etc. are dwindling drastically.
- An oasis is a fertile fresh water source found in deserts and semi-arid regions. Oases are fed by springs. Crops like date palms, figs, citrus fruits, maize etc. are cultivated near these oases.

➢ **Tropical Savanna Biomes :**

◆ Tropical grasslands are generally found between tropical forests and deserts. Tropical

Savanna biomes are found between 10° to 20° N and S latitudes. These grasslands are generally flat and are found in the Sahel, south of Sahara in East Africa and in Australia.

- This biome is generally hot and dry and experiences moderate to low rainfall. So, the grass which grows here is tall and sharp. Hence the chief occupation of the people found here is herding. The primitive people living here are nomadic.
- The common animals found here are the lion, leopard, tiger, deer, zebra, giraffe etc. Flora such as Rhodes grass, red oats grass, lemon grass etc. are found in this biome.

➢ **Desert Biomes :**

- Deserts are usually found on the western margins of the continents between 20° and 30° N and S latitudes. The annual rainfall is less than 25 cm in these regions.
- Due to the lack of rainfall and arid conditions, these regions do not possess any vegetation but have special vegetation types called Xerophytes. As the soil is sandy and saline, deserts remain agriculturally unproductive. Drought resistant thorny shrubs and bushes, palms are found here.
- Tribal people who live here practice food gathering and hunting. They move their temporary settlements frequently in search of pastures. Transportation becomes very difficult here and is carried on by camels. Reptiles like snakes, lizards, scorpions etc are most commonly found here.

➢ **Temperate Grassland Biomes :**

- Temperate Grasslands are usually found in the interior of the continents and are characterised by large seasonal temperature variations, with warm summer and cold winter. The type of grassland in these regions strongly depends upon precipitation.
- Higher precipitation leads to tall and soft grass and lower precipitation leads to short and soft grass. These regions favour wheat cultivation. Extensive mechanised agriculture is practised due to lack of farm labour.
- Pastoral industry becomes the main occupation, thereby facilitating slaughtering of animals, packing of raw and processed meat, dairy products etc. The common birds and animals are grass hopper, wolf, bison, prairie dog etc.

Do You Know?

- Temperate grasslands are called differently in different parts of the world.
  - Prairies -- North America
  - Steppes -- Eurasia
  - Pampas -- Argentina and Uruguay
  - Veld -- South Africa
  - Downs -- Australia and New Zealand

➢ **Tundra Biomes :**

- These vast lowlands are found where the ground remains frozen. Greenland, Arctic and Antarctic regions and Northern parts of Asia, Canada and Europe fall in this biome.
- These regions are also called Barren lands. This biome experiences a long severe winter and short cool summer. Due to the prevailing low temperature and short growing seasons, the net primary productivity is very low in tundra.
- People are nomadic. Hunting and fishing are their major occupations. The population here is extremely sparse and the harsh environment makes them change their settlement frequently.
- They live in igloos in winter and in tents during summer. Arctic moss, Arctic willow, lichens etc. grow here. Fauna like the polar bear, wolverine, reindeer, snowy owl are found here.

➢ **Aquatic Biomes :** Aquatic biomes are a group of living organisms that live and interact with one another and its aquatic environment for nutrients and shelter. Like terrestrial biomes, aquatic biomes are influenced by a series of abiotic factors.It is broadly classified as freshwater biomes and marine biomes.

➢ **Freshwater Biomes :**

- It comprises lakes, ponds, rivers, streams, wetlands etc. It is influenced by various abiotic components such as the volume of water, water flow, composition of oxygen, temperature, etc.
- Humans rely on freshwater biomes for drinking water, crop irrigation, sanitation and industry. Water lilies, lotus, duck weeds etc. are the common plants found here. Trout, salmon, turtles, crocodiles etc. are the animals found here.

➢ **Marine Biomes :**

- They are the largest aquatic biomes on earth. They are continuous bodies of salt water and provide a wide range of habitats for marine plants and animals.
- Coral reefs are a second kind of marine biomes within the ocean. Estuaries, coastal areas where saltwater and freshwater mix, form a third unique marine biome.
- As water provides maximum mobility to marine organisms, nutrients are circulated

more quickly and efficiently here than the terrestrial biomes.

- Apart from animals, plants such as kelp, algae, phytoplankton etc. also grow in water. Aquatic biomes are not only important for plants and animals, but also for humans.
- Humans use aquatic biomes for water, food and leisure activities. Some of the threats and issues to aquatic biomes are overfishing, pollution and rise in sea level.

Difference Between Aquatic and Terrestrial Ecosystem

Aquatic Ecosystem	Terrestrial Ecosystem
Aquatic ecosystem exists on water covering 71% of the earth surface.	Terrestrial ecosystem exists on land covering 29% of the earth surface.
Aquatic animals use 20% of energy to obtain oxygen.	Terrestrial animals use only 1-2% of energy to obtain oxygen.
In this ecosystem there is abundant water with limited oxygen supply.	In this ecosystem there is less availability of water, greater availability of gases and temperature fluctuation.
The small drifting photosynthetic organisms of the ocean called photo phytoplankton are regarded as the major primary producer.	The primary producer is the plant that produces food through photosynthetic processes.
Aquatic environment is more stable with smaller fluctuations in temperature and other variables.	Terrestrial environment is quite unstable as the land surface is affected by great risks from external impacts.

24. Conservation of Environment

- In our environment we have air, water, green plants and animals around us. This is our environment. We are used to living in our environment. Any change in the environment around us which is not favorable to us troubles us.
- There are some changes that are not suitable for life, and they pollute our environment. The pollution of the atmosphere is called 'Environmental Pollution.
- Conservation of the environment is very essential. We should protect our air, water, soil and forests in order to conserve the environment. We also have to see that the balance between natural things and living beings is maintained.
- Conservation can be defined in simple terms, as the management of resources in such a manner that the largest number of people benefit for the longest possible time without harming the natural or ecological balance.
- Conservation is the protection, preservation, management of wildlife and natural resources such as forest and water.
- Conservation of biodiversity helps us to protect, maintain and recover animals and plant species.
- Conservation is of two types. They are : (a) In-situ conservation (within habitat) (b) Ex-situ conservation (outside the habitat).
  - **In-situ conservation :** It is the conservation of living resources within the natural ecosystem in which they occur. This is achieved by protection of natural habitat and maintenance of endangered species in certain protected areas such as national parks, wildlife or bird sanctuaries and biosphere reserves. In India, there are about 104 national parks, 566 wildlife sanctuaries and 18 biosphere reserves.
  - **Ex-situ conservation :** It is the conservation of wildlife outside their habitat. Establishing zoos and botanical gardens, conservation of genes, seedling and tissue culture are some of the strategies followed in this method.
    - **Botanical Gardens :** It is a place where flowers, fruits and vegetables are grown. These places provide a healthy and calm environment.
    - **Zoological Parks :** They are the areas where wild animals are conserved.
    - **Tissue Culture :** It is a technique of growing plant cells, tissues, organs, seeds or other plant parts in a sterile environment on a nutrient medium.
    - **Seed Bank :** The seed bank preserves dried seeds by storing them in a very low temperature. The largest seed bank in the world is the Millennium Seed Bank in England.
    - **Cryo Bank :** It is a technique by which a seed or embryo is preserved at a very low temperature. It is usually preserved in liquid nitrogen at –1960C. This is helpful for the conservation of species facing extinction.
- The Central Pollution Control Board of India is a statutory organization under the Ministry of Environment, Forest and Climate Change. It was established in 1974 under the Water Act, 1974. It Coordinates the activities of the State Pollution Control Boards by providing technical assistance and guidance and also resolves disputes among them. It is the apex organization in country in the field of pollution control.
- **Soil Conservation**
  - Our soil took crores of years to make. Its upper crust is very fertile. It needs to be protected for growing healthy plants. It is protected by grasses and forests.
  - Cutting down of forest trees and overgrazing of grasslands is harmful for the fertile layer of soil. It gets eroded by fast moving winds and water. So we have to keep it covered by growing plants on it.
- **Forest Conservation**
  - Plants and forests are very important for us. They clean our air and keep our surroundings cool. There is no life without plants. We get oxygen from plants which is necessary for life. We also get animal feed, fuel, wood, medicines, honey, lac, wax, gum, rubber, cotton, fruits, flowers etc. from plants and trees. Roots

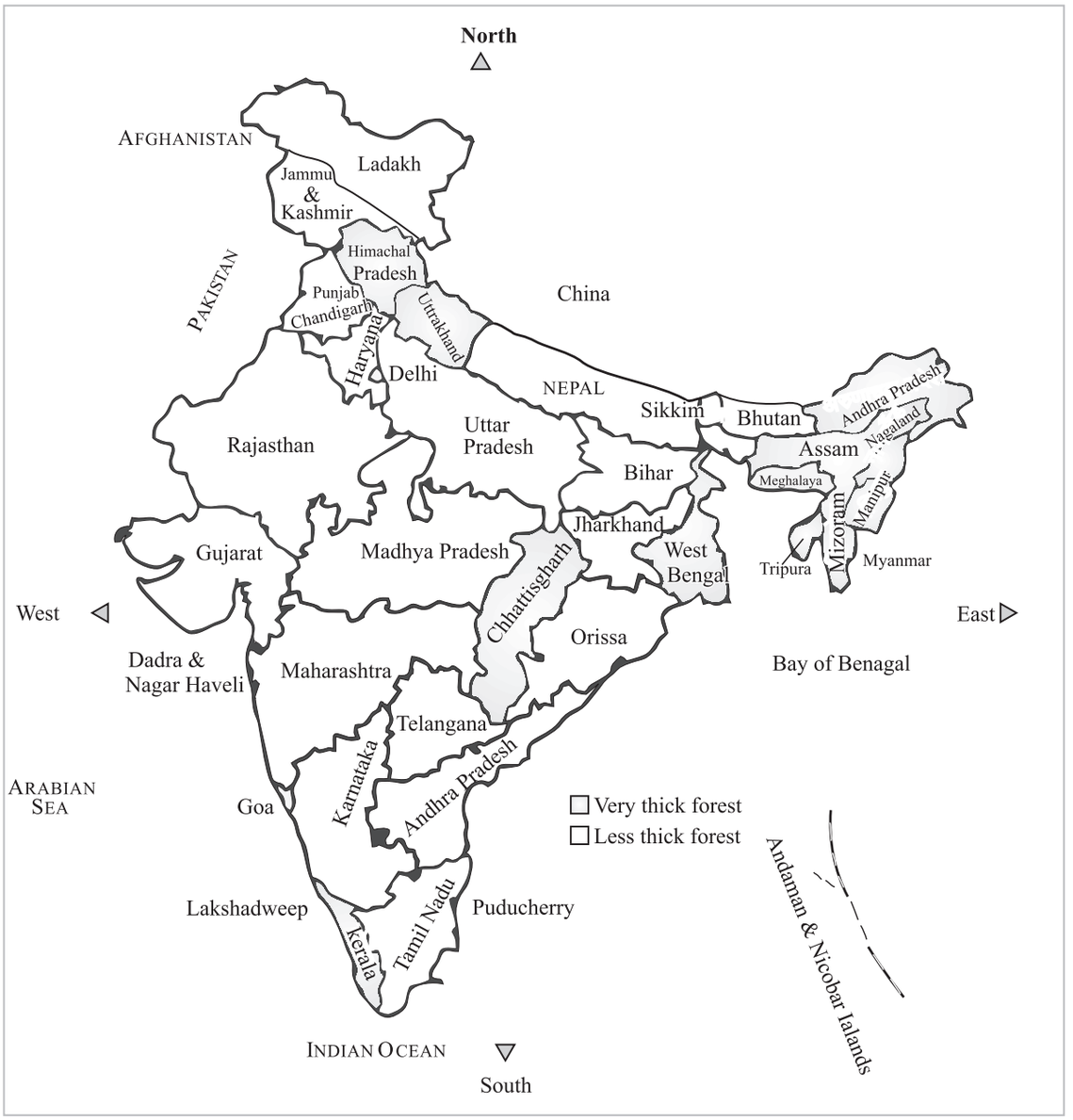
of plants spread to form a network under the soil and do not allow it to erode.

- Trees also hold water in the farms. A number of tribals live in the forests. They take care to protect the forests and forest animals. Cutting of trees and forests is an offence and has been legally banned in our country.
- There are some practices that we can follow to save our environment -
  - Grow as many trees as possible around your house and farmlands.
  - Keep your surroundings clean. Don't litter.
  - Use garbage, rotten leaves, and other such things to make compost.
  - Try to reduce the use of chemicals in the farms. Promote organic farming.
  - Protect forests and forest animals.
  - Our environment gets polluted when we litter it with plastic bags. These plastic bags are eaten by cows and other animals. Many of them die because of this.

Right to Forest Act 2007

People who have been living in the forests for at least 25 years, have a right over the forest land and what is grown on it. They should not be removed from the forest. The work of protecting the forest should be done by their Gram Sabha.

A forest is everything for adivasis. They can't live away from the forests even for a day. Government has started many projects in the name of development – dams and factories are being built. Forests, which are theirs, are being taken away from them. Because of these projects, we need to think where the forest people will go and what will happen to their livelihood?



Chipko Movement

The Chipko movement was a forest conservation movement in India. The movement originated in 1973 at the Himalayan region of Uttarakhand (then part of Uttar Pradesh) and went on to become a rallying point for many future environmental movements all over the world. It created a precedent for starting nonviolent protest in India. However, it was Sunderlal Bahuguna, a Gandhian activist, who gave the movement a proper direction and its success meant that the world immediately took notice of this non-violent movement, which was to inspire in time many similar eco-groups by helping to slow down the rapid deforestation, expose vested interests, increase social awareness and the need to save trees, increase ecological awareness, and demonstrate the viability of people power. He used the slogan "Ecology is the permanent economy". Above all, it stirred up the existing civil society in India, which began to address the issues of tribal and marginalized people. And it's true that the support for the movement came mainly from the womenfolk. The Chipko Andolan or the Chipko movement is a movement that practiced methods of Satyagraha where both male and female activists from Uttarakhand played vital roles, including Gaura Devi, Suraksha Devi, Sudesha Devi, Bachni Devi and Chandi Bhatt, Virushka Devi and others.

Water Conservation

- The river flows through or near many villages, towns and cities the water changes. The people use the river water for many different things such as washing clothes, bathing animals and cleaning utensils. Many of these
  activities make the water dirty. The water in the river keeps changing as it flows through various places. Water in ponds and lakes can also become dirty due to similar reasons.
- There is no life without water. Water is necessary for good production of crops. Water keeps our environment cool and humid. Flowing water is a source for energy and is used for transport.
- We get most of the water from rains. Some amount of rainwater seeps into the soil and adds to the ground water. Rest of it flows into the rivers. These rivers finally pour water into the seas.
- There are many things that dissolve easily in water. Some of these can be very harmful for our body. Hence, it is important that we clean water before drinking it. One of the best ways to do this is to boil the water.
- Government and some other agencies work to save water and to keep it clean. They build dams over rivers, construct canals, clean lakes and rivers. But we should start saving water right from our homes. We should follow the practices like-
  - Don't waste water. Plants can be watered with used and dirty water (without soap).
  - Make arrangements for holding water in the farms.
  - Don't put garbage in the water bodies like rivers, lakes and ponds. Clean water tanks, ponds, lakes, rivers etc.
  - Make arrangements to harvest rainwater.
  - Government and non-government organizations help in water harvesting.
  - We can make arrangements for collecting rainwater in our homes. For this rainwater is collected on the roofs. From there it is sent to an underground tank through water pipes. A mesh is fitted at the mouth of the pipe so that dirt is not able to go to the tank. Water, collected in this way, is used for various purposes.
  - Teach children how to save water and keep it clean.

Wildlife Conservation

- **National Parks:** National park is an area which is strictly reserved for the betterment of the wildlife. Here no human activities are allowed and boundaries are fixed and defined. Flora, fauna or any other objects of historical significance are protected. Not usually open to the public. National Parks are formed by the state or central legislature.

Names	State	Established Year
Jim Corbett National Park	Uttarakhank	1936
Dudhwa National Park	Uttar Pradesh	1977
Gir National Park	Gujarat	1975
Kanha National Park	Madhya Pradesh	1955
Sundarbans National Park	West Bengal	1984
Guindy National Park	Chennai	1976
Gulf of Mannar National Park	Ramanatha Puram	1980
Indira Gandhi National Prak	Coimbatore	1989
Mudumalai National Park	The Nilgiris	1990
Mukurthi National Park	The Nilgiris	1990
Ranthambore National Park	Rajasthan	1955

Rare Species and Associated National Parks

National Park (wild life sanctuaries)	Rare species of wild animals protected
1. Dachigram (J&K)	Hangul, Musk deer
2. Corbett (Uttrakhand)	Tiger,Elephant, Panther, Deer
3. Dudhwa (U.P.)	Elephants and Tiger
4. Kanha (M.P.)	Tiger, Barasingha
5. Badipur (Karnataka)	Tiger, and Barasingha
6. Periyar (Kerala)	Elephants
7. Bharatpur (Rajasthan)	Different types of water birds
8. Deset Park (Rajasthan)	Desert wolf, Fox
9. Gir (Gujarat)	Lion, Panther, Chital
10. Kaziranga (Assam)	Rhino, Wild Buffalo
11. Manas (Assam)	Elephant, Rhino, Wild Buffalo
12. Nam Dafa (Arunachal Pradesh)	Tiger, Gaur, Wild buffalo
13. Sundarbans (West Bengal)	Royal Bengal Tiger

- **Wildlife Sanctuaries:** Sanctuary is a protected area which is reserved for the conservation of animals only. Human activities like harvesting of timber, collection of forest products and private ownership rights are allowed here. Controlled interference like tourist activity is also allowed. The wildlife sanctuaries of India are as follows:
  - Mudumalai wildlife sanctuary (Tamil Nadu) is famous for Tiger, Elephant , Bison, Deer.
  - Kaziranga National Park (Assam) is famous for Tiger, Deer, Buffalo.
  - Ranthambore National Park (Rajasthan) is famous for Tiger.
  - Kanha National Park (Madhya Pradesh) is famous for Swamp Deer.
  - Sundarbans National Park (West Bengal) is famous for the Bengal Tiger.
  - Gir National Park (Gujarat) is famous for Lions.
  - Bhadra Wildlife Sanctuary (Karnataka) is famous for Bison, Leopard, Gaur.
  - Periyar National Park (Kerala) is famous for Elephant, Deer.
  - Corbett National Park (Uttarakhand) is famous for Tiger.
- **Biosphere Reserves :** Biosphere is a protected area where human population also forms part of the system. The area of these places will be around 5000 square kilometers. They conserve the ecosystem, species and genetic resources. These areas are set up mainly for economic development. Nilgiri is the first and the biggest bioreserve in India.

Name of Biosphere	State/Union Territory
Nanda Devi	U.P
Nokrek	Meghalaya
Manas	Assam
Sunderbans	West Bengal
Gulf of Mannar	Tamil Nadu
Nigiri	Tamil Nadu
Great Nicobars and Similipal	Andaman and Nicobar/Orissa

Do You Know?

- For Gandhiji's 150th birthday, the Swachh Bharat Abhiyan was launched in 2014. It is to help us realise that cleanliness is everyone's duty and responsibility.

Migration:

- When people move from one place to another, the place they move from is called the place of origin and the place they move to is called the place of destination.
- Migration may be permanent, temporary or seasonal.
- It may take place from rural to rural areas, rural to urban areas, urban to urban areas and urban to rural areas.
- People from villages migrate to cities and towns for better job opportunities and educational facilities.

Displacement:

- In the human population, displacement means the relocation of a large number of people from their homes.
- It can be caused by both non-human activities and also human activities.
- As a non-human activity, climate change can change a place from farmland to desert then people have to face displacement because of it.
- On the other hand, humans cause displacement to happen because of an inequitable social and political system that does not provide people protection and other necessary things they want.
- Example: Due to dam construction in the state of Madhya Pradesh, Maharashtra, and Gujrat indigenous people of this area face man making displacement and they had to leave the place of their habitat.

Immigration: Immigration is the number of individuals of the same species that have come into the habitat from elsewhere during the time period under consideration.

Out Migration: In this kind of migration, people move out from one region of the country to another region of the same country to live there permanently.

Important Days related to Environment

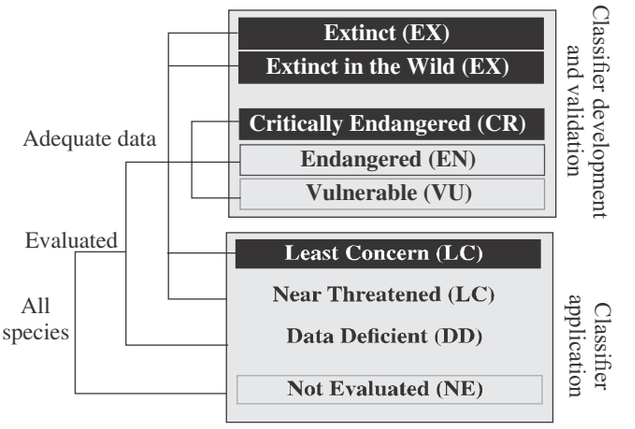
World Forest Day	21 March
World Water & Sanitation Day	22 March
World Resources Day	23 March
World Atmosphere Day	10 April
Earth Day	22 April
World Migratory Bird Day	08 May
World Biodiversity Day	22 May
World Environment Day	05 June
Van Mahotasav Saptah	01-07 July
World Population Day	11 July
World Ozone Day	16 September
Wildlife Week	02-08 October
World Nature Day	03 October
World Wildlife Day	06 October
World Birds Day	12 November
World Energy Conservation Day	14 November

25. Government Initiatives

- In order to preserve the plants and animals, the government has taken a lot of initiatives and some acts have also been passed to protect them.
- "Project Tiger" : The population of tigers (Panthera tigris) reduced from 40,000 to 1827 in 1972. On 1st April, 1973, Project Tiger was launched by the Government of India, it resulted in the increase of tiger population in India from 1400 in 2006 to 2967 in 2018.
- Madhya Pradesh is known as Tiger State.
- Corbett National Park was the first National Park in India to be covered under project Tiger.
- An ambitious programme "Project Elephant" was launched by the Ministry of Environment and Forests, which focuses on solving the problems of humans and elephants competing for the same habitat.
- "Operation Rhino" : Number of Indian rhinos or one horned Rhinoceroses are lost due to hunting and natural calamities. To protect the Indian species, a centrally sponsored rehabilitation programme was undertaken in Dudhwa National Park in Uttar Pradesh. They are also protected in Kaziranga National Park.
- "Lion Sanctuary" : In 1972, a five year plan was proposed by the Government of Gujarat, to protect this magnificent feline species in the Gir Sanctuary.
- The Crocodile Breeding and Management Project was launched by the Government of India in 1975 for all the three endangered crocodile species namely, the freshwater crocodile, saltwater crocodile and the rare gharial.
- Apart from this, the government has enacted Acts such as Madras Wildlife Act, 1873, The Wild Bird and Animal Protection Act, 1912, All India Wildlife Protection Act, 1972 and Environmental Protection Act, 1986.

26. Red Data Book

- The Red Data Book is the file for recording rare and endangered species of animals, plants and fungi.
- Red data book gives important data for observational studies and monitoring programmes on habits and habitats of rare and endangered species.
- This book is created to identify and protect the species which are about to go extinct.
- The Red Data Book is maintained by the International Union for Conservation of Nature (IUCN). Founded in 1964, with the aim of maintaining a complete record of every species that ever lived. It is an international organization working in the field of nature conservation and sustainable use of natural resources.
- The Red Data Book classifies species mainly into three categories namely "Critically Endangered", "Endangered" and "Vulnerable". In the case of India, the names of Black Buck, Great Indian Rhinoceros and Himalayan Musk Deer can be found in this book.



27. Biodiversity

- The variety of organisms, their inter-relationships and their relationship with the environment is known as biodiversity.
- The term biodiversity was coined by Walter G. Rosen in 1985.
- India contains four (4) out of 34 biodiversity hotspots of the world and these are :
  - The Himalayas,
  - The Western Ghats,
  - The Indo-Burma Region and
  - The Sundaland (Includes Andaman-Nicobar Island Groups).
- **Threats to Biodiversity :**
  - **Natural causes :** Floods, earthquakes, landslides, natural competition between species, lack of pollination and diseases.
  - **Man-made causes :** Development activities like housing, agriculture, construction of dams, reservoirs, roads, railway tracks etc.
- **Loss of Biodiversity :** It occurs when either the habitat essential for the survival of a species is destroyed or a particular species is destroyed.
- **Advantages of biodiversity conservation :**
  - To preserve the continuity of the food chain.
  - The genetic diversity of plants and animals is preserved.
  - It provides immediate benefits to the society such as recreation and tourism.
  - It ensures the sustainable utilization of life supporting systems on earth.

Do You Know?

- Tigers and Lions belong to the cat family, commonly known as Big Cats.
- India is the only country with 5 species of Big cats. They are: Lion, Tiger, Leopard, Snow Leopard, Clouded Leopard.
- There should have been 6 species, but cheetahs became extinct in the 1950s.
- Rock shelters are also found inside the Satpura National Park. These are the prehistoric evidence of human life in these jungles. A total of 55 rock shelters have been identified in Pachmarhi Biosphere Reserve.
- Sacred grove : These are the tracts of forests that are communally protected. Because of traditions these species are protected. Traditional knowledge is transmitted orally from generation to generation in the form of songs, proverbs, rituals etc. Tradition of tree worship (to protect) is observed all over India.

- **PBR (People's Biodiversity Register) :**
  - It is a document which contains comprehensive information on locally available bio-resources including landscape and demography of a particular area or village.
  - Preparation of this register promotes conservation, preservation of habitats and breed of animals and gathering of knowledge relating to biological diversity.
- Biomagnification is the increase in contaminated substances due to the intoxicating environment.
- Blue Cross is a registered animal welfare charity in the United Kingdom, founded in 1897 as 'Our Dumb Friends League'. The vision of this charity is that every pet will enjoy a healthy life in a happy home. The charity provides support for pet owners who cannot afford private veterinary treatment, helps to find homes for unwanted animals, and educates the public in the responsibilities of animal owner- ship.
- CPCSEA stands for 'The Committee for the Purpose of Control and Supervision of Experiments on Animals'. It is a statutory committee set up under the Prevention of Cruelty to Animals Act, 1960. It has been functioning since 1991 to ensure that animals are not subjected to unnecessary suffering during experiments on them.

28. Migration of animals and birds

- When an animal or maybe a bird moves from one place to the other due to change in season. This is known as Migration.
- It protects them from the harsh and cold conditions of their normal habitat and allows them to survive and reproduce.
- **The examples can be seen in the form of :**
  - Siberian Crane which migrates from colder areas of
  - Siberia to warmer areas of Bharatpur (Rajasthan).
  - The salmon fish travels up to 1500 miles (2400 km) from the sea to fresh water for breeding.
  - The Brazilian turtles travel up to 1250 miles (2000 km) in eight weeks for breeding.
  - Swallows of Northern Europe may fly 6800 miles (11,000 km) or so, to their African wintering grounds.
- Dr. Salim Ali is an Ornithologist, known as "the Bird man of India".
- Many birds that migrate may be sensitive to variations that occur in the earth's magnetic field. With the help of that, they find their destinations. Racing pigeons find their way home only by this method.
- Vedanthangal Bird Sanctuary in Tamil Nadu is home for migratory birds such as pintail, garganey, grey wagtail, blue- winged tail, common sandpiper and other birds.

Do You Know?

- **Recycling of Paper :** It takes 17 full grown trees to make one tonne of paper. Therefore, we should save paper. By recycling we not only save trees but also save energy and water needed for manufacturing paper.

29. Important Environmental Conventions

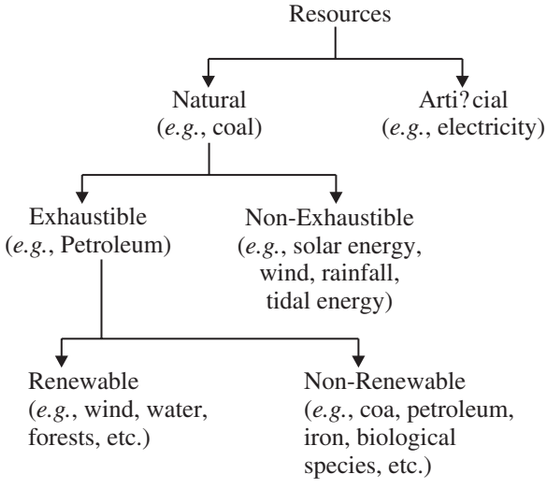
- **Ramsar Convention**
  - It is called the Convention on Wetlands
  - It was adopted in the city of Iran, Ramsar in 1971.
  - It came into force in 1975.
- **Stockholm Convention**
  - It is a convention on Persistent Organic Pollutants (POPs)
  - It was adopted in 2001 in Geneva, Switzerland.
  - It came into force in 2004.
- **CITES**
  - It is a convention on International Trade in Endangered Species of Wild Fauna and Flora
  - It was adopted in 1963.
  - It came into force in 1975.
- **Convention on Biological Diversity (CBD)**
  - It is a convention for the conservation of biological diversity.
  - It was adopted in 1992
  - It came into force in 1993.
- **Bonn Convention**
  - It is a convention on the Conservation of Migratory Species of Wild Animals.
  - It was adopted in 1979.
  - It came into force in 1983.

- **Vienna Convention**
  - It is a convention for the Protection of Ozone Layer.
  - It was adopted in 1985.
  - It came into force in 1988.
- **Montreal Protocol**
  - It is an international environment protocol on substances that deplete the Ozone Layer.
  - It was adopted in 1987.
  - It came into force in 1989.
- **Kyoto Protocol**
  - It is an international protocol to reduce greenhouse gas emissions.
  - It was adopted in 1997.
  - It came into force in 2005.
- **United Nations Framework Convention on Climate Change**
  - It is an international environmental treaty governing actions to combat climate change through adaptation and mitigation efforts directed at control of emission of GreenHouse Gases (GHGs) that cause global warming.
  - It was adopted in 1992.
  - It came into force in 1994.
- **Rio Summit**
  - It is a United Nations Conference on Environment and Development.
  - It was held in 1992 at Rio de Janeiro, Brazil.
- **UNCCD**
  - It is a United Nations Convention to Combat Desertification.
  - It was adopted in 1994.
  - It came into force in 1996.
- **Basel Convention**
  - It is a convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.
  - It was adopted in 1989.
  - It came into force in 1992.
- **Cartagena Protocol**
  - It is an international environmental protocol on Biosafety to the Convention on Biological Diversity.
  - It was adopted in 2000.
  - It came into force in 2003.
- **UN-REDD**
  - It is a United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation.
  - It was created in 2008.
- **Nagoya Protocol**
  - It is an international environment protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) to the Convention on Biological Diversity (CBD).
  - It was adopted in 2010.
  - It came into force in 2014.

30. Resources

- A resource can be defined as any natural or artificial substance, energy or organism, which is used by human beings for its welfare. They are classified as under-
  - **Natural Resources :** The term 'Natural resource' means anything that we use from our environment such as soil, air, water, minerals, coal, sunshine (sunlight), animals and plants, etc., to achieve our objective.
  - **Artificial Resources :** The resources, which have been developed by human beings during the growth of civilization, are called artificial resources. For *e.g.,* biogas, thermal electricity, plastics. These man-made resources are generally derived from some other natural resources. For example, plastics from the natural resource, petroleum.
  - **Inexhaustible Resources :** The resources which cannot be exhausted by human consumption are called inexhaustible resources. For e.g., Energy sources like solar radiation, wind power, water power (flowing streams) and tidal power, and substances like sand. clay, air, water in oceans, etc.
  - **Exhaustible Resources :** Resources which are available in limited quantities and are going to be exhausted as a result of continuous use. These are called exhaustible resources. For e.g., The stock of coal in the earth is limited and one day there will be no more coal available for our use.
  - **Renewable Resources :** Some of the exhaustible resources are naturally regenerated after consumption and are known as renewable resources. For *e.g.,* Forest trees and plants that make a forest may be destroyed but new ones grow in their place. Some other examples are fresh water, fertile soil, forest (yielding wood and other products), vegetation. wildlife, etc.
  - **Non-renewable Resources :** The resources, which cannot be replaced after the use, are known as non-renewable resources. *e.g.* minerals (copper, iron etc.) fossil fuels (coal, oil etc.). Even wildlife species (rare plants and animals) belong to this category.

Classification of Natural Resources



Bhopal Gas Tragedy

- The world's worst industrial tragedy took place in Bhopal in 1984. Union Carbide (UC) , an American company, had a factory in the city in which it produced pesticides. At midnight on 2 December 1984 methyl-isocyanite (MIC) - a highly poisonous gas - started leaking from this UC plan.
- Within three days, more than 8,000 people were dead. Hundreds of thousands were maimed. Most of those exposed to the poison gas came from poor, working-class families, of which nearly 50,000 people are today too sick to work. Among those who survived, many developed severe respiratory disorders, eye problems and other disorders. Children developed peculiar abnormalities.
- The disaster was not an accident. UC had deliberately ignored the essential safety measures in order to cut costs. Much before the Bhopal disaster, there had been incidents of gas leak killing a worker and injuring several.
- Despite the overwhelming evidence pointing to UC as responsible for the disaster, it refused to accept responsibility. In the ensuing legal battle, the government represented the victims in a civil case against UC. It filed a $3 billion compensation case in 1985, but accepted a lowly $470 million in 1989. Survivors appealed against the settlement but the Supreme Court ruled that the settlement amount would stand.
- UC stopped its operations, but left behind tons of toxic chemicals. These have seeped into the ground, contaminating water. Dow Chemical, the company who now owns the plant, refuses to take responsibility for cleanup.
- 24 years later, people are still fighting for justice: for safe drinking water, for health-care facilities and jobs for the people poisoned by UC. They also demand that Anderson, the UC chairman who faces criminal charges, be prosecuted.

31. Social Environment

- We have many people around us, for example- barber (hairdresser), washer men, cobbler (shoe maker), cleaner, doctor, teacher, etcWe also have some public services, for example, hospitals, schools, banks, post-offices and police etc. We have a happy life with the help of all of these. All of these services are necessary for us.
- **The Professions in our Neighbourhood**
  - The main profession in our villages is agriculture. But all types of people live in a village because no one can do all the necessary work for him/herself on their own, for example, there is a barber to cut hair and shave. The potter is there to make earthen pots. Cobbler is available to do leather related works. The blacksmith makes several tools for us. The carpenters are there for wood work.
  - The Goldsmith is available to make jewellery out of gold and silver etc. The oil man is available to extract oil for us. The Bhadbhunja is available to roast corn gram etc. for us.
- **Change in Profession :** With the passage of time the professions of all these people have changed and become new. There are many reasons for change in profession such as :
  - The number of family members has increased and, therefore, all the members cannot continue working in the same profession.
  - Earlier, people used to be dependent only on farmers and rich villagers for their livelihood. Now they go out of the village and work.
  - It is a social concern that sewage in many cities in India is still cleaned by manual scavengers.

32. Public Service

- We have almost daily relations with hospitals, schools, post offices, police stations etc. We live a smooth life with the help of these all. All these services are called the public services. The public services can be Governmental or Non-Governmental.
- **Some Important Public Services are given below:**
  - Hospitals
  - Schools
  - Post Office
  - Bank
  - Police
  - Court
  - Municipality and Municipal Corporation
  - Village Panchayat
- **Facilities received from a Court**
  - The Panchayats solve the disputes between people in villages. However, if they are not solved there, then people go to a court. The courts take decisions regarding disputes and crimes.
  - Case hearing takes place in front of the Judge. The advocates present cases of their clients for judgement before the Judge.
  - The District level court is called District Court. The court at the State level is called the High Court. The highest court of the country is called the Supreme Court.

- The Supreme Court is in New Delhi. Here appeals from all the lower courts are received. Independent cases are also received here. The decision of the Supreme Court is final. There could be no appeal against it. The main work of the Judiciary is to see that the country's law and order are being maintained as per the Constitution.
- If injustice is done to somebody and that person does not have money to pay fees for the case, the Judge may waive off the fee. Judge may also appoint a free advocate. The Government has opened an office for free legal help in each court. It is called "Legal Aid Cell".

- **Functions of Municipality and Municipal Committee/ Corporation:** These offices are responsible for maintenance of several facilities related to city life. These are the offices which take care of electricity, water, cleaning, prevention of diseases, roads, education, parks etc. The birth and death certificates are also issued from here.
- **Working of a Village Panchayat**
  - It is the duty of the Panchayat to provide facilities to villagers. Here developmental plans are made. All the Governmental and non-Governmental plans for social service and development of the village are implemented from here.Registration for MGNREGA is also done here. Job Cards are also made in the Panchayat .
  - The main works of a Panchayat are:
    - development of agriculture and plantation preparing fields for grazing and their protection,
    - tree plantation,
    - improvement and conservation of soil,
    - work related to making of embankments and dams,
    - consolidation of holdings, development of irrigation facilities, their construction, repair and maintenance,
    - improving animals breed, milk production, fishery, poultry, rearing of pigs,
    - plantation of trees on the public land and roads, small industries, cottage industries, village industries,
    - construction of houses for villagers, maintaining public wells, ponds etc. for water,
    - development of fuel, fodder and land,
    - maintenance of village roads, culverts, and small quays and waterways,
    - arrangement of electricity for villages,
    - programmes for eradication for poverty, primary and middle education, sports,
    - cultural activities,
    - cleanliness of village,
    - vaccination of people and animals,
    - registration of birth, death and marriages, family welfare;
    - making plans for development.
- The family and neighbourhood play an important role in the development of the society. The society develops when the people are educated, healthy, responsible and live together with co-operation.

Do You Know?

- The World Wide Fund for Nature Inc. is an international non-governmental organization founded in 1961 that works in the field of wilderness preservation and the reduction of human impact on the environment. It was formerly named the World Wildlife Fund, which remains its official name in Canada and the United States. It is headquartered in Gland, Switzerland.
- Greenpeace is an independent global campaigning network. The network comprises 26 independent national/regional organisations in over 55 countries across Europe, the Americas, Africa, Asia and the Pacific, as well as a co-ordinating body, Greenpeace International, based in Amsterdam, the Netherlands.
- Desert Oak is a tree that is found in Australia. It grows almost as tall as your classroom wall. It has very few leaves. Imagine the length of about 30 such trees laid down in a line end to end, one after another. That is how long the roots of this tree can be. These roots go deep into the ground till they reach water. This water is stored in the tree trunk. Local people knew about this. When there was no water in the desert, the local people use to put a thin pipe into the trunk of the tree, to drink this water.

Important Questions

1. Which is not a characteristic of a family ?
(A) Atleast two different adults of different gender living together.
(B) The income of each member deposited separately.
(C) They use same house, food and perform common social activities.
(D) Common responsibility for security and children.

2. Which of the following statement is correct ?
(A) Dowry system is common in nuclear family.
(B) Child labour is common in nuclear family.
(C) Dowry and child labour are social evils.
(D) Dowry and child labour are common in cities.

3. Nuclear family refers to ..... :
(A) any family born after 1950
(B) family includes parents and their children
(C) entire family including children, their parents and grandparents
(D) only husband and wife

4. "A family is a unit consisting of mother, father and their two children." This statement is :

(A) correct, because this is what all Indian families are like
(B) incorrect, because the statement should specify that the children are biological
(C) incorrect, because the statement should specify that the children are biological
(D) correct, since this is an ideal family size

5. Ozone layer protection is an important environmental initiative undertaken all over the world. Select the reason that led to protection of Ozone layer.
(A) Ramsar Convention
(B) Mantreal Protocol
(C) Kyoto Protocol
(D) Durban Summit

6. Consider the following statements about a tree
(a) This tree grows as tall as the walls of a common classroom.
(b) The roofs of this tree go down nearly thirty times its own height till they reach the water table
(c) These trees store water in their trunk
(d) This tree is found near the sand dunes in Abu Dhabi
The correct statements about this tree (called "Desert Oak') are :
(A) Only a and c
(B) Only b and d
(C) a, b, and c
(D) a, c, and d

7. People who have been living in forest for at least 25 years have a right over the forest land and what is grown on it. This Act is derived from ?
(A) Right to Forest Act, 2007
(B) Indian Forest Act, 1927
(C) National Forest , 1988
(D) Indian Forest Amendment Act, 2019

8. Who coined the term 'biodiversity' ?
(A) A. G. Tansley
(B) E. Haeckel
(C) R. H. Whittaker
(D) W. G. Rosen

9. Human activities, which are responsible for climate change on the earth-
(A) Use of aerosol can
(B) burning of forests
(C) Agricultural activities
(D) all of the above

10. The Bhopal gas tragedy of the year 1984 was caused by the leakage of which of the following gas?
(A) Methane
(B) Methyl isocyanate
(C) Nitrous oxide
(D) carbon monoxide

11. When is 'World Environment Day' celebrated?
(A) June 5
(B) 2 December
(C) 16 September
(D) 11th July

12. 'Red Data Book' is related to?
(A) Organism near extinction
(B) pollution in rivers
(C) Decreasing groundwater level
(D) air pollution

13. Which of the following sequences is correct regarding energy flow in the ecosystem?
(A) Producer-consumer-decomposer
(B) Producer-Decomposer-Consumer
(C) decomposer-consumer producer
(D) consumer producer-decomposer

14. The Wildlife Protection Council Act was passed in-
(A) in the year 1960
(B) in the year 1962
(C) in the year 1972
(D) in the year 1975

15. The headquarter of Greenpeace International is located at
(A) New York (B) Sydney
(C) Amsterdam (D) Nagasaki

16. 'W W.F. means-
(A) World Wide Fund
(B) World War Fund
(C) World Wildlife Fund
(D) World Watch Fund

17. In which year the Environment Protection Act was passed?
(A) 1982 (B) 1986
(C) 1992 (D) 1996

18. In which of the following is maximum biodiversity found?
(A) Temperate deciduous forest biome
(B) Tropical Evergreen Rain Forest Biome
(C) Temperate Grassland Biome
(D) Savanna Biome

19. International 'Ozone Day' is celebrated on :
(A) 16 September (B) 7th December
(C) 30 March (D) 22 April

20. What is the cycling of elements of the ecosystem called?
(A) chemical cycle
(B) Biogeochemical cycle
(C) Geological cycle
(D) Geochemical cycle

21. What is the correct definition of ecosystem?
(A) interacting community
(b) Abiotic component of a place
(C) living beings live in the area between the earth and the atmosphere
(D) Balanced system of living community and its environment

22. The primary consumer in a biological community is
(A) Carnivores (B) omnivores
(C) Herbivores (D) Detritivor

23. When one organism takes advantage without affecting the other living organism then it is called
(A) parasite (B) companion
(C) Scavenger (D) Symbiotic

24. The vegetarian animals who depend on green trees and plants for food-
(A) First stage consumer
(B) Second stage consumer
(C) Third stage consumer
(D) consumer

25. Which of the following is not a greenhouse gas?
(A) CO_2 (B) N_2O
(C) CO (D) CH_4

26. Which is the famous 'one horned rhinoceros' wildlife sanctuary of Assam?
(A) Manas (B) Kaziranga
(C) Gir forest (D) Kanha-Kisli

27. The interconnected group of the food chain is called-
(A) Food cycle
(B) chain reaction
(C) food web
(D) Pyramid of biomass

28. The interconnected group of the food chain is called-
(A) Food cycle
(B) chain reaction
(C) food web
(D) Pyramid of biomass

29. Which is the coldest layer of the atmosphere?
(A) thermosphere (B) Mesosphere
(C) Troposhere (D) Ionosphere

30. Which state is associated with the Chipko movement to save the environment?
(A) Uttar Pradesh (B) Jharkhand
(C) Uttarakhand (D) Chhattisgarh

Answers

1. (B)	**2.** (C)	**3.** (B)	**4.** (C)	**5.** (B)
6. (C)	**7.** (A)	**8.** (D)	**9.** (D)	**10.** (B)
11. (A)	**12.** (A)	**13.** (A)	**14.** (C)	**15.** (C)
16. (B)	**17.** (B)	**18.** (B)	**19.** (A)	**20.** (B)
21. (D)	**22.** (C)	**23.** (B)	**24.** (A)	**25.** (C)
26. (B)	**27.** (C)	**28.** (B)	**29.** (C)	**30.** (C)

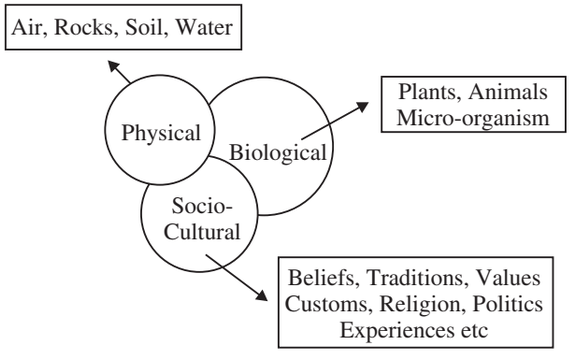
1

Chapter

Concept and Scope of EVS

1. Meaning And Definition of Environment

- **Meaning of Environment Education**
  - Environmental education is the field of study which consists of organised efforts put together to understand and teach how natural environments function. It also deals with studying how human beings manage their behaviour and ecosystems to live sustainable lives.
  - Environmental education is a multidisciplinary field that includes ideas and concepts from various fields like biology, chemistry, physics, ecology, earth science, atmospheric science, mathematics, and geography
  - Environmental Education is education about the environment, for the environment and through the environment. Its purpose is to protect, conserve and sustain the environment and to regulate its utilization in wholesome ways.
  - Environmental education is being pushed so that people become aware of the harm they are causing to mother Earth.
  - Environmental Education is basically an awareness program in which participation of everyone is compulsory.
  - Environmental education is an approach to study of human interactions with the natural environment. It integrates different approaches of the humanities, social sciences, biological sciences and physical sciences and applies these approaches to investigate environmental concerns.
  - Environmental study is a key process for bringing about the changes in the knowledge, values, behaviours and lifestyles of the people, required to achieve sustainability and stability within and among countries.
  - Environmental education also deals with every issue that affects an organism. It is essentially a multidisciplinary approach that brings about an appreciation of our natural world and human impacts on its integrity.
  - Environmental education is an applied approach which seeks practical answers to make human civilization sustainable.
  - People gain a deeper grasp of ecological issues as well as the knowledge and skills necessary to make ethical judgments through environmental education. There are various parts to it. These are what they are :
  - Environmental sensitivity and awareness of environmental and ecological difficulties-
    - Knowledge and comprehension of environmental and ecological challenges
    - Possessing environmental concerns and the desire to preserve, protect, or enhance environmental quality;
    - Possessing the knowledge and abilities to recognise and address ecological problems;
    - Taking part in activities and behaviours that help to address ecological problems.
  - Environmental education does not support a single viewpoint or course of action in particular. Environmental education rather teaches people how to handle various sides of a problem through critical thinking. It also increases the individual's own problem-solving and decision-making skills.
  - Various terms such as Environmental Education (E. E.), Environmental study (E.S.) and Environmental Approach (E.A.) are being used in the literature in the context of environment and education. Environmental Education, Environmental Studies and Environmental Approach have different meanings but these are being used many a time synonymously and interchangeably.
  - **Environmental Education enables us to:**
    - Understand that human beings are an inseparable part of the environment. We are part of a complex web of systems that links individuals, their culture and the biotic and abiotic elements of nature.



Interaction of various Components of Environment

- Recognize that it is „we‟ who are responsible for creating the present environmental crisis and it is „we‟ who have the ability to mitigate the problems of the environment, strengthen and maintain the health of this planet Earth.
- Recognize that each one of us has a moral responsibility to develop and maintain high quality natural and social systems which will advance human well-being and maintain ecological stability.
- Recognize that the biophysical world contains a range of renewable and finite resources, which human beings can develop to satisfy their needs and wants. However, we need to limit our needs and wants with due consideration for the generations to come.
- Understand that our environment is getting degraded day-by-day due to unwise use of natural resources. We need to modify our lifestyles in order to ensure ecologically sustainable development.

- Environmental Education is a continuous activity and a life-long process. It should be extended to all people, in different age groups and places with appropriate aims and contents, methods and strategies. It should adopt a combination of formal, non-formal and informal approaches. It would essentially be multi-disciplinary as it includes contents from Geography, Geology, Biology and even other physical and social sciences. It should aim to develop appropriate awareness, knowledge, attitudes and skills.

- **Definitions of Environmental Education:** After having understood the meaning of environment and environment education, let us now consider some of the definitions of Environmental Education. Below are given a few of the definitions of the term Environmental Education as defined by various International and National Commissions and Individuals-

  - **According to the Ministry of Environment and Forest, Government of India (2006),** Environmental education can be defined as 'a process of recognizing values and clarifying concepts in order to develop skills and added tools necessary to understand and appreciate the interrelationships among man, his culture and his biophysical surroundings. Environmental education is a process to disseminate awareness and understanding of the environment and its relationship with man and his activities. It is also aimed to develop responsible actions necessary for preservation, conservation and improvement of the environment and its components.
  - Environment education denotes a study of the environment and its dynamics, environmental degradation and its various forms, factors degrading environment and its impact on man's life. Environment education is education 'about' the environment, 'from' the environment and 'for' the environment.
  - **According to a report of conference of African Educators at Nairobi (1968)** "Environmental Education is to create an awareness and understanding of the evolving social and physical environment as a whole, its natural, manmade, cultural, spiritual resources together with the rational use and conservation of these resources for development."
  - **According to Mishra (1993)** environmental education appears to be the process that equips humans with awareness, knowledge, skill, attitudes and commitment to improve the environment.
  - According to the Nairobi Conference (1968) “The purpose of Environmental Education is to create an awareness and understanding of the evolving social and physical environment as a whole, its natural, man-made, cultural and spiritual resources, together with the rational use and conservation of these resources for development”.
  - **According to the International Union for Conservation of Nature, (1971)** “Environmental Education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter relatedness among man, his culture and his bio-physical surroundings. Environmental Education also entails practice in decision-making and self-evaluation of a code of behaviour about issues concerning environmental quality”.
  - **According to Belgrade Charter, (1975)** “Environmental Education aims at developing a citizenry which is aware of and concerned about the total environment and its associated problems and that has the knowledge, attitudes, motivation, commitment and the skills to work individually and collectively towards solution of current problems and prevention of new ones”.
  - **According to Tbilisi Conference, (1977)** “Environmental Education is a process of developing a world population that is aware of and concerned about the total environment and its associated problems and which has the knowledge, skills, attitudes, motivation and commitment to work individually and collectively towards solution of current problems and the prevention of the new ones”.
  - **According to Stapp, W.B, (1986)** “Environmental Education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems and motivated to work towards their solution”.

- **According to the Australian Association of Environmental Education, (1993)** "Environmental Education is an across the curriculum approach to learning which helps individuals and groups to understand the environment with the ultimate aim of developing caring and committed attitudes that will foster the desire to and ability to act responsibly in the environment. Environmental Education is also concerned not only with knowledge but also with feelings, attitudes, skills and social action".
- **According to Disinger, (1993)** "Environmental Education is the interdisciplinary process of developing a citizenry that is knowledgeable about the total environment - including both its natural and built aspects - that has the capacity and the commitment to engage in inquiry, problem-solving, decision making and action that will assure environment quality".
- **According to ASPBAE, (1996)** "Environmental Education is a life-long process that involves all of us as learners and educators; is interdisciplinary, integrates the historical, political, social, economic and cultural contexts; covers a wide learning spectrum from awareness, understanding to action; values indigenous and local knowledge; recognizes the role of both women and men in environmental protection, while contributing to the empowerment of women; is contextualised to the local and global realities and explores participatory and creative learning methods that are culturally appropriate".
- **Environmental Protection Act (1986)** defined "Environment as the sum total of water, air and land, their interrelationship among themselves and with the human beings, other living beings and property."
- 'The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature behaviour and the growth, development and maturity of living organisms' **(Douglas and Holland).**
- 'Environment refers to the sum total of all conditions which surround man at a given point in space and time' **(C.C. Park)**
- The entire range of external influence acting on an organism, both the physical and biological, and other organisms, i.e. forces of nature surrounding an individual. **(Encyclopedia Britannica)**
- Total environmental system including not only the biosphere, but also his interactions with his natural and man-made surroundings **(US Council on Environmental quality).**
- According to **UNESCO,** "Environmental education is a way of implementing the goals of environmental protection. It is not a separate branch of science but the lifelong interdisciplinary field of study." It means education towards protection and enhancement of the environment and education as an instrument of development for improving the quality of life of human communities.
- **The Report of a conference of African Educators, EDC and CREDO** held at Nairobi in 1968 says: "To create awareness and an understanding of the evolving social and physical environment as a whole, its natural, man-made cultural, spiritual resources, together with the rational use and conservation of these resources for development." Environmental education can be regarded as the process of learning, through which participants acquire sufficient knowledge to contribute towards solving environmental problems.
- **Environmental Education Act, 1970:** "For the purpose of this Act, the term 'Environmental Education' means the educational process dealing with man's relationship with his natural and man-made surroundings and includes the relation of population, Pollution resource allocation and depletion, conservation, transformation, technology and urban and rural planning to the total human environment".
- The First Report of the British Royal Commission on Environmental Pollution (1971) says; "The best insurance for the environment is a commitment on behalf of the public to prevent the deterioration of air, water and land."
- **The Finnish National Commission in a Seminar held in 1974 has said:** "Environmental education is a way of implementing the goals of environmental protection. Environmental education is a separate branch of science subject of study. It should be carried out according to the principle of lifelong integral education."

2. Evolution of Environment educations

- **In 1970, the IUCN** (International Union for the Conservation of Nature) formalised environmental education.
- **In 1977,** Tbilisi declared environmental education with a major objective about awareness, knowledge, attitude, skill, and participation towards conservation and promotion of the environment.
- **In 1991,** the Supreme court of India directed the government to make environmental education at all levels of education, and the government incorporated the environment in the school syllabus from 2004-05.

3. Classification of Environmental Education

- **The Concept of Environmental Education can be Classified as :**

- education for the environment,
- education about the environment and
- education through the environment.

- **Education for the Environment :**
  - Environmental education is a pragmatic response to the defacement of the environment.
  - Environmental education is a kind of education which seeks to make pupils fully aware of the problems connected with their environment so that they will be able to tackle these problems with a sense of responsibility and with the technical skills which will enable them to contribute to their solutions along with other members of their community.
  - Agarwal, (1986) has aptly said “This awareness of environmental problems is social awareness."
  - Such problems will be solved through collective action aimed at eradicating the social and economic causes of degradation of the human environment.
- **Education about the Environment :**
  - Environmental Education includes conservation, outdoor and natural resource education as well as nature study but it also includes everything that relates to man and his environment.
  - E.E. is the study of man and how he shapes his total natural and cultural surroundings for good or ill.
  - Man, not his technology, not the physical or biological world as a separate entity, not the arts or professions operating in segregated spheres, but all of these as they affect the quality of human life, become the pivotal concern.
  - Man cannot be separated from the earth's ecosystem for he is the only conscious manipulator of the environment and his manipulation must be directed towards enhancing the quality of the environment.
- **Education through the Environment :**
  - Environmental education is not a separate subject. It is a multi-disciplinary approach both to education and to the problem of the environment.
  - The entire subject in the existing curriculum does have some information pertaining to the environment but in their present form the subjects fail to relate to one another.
  - Just as piecemeal attacks on environmental problems are ineffective, so is piecemeal education about the environment inadequate because it does not take into account the interdependence of the pieces.
  - E.E Must, therefore, be of wholes not of parts, if human race is to understand the totality of environments subject areas must collaborate, integrate and coordinate so that E.E. may prove effective in overcoming the environmental crisis.
  - The multidisciplinary approach integrates environmental education into all learning, in all subjects in all grades all year long and beyond the formal school years to a lifelong education.
  - Environmental education should result in the knowledge, desires and ability necessary to direct one's conduct towards improving the quality of life.
  - It should enable the individual to perceive the problems that exist and to devise solutions to them.
  - In order for students to develop an environmental ethics; "Man is a part of this earth rather than a careless exploiter of it. If we exploit nature in an unwise manner, it will be difficult to support even a small population. But if we protect nature, it will continue to meet the needs of all living things and not only for man.
  - The consideration of the environment as a natural heritage may be an integral part of environmental education.
  - Only when our life is guided by respect for the earth and all living things.
  - We will be able to live in harmony with our environment." they must now throw off their arrogance and perceive with humility, their place in the earth's ecosystem and their ability to manipulate the environment.
  - Their energies will have shifted from material growth to 7 environmental protection.
  - In short, the environmental ethic must provide them with a new rationale for their existence, or all the technology and power will not sustain their existence.

4. Scope of Environmental Education

- **Environmental education discipline has multiple and multilevel scopes. This is important and necessary with regard to :**
  - Conservation of natural resources.
  - Ecological aspects.
  - Pollution of the surrounding natural resources.
  - Controlling the pollution
  - Social issues connected to it.
  - Impacts of human population on the environment.
- **The scope of environmental education is summarised as follows :**
  - Given the ever-increasing magnitude, intensity, and above all the urgency of today‘s environmental problems, educationists, all over the world, have

argued for incorporating Environmental Education into the formal educational setting. By its objectives and underlying principles, Environmental Education is considered as a form of good educational practice harmonising the life of the society.

- This can become possible only if all members of society – students, teachers, scientists, specialists, technologists, administrators, and lawmakers, etc. participate in the complex task of solving environmental problems. This can be achieved only with an environmentally enlightened society that is aware of its responsibilities.
- Schools have an important role in imparting Environmental Education to the younger generation. We need to realise that Environmental Education is a permanent investment in creating a sustainable society and hence it should not be treated as an additional subject in the school curriculum. On the contrary, it should be viewed as a fundamental educational reform aiming at creating an environmentally literate society. Thus the scope of Environmental Education includes not only imparting knowledge about the environment but also (1) developing positive attitudes, values, and practices in students. (2) generating positive actions that will help improve the quality of the environment. (3) promoting a conservation ethic and encouraging the adoption of environmentally responsible lifestyles. (4) creating a drive for greater involvement in the community-oriented environmental programmes.
- Environmental Education is education in, about, and for the environment. Therefore its scope is very large. It begins from using the environment as a medium of learning to actions that can be taken for conserving our natural resources and maintaining its health for this as well as forth-coming generations. Thus it relates to a wide range of concepts, issues, and values about the protection and conservation of the environment and all life support systems such as air, water, soil, etc. Environmental Education will not only open our eyes to the disasters we have been causing to the environment but will enable us to think of the ways and means by which we can halt further deterioration of the environment.
- The environment is full of exciting things. It exhibits a wide variety of phenomena, processes, and diversity. How many of us have concentrated on the flight of a bird and try to understand the laws of Aerodynamics? All the disciplines such as physics, chemistry, geology, geography have evolved from the observations made by people in the environment. To this extent, our environment is a wonderful laboratory to introduce students to the laws and principles of science and make them understand how they work.
- Rabindranath Tagore has expressed that education divorced from nature has brought untold harm to young children. The sense of isolation that is generated through such separation has caused great evil to mankind. Tagore‘s philosophy of nature is based on the fundamental postulate that man has a spontaneous attraction for nature and this attraction is even more powerful during the formative years of the children. He has called for providing children with a large space for learning and this space is present in nature.
- Environmental Education through its various methodologies such as field trips, nature trails, trekking, etc, can introduce children to beautiful nature.
- Environmental Education creates an awareness of the economic, social, political, and ecological interdependence of the modern world to enhance a spirit of responsibility and solidarity among nations. Such awareness forms a prerequisite for solving serious environmental problems.
- The scope of Environmental Education is therefore not limited to students alone. It encompasses all sections of society. Hence, it should be aimed at all members of the community, in ways corresponding to the needs, interests, and motivations of the different age groups and socio-economic categories. Environmental Education should also take into consideration different socio-economic and cultural contexts and also the living conditions of the people of different communities in society.
- The study creates awareness among the people to know about various renewable and nonrenewable resources of the region. The estimates of potential utilisation patterns and the available balance of various resources for future use can be assessed. It enables theoretical knowledge into practice and the multiple uses of the environment.
- It teaches the citizens about the need for sustainable utilisation of resources as these resources are inherited from our ancestors and have to be passed on to future generations without deteriorating their quality and quantity.
- The necessary information about biodiversity and the potential threats to plant, animal, species in the environment.
- The ability to understand the causes and impacts due to natural and manmade disasters and suggest mitigation measures to minimize the effects is enhanced.
- The evaluation of alternatives can be done before setting up any project or deciding an action.

- It enables the individuals to acquire knowledge about ecological systems and cause and effect relationships.
- It teaches the citizens the need for sustainable utilisation of resources as these resources are inherited from our ancestors to the younger generation without deteriorating their quality.
- The ability of citizens to understand the problems of overpopulation, their living quality, health, hygiene, etc. and be solved through environmental education.
- Through environmental education, adoption of green technology and developing appropriate indigenous eco-friendly skills and technologies can be initiated to resolve various environmental issues.
- The awareness regarding environmental acts, rights, rules, legislations, etc. is created among the citizens to make appropriate decisions for the protection and improvement of the environment of the earth.
- It enables theoretical knowledge into practice and the multiple uses of the environment.

- The scope of environmental education can be divided into biological, physical and sociological aspects as described below :
  - **Biological aspect:** Biological aspect is the most important aspect of environmental education. In this particular aspect living organisms such as human beings, animals, birds, insects, microorganism, plants, are included.
  - **Physical aspect:** It refers to natural and manmade aspects which include air, water, land, climate, etc. in natural physical aspects whereas Man made physical aspects cover things such as roads, buildings, bridges, houses, etc. constructed by humans.
  - **Sociological and cultural aspect:** Socio- cultural aspects are man-made social practices, rules and laws, and religious places, etc. created by them.

5. Types of Environment

- On the basis of basic structure, the environment may be divided into-
  - Physical/abiotic environment
  - Biotic environment
  - Cultural environment
- **Physical/Abiotic Environment:**
  - on the basis of physical characteristics and state, abiotic or physical environment is subdivided into:
    - Solid i.e. lithosphere (solid earth)
    - Liquid i.e. hydrosphere (water component)
    - Gas i.e. atmosphere (gaseous component)
  - These environments can be termed as lithospheric, hydrospheric, atmospheric environments which can be further broken into smaller units based on different spatial scales like mountain environment, plateau, plain, lake, river maritime, glacier, desert environment etc.
  - The physical environment may also be viewed in terms of climatic conditions providing certain suits of habitat for biological communities like tropical, temperate and polar environments etc.

Biotic Environment

- A biotic environment consists of flora and fauna including man as an important factor. Thus the biotic environment may be divided into:
  - Floral environment
  - Faunal environment
- Further all the organisms work to form their social groups and organisations at several levels and thus is formed a social environment, where in, the organisms work to derive matter from the physical environment for their sustenance and development.
- This process generates an economic environment. It may be pointed out that of all the organisms man is the most skilled and civilised and hence his social organisation is most systematic.
- It is significant to note that three aspects of man, physical, social and economic, have different characteristics and functions in the biotic environment.
- As 'physical man' is one of the organismic populations or biological community and thus requires basic elements of physical environment (habitat, air, water, food etc.) like other biological populations and releases wastes into the ecosystem; 'social man' establishes social institutions forms social organisations, formulates laws and policies to safeguard his existence, interest and social welfare and 'economic man' derives and utilises resource from the physical and biotic environments with his skills and technologies.
- These may be termed as physical, social and economic functions of man. It is the third function which makes man an environmental process because he transports matter and energy from one component of the ecosystem to the other.

6. Components of Environment

- The basic components of the environment are atmosphere or the air, lithosphere or the rocks and soil, hydrosphere or the water, and the living component of the environment or the biosphere.

- **Atmosphere :**
  - the thick gaseous layer surrounding the earth.
  - It spreads up to 300 km. above the earth's surface.
  - Apart from gases there are water vapour, industrial gases, dust and smoke particles in suspended state, microorganism etc.
- **Lithosphere :** The word lithosphere originated from a Greek word meaning "rocky" + "sphere" i.e. the solid outermost shield of the rocky planet. The Earth is an oblate spheroid. It is composed of a number of different layers. These layers are:
  - The Core which is around 7000 kilometres in diameter (3500 kilometres in radius) and is situated at the Earth's centre.
  - The Mantle which environs the core and has a thickness of 2900 kilometres.
  - The Crust floats on top of the mantle and is composed of basalt rich oceanic crust and granitic rich continental crust.
- **Hydrosphere:** The hydrosphere includes all water on or near earth's surface and includes oceans, lakes, rivers, wetlands, icecaps, clouds, soils, rock layers beneath the surface etc.
  - water exist in all three states: solid (ice), liquid (water), and gas (water vapour)
  - 71%of planet surface is covered with water
  - Freshwater- 2.53%
  - Freshwater in glaciers-1.74%
  - Water as water vapour in atmosphere-12,900 km3
  - Living organisms contain- 1100 km3
- Since the environment includes both physical and biological concepts, it embraces both the abiotic (non-living) and biotic (living) components of planet earth. Thus, on account of basic structure the components of environment may be classified into two basic types :
- **Abiotic Components (Non-Living):** These are the most important determining factors of where and how well an organism exists in the environment. Although these factors interact with each other, one single factor can limit the range of an organism thus acting as the limiting factor. These factors can be categorised into following groups :
  - **Physical Factors :** The major components are temperature, Water (Rainfall), Light (Energy), Soil, Atmospheric pressure.
    - **Temperature :**
      - Temperature is the most ecologically germane environmental factor.
      - It's a very well-known and an established fact that the average temperature on land varies seasonally, decreasing progressively from the equator towards the poles and from plains to the top of mountains ranging from sub-zero levels to >50˚C in polar areas/high altitudes and tropical deserts in summer respectively.
      - There are, however, unique habitats like thermal springs and deep-sea hydrothermal vents where average temperatures exceed 100˚C.
      - It is commonly known fact that mango trees do not and cannot grow in temperate countries like Canada and Germany, snow leopards are not found in Kerala forests and tuna fish are rarely caught beyond tropical latitudes in the ocean.
      - A few organisms can tolerate and thrive in a wide range of temperatures without having effect on their internal environment (they are called eurythermal), but a vast majority of them operate within a narrow range of temperatures (such organisms are called stenothermal).
    - **Water (Rainfall) :**
      - Subsequent to temperature, water is another most important factor influencing the life of organisms.
      - In fact, the genesis of life on earth is attributed to water without which life is unsustainable.
      - Its availability is too scarce in deserts. Due to this scarcity only special adaptations by plants and animals of this region make it possible to survive there in such unusual living conditions.
      - The productivity and distribution of plants is also profoundly dependent on water.
      - One might believe that organisms living in oceans, lakes, rivers and other water bodies should not face any water-related problems, but it doesn't hold true.
      - For aquatic organisms the quality (chemical composition, pH) of water becomes crucial and one of the most determining factors for their survival.
      - The saline concentration (measured as salinity in parts per thousand), is less than 5 % in inland waters, 30-35 % in the sea and >100 % in some hypersaline lagoons.
      - Some organisms are tolerant to a wide range of salinity (referred as euryhaline) while others are restricted to a much narrower range of salinity (referred as stenohaline).

- Many freshwater animals cannot survive for long in sea water and vice versa because of the osmotic problems which would subsequently lead to their death.

➢ **Light (Energy) :**

- One can quickly and easily understand the importance of light/energy for living organisms, particularly autotrophs since they produce/manufacture food through photosynthesis, a specialised process which is only possible with the availability of sunlight as a source of energy.
- Many plants are also dependent on sunlight to meet their photoperiodic requirement for flowering.
- For many animals too, light is essential as they use the diurnal and seasonal variations in light intensity and duration (photoperiod) as cues for timing their searching for food, reproductive and migratory activities.
- The availability of light on land is in close association with that of temperature since the sun is the source for both. But, deep (>500m) in the oceans, the environment is perpetually dark and its inhabitants are unaware of the existence of a celestial source of energy called the Sun.

➢ **Soil :**

- The nature and properties of soil in various places vary to a great extent depending upon the climate which includes temperature and humidity, the weathering process, whether soil is transported or sedimentary and how soil development occurred.
- Various physical characteristics of the soil such as soil composition, grain size and aggregation determine the percolation and water holding capacity of the soil.
- These features along with chemical parameters such as pH, mineral composition and also topography determine to a large extent the vegetation in any area.
- This in turn indicates or rather determines the type of animals that can be supported on a particular soil area. Similarly, in an aquatic environment, the sediment-characteristics often determine the type of benthic animals that can thrive there optimally.

❖ **Responses To Change In Abiotic Factors :**

Abiotic conditions of many habitats may vary drastically in time, which raises an essential question –how do the organisms living in such changing habitats adapt themselves with stressful conditions? But, prior to delving into answering this inevitable question, one should perhaps ask first why a highly variable and ever changing external environment should create an inconvenience to an organism after all. One would expect that during the course of millions of years of their existence, many species would have evolved a relatively constant internal (within the body) environment that enables all biochemical reactions and physiological functions to progress with maximal efficiency and thus, enhance the overall 'fitness' of the species.

➢ **Regulate :**

- Some organisms are able to achieve and stabilise homeostasis by physiological (sometimes behavioural also) means which ensures constant body temperature, constant osmotic concentration, etc.
- All birds and mammals, and a very few lower vertebrate and invertebrate species are indeed capable of such regulation (thermoregulation and osmoregulation).
- Evolutionary biologists are of the opinion that the mammalian success is largely owing to their ability to adhere to a constant body temperature and thrive successfully whether they live in frigid Antarctica or in the blazing Sahara Desert.
- The mechanisms used by most mammals to regulate or stabilise their body temperature are similar to those of human beings. We, the humans, maintain a constant body temperature of 37˚C.
- In summer, when external temperature is more than our body temperature, we sweat profusely resulting in evaporation which leads to external body cooling thus lowering the overall body temperature.
- Likewise, in winter when the temperature is much lower than 37˚C, we start to shiver, leading to heat generation and thus raising the body temperature and thereby maintaining homeostasis around 37˚C.
- Plants, on the other hand, do not possess such mechanisms to maintain internal temperatures and are thus unable to regulate homeostasis.

➢ **Conform :**

- In literal English terms it means to obey or agree to something.
- An overwhelming majority (99%) of animals and nearly all plants are unable to maintain a constant internal environment, thus inefficient in maintaining homeostasis.

- Their body temperature varies with the ambient temperature, rises with increasing temperature and falls with decreasing temperature most of the time.
- In aquatic animals, the osmotic concentrations of the body fluids change with that of the ambient water osmolality which itself depends upon the salinity of the surrounding water.
- Such animals and plants are simply conformers, meaning thereby that they just agree to the surrounding conditions rather than adopting any mechanism to stabilise their internal environment.

➢ **Migrate :**

- The organisms can shift away temporarily from the stressful habitat to a more hospitable area and return when the stressful period is over.
- In human analogy, this strategy is like a person moving from Delhi to Shimla for the duration of summer to avoid the stressful conditions of severe heat and return back to Delhi when temperature is more comfortable.
- Likewise, many animals, particularly birds, during winter undertake long-distance migrations to more hospitable areas and avoid the frigid conditions of their true environment.
- Every winter the famed Keoladeo National Park (Bharatpur) in Rajasthan hosts thousands of migratory birds coming from Siberia and other extremely cold northern regions which become temporarily inhospitable for them.
- Thus migration is a form of temporary shift of an organism from its true habitat to an ecologically friendlier habitat due to more stressful conditions of true habitat.

➢ **Suspend :**

- In bacteria, fungi and lower plants, various types of thick walled spores are formed which help them to survive unfavourable/ extreme conditions – which subsequently germinate on availability of suitable environment.
- In higher plants, seeds and some other vegetative reproductive structures serve as means to resist the periods of stress besides helping in its dispersal – they germinate to form new plants under favourable moisture and temperature conditions.
- They do so by reducing their metabolic activity and going into a stage of 'dormancy'.
- In animals, the organism, if unable to migrate, might avoid the stress by escaping in time through the two phenomena.
- The familiar case of bears going into hibernation during winter is an example of escape in time to avoid extreme cold.
- Some snails and fish go into aestivation (a state of animal dormancy characterised by inactivity and a lowered metabolic rate) to avoid extreme summer heat and desiccation.
- Similarly, under unfavourable conditions many zooplankton species in lakes and ponds are known to enter diapause, (a stage of suspended/deferred development).
- Diapause, when referencing animal dormancy, is the delay in development in response to regular and recurring periods of adverse environmental conditions.

❖ **Inorganic And Organic Substances :** Water, Oxygen, Carbon, Nitrogen, Sulphur, Nitrates, Phosphates and ions of various metals etc. are inorganic substances essential for organisms to survive while proteins, Carbohydrates, Lipids etc. are essential Organic substances:

● **Biotic Components (Living) :** It consists of the living parts of the environment, including the association of a lot of interrelated populations that belong to different species inhabiting a common environment. The populations are those of the animal community, the plant community and the microbial community. The biotic community is divided into: a. Autotrophs, b. Saprotrophs, and c. Heterotrophs

❖ AUTOTROPHS (derive from Greek word: auto - self, trophos - feeder) are called producers, transducers or convertors, as well. Those are photosynthetic plants, normally chlorophyll bearing, which synthesise a high-energy complex organic compound (food) from the inorganic raw materials utilising the aid of the sun, and this process is called photosynthesis. Autotrophs form the core of all biotic systems. In terrestrial ecosystems, autotrophs are usually rooted plants. In the aquatic ecosystems, the floating plants referred to as phytoplankton and the shallow water rooted plants – macrophytes - are the main producers.

❖ HETEROTROPHS (from Greek: heteros - other; trophs - feeder) are the consumers, normally animals

that feed on the other organisms. Consumers are also referred to as phagotrophs (phago - to swallow or ingest) while macroconsumers are normally herbivores and carnivores. Herbivores are called First order or primary consumers, for they feed directly on green plants. For example, Terrestrial ecosystem consumers are cattle, deer, grasshopper, rabbit, etc. Aquatic ecosystem consumers are protozoans, crustaceans, etc. Carnivores are animals that prey or feed on other animals. Second order consumers or Primary carnivores include those animals that feed on herbivorous animals. For example, foxes, frogs, smaller fishes, predatory birds, snakes, etc. Third order consumers or Secondary carnivores are the animals that feed on primary carnivores. For example, wolf, owl, peacock, etc. Some larger carnivores prey on Secondary carnivores. Quaternary consumers or Tertiary carnivores include those animals which feed upon secondary carnivores. For example, the lion, the tiger, etc. Those are not eaten by any other animal. The larger carnivores which cannot be preyed on further are also called the top carnivores.

- **SAPROTROPHS** (from Greek again: sapros - rotten; trophos - feeder) are called the reducers or decomposers or osmotrophs. They break the complex organic compounds in dead matter down (dead plants and animals). Decomposers don't ingest the food. Instead they secrete a digestive enzyme into the dead, decaying plant or animal remains and digest this organic material. The enzymes act on the complex organic compounds in the dead matter. Decomposers absorb a bit of the decomposition products to provide themselves with nourishment. The remaining substance is added as minerals in the process of mineralisation to the substratum. Released minerals are utilised or reused as nutrients by plants - the producers.

7. Characteristics of Environmental Education

- Hart (1981), through a study of several reports on Environmental Education, has listed 25 important characteristics of Environmental Education. These have been reproduced below.
  - **Interdisciplinary and multidisciplinary:** Environmental Education should be a part of every subject taught.
  - **Multilevel :** Environmental Education should be taught at all grade levels.
  - **Global views:** Environmental Education involves the development of integrated environmental ethics.
  - **Concepts:** Environmental Education involves the development of awareness and understanding of basic environmental concepts (Ex: limiting factors, carrying capacity)
  - **Process development:** Environmental Education involves the development of cognitive, affective, and skill behaviour processes.
  - **Problem-solving:** Environmental Education involves helping students develop processes of thinking which could be more effective in resolving complex environmental problems.
  - **Values clarifying:** Environmental Education involves exploring personal assumptions, values, and feelings towards self and society as well as the relationship of these to the natural world.
  - **Systems thinking:** Environmental Education implies that one must learn to think in terms of systems of interacting factors, that is to think not only rationally about the parts of a complex system but to develop an intuitive feeling for the dynamic behaviour of such a system as a whole.
  - **First-hand experiences and activities:** Environmental Education requires situations where learning can be best nurtured through first-hand experiences and activities which foster a deep respect and love for the natural world.
  - **Environmental issues-oriented:** Environmental Education involves the use of local environmental issues as well as case studies, role-playing, and games that provide opportunities to examine and participate in the complexities of decision making, understanding of personal and alternative values, and the actual operation of systems –natural and man-made.
  - **Present and future orientation:** Environmental Education continually assesses the present and promotes an ideology that examines desirable images of the future.
  - **Active participation:** Environmental Education emphasizes active participation in preventing and solving environmental problems.
  - **Individual learning:** Environmental Education involves certain degrees of independent study of a diverse number of interdisciplinary environmental problems.
  - **A team approach to teaching/learning:** Environmental Education involves teacher participation in environmental problem-solving learning situations as a team member.
  - **Productive student-teacher relationships:** Environmental Education emphasizes problem-solving including recognition of the values and biases of oneself and others and responsibility for working

individually and collectively in a process of informed environmental decision making.

- **Community-oriented:** Environmental Education involves the entire community as a learning environment in the achievement of Environmental Education objectives.
- **Field studies:** Environmental Education includes the provision of field experiences which are first-hand experiences.
- **Communication networking:** Environmental Education involves communication skills as a process that can provide complete and accurate images of environmental problems.
- **Coordination and cooperation:** Environmental Education promotes the values of and necessity for local to international co-operation in the solution of environmental problems.
- **Flexible administrative patterns:** Environmental Education requires institutional flexibility to cope with evaluation and provide adequate instruction because of its interdisciplinary nature.
- **Reform of educational processes and systems:** Environmental Education requires modification of existing educational structures.
- **Curriculum development base:** Environmental Education requires the development of new curricula according to needed content and strategies.
- **Curriculum evaluation base:** Environmental Education involves the evaluation of processes that lead toward the achievement of intended outcomes for effective programme development.
- **Research base:** Environmental Education requires a sound research base to identify its strengths and weaknesses.
- **Teacher education:** Environmental Education is part of the teacher education programme aiming at the improvement in professional development through preservice and in-service programmes.
- We can conclude by saying that Environmental Education is an education in the environment, education about the environment, and education for the environment.

8.Importance of Environmental Education

- You have already understood that Environmental Education is a process by which people develop awareness, concern, and knowledge of the environment and learn to use this understanding to preserve, conserve and utilize the environment in a sustainable manner for the benefit of present and future generations.
- On the role of education in solving environmental problems, UNESCO asserts that ―Education is the means for disseminating knowledge and developing skills for bringing about desired changes in behaviours, values, and lifestyles. Education is the best hope and the most effective means in the quest to achieve sustainable development. Education has the potential to make people wiser, knowledgeable, informed, intelligent, ethical, and responsible‖.
- The report of the UN Conference on Environment and Development Popularly known as Earth Summit (1992) held at Rio de Janeiro and adopted by several countries as an agenda (Agenda – 21) for environmental action endorses the potentials of education by stating that ―Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues. It is critical for achieving environmental and ethical awareness, values and attitudes, skills, and behaviours consistent with sustainable development and for effective public participation in decision – making‖. Environmental Education is thus crucial and critical for everyone as it provides opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment. It also develops and reinforces new patterns of environmentally sensitive behaviour among individuals, groups, and society as a whole for a sustainable environment.
- Environmental Education relates to every one of us. It is not a subject of only environmentalists. Intending to increase public awareness of the mounting environmental problems and generate necessary actions for mitigating them, Environmental Education is being introduced at all levels of education, from primary to post-graduate and technical and vocational levels.
- Environmental Education at all levels and for all people is crucial because the more knowledge the public has about the environment, the better, the more rapid, and the more effective decision-makers they can be. Furthermore, Environmental Education is the cornerstone of long–term environmental strategies for (i) Preventing environmental problems (ii) Solving those which arise or have occurred, and (iii) Assuring environmentally sound, sustainable development.
- Recognizing the importance of Environmental Education, the National Policy on Education (NPE, 1986) emphasised that ―There is a paramount need to create a consciousness of the environment. It must permeate all ages and all sections of society, beginning with the child‖. As Environmental Education is about the environment, its protection, and conservation, we need to educate our younger generation about the problems and perspectives on the environment and prepare them to face

them and find solutions to many of them. This demands incorporating real-life situations into our educational transactions and providing learners with opportunities to think and act for the environment.

- **The following points highlight the importance of Environmental Education.**
  - Nature is man‘s greatest protector, provider, and promoter. The more he understands and appreciates nature‘s provisions and systems the better for his safety and survival.
  - Man is a part of nature and is bound by its basic laws. The more he crosses his limits and flouts natural laws and tendencies the more he invites danger.
- **Nature is man‘s largest reservoir of resources.**
  - While he can draw from these for meeting his needs and purposes he has to prevent their depletion and destruction beyond safe limits.
  - Nature‘s components and systems work in coordination resulting in balance and harmony. The man should understand this and see that they are not seriously disturbed.
  - Nature has its forms and sources of energy. The more man unravels, understands, and utilizes these, the better for the enrichment of his environment and his life.
  - Man with his superior capacities is the greatest consumer of natural resources and also the most prolific builder of artificial components and systems in his environment. This can disturb the equilibrium and health of the environment.
  - Uncontrolled deforestation, ill-planned construction of dams, production, and use of nuclear energy also pose a grave threat to the balance and rhythm in nature.
  - The rapid growth of population, crowded urban settlements, ever-expanding industrialization, increasing use of chemicals in agriculture, the uncontrolled output of industrial effluents and biological wastes, continuous expansion of modern means of transportation and communication, etc. pollute the environment and create hazards in the biosphere, hydrosphere, and atmosphere.
  - Environmental Education promotes the use of interdisciplinary and multidisciplinary knowledge as solving many of the environmental problems calls for knowledge of science and social science subjects. Since the environment forms a foundation for learning these disciplines, students‘ learning would become more meaningful, focused, and interesting. It also promotes group dynamics and collective effort which would be instrumental in solving future problems. Another advantage of Environmental Education is that it involves value education. It allows students to examine our thinking and practices, develop new ideas, and frame opinions of what is good and what is bad for the environment, evaluate the options and adopt those that are environmentally friendly.

9. Need Of Environmental Education

- Every country is putting efforts to integrate environmental concerns with education. According to these countries, Environmental education should not only be a part of the education system but also the political system where actions, policies and plans can be formulated and executed at national level.
- Environmental education must be able to assess environmental situations and the conditions leading to the damage of the environment. Environmental education must target the routine and how simple changes in a daily life can make a huge difference to the environment.
- Protecting the environment is the responsibility of everyone, hence environmental education cannot be confined to one group or society. Every individual must be prepared for saving the environment. It must be a continuous and a lifelong process. Above that environmental education must be practical so that teachings can be implemented directly.
- Conserving nature and environment will be much easier if children are taught about depleting resources, environmental pollution, land sliding and degradation and extinction of plants and animals. Education is a sort of investment that turns into a valuable asset over a period of time.
- Universities in India focus on teaching, research and training. In more than 20 Universities, different colleges and institutes courses in Environmental Engineering, Conservation and Management, Environmental Health and Social Sciences are taught.
- To promote environmental awareness across the Nation, the Centre for Environment Education (CEE) was established in August 1984 with support from the Ministry of Environment and Forests, Government of India. One of the tasks of the CEE is to put efforts to give due recognition to the role of environmental education. The CEE runs many Educational Programs in this regard.
- Because of societal shifts, today’s children are busy playing indoor games and electronic gadgets. They spend most of their time watching Television, listening to music, playing video games or surfing the Internet or using computers. They have no time to travel around and

to explore the natural world around them. This not only impacts the health of children but also detaches them from their surroundings and nature. They have grown up into adults who are least bothered about conserving nature. Raising an environmentally educated generation is also necessary because of the depletion of natural resources.

- Students must be encouraged to understand their surroundings and a framework for an action plan must be formulated.Environmental education is the need of the day. It must encourage social participation. Hence integrating environment education into a curriculum is a wise option to connect students with nature right from their childhood.

  - **Imagination and enthusiasm are heightened:** Environmental education is hands-on, interactive learning that sparks the imagination and unlocks creativity. When Environmental education is integrated into the curriculum, students are more enthusiastic and engaged in learning, which raises student achievement in core academic areas.
  - **Learning transcends the classroom:** Not only does Environmental education offer opportunities for experiential learning outside of the classroom, it enables students to make connections and apply their learning in the real world. Environmental education helps learners see the interconnectedness of social, ecological, economic, cultural, and political issues.
  - **Critical and creative thinking skills are enhanced:** Environmental education encourages students to research, investigate how and why things happen, and make their own decisions about complex environmental issues. By developing and enhancing critical and creative thinking skills, Environmental education helps foster a new generation of informed consumers, workers, as well as policy or decision makers.
  - **Tolerance and understanding are supported :** Environmental education encourages students to investigate varying sides of issues to understand the full picture. It promotes tolerance of different points of view and different cultures.
  - **State and national learning standards are met for multiple subjects:** By incorporating Environmental education practices into the curriculum, teachers can integrate science, math, language arts, history, and more into one rich lesson or activity, and still satisfy numerous state and national academic standards in all subject areas. Taking a class outside or bringing nature indoors provides an excellent backdrop or context for interdisciplinary learning.
  - **Biophobia and nature deficit disorder decline:** By exposing students to nature and allowing them to learn and play outside, Environmental education fosters sensitivity, appreciation, and respect for the environment. It combats "nature deficit disorder" … and it's FUN!
  - **Healthy lifestyles are encouraged:** Environmental education gets students outside and active, and helps address some of the health issues we are seeing in children today, such as obesity, attention deficit disorders, and depression. Good nutrition is often emphasized through Environmental education and stress is reduced due to increased time spent in nature.
  - **Communities are strengthened:** Environmental education promotes a sense of place and connection through community involvement. When students decide to learn more or take action to improve their environment, they reach out to community experts, donors, volunteers, and local facilities to help bring the community together to understand and address environmental issues impacting their neighborhood.
  - **Responsible action is taken to better the environment:** Environmental education helps students understand how their decisions and actions affect the environment, builds knowledge and skills necessary to address complex environmental issues, as well as ways we can take action to keep our environment healthy and sustainable for the future. Service-learning programs offered by PLT and other Environmental education organizations provide students and teachers with support through grants and other resources for action projects.
  - **Students and teachers are empowered:** Environmental education promotes active learning, citizenship, and student leadership. It empowers youth to share their voice and make a difference at their school and in their communities. Environmental education helps teachers build their own environmental knowledge and teaching skills. I hope these "top ten" benefits will give you the confidence and commitment to incorporate Environmental education into your curriculum!

10. Aims of Environmental Education

According to the International Journal of Current Research and Modern Education (IJCRME) ,EE has two main aims -

- The first aim is to provide different groups of people in a variety of professional fields with the knowledge needed to develop a sense of responsibility towards the environment and the rational utilisation of its resources.
- The second aim is to make use of these knowledge and skills to preserve, conserve and utilise the environment in a sustainable manner for the benefit of present and future generations.

11.Environmental Education in India

- India also started taking significant steps to propagate environmental education.
- At postgraduate level, environmental education was started by many central and state universities in India during 1985-2000.
- In 1991, Hon. The Supreme Court of India gave a historical ruling to implement environmental education at all the levels and gave directions to make Environmental Studies a compulsory paper for all the streams at under-graduate levels in Indian universities.
- At present, various short-term and regular courses on environment and its various dimensions are being run in various universities in India.

12. Importance Of Environment in The Development Of The Child

- As you have seen, we belong to our environment, grow up in it, learn from it, depend on it, contribute to it, and influence it, just as it influences us. This influence begins from the moment we are born, and continues throughout our life.
- The world of the child begins with an awareness of its own body and gradually expands, in ever-widening circles to an exploration of the immediate surroundings—family and home, neighbourhood, school, and beyond.
- Learning takes place first and foremost in the home and family. Even when children join school, the learning continues to take place, not only in the school, but at home and within the community.
- The immediate environment is the primary context to which the child relates. It includes not just the physical structures and outdoor spaces, but equally the social and cultural world of stories and songs, festivals and get-togethers, family and community celebrations and occasions.
- Valuable learning takes place through interactions with the immediate environment. Every day children experience the natural environment—seasons, heat, rain, cold, the sky, sun and moon, the different aspects of water, plants and animals. Sadly, caught up as they are in the busy routine of time tables, homework and examinations, children do not have the time and space to really explore and immerse themselves in these experiences.
- Most curricula do not provide the time and space for the joy of discovery and experiences true to life.
- Children, especially young children, have a natural desire to learn and make sense of the world around them. It is critical that they are provided with an environment that enables and supports this learning.
- The National Curriculum Framework 2005 (NCF 2005) recognizes this unique characteristic, as well as the opportunity.
- "Learning in the early years must hence be directed by the child's interests and priorities, and should be contextualised by his/her experiences, rather than being structured formally. An enabling environment for children would be one that is rich in stimulation and experiences, that allows children to explore, experiment and freely express themselves, and one that is embedded in social relations that give them a sense of warmth, security and trust" (NCF 2005).

13. Linking Environment To The Child

- The period of eight years from class 1 to class 8 is one of tremendous development of the child. During this period there is a shaping of physique, reasoning, intellect, emotions and social skills, as well as values and attitudes that provide a strong life-long foundation. During this period the child is not only developing the foundation of academic learning, but is also 'learning for life'. The 'learning for life' takes place within this environment, which as we have now understood, includes every aspect of the world around us.
- Poverty exposes children to terrible risk to their health development and education. They suffer severely as they have to undergo a poor environment. Once the environment is polluted all children become the first prey of the situation. They are at greater risk from environmental hazards.
- They are different from adults in their physical size, immature organs, metabolic rate, behaviour, natural curiosity and lack of knowledge with the current trend of environmental degradation. They have fewer places to escape. They can even be exposed to harmful environmental hazards before birth.
- On the other hand, children are dynamic and powerful forces for environment protection.
- They do have natural interest in nature and can easily be made instrumental for protection and preservation of their environment. They can easily be indulged in environmental activities and can contribute effectively.
- The link between children and the environment has been recognised in many international declarations and agreements over the past decade.
- To mention a few of those are:
  - Convention on the Rights of the Child (1989)
    - To combat disease and malnutrition including within the framework of primary health care.

- Plan of Action for Implementing the Work Declaration the Survival Protection and Development of Children (1990) .
  - To improve the environment by combating disease and malnutrition and promoting education.
- The Habitat Agenda (1990)- The needs of children and youth, particularly with regard to their living environment have to be taken fully into account.
- Declaration of the Environment Leaders of the Eight on children's Environmental Health (1997).
  - Children face significant threats to health from an array of environmental hazards. They are particularly vulnerable to pollution Prevention of exposure is the single most effective means of protecting children against environmental threats.
- G8 Environment Ministers Communiqué (2001).
  - Development policies and implementation of action to provide children with a safe environment, including during prenatal and postnatal development towards the highest attainable level of health.
- The Berlin Commitment for Children of Europe and Central Asia(2001).
  - Protect all children, irrespective of the social and economic conditions, they live in from environmental threats; create child-respecting urban and rural environments which enable all children to have access to a range of play and informal learning opportunities both at home and within their local communities.

- The special session on children of the United Nation General Assembly in May 2002 provided an opportunity to world leaders to formally adopt principles together with a series of supporting action to make a world safe for children. The ten principles are:
  - Leave no child out
  - Put children first
  - Care for every child
  - Fight HIV/AIDS
  - Stop harming and exploiting children
  - Listen to children
  - Educate every child
  - Protect children from war
  - Protect the earth for children
  - Fight poverty: invest in children

- Degraded environmental conditions and other physical hazards are common and inescapable for the poor in densely populated cities, where infectious diseases can spread rapidly. The air, soil and water pollution do not spare the children poor or rich. Ultimately the unhealthy environment affects all types of children about their education.

14.Valuing Environment For Learning

- Environment forms an important aspect of learning. Children interact with their environment continuously. Everything in the environment attracts them.
- Children explore and experience different things in their environment, and derive meaning from them. This experience is unique to each child. The child continuously modifies this understanding as he or she further experiences /encounters new things in the surrounding environment. Thus the environment provides the necessary stimuli for children to develop both physically and mentally. This initial experience of children needs to be considered, and expanded/integrated in the teaching learning of the environment, as it is within this concrete experience of children only that a real understanding of the environment can be developed. Thus the immediate environment of a child becomes an important medium of learning.
- The NCF 2005 recognises the critical role of the environment as the context in children's learning by emphasising that "Learning takes place through interactions with the environment around, nature, things and people, both through actions and through language.
- The physical activity of moving, exploring, and doing things, on one's own, with one's peers or in the company of adults, and using language—to read, to express or ask, to listen and to interact—are the key processes through which learning occurs. The context in which learning takes place is thus of direct cognitive significance" .
- The NCF 2005,also emphasises these points with respect to the environment and children's learnings:
  - All children are naturally motivated to learn and are capable of learning. Making meaning and developing the capacity for abstract thinking, reflection and work are the most important aspects of learning.
  - Children learn in a variety of ways – through experience, making and doing things, experimentation, reading, discussion, asking, listening, thinking and reflecting and expressing oneself in speech, movement or writing—both individually and with others. They require opportunities of all these kinds in the course of their development.

- Learning takes place both within the school and outside school. Learning is enriched if the two arenas interact with each other.
- For this to happen, children need to be given adequate opportunities to relate to the environment around them, both physical and social; to nurture their curiosity— to do things, to ask questions and to pursue investigations and share their findings.
- This is the essence of teaching and learning about the environment. As facilitators of this experience, you have the challenge of creating suitable opportunities for not only these experiences, but also developing in the children, the attitudes and values that will transform these into life-long learning. This is the broad aim of education for sustainable development.

Important Questions

1. Meaningful EVS learning can only be made possible if :

(A) Student's local experiences are related to school experiences.

(B) School knowledge is used in the construction of knowledge

(C) Student's local experiences are not given due importance

(D) Trained EVS teacher's experiences are used.

2. Choose the suitable alternative for the statement.

Environmental studies is ..... subject.

(A) Interdisciplinary

(B) Disciplinary

(C) Integrated

(D) Single subject

Answers

1. (A) **2.** (C)

अध्याय 1

अपठित गद्यांश

महत्वपूर्ण अभ्यास प्रश्न

निर्देश (प्रश्न संख्या 1 से 9 तक)

निम्नलिखित गद्यांश को पढ़कर पूछे गए प्रश्नों के सबसे उपयुक्त उत्तर वाले विकल्प चुनिए–

भौगोलिक दृष्टि से भारत विविधताओं का देश है, तथा सांस्कृतिक रूप से एक इकाई के रूप में इसका अस्तित्व प्राचीनकाल से बना हुआ है। इस विशाल देश में उत्तर का पर्वतीय भू–भाग है, जिसकी सीमा पूर्व में ब्रह्मपुत्र और पश्चिम में सिन्धु नदियों तक विस्तृत है। इसके साथ ही गंगा, यमुना, सतलुज की उपजाऊ कृषिभूमि, विंध्य और दक्षिण के वनों से आच्छादित पठारी भू–भाग, पश्चिम में थार का रेगिस्तान, दक्षिण का तटीय प्रदेश तथा पूर्व में असम और मेघालय का अतिवृष्टि का सुरम्य क्षेत्र सम्मिलित है। इस भौगोलिक विभिन्नता के अतिरिक्त इस देश में आर्थिक और सामाजिक भिन्नता भी पर्याप्त रूप से विद्यमान है। वस्तुतः इन भिन्नताओं के कारण भारत में अनेक सांस्कृतिक उपधाराएँ विकसित होकर पल्लवित और पुष्पित हुई हैं। संस्कृति की सकारात्मकता देश के लोगों की निपुणता, नेतृत्व, संयम उत्कंठा पर निर्भर करती है। जिस जनसमुदाय में अपने देश की समस्याओं को सुलझाने की प्रबल इच्छा हो, उस देश की संस्कृति सृजनात्मक अवश्य होगी।

1. गद्यांश के अनुसार संस्कृति की सकारात्मकता देशवासियों के किन गुणों पर निर्भर करती है?
(A) आज्ञाकारिता (B) निपुणता
(C) सौजन्यता (D) सदृश्यता

2. भारत के पश्चिम का भू–भाग कैसा है ?
(A) तटीय (B) उपजाऊ
(C) रेतीला (D) अतिवृष्टि वाला

3. 'भौगोलिक दृष्टि से भारत विविधताओं का देश है।' भौगोलिक विविधता से तात्पर्य है–
(A) परिधान की विविधता
(B) धर्म की विविधता
(C) भाषा की विविधता
(D) जलवायु की विविधता

4. उत्तर दिशा के पर्वतीय भू-भाग की सीमा कहाँ से कहाँ तक विस्तृत है ?
(A) पूर्व में ब्रह्मपुत्र और पश्चिम में सिन्धु नदी तक
(B) मेघालय के अतिवृष्टि वाले क्षेत्र तक
(C) सतलुज की उपजाऊ भूमि तक
(D) थार के रेतीले और पठारी भू–भाग तक

5. गद्यांश में किस प्रकार की विभिन्नता की बात नहीं की गयी है?
(A) आर्थिक (B) सामाजिक
(C) बौद्धिक (D) भौगोलिक

6. भारत में अनेक सांस्कृतिक उपधाराएँ विकसित होने का क्या कारण है?
(A) इसके भू–भाग की विशालता।
(B) इसमें पाई जाने वाली विविधता
(C) देशवासियों की निपुणता.
(D) जनसमुदाय की सृजनात्मकता

7. 'मेघालय' शब्द का संधि विच्छेद है–
(A) मेघा + आलय (B) मेघाल + य
(C) मेघ + आलय (D) मेघ + अलय

8. 'पल्लवित और पुष्पित हुई हैं,' रेखांकित से तात्पर्य है–
(A) समृद्ध (B) बलिष्ठ
(D) विकृत (C) पैदा

9. 'सांस्कृतिक' शब्द में प्रत्यय है–
(A) इक (B) क
(C) तिक (D) का

निर्देश (प्रश्न संख्या 10 से 18 तक)

निम्नलिखित गद्यांश को पढ़कर पूछे गये प्रश्नों के सबसे उपयुक्त उत्तर वाले विकल्प को चुनिए।

धूल के कारण प्रदूषण, प्रदूषण का एक अप्रत्याशित कारण भी है। आज के वर्तमान समय में मनुष्य के द्वारा प्रकृति के कार्यों में हस्तक्षेप किया जा रहा है। जिसके कारण वातावरण में आँधी के द्वारा फेंकी जाने वाली धूल बढ़ती जा रही है। खनन, सड़क निर्माण, भवन–निर्माण जैसे कार्य भी इसके लिए उत्तरदायी हैं। हम भारत में थार मरुस्थल में उठने वाले धूल के तूफानों से परिचित हैं जो कि दिल्ली तक के दूरस्थ क्षेत्रों को प्रभावित करते हैं। यह विश्वास किया जाता है कि यह भूमि के प्राकृतिक रूप में मनुष्य द्वारा किये जा रहे परिवर्तन जैसे कि चारागाहों को ज्यादा से ज्यादा मवेशियों के द्वारा चराकर नष्ट करने से हो रहा है।

वातावरण में धूल इकट्ठी करने में गंधक, सल्फर डाइ–आक्साइड और हाइड्रोजन सल्फाइड जैसी गैसें भी सहायक होती हैं जो कि कारखानों की चिमनियों से लगातार निकल रही हैं। ये गैसें वनस्पतियों और अन्य जैविक तत्वों के सड़ने से भी पैदा होती हैं। भले ही ये गैसें कुछ ही घंटों में बिखर जाती हैं, लेकिन उतने ही समय में अमोनिया क्रिया करके सल्फर डाइ–आक्साइड गैस अमोनियम सल्फाइड के सूक्ष्म कण पैदा करने में समर्थ हो जाती है। ये कण वातावरण में काफी लंबे समय तक तैरते रहते हैं। इस प्रकार हम देखते हैं कि मनुष्य प्रकृति के मामले में हस्तक्षेप करके एक धूसरित भविष्य के निर्माण में सहायक हो रहा है।

10. 'अप्रत्याशित' का संधि विच्छेद होगा–
(A) अप्रत्यय + आशित (C) अप्रति + आशित
(B) अ + प्रत्याशित (D) अप्रत्या + आशित

11. 'खनन' का तात्पर्य है–
(A) खान (B) खोदना
(C) खाना (D) खिलाना

12. धूल बढ़ने के अप्रत्याशित कारणों में शामिल नहीं है–
(A) आँधी और तूफान
(B) खुदाई और निर्माण कार्य
(C) मरुस्थलों से गुजरने वाले तूफान
(D) चारागाहों की संख्या में वृद्धि

13. गंधक और सल्फर डाइ आक्साइड की क्या भूमिका बताई गई है?
(A) कारखानों में प्रदूषण
(B) धूल नष्ट करना
(C) धूल एकत्रित करना
(D) ऑक्सीजन से प्रतिक्रिया करना

14. 'जैविक' शब्द में मूल शब्द और प्रत्यय क्या है?
(A) जैव + इक (B) जै + विक
(C) जीव + क (D) जीव + इक

15. 'धूल के कण वातावरण में लंबे समय तक तैरते हैं।'
उपर्युक्त वाक्य का प्रकार है–
(A) सरल (B) संयुक्त
(C) मिश्र (D) जटिल

16. 'तैरते रहते हैं'–पद क्रिया के किस भेद के अंतर्गत आएगा?
(A) अकर्मक (B) सकर्मक
(C) द्विकर्मक (D) प्रेरणार्थक

17. गद्यांश से उद्धृत निम्नलिखित वाक्य को चार भागों में बाँटा गया है। इनमें से एक भाग में अशुद्धि है। उसे पहचानिए।
(A) आज के वर्तमान समय में
(B) मनुष्य के द्वारा
(C) प्रकृति के कार्यों में
(D) हस्तक्षेप किया जा रहा है।

18. किसके कण वातावरण में काफी समय तक तैरते रहे हैं?
(A) अमोनिया
(B) अमोनिया सल्फाइड
(C) सल्फाइड
(D) सल्फर डाइ–आक्साइड

निर्देश (प्रश्न संख्या 19 से 27 तक)
निम्नलिखित गद्यांश को पढ़कर पूछे गए प्रश्नों के सबसे उपयुक्त उत्तर वाले विकल्प चुनिए।

मातृभाषा का विद्यालयी पाठ्यचर्या में महत्वपूर्ण स्थान है। यह विद्यालय में पढ़ाया जाने वाला एक विषय मात्र नहीं, अन्य विषयों को सीखने का माध्यम भी है। भाषा के माध्यम से जो मूलभूत कौशल अर्जित किए जाते हैं, वे अन्य विषय क्षेत्रों की संकल्पनाओं को समझने सीखने में भी सहायता करते हैं। अक्सर देखा गया है कि जिस बालक में मातृभाषा की पकड़ जितनी अधिक होती है, वह उतनी सरलता और शीघ्रता से अन्य विषयों का ज्ञानार्जन कर लेता है। इस दृष्टि से यह उपयुक्त है कि जिस भाषा में बालक बोलता, सोचता और कल्पना करता है वही भाषा उसकी शिक्षा का माध्यम भी हो ताकि अध्ययन किए जाने वाले विषयों को सही ढंग से समझने, उन पर स्वतंत्र रूप से चिंतन करने तथा उन्हें स्पष्ट और प्रभावी रूप से अभिव्यक्त करने में आसानी हो। इसी कारण सभी शिक्षाविदों ने इस बात पर बल दिया है कि शिक्षा का माध्यम मातृभाषा ही होना चाहिए। परन्तु अक्सर देखने में आता है कि विद्यालयों में मातृभाषा के अध्ययन–अध्यापन पर अपेक्षित बल नहीं दिया जाता। अध्यापकों की सारी शक्ति विज्ञान, गणित, सामाजिक विज्ञान आदि विषयों के शिक्षण पर केन्द्रित रहती है। भाषा पर पूर्ण अधिकार न होने के कारण बालकों में इन विषयों की सूझ–बूझ भी अधूरी ही रह जाती है। इसके लिए आवश्यक है कि मातृभाषा के अध्ययन–अध्यापन को शिक्षा का केन्द्र बिन्दु मानकर चला जाए ताकि बालकों में भाषा कौशलों का विकास हो सके तथा उनकी अभिव्यक्ति में स्पष्टता, ज्ञान में गंभीरता, कल्पना–शक्ति में मौलिकता और अंतःवृत्तियों में सजगता आए।

19. विद्यालयी पाठ्यचर्या में मातृभाषा का विशेष महत्व माना गया है, क्योंकि वह–
(A) बच्चों को सर्वाधिक प्रिय होती है
(B) एक विषय की तरह पढ़ाई जाती है
(C) मातृभूमि से प्रेम करना सिखाती है
(D) अन्य विषयों को सीखने का माध्यम होती है

20. अन्य विषयों की संकल्पनाओं को समझने के कौशल अर्जित किए जा सकते हैं–
(A) किसी भाषा के माध्यम से
(B) मातृभाषा में कुशल होने से
(C) प्रशिक्षण प्राप्त करने से
(D) वैज्ञानिक दृष्टि अपनाने से

21. 'सूझ-बूझ' शब्द है–
(A) समास रहित शब्द
(B) पूरक शब्द
(C) समानार्थी शब्द
(D) युग्म शब्द

22. मातृभाषा के स्थान पर विज्ञान, गणित आदि के शिक्षण पर अधिक बल देने के परिणामस्वरूप–
(A) बालकों की सूझ–बूझ अधूरी रह जाती है
(B) परीक्षा परिणामों में सुधार दिखाई पड़ता है
(C) बच्चों के ज्ञान में वृद्धि होती है
(D) बच्चे जागरूक नागरिक बनते हैं

23. मातृभाषा को शिक्षा का केंद्र बिंदु मानकर चलने के लाभों के बारे में निम्नलिखित abc कथनों पर विचार कीजिए और सही विकल्प चुनिए–
(a) अभिव्यक्ति में स्पष्टता और ज्ञान में गंभीरता आती है
(b) कल्पनाशक्ति में सजगता और अंतःवृत्तियों में मौलिकता दिखाई देती है
(c) भाषा कौशलों का विकास होता है।
(A) केवल a (B) a तथा b
(C) b तथा c (D) a तथा c

24. अनुच्छेद में सर्वाधिक बल किस बात पर दिया गया है?
(A) शिक्षण में पाठ्यचर्या के महत्व पर
(B) मातृभाषा को शिक्षा का माध्यम बनाने पर
(C) विज्ञान-गणित आदि के महत्व पर
(D) कल्पनाशक्ति और सजगता पर

25. अनुच्छेद के अनुसार 'ज्ञानार्जन' शब्द का विग्रह होगा–
(A) ज्ञान से अर्जन
(B) ज्ञान का अर्जन
(C) ज्ञान में अर्जन
(D) ज्ञान के लिए अर्जन

26. 'गंभीरता' शब्द के पद–परिचय में कौन–सा कथन अनुपयुक्त है?
(A) भाववाचक संज्ञा (B) स्त्रीलिंग
(C) गुणवाचक (D) एकवचन

27. 'मातृभाषा विद्यालय में पढ़ाया जाने वाला एक विषय मात्र ही नहीं है।'
उपर्युक्त वाक्य का अर्थ के अनुसार भेद होगा–
(A) विधानार्थक वाक्य
(B) सरलार्थक वाक्य
(C) निषेधार्थक वाक्य
(D) आज्ञार्थक वाक्य

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निम्नलिखित गद्यांश को ध्यानपूर्वक पढ़िए तथा पूछे गए प्रश्नों का उत्तर दीजिए।

जनता के पास लोकतंत्र में चुनाव ही वह अस्त्र हुआ करता है जिसके द्वारा वह शासक दल और विरोधी-दल दोनों पर अंकुश और नियंत्रण लगाए रख सकती है, पर अपने इस अचूक अस्त्र के प्रयोग के लिए लोकतंत्रीय व्यवस्था वाले देशों में जनता का सभी प्रकार से जागरूक तथा सावधान होना बहुत आवश्यक हुआ करता है। सामाजिक, राजनैतिक आदि सभी पहलुओं से जागरूक जनता ही चुनाव के माध्यम से देश या प्रांतों के प्रशासन में ऐसे व्यक्तियों को भेज सकती है जो वास्तव में निहित स्वार्थों से ऊपर उठकर जनसेवा के कार्यों में रुचि रखने वाले हों, त्याग और बलिदान की भावना से भरकर जनता और राष्ट्रहित को ही सर्वोच्च मानने वाले हों और उनमें ऐसा सब कर सकने की शक्ति और क्षमता भी पूर्ण रूप से विद्यमान हो। इस जागरूकता और सावधानी के अभाव में चुनावों का नाटक और लोकतंत्र खिलवाड़ बनकर रह जाया करते हैं।

28. जनप्रतिनिधि को क्या नहीं होना चाहिए–
(A) जनसेवक
(B) राष्ट्रहित को सर्वोच्च मानने वाला
(C) स्वार्थी
(D) निःस्वार्थी

29. चुनाव का अचूक प्रयोग कौन कर सकता है?
(A) अंधभक्त जनता (B) जागरूक जनता
(C) सोयी हुई जनता (D) परेशान जनता

30. किसके माध्यम से शासक दल और विरोधी दल पर नियंत्रण लगाया जा सकता है?
(A) चुनाव (B) बहिष्कार
(C) समर्थन (D) प्रोत्साहन

31. चुनाव नाटक कब बन जाते हैं?
(A) जब जनता व्यक्ति के कार्य व क्षमता से प्रभावित होकर अपना वोट दे
(B) जब जनता जागरूक तथा सावधान हो
(C) जब जनता जागरूक तथा सावधान न हो
(D) जब जनता अपने वोट का सही प्रयोग करे

32. 'अंकुश' शब्द का विलोम है–
(A) निरंकुश (B) लवकुश
(C) नियंत्रण (D) रोकथाम

33. जनप्रतिनिधियों में कौन-सा भाव नहीं होना चाहिए?
(A) जनसेवा का भाव
(B) त्याग का भाव
(C) बलिदान का भाव
(D) स्वार्थ का भाव

34. सामाजिक शब्द में कौन-सा प्रत्यय है?
(A) इत (B) इक
(C) ईक (D) जिक

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नीचे दिए गए गद्यांश को पढ़कर सबसे उचित विकल्प का चयन कीजिए।

समाज में पाठशालाओं, स्कूलों अथवा शिक्षा की दूसरी दुकानों की कोई कमी नहीं है। छोटे–से–छोटे बच्चे को माँ–बाप स्कूल भेजने की जल्दी करते हैं। दो–ढाई साल के बच्चे को भी स्कूल में बिठाकर आ–जाने का आग्रह भी हर घर में बना हुआ है।

इसके विपरीत हर घर की दूसरी सच्चाई यह भी है कि कोई भी माँ–बाप बालकों के बारे में, बालकों की सही शिक्षा के बारे में और साथ ही सच्चा एवं अच्छा माता–पिता अथवा अभिभावक होने का शिक्षण कहीं से भी प्राप्त नहीं करता। माता–पिता बनने से पहले किसी भी नौजवान जोड़े को यह नहीं सिखाया जाता है कि माँ–बाप बनने का अर्थ क्या है? इससे पहले किसी भी जोड़े को यह भी नहीं सिखाया जाता कि अच्छे और सच्चे दाम्पत्य की शुरुआत कैसे की जानी चाहिए ? पति–पत्नी होने का अर्थ क्या है? यह भी कोई नहीं बताता। परिणाम साफ है कि जीवन शुरू होने से पहले ही घर टूटने–बिखरने लगते हैं। घर बसाने की शाला न आज तक कहीं खुली है और न खुलती दिखती है। समाज और सत्ता दोनों या तो इस संकट के प्रति सजग नहीं हैं या फिर इसे अनदेखा कर रहे हैं।

35. 'भी' शब्द है–
- (A) क्रिया
- (B) क्रियाविशेषण
- (C) संबंधवाचक
- (D) निपात

36. 'इसके विपरीत हर घर की दूसरी सच्चाई यह भी है कि .....' वाक्य के रेखांकित अंश का समानार्थी शब्द है।
- (A) सूक्ति (B) वास्तविक
- (C) वास्तविकता (D) सद्वचन

37. घर के टूटने–बिखरने का मुख्य कारण क्या है?
- (A) बच्चों के बारे में न जानना
- (B) माता–पिता बनने का अर्थ न जानना
- (C) दाम्पत्य का अर्थ न जानना
- (D) घर बसाने की जल्दी करना

38. हर घर में किस चीज़ का आग्रह बना हुआ है?
- (A) बच्चों को स्कूल न भेजने का
- (B) बहुत छोटे बच्चे को स्कूल में पढ़ाने का
- (C) बहुत छोटे बच्चे को दुकान भेजने का
- (D) बहुत छोटे बच्चे को स्कूल में बिठाकर आने का

39. लेखक के लिए किसका शिक्षण प्राप्त करना ज़रूरी है?
- (A) पति–पत्नी बनने का
- (B) बच्चों को किसी भी प्रकार की शिक्षा देने का
- (C) अच्छे माता–पिता बनने का
- (D) छोटे–छोटे बच्चों को उच्च विद्यालयों में प्रवेश दिलाने का

40. माता–पिता को बच्चों की सही शिक्षा के बारे में जानना क्यों ज़रूरी है?
- (A) बच्चों को ज्ञानवान् बनाया जा सके
- (B) ताकि बच्चों को उच्च डिग्रियाँ प्राप्त करवाई जा सकें
- (C) ताकि बच्चे स्वयं प्रवेश लेने योग्य बन सकें
- (D) जिससे बेहतर समाज का निर्माण किया जा सके

41. समाज और सत्ता किसके प्रति सजग नहीं है?
- (A) अभिभावकों के द्वारा शिक्षा प्राप्त न करने के प्रति
- (B) ज्ञानवान समाज न बन पाने के घोर संकट के प्रति
- (C) घर बसाने की शिक्षा देने वाली शाला खोलने के प्रति
- (D) माता–पिता द्वारा बच्चों को पालन–पोषण न करने के प्रति

42. लेखक के अनुसार सबसे पहले क्या जानना जरूरी है?
- (A) दाम्पत्य की शुरुआत कैसे की जानी चाहिए
- (B) बच्चों के बारे में
- (C) बच्चों की शिक्षा के बारे में
- (D) माता–पिता के शिक्षा–स्तर को

43. 'माता–पिता' शब्द–युग्म है।
- (A) सार्थक–निरर्थक शब्द–युग्म
- (B) सार्थक शब्द–युग्म
- (C) निरर्थक शब्द–युग्म
- (D) पुनरुक्त शब्द–युग्म

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नीचे दिए गए गद्यांश को पढ़कर सबसे उचित विकल्प का चयन कीजिए।

शिक्षा केवल तभी बच्चों के आत्मिक जीवन का एक अंश बनती है, जबकि ज्ञान सक्रिय कार्यों के साथ अभिन्न रूप से जुड़ा हो। बच्चों से यह आशा नहीं की जा सकती कि पहाड़े या समकोण चतुर्भुज का क्षेत्रफल निकालने के नियम आप से आप उन्हें आकर्षित करेंगे। जब बच्चा यह देखता है कि ज्ञान सृजन के या श्रम के लक्ष्यों की प्राप्ति का साधन है, तभी वह ज्ञान पाने की इच्छा उनके मन में जागती है। मैं यह चेष्टा करता था कि छोटी उम्र में ही शारीरिक श्रम में बच्चों को अपनी होशियारी और कुशाग्र बुद्धि का परिचय देने का अवसर मिले। स्कूल का एक सर्वाधिक महत्त्वपूर्ण कार्यभार है–बच्चों को ज्ञान का प्रयोग करना सिखाना। छोटी कक्षाओं में यह खतरा सबसे ज़्यादा होता है कि ज्ञान निरर्थक बोझ बनकर रह जाएगा, क्योंकि इस उम्र में बौद्धिक श्रम नई–नई बातें सीखने से ही संबंधित होता है।

44. लेखक के अनुसार शिक्षा का अर्थ है
- (A) ज्ञान का प्रयोग करना
- (B) श्रम करना
- (C) विषय पर अधिकार प्राप्त करना
- (D) ज्ञान प्राप्त करना

45. ज्ञान–प्राप्ति की इच्छा कब जगती है?
- (A) जब हम यह देखें कि ज्ञान हमारे भौतिक जीवन के लक्ष्यों की प्राप्ति का साधन है
- (B) जब हम यह देखें कि ज्ञान-वान मनुष्य ही श्रम का अधिकारी है
- (C) जब हम यह देखें कि ज्ञान के द्वारा हम समस्त सुखों का लाभ उठा सकते हैं
- (D) जब हम यह देखें कि ज्ञान के द्वारा सृजनात्मक कार्य किए जा सकते हैं

46. लेखक के अनुसार :
- (A) शारीरिक श्रम में तेज बुद्धि की आवश्यकता नहीं होती
- (B) शारीरिक श्रम में समझदारी और तेज बुद्धि की भी आवश्यकता होती है
- (C) शारीरिक श्रम बच्चों को होशियार बनाता है
- (D) शारीरिक श्रम ही एकमात्र महत्त्वपूर्ण तत्त्व है

47. गद्यांश के अनुसार ज्ञान कब निरर्थक बोझ बन जाता है?
- (A) जब उसे कक्षाओं तक सीमित कर दिया जाए
- (B) जब उसे शारीरिक श्रम से न जोड़ा जाए
- (C) जब उसका सक्रिय प्रयोग न किया जाए
- (D) जब उस पर पूर्णतः अधिकार न किया जाए

48. 'इच्छा' शब्द में 'इक' प्रत्यय जोड़ने से बनने वाला नया शब्द है
- (A) ऐच्छिक (B) इच्छिक
- (C) ईच्छिक (D) एच्छिक

49. 'कार्य' का बहुवचन रूप है–
- (A) कार्यें (B) कार्य
- (C) कार्यक्रमों (D) कार्यों

50. 'बौद्धिक' शब्द में मूल शब्द है
- (A) बुद्ध (B) बौद्ध
- (C) बौद्धि (D) बुद्धि

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नीचे दिये गये गद्यांश को पढ़कर सबसे उचित विकल्प का चयन कीजिए:

बाल–मस्तिष्क की प्रकृति की यह माँग होती है कि बच्चे का बौद्धिक विकास विचारों के स्रोत के पास हो। दूसरे शब्दों में, यह ठोस, वास्तविक बिंबों के बीच और सर्वप्रथम प्रकृति की गोद में हो, जहाँ बच्चा ठोस बिंब को देखे, सुने और फिर उसका विचार इस बिंब के बारे में प्राप्त सूचना के 'संसाधन' के काम में लगे। जब बच्चे को प्रकृति से दूर रखा जाता है, जब बच्चा पढ़ाई के

पहले दिन से ही केवल शब्द के रूप में सारा ज्ञान और बोध पाता है, उसके मस्तिष्क की कोशिकाएँ जल्दी ही थक जाती हैं और अध्यापक द्वारा प्रस्तुत काम को निभा नहीं पातीं। और इन कोशिकाओं को तो अभी विकसित, सशक्त, सुदृढ़ होना है। यहीं पर उस बात का कारण छिपा है, जो प्राथमिक कक्षाओं में अक्सर देखने में आती हैं– बच्चा चुपचाप बैठा अध्यापक की आँखों में आँखें डाले देखता है, मानों बड़े ध्यान से सुन रहा हो, लेकिन वास्तव में वह एक शब्द भी नहीं समझ पाता, क्योंकि बच्चे को नियमों पर सोच–विचार करना पड़ता है, और ये सब अमूर्त सामान्यीकृत बातें होती हैं।

51. ''.... वास्तव में वह एक शब्द भी नहीं समझ पाता ....'' इसका संभावित कारण क्या है?
(A) बच्चों के पास कोई सजीव बिंब नहीं होता
(B) बच्चे मंदबुद्धि होते हैं
(C) बच्चों के पास बहुत सीमित अनुभव होते हैं
(D) शिक्षक बच्चों की बात नहीं सुनते

52. बच्चों को प्रकृति के निकट रखने की बात क्यों की गई है?
(A) प्रकृति में शुद्ध ऑक्सीजन मिलती है
(B) प्रकृति का हरा–भरा वातावरण बच्चों को आकर्षित करता है
(C) बच्चे अपनी इंद्रियों के माध्यम से बिंब बनाते हैं
(D) बच्चे को सबसे ज़्यादा विचार प्राकृतिक वातावरण में ही आते हैं

53. केवल शब्दों के रूप में सारा ज्ञान देना :
(A) बाल–मस्तिष्क को प्रखर बनाता है
(B) बाल–मस्तिष्क की प्रकृति के विरुद्ध है
(C) बाल–मस्तिष्क की कोशिकाओं को विकसित करता है
(D) बाल–मस्तिष्क की प्रकृति के अनुकूल है

54. इस गद्यांश के आधार पर आप अपनी कक्षा में क्या करेंगे?
(A) बच्चों को मैदान, वन–बाग की सैर कराएँगे।
(B) बच्चों पर सीखने का बोझ नहीं डालेंगे
(C) बच्चों के मस्तिष्क को प्रखर बनाने के लिए कठोर परिश्रम करेंगे और बच्चों से करवाएँगे
(D) ऐसे अनुकूल वातावरण का निर्माण करेंगे, जहाँ बच्चों को इंद्रिय अनुभव के अवसर मिल सकें

55. ''यहीं पर उस बात का कारण छिपा है, जो प्राथमिक ..... आती हैं।'' वाक्य में किस बात की तरफ इशारा दिया गया है?
(A) बच्चे का कक्षा में सदैव डर के कारण चुपचाप बैठना
(B) अध्यापक का सदैव बोलना
(C) बच्चे द्वारा अध्यापक की बातों को न समझ पाना
(D) बच्चे द्वारा निरन्तर सोच–विचार करना

56. किस शब्द में 'इक' प्रत्यय का प्रयोग नहीं किया जा सकता?
(A) प्रकृति (B) ज्ञान
(C) वास्तव (D) बुद्धि

57. ''जब बच्चे को प्रकृति से दूर रखा जाता है ...।'' वाक्य के रेखांकित अंश में कौन–सा कारक है?
(A) कर्ता कारक (B) सम्प्रदान कारक
(C) कर्म कारक (D) अपादान कारक

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दिये गये गद्यांश को पढ़कर निम्नलिखित प्रश्नों के विकल्प छाँटिए:

आदिम आर्य घुमक्कड़ ही थे। यहाँ से वहाँ वे घूमते ही रहते थे। घूमते भटकते ही वे भारत पहुँचे थे। यदि घुमक्कड़ी का बाना उन्होंने न धारण किया होता, यदि वे एक स्थान पर ही रहते, तो आज भारत में उनके वंशज न होते। भगवान बुद्ध घुमक्कड़ थे। भगवान महावीर घुमक्कड़ थे। वर्षाऋतु के कुछ महीनों को छोड़कर एक स्थान में रहना बुद्ध के वश का नहीं था। 35 वर्ष की आयु में उन्होंने बुद्धत्व प्राप्त किया। 35 वर्ष से 80 वर्ष की आयु तक जब उनकी मृत्यु हुई, 45 वर्ष तक वे निरन्तर घूमते ही रहे। अपने आप को समाज सेवा और धर्म प्रचार में लगाये रहे। अपने शिष्यों से उन्होंने कहा था, ''चरथ भिक्खवे'' चारिक'' हे भिक्षुओं! घुमक्कड़ी करो यद्यपि बुद्ध कभी भारत के बाहर नहीं गये, किन्तु उनके शिष्यों ने उनके वचनों को सिर आँखों पर लिया और पूर्व में जापान, उत्तर में मंगोलिया पश्चिम में मकदूनियाँ और दक्षिण में बाली द्वीप तक धावा मारा। श्रवण महावीर ने स्वच्छन्द विचरण के लिए अपने वस्त्रों तक को त्याग दिया।

दिशाओं को उन्होंने अपना अम्बर बना लिया, वैशाली में जन्म लिया, पावा में शरीर त्याग किया। जीवनपर्यन्त घूमते रहे। मानव के कल्याण के लिए मानवों के राह प्रदर्शन के लिये और शंकराचार्य, बारह वर्ष की अवस्था में संन्यास लेकर कभी केरल, कभी मिथिला, कभी कश्मीर और कभी बद्रिकाश्रम में घूमते रहे। कन्याकुमारी से लेकर हिमालय तक समस्त भारत को अपना कर्मक्षेत्र समझा। सांस्कृतिक एकता के लिए, समन्वय के लिए, श्रुति धर्म की रक्षा के लिए शंकराचार्य के प्रयत्नों से ही वैदिक धर्म का उत्थान हो सका।

58. घुमक्कड़ शब्द में कौन-सा प्रत्यय है?
(A) अड़ (B) ड़
(C) अक्कड़ (D) कड़

59. महावीर स्वामी का जन्म कहाँ हुआ था?
(A) कुशीनगर (B) वैशाली
(C) पावापुरी (D) पारसौली

60. स्वच्छन्द में कौन-सी सन्धि है?
(A) गुण (B) दीर्घ
(C) विसर्ग (D) व्यंजन

61. महात्मा बुद्ध ने जब बुद्धत्व प्राप्त किया तब उनकी अवस्था कितनी थी?
(A) 45 वर्ष (B) 35 वर्ष
(C) 12 वर्ष (D) 80 वर्ष

62. ''श्रुति धर्म'' का क्या अर्थ है?
(A) मुस्लिम धर्म (B) बौद्ध धर्म
(C) जैन धर्म (D) वैदिक धर्म

63. निम्नलिखित गद्यांश को पढ़कर का उत्तर दीजिए।

आज विज्ञान मनुष्यों के हाथों में अद्‌भुत और अतुल्य शक्ति दे रहा है, इसका उपयोग एक व्यक्ति और समूह के उत्कर्ष और दूसरे व्यक्ति और समूह के गिराने में होता ही रहेगा। इसलिए हमें उस भावना को जागृत रखना है और उसे जागृत रखने के लिए कुछ ऐसे साधनों को भी हाथ में रखना होगा, जो उस अहिंसात्मक त्याग भावना को प्रोत्साहित करे और भोग भावना को दबाए रखें। नैतिक अंकुश के बिना शक्ति मानव के लिए हितकर नहीं होती।

उपर्युक्त पंक्ति मैं कौन मनुष्य के हाथों में अद्‌भुत और अतुल्य शक्ति दे रहा है?
(A) विज्ञान (B) साहित्य
(C) वाणिज्य (D) कला

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निम्नलिखित गद्यांश के आधार पर प्रश्नों के उत्तर दीजिए–

'शिक्षा' बहुत व्यापक शब्द है। उसमें सीखने योग्य अनेक विषयों का समावेश हो सकता है। पढ़ना-लिखना भी उसी के अंतर्गत है। इस देश की वर्तमान शिक्षा-प्रणाली अच्छी नहीं। इस कारण यदि कोई स्त्रियों को पढ़ाना अनर्थकारी समझे तो उसे उस प्रणाली का संशोधन करना या कराना चाहिए, खुद पढ़ने-लिखने को दोष न देना चाहिए। लड़कों ही की शिक्षा-प्रणाली कौन-सी बड़ी अच्छी है। प्रणाली बुरी होने के कारण क्या किसी ने यह राय दी है कि सारे स्कूल और कॉलेज बंद कर दिया जाएँ ? आप खुशी से लड़कियों और स्त्रियों की शिक्षा की प्रणाली का संशोधन कीजिए। उन्हें क्या पढ़ना चाहिए, कितना पढ़ना चाहिए, किस तरह की शिक्षा देनी चाहिए और कहाँ पर देनी चाहिए घर में या स्कूल में – इन सब बातों पर बहस कीजिए, जी में आये सो कीजिए; पर परमेश्वर के लिए यह न कहिए कि स्वयं पढ़ने-लिखने में कोई दोष है–यह अनर्थकर है, वह अभिमान का उत्पादक है, वह गृह–सुख का नाश करने वाला है। ऐसा कहना सोलहों आने मिथ्या है।

64. 'अनर्थकारी' शब्द का क्या अभिप्राय है ?
(A) विपरीत अर्थ करने वाला
(B) अमौद्रिक अर्थ वाला
(C) विशिष्ट अर्थ करने वाला
(D) अनिष्ट करने वाला

65. इनमें कौन-सा शब्द पुल्लिंग के रूप में प्रयुक्त होता है ?
(A) शिक्षा (B) अच्छी
(C) बहस (D) अभिमान

66. इनमें कौन-सा युग्म सही विकल्प है ?

(A) गौ – गौएँ (B) गृह – गृहें

(C) स्कूल – स्कूलें (D) अनेक – अनेकों

67. 'अध्यापक कक्षा में पढ़ा रहा होगा' वाक्य में कौन-सा काल है ?

(A) सामान्य भविष्यत् काल

(B) संभाव्य भविष्यत् काल

(C) सामान्य भूत काल

(D) आसन्न भूत काल

68. 'प्रणाली' शब्द का सही अर्थ है–

(A) परंपरा (B) राय

(C) पद्धति (D) विधान

निर्देश (प्रश्न संख्या 69 से 73 तक)

एक एक गद्यांश दिया गया है। गद्यांश को ध्यानपूर्वक पढ़ें तथा प्रत्येक प्रश्न के चार विकल्पों में से सही विकल्प चुनें।

विवेकशीलता का अर्थ है सही और गलत की पहचान कर पाना और फिर सही के समर्थन में गलत का विरोध करना। यही है वह पक्षधरता जो मनुष्य को जागरूक बनाती है। हमारी त्रासदी यह है कि दृष्टा भाव से जीने को हम एक दार्शनिक और आध्यात्मिक अर्थ देकर अनायास अपना बचाव कर लेते हैं। दृष्टा भाव से जीने का कुछ भी ऊँचा अर्थ होता हो, सही के पक्ष में खड़े होने को आवश्यकता और महत्ता उससे कम नहीं होती। आज सवाल मनुष्यता के अस्तित्व का है, मनुष्यता अर्थात् वह भावना जो मानवीय आदर्शों से हमें जोड़ती है, जो यह अहसास कराती है कि मनुष्य होने के नाते हमारा यह कर्त्तव्य बनता है कि हम उचित के पक्ष में खड़े हों। अपने भीतर वह साहस पैदा करें जो अनुचित के विरुद्ध खड़े होने की प्रेरणा बनता है। 'कोउ नृप होहि हमहिं का हानी' वाला मंथरा–दर्शन कुल मिलाकर हमें सजीव मनुष्य से निर्जीव वस्तु में ही परिणत करता है। अपने आप को निर्जीव वस्तु के रूप में देखना मनुष्य के लिए असंभव की हद तक मुश्किल है। लेकिन जब हमे यह भूल जाते हैं कि सही–गलत की पहचान करके सही के साथ खड़े होना हमारी मनुष्यता का प्रमाण है, तो हमारे सजीव और सजग होने का अर्थ ही क्या रह जाता है? सवाल मनुष्योचित सजगता को जीवित रखने का है। कहीं भी, किसी भी तरह से यदि कुछ गलत हो रहा है तो इस सजगता का तकाजा है कि हम अपना विरोध दर्ज कराएँ–स्वयं अपनी दृष्टि में मनुष्य बने रहने के लिए। यही है तटस्थता की विरुद्धता का दर्शन और यही हमारे मनुष्य होने का प्रमाण भी है।

69. गद्यांश में पक्षधरता से क्या आशय है ?

(A) सही के समर्थन से

(B) गलत के विरोध से

(C) सही–गलत में पहचान न कर पाना

(D) सही के समर्थन में गलत का विरोध

70. 'दृष्टा भाव' का प्रयोग लोग अधिकतर किसलिए करते हैं ?

(A) आत्म–रक्षा के लिए

(B) अपनी कायरता छिपाने के लिए

(C) स्वयं को तटस्थ दिखाने के लिए

(D) किसी पचड़े में न पड़ने के लिए

71. लेखक को मंथरा–दर्शन क्यों अच्छा नहीं लगता ?

(A) स्वार्थ प्रेरित (B) कायरतापूर्ण

(C) संवेदनहीन (D) निर्जीव बनाता है

72. यहाँ 'तकाजा' शब्द का अर्थ है–

(A) शिकायत (B) माँग

(C) ऋण (D) देनदार

73. लेखक को तटस्थता की विरुद्धता के दर्शन की आवश्यकता क्यों महसूस हुई ?

(A) समय की माँग

(B) अनेक वादों के प्रचार से बचने के लिए

(C) मानवता के संरक्षण के लिए

(D) अपने अस्तित्व की रक्षा के लिए

उत्तरमाला

1. (B)	**2.** (C)	**3.** (D)	**4.** (A)	**5.** (C)
6. (B)	**7.** (C)	**8.** (A)	**9.** (A)	**10.** (C)
11. (B)	**12.** (D)	**13.** (C)	**14.** (D)	**15.** (A)
16. (A)	**17.** (A)	**18.** (B)	**19.** (C)	**20.** (B)
21. (D)	**22.** (A)	**23.** (D)	**24.** (B)	**25.** (B)
26. (C)	**27.** (A)	**28.** (C)	**29.** (B)	**30.** (A)
31. (C)	**32.** (A)	**33.** (D)	**34.** (B)	**35.** (D)
36. (C)	**37.** (C)	**38.** (D)	**39.** (C)	**40.** (D)
41. (C)	**42.** (A)	**43.** (B)	**44.** (A)	**45.** (D)
46. (B)	**47.** (C)	**48.** (A)	**49.** (B)	**50.** (D)
51. (A)	**52.** (C)	**53.** (B)	**54.** (D)	**55.** (B)
56. (B)	**57.** (C)	**58.** (C)	**59.** (B)	**60.** (D)
61. (B)	**62.** (D)	**63.** (A)	**64.** (D)	**65.** (D)
66. (A)	**67.** (B)	**68.** (C)	**69.** (D)	**70.** (C)
71. (D)	**72.** (B)	**73.** (C)		

❑❑

अध्याय
1

अधिगम एवं अर्जन

1. प्रस्तावना

- सीखना मानव जीवन की एक ऐसी व्यापक प्रक्रिया है जो सतत् एवं जीवन पर्यन्त चलती है।
- मनुष्य जन्म के उपरांत ही सीखना प्रारंभ कर देता है और वह जीवन भर कुछ न कुछ किसी न किसी रूप में सीखता रहता है। धीरे–धीरे वह अपने आप को वातावरण से समायोजित करने का प्रयत्न करता है।
- भाषा सीखने के लिए वातावरण आवश्यक है।
- बच्चा अपने घर, माता–पिता, मित्र–मण्डली आदि में वार्तालाप व बोल चाल शुरू करता है लेकिन इसमें भी भाषा सीखने की एक प्रक्रिया रहती है।
- बच्चा जो वातावरण में सुनता है उसका अनुकरण करके दोहराता भी है।
- भाषा को औपचारिक तौर पर भी सीखा जाता है ताकि भाषा का ज्ञान समृद्ध हो सके।

2. भाषा सीखने एवं सिखाने के विभिन्न दृष्टिकोण

भाषा अर्जन

- भाषा अर्जन उस प्रक्रिया को कहते हैं जिसके द्वारा मानव भाषा को ग्रहण करने एवं समझने की क्षमता अर्जित करता है तथा बातचीत करने के लिए शब्दों एवं वाक्यों का प्रयोग करता है।
- जब कोई बालक भाषा अर्जन की इस प्रक्रिया को सीख जाता है तो उसके अंदर मानव भाषा को ग्रहण करने की क्षमता अर्जित हो जाती है और वह इस तरह अर्जित की गई भाषा को बातचीत करने के लिए शब्दों एवं वाक्यों के माध्यम से आसानी से प्रयोग करता है।
- इसमें बालक के सीखने की प्रक्रिया व्याकरणीय नियमों से पूर्णतः अनभिज्ञ रहती है और वह प्रथम भाषा अर्जित करता है।
- भाषा अर्जन की प्रक्रिया में बालक को एक प्राकृतिक संप्रेषण स्रोत की आवश्यकता होती है।
- इस प्रक्रिया में बालक सुनकर, बोलकर, भाषा ग्रहण करता है तथा निरंतर परिमार्जन करता रहता है। भाषा सीखने की प्रक्रिया में भाषा अर्जन की प्रक्रिया महत्वपूर्ण होती है।
- सीखी हुई भाषा को समझने की क्षमता अर्जित करना तथा उसे दैनिक जीवन में प्रयोग में लाने को भाषा अर्जन कहते हैं।
- भाषा अर्जन एक सहज एवं स्वाभाविक प्रक्रिया है जिसमें बच्चे घरेलू परिवेश में भाषा के नियमों को आसानी से आत्मसात् करते हैं।
- भाषा अर्जन के माध्यम से बालक अनुकरण द्वारा प्रथम भाषा सीख कर अपनी बातों को बोलचाल अर्थात् घर की भाषा में आसानी से अभिव्यक्त कर पाता है।
- भाषा–अर्जन एक अवचेतन प्रक्रिया है, सभी बच्चों में भाषा–अर्जन की स्वाभाविक क्षमता होती है।
- भाषा–अर्जन बालक बिना विद्यालय जाये भी कर लेता है।

भाषा–अधिगम

- भाषा अधिगम एक चेतन प्रक्रिया है।
- यह प्रक्रिया नियमबद्ध होती है अर्थात् भाषा व्याकरणीय नियमों से सिखाई जाती है।
- इसमें बालक सीखने की प्रक्रिया से पूरी तरह अनभिज्ञ रहता है।
- भाषा को सीखने के लिए भिन्न–भिन्न विधियों का प्रयोग किया जाता है।
- भाषा की लेखन प्रक्रिया पर जोर दिया जाता है।
- इसमें भाषा सिखाने में भाषा की संरचना, भाषा के नियम, शब्द विज्ञान एवं रूप विज्ञान का भलीभाँति ध्यान रखा जाता है।
- भाषा सिखाते समय बच्चे की अर्जित भाषा का सहारा लिया जाता है।
- इसमें नियमों को बच्चों को स्मरण करवाया जाता है।
- भाषा अधिगम का अर्थ भाषा को सीखना है। मनुष्य अपने विचारों को अभिव्यक्त करने एवं समाज एवं वातावरण के साथ सामंजस्य स्थापित करने के लिए जिसके द्वारा भाषा क्षमता का विकास करता है, भाषा अधिगम कहलाती है।
- भाषा अधिगम भाषा के विकास का एक भाग है जो एक ऐसी प्रक्रिया को संदर्भित करता है जो जीवन में जल्दी शुरू होती है जिसके द्वारा बच्चे भाषाओं के माध्यम से भावनाओं को समझना और व्यक्त करना शुरू करते हैं।
- भाषा अधिगम में वातावरण, समूह द्वारा शिक्षार्थी उसके सभी कार्य को जो उसकी योग्यता में वृद्धि करते है उसे आनंदपूर्वक पूर्ण करते हैं।

3. समग्र भाषा दृष्टिकोण

- समग्र भाषा दृष्टि भाषा सीखने–सिखाने का एक दर्शन है।
- इस प्रक्रिया में बालकों को कैसे भाषा को पढ़ाएँ इस पर विचार किया जाता है।
- इसमें ऐसी विधि अपनाने पर बल दिया जाता है कि बालक को विषय बोझिल न लगे तथा वह उत्सुकतापूर्वक भाषा अर्जन करे। यह क्रिया उसे आनंददायक लगे।

- इससे व्याकरण की पुस्तक में दिये गए रूप जैसे–संज्ञा, सर्वनाम, विशेषण आदि को न सिखाकर वह समग्र रूप से भाषा का अर्जन एवं अधिगम करता है।
- इसका उद्देश्य यह होता है की बच्चों को यह मालूम हो सके कि लिखी गई बातों को पढ़ा भी जा सकता है।

4. रचनात्मक दृष्टिकोण

- भाषा सीखने–सिखाने की रचनात्मक दृष्टि एक ऐसी रणनीति है जिसमें पूर्वज्ञान अवस्थाओं और कौशल का प्रयोग होता है।
- भाषा सीखने–सिखाने की इस रचनात्मक दृष्टि के माध्यम से विद्यार्थी अपने पूर्व ज्ञान और सूचना के आधार पर नई किस्म की समझ विकसित करता है।
- इस दृष्टिकोण के अनुसार शिक्षक प्रश्न उठाता है और विद्यार्थियों के जवाब तलाशने की प्रक्रिया का निरीक्षण करता है और उन्हें निर्देशित करता है इसके साथ–साथ सोचने समझने के नए तरीकों का सूत्रपात करता है।
- रचनात्मक दृष्टिकोण को देने वाले प्रसिद्ध भाषाविद क्रेसन थे। उन्होंने बताया कि भाषा सीखते समय तीन आन्तरिक प्रक्रियाएँ काम करती हैं–
  - अवचेतन,
  - पृथ्वीकरण एवं शुद्धिकरण,
  - निगरानी ।
- भाषा अर्जन हेतु उन्होंने 5 परिकल्पनाओं का निर्माण किया। ये परिकल्पनाएं इस प्रकार हैं–
  - **अर्जन अधिगम परिकल्पना**
  - **निगरानी परिकल्पना**
  - **स्वाभाविक क्रम परिकल्पना**
  - **अदा प्रक्रिया**
  - **भावात्मक फिल्टर परिकल्पना**

5. भाषा सीखने एवं सिखाने की बहुभाषिक दृष्टि

- संसार में हजारों भाषाएँ एवं बोलियाँ प्रचलित हैं और उसको बोलने वाले लोग भी मौजूद हैं जो भाषा बालक अपनी माँ से सीखता है वह मातृभाषा कहलाती है किन्तु अपने व्यावहारिक जीवन में शिक्षा के लिए और अपने अन्य कार्यों को चलाने के लिए मनुष्य मातृभाषा के अलावा अन्य भाषा भी सीखता है।
- भाषा वैज्ञानिकों के सामने एक अहम प्रश्न है कि मनुष्य ये भाषाएँ किस प्रकार सीख पाता है। इस पर भाषाविदों ने अपने–अपने विचार व्यक्त किए हैं। जिसमें चॉम्स्की एवं वॉयगोत्सकी का नाम मुख्य है।

चॉम्स्की का बहुभाषिक दृष्टिकोण

- बहुभाषिक दृष्टिकोण के संबंध में चॉम्स्की का कहना है कि मानव अपने जन्म से ही इस योग्य होता है कि वह कोई न कोई भाषा सीख सके।
- उनके अनुसार मनुष्य के बचपन से ही उसके मस्तिष्क पर पहले से ही कुछ भाषाई संरचना बनी रहती है।
- जब शुरूआत के दौर में कोई बालक किसी भाषा को सीखता है तो वह भाषा अर्जन विधि का ही प्रयोग करता है।
- वह उस समय केवल नए शब्द संग्रह को ही सीखना चाहता है।
- दूसरी तरफ चॉम्स्की का मानना है कि बालक केवल अनुकरण के माध्यम से ही लिखे, यह संभव नहीं होता है क्योंकि बालक जिस वातावरण में रह रहा होता है वह हमेशा परिष्कृत एवं परिमार्जित नहीं होता है। वह अनियमित भी हो सकता है।
- चॉम्स्की यह मानते हैं कि बालक कोई भी भाषा सीखने की योग्यता लेकर पैदा होता है। उन्होंने माना कि कुछ भाषायी संरचना बच्चे के मस्तिष्क पर पहले से ही अंकित होती है जिसके फलस्वरूप बच्चा भाषा का सही रूप बोल पाता है।
- इसके लिए उन्होंने बताया कि प्रत्येक बालक भाषा–अर्जन उपकरण यंत्र के साथ पैदा होता है जिस पर व्याकरणीय संरचना और भाषा के मुख्य सिद्धान्त का एक प्रकार से अंकन रहता है।
- बच्चे को केवल नये शब्द संग्रह को सीखना होता है और उनको पहले से मस्तिष्क में मौजूद भाषायी यंत्र में ढालना होता है।
- चॉम्स्की का दृढ़ विश्वास था कि:
  - बच्चों में भाषा अर्जन क्षमता जन्मजात होती है।
  - बच्चे भाषा–अर्जन क्षमता के कारण ही भाषा सीखते हैं।
  - बच्चों में भाषा अर्जित करने की सहजात योग्यता होती है।
  - बच्चों की भाषा अर्जन क्षमता ही भाषा अधिग्रहण का आधार बनती है।
  - बच्चों में भाषाई विकास एक काल्पनिक भाषा अधिग्रहण उपकरण (Language Acquisition Device) द्वारा होता है।

वॉयगोत्सकी का बहुभाषिक दृष्टिकोण

- वॉयगोत्सकी एक रूसी मनोवैज्ञानिक थे।
- उन्होंने मानव के सांस्कृतिक तथा जैव–सामाजिक विकास का सिद्धान्त दिया साथ ही साथ उन्होंने भाषा सीखने–सिखाने के बहुभाषिक दृष्टिकोण के संबंध में बताया कि भाषा के विकास में संप्रेषण की एक बहुत ही महत्वपूर्ण भूमिका होती है।
- इस संप्रेषण के माध्यम से सामाजिक अंतः क्रिया द्वारा जो भाषा का विकास होता है और जिसमें मनुष्य एक दूसरे से अपने भाव एवं विचारों का सम्प्रेषण करता है।
- बहुभाषिक का अर्थ ऐसे व्यक्ति से है जो दो या दो से अधिक भाषाओं का प्रयोग करता है। अगर देखा जाए तो विश्व में बहुभाषी लोगों की संख्या एकभाषिक की तुलना में बहुत अधिक है।
- वॉयगोत्सकी के अनुसार सम्प्रेषण के उद्देश्य से सामाजिक अन्तःक्रिया के द्वारा भाषा का विकास होता है अर्थात् मनुष्य एक दूसरे से अपने भाव एवं विचारों का सम्प्रेषण करना चाहता है और उसके लिए समाज में मौजूद लोगों के साथ अंर्तक्रिया करता है और उसी के द्वारा मनुष्य के Interaction भाषा का विकास होता है।

- वॉयगोत्सकी ने दर्शनशास्त्र भाषाविज्ञान एवं साहित्य तथा मनोविज्ञान में कार्य किया ।
- भाषा के संबंध में उनका विचार था कि विचारों का विकास एवं भाषा के विकास में गहरा संबंध है।
- **''विचार एवं भाषा की उत्पत्ति''**
  - विचार की उत्पत्ति मनुष्य के मन में होती है। जिसके माध्यम से वह अपने भावों को व्यक्त करना चाहता है। यह एक तरह से अशाब्दिक होता है।
  - मनुष्य के जन्म के शुरूआती दौर मे जब वह दो वर्ष की अवस्था पर पहुंच जाता है तो उसे अपने विचारों को व्यक्त करने के लिए शब्द मिल जाते हैं। जिनकी सहायता से वह अपने विचारों को एक दूसरों तक पहुँचाने लगता है।
  - जहाँ तक भाषा के प्रयोग की बात है तो यह आरंभिक अवस्था में सामाजिक अंतः क्रिया के लिए होता है।
- **वॉयगोत्सकी ने भाषा को तीन प्रकार से विभेदीकरण किया है।**
  - सामाजिक वाक्
  - मूक अन्तः वाक्
  - निजी वाक्

6. भाषा अधिग्रहण की प्रक्रिया

भाषा सीखने की अवस्थाएँ

- भाषा सीखने के क्रम में बच्चे कुछ निश्चित अवस्थाओं (Stages) से होकर गुजरते हैं। ज्ञातव्य है कि भाषा सीखने की इन अवस्थाओं का क्रम तो समान होता है लेकिन यह कोई जरूरी नहीं कि इन अवस्थाओं से गुजरने की प्रत्येक बच्चे की आयु समान हो। यानी अलग–अलग बच्चे अलग–अलग आयु में इन अवस्थाओं से (इसी क्रम में) गुजर सकते हैं।

कूइंग

- 6 सप्ताह के आसपास बच्चे कूइंग और गूइंग शुरू कर देते हैं।
- आरम्भ में ये ध्वनियाँ स्वरों के गुच्छ जैसे–उउउउ, इइइइ की तरह लगती हैं।
- चार महीने के आसपास इन स्वर गुच्छों के आरम्भ में व्यंजन ध्वनियाँ जुड़ जाती हैं और वे बहुत हद तक कूऊऊऊ, गूऊऊऊ की तरह सुनायी देते हैं।

बैब्लिंग

- 6 महीने के आसपास जब बच्चे सामान्यतः बैठना शुरू कर देते हैं तब वे बैब्लिंग करने लगते हैं।
- इस अवस्था में वे कई प्रकार के स्वरों और व्यंजनों का उच्चारण करने लगते हैं जो कि एक व्यंजन और एक स्वर के गुच्छ के रूप में होते हैं। जैसे–गि–गि–गि, का–का–का, मामा–मा, पापा–पा, मि–मि–मि आदि। नौ से दस महीने के आसपास इस मिश्रण में परिवर्तन आने लगते हैं। जैसे–बाबा–गा–गा और यह आगे के महीनों में और जटिल होता जाता है। जैसे–मिम–मिम माइ–याआआआ।

एक शब्द की अवस्था

- एक वर्ष के आसपास बच्चे पहली बार ऐसे शब्द बोलते हैं जिन्हें पहचाना जा सकता है। इनमें से बहुत सारे शब्द ऐसे होते हैं जिन्हें वे अपने आसपास सुनते हैं जैसे–व्यक्तियों और वस्तुओं के नाम–मामा, पापा, भइया, दीदी, चिड़िया, गुड़िया आदि।
- इस अवस्था में वे ना, खतम और देदो जैसे शब्द भी बोलने लगते हैं। इस अवस्था को 'होलोफ्रेस्टिक अवस्था भी कहा जाता है क्योंकि इसमें एक शब्द का प्रयोग एक पूरे पद या वाक्य के रूप में किया जाता है। जैसे–बच्चा 'मुझे पानी चाहिए' के स्थान पर केवल मम मम (पानी) करता है।

दो शब्द की अवस्था

- डेढ़ साल की आयु तक बच्चे के पास सामान्यतः 50 शब्दों की एक सक्रिय शब्दावली हो जाती है और वह दो–दो शब्दों को एक साथ रखना शुरू कर देता है। जैसे–दूध नहीं, खाना नहीं, दूध खतम, बॉल देदो आदि। हालाँकि इन शब्दों के अर्थ 'एक शब्द की अवस्था' में प्रयुक्त शब्दों के अर्थ के समान ही हैं लेकिन बाद में इस अवस्था में बच्चा नये अर्थ वाले लगता है जैसे मम्मी खाना, जीजी मारा, घूमी जाना, पापा । फोन, दूदु पीना आदि।
- इस अवस्था में बच्चों की अभिव्यक्ति से उनकी घरेलू भाषा की वाक्य संरचना झलकने लगती है।

लम्बे कथन

- समय के साथ बच्चों के वाक्यों में शब्दों की संख्या बढ़ती जाती है और 2 से 4 साल के बीच वे बहुत सारे व्याकरणिक रूप भी सीख लेते हैं। दिलचस्प यह है कि अधिकांश बच्चे इन रूपों को मोटे तौर पर समान क्रम में सीखते हैं।

7. विभिन्न अवस्थाओं में भाषा विकास

शैशवावस्था में भाषा विकास

- जन्म के समय शिशु क्रन्दन करता है। यही उसकी पहली भाषा होती है। इस समय है उसे न तो स्वरों का ज्ञान होता है तथा न व्यंजनों का।
- 25 सप्ताह तक शिशु जिस तरह की ध्वनियाँ निकालता है, उनमें स्वरों की संख्या ज्यादा होती है।
- 10 मास की अवस्था में शिशु पहला शब्द बोलता है, जिसे बार–बार दोहराता है। एक वर्ष तक शिशु की भाषा समझना कठिन होता है। सिर्फ अनुमान से ही उसकी भाषा समझी जा सकती है।
- मेक–कॉर्थी ने 1950 में एक अध्ययन किया तथा यह निष्कर्ष निकाला कि 18 मास के बालक की भाषा 26% समझ में आती है। शुरू में बालक एक शब्द से वाक्यों का बोध कराते हैं।

सारणी : भाषा विकास की प्रगति

आयु	शब्द
जन्म से 8 मास	0
10 मास	1
1 वर्ष	3

1 वर्ष 3 मास	19
1 वर्ष 6 मास	22
1 वर्ष 7 मास	118
2 वर्ष	212
4 वर्ष	550
5 वर्ष	2072
6 वर्ष	2562

- शिशु की भाषा पर उसकी बुद्धि एवं विद्यालय का वातावरण अपनी भूमिका पेश करते हैं। एनास्टसी ने कहा है कि लड़कों की बजाय लड़कियों का भाषा–विकास शैशवकाल में ज्यादा होता है। जिन बच्चों में गूंगापन, हकलाना, तुतलाना आदि दोष होते हैं, उनका भाषा विकास धीमी गति से होता है।

बाल्यावस्था में भाषा विकास

- आयु के साथ–साथ बालकों के सीखने की गति में वृद्धि होती है। प्रत्येक क्रिया के साथ विस्तार में कमी होती है। बाल्यकाल में बालक, शब्द से लेकर वाक्य विन्यास तक की सभी क्रियाएँ सीख लेता है। हाइडर ने अध्ययन करके यह परिणाम निकाला कि–
  - लड़कियों की भाषा का विकास लड़कों की बजाय ज्यादा तेजी से होता है।
  - लड़कों की बजाय लड़कियों के वाक्यों में शब्द संख्या ज्यादा होती है।
  - अपनी बात को सही ढंग से पेश करने में लड़कियाँ ज्यादा तेज होती हैं।
- सीशोर ने बाल्यावस्था में भाषा विकास का अध्ययन किया। 4 से 10 वर्ष तक के 117 बालकों पर चित्रों की सहायता से उसने प्रयोग किये। उसके परिणामों का संकलन निम्न तालिकानुसार है–

सारणी : भाषा विकास की प्रगति

आयु (वर्ष में)	शब्द
4	5, 600
5	9, 600
6	14,700
7	21,200
8	26,309
10	34,300

किशोरावस्था में भाषा विकास

- किशोरावस्था में कई शारीरिक परिवर्तनों से जो संवेग पैदा होते हैं, भाषा का विकास भी उनसे प्रभावित होता है। किशोरों में साहित्य पढ़ने की रुचि पैदा हो जाती है। उनमें कल्पना शक्ति का विकास होने से वे कवि, कहानीकार, चित्रकार बनकर कविता, कहानी एवं चित्र के माध्यम से अपनी भावनाओं की अभिव्यक्ति करते हैं। किशोरावस्था में लिखे गये प्रेम–पत्रों की भाषा में भावुकता का मिश्रण होने से भाषा–सौन्दर्य प्रस्फुटित होता है। एक–एक शब्द अपने स्थान पर सार्थक होता है।

8. शब्द भंडार का विकास

बच्चे की उम्र के अनुसार शब्दावली

(Vocabulary According to the Age of Child)

जन्म से 8 महीने	0 शब्द
9 से 12 महीने	3 से 4 शब्द
डेढ़ साल तक	10 से 272 शब्द तक
ढाई साल तक	450 शब्द से 1 हजार शब्द तक
साढ़े तीन साल तक	1250 शब्द से 2100 शब्द तक
11 वर्ष तक	50,000 शब्द से 80,000 शब्द तक
16 साल से अधिक	1 मिलियन से अधिक शब्द

9. भाषा विकास के प्रभावी कारक

भाषा विकास अपने–आप में स्वतन्त्र रूप से विकसित नहीं होता। इस पर कई तरह के प्रभाव पड़ते हैं। शब्द भण्डार, वाक्य–विन्यास एवं अभिव्यक्ति के प्रसार आदि पर इन कारकों का प्रभाव पड़ता है

- **स्वास्थ्य–(स्मिथ के अनुसार)**–"लम्बी बीमारी (विशेष रूप से पहले दो वर्ष में) के कारण बालक भाषा विकास में दो मास हेतु पिछड़ जाते हैं।" इसका कारण है–भाषा की सम्पर्कजन्यता । सम्पर्क से भाषा सीखी जाती है तथा बीमारी के दौरान बालक समाज के सम्पर्क में कम रहता है, इसलिए इस स्थिति का प्रभाव बालक के भाषा विकास पर पड़ना स्वाभाविक है। यह भी देखा गया है कि कम सुनने वाले बालकों का भाषा विकास अवरुद्ध हो जाता है। ऐसे बालकों का शब्द भण्डार भी कम होता है। इसका कारण है–बालक भाषा को अनुकरण के माध्यम से सीखता है। स्वास्थ्य के ठीक न होने से उसे अनुकरण के अवसर नहीं मिलते ।
- **बुद्धि–(टर्मन के अनुसार)**–"बुद्धि एवं भाषा का घनिष्ठ संबंध होता है। भाषा के स्तर से ही बुद्धि का पता चलता है। यह बात बाल्यावस्था पर बालक के शब्द भण्डार में वृद्धि के कारण प्रकट होती रहती है।" अध्ययनों से पता चलता है कि पहले दो वर्षों में भाषा एवं वृद्धि का सह–संबंध अधिक होता है।
- **हकलाना**–हकलाना वाणी दोष है। मनोवैज्ञानिकों का विचार है कि हकलाना मानसिक अव्यवस्था के कारण होता है। बालक जब स्वाभाविक रूप से शब्दोच्चारण पर जोर नहीं देता, तब उच्चारण संबंधी तन्त्र को अधिक शक्ति लगानी पड़ती है। इसका परिणाम यह होता है कि श्वसन शक्ति की गति तीव्र हो जाती है, फेफड़ों में हवा नहीं रहती, ऐसी स्थिति में उच्चारण में दोष पैदा होता है, जो हकलाने के रूप में प्रकट होता है।
- ''हकलाना दो तरह का होता है–
  - **प्रारम्भिक हकलाना**–इस तरह की हकलाहट में बालक को पहला शब्द उच्चरित करने में कठिनाई अनुभव होती है।
  - **पुनर्वाद–व्यंजन अथवा हकलाहट**–इस तरह की हकलाहट में श्वसन तीव्रगति होने से वाक्य के मध्य में ही हकलाहट होने लगती है।
- **सामाजिक आर्थिक स्तर**–अनुसन्धानों से पता चला है कि जिन परिवारों का सामाजिक आर्थिक स्तर नीचा होता है, वहाँ पर बालकों की भाषा का विकास द्रुत गति से नहीं होता। इसका कारण है–निम्न सामाजिक, आर्थिक समूहों के बालकों में सीखने की गति का धीमा होना। व्यापारी वर्ग, श्रमिक वर्ग बुद्धिजीवी वर्ग के बच्चों की भाषा का अध्ययन करने से यह परिणाम निकाला गया है कि वर्गों के बालकों की शब्दावली तथा वाक्य

विन्यास आदि में भिन्नता पायी जाती है। उच्च वर्ग के बालकों के आपसी संबंध भी इसी तरह के लोगों में रहते हैं एवं वे सुसंस्कृत शब्दावली युक्त लोक–व्यवहार की भाषा बोलते हैं।

- **यौन–भिन्नता**–बच्चों की भाषा में प्रथम वर्ष में कोई अन्तर नहीं होता। लड़कियों की भाषा में यौन भिन्नता दो वर्ष की आयु के बाद शुरू हो जाती है।
- **पारिवारिक संबंध**–अनाथालयों, छात्रावासों एवं परिवारों में पले बच्चों के अध्ययन से पता चला कि भाषा सीखने और प्रभावित करने में पारिवारिक संबंधों का विशेष महत्व है। संस्थाओं के बच्चों का संवेगात्मक सम्पर्क परिवार के सदस्यों से नहीं हो पाता, अतः वे भाषा सीखने में देरी लगाते हैं। भाषा के सीखने में परिवार के आकार का भी महत्पूवर्ण स्थान है। बच्चे, बड़े, बालकों के सम्पर्क से भी भाषा का विकास करते हैं।

महत्वपूर्ण अभ्यास प्रश्न

1. किसी एक बच्चे द्वारा परिवार के सदस्यों की सहायता से सबसे पहले अर्जित की जाने वाली भाषा क्या कहलाती है?
(A) प्रथम भाषा
(B) द्वितीय भाषा
(C) क्षेत्रीय भाषा
(D) विदेशी भाषा

2. भाषा अधिगम और अर्जन के बारे में कौन सा सही नहीं है?
(A) यदि अवसर और परिवेश दिया जाए तो सभी बच्चे अनेक भाषाएँ सीख सकते हैं।
(B) प्रथम भाषा दूसरी भाषा के अधिगम में व्यवधान डालती है।
(C) भाषा अधिगम अर्थ से शुरू होना चाहिए और फिर उसके स्वरूप को समझने की बात होनी चाहिए।
(D) प्रथम भाषा द्वितीय भाषा के अधिगम को समर्थित करती है।

3. भाषा अधिगम के लिए अंतः क्रियात्मक आधारित कार्य कौन–सा है?
(A) शिक्षार्थी किसी विषय पर दो मिनट की एक्सटमपोर वाचन करते हैं।
(B) शिक्षार्थी किसी चित्र को देखकर मुखरित चिंतन करते हैं।
(C) शिक्षार्थी दिए गए विषय पर निबंध लिखते हैं।
(D) पठन सामग्री पढ़ने के बाद शिक्षार्थी समूह कार्य करते हैं।

4. निम्नलिखित में से कौन–सा प्रथम भाषा के अर्जन में महत्वपूर्ण कारक है?
(A) शिक्षक
(B) विद्यालय
(C) अवसरों की प्रकृति
(D) पहचान तथा प्रोत्साहन

5. भाषा अर्जन ..... है।
(A) सचेतन और सुचिंतित
(B) स्वाभाविक और सुचिंतित
(C) स्वाभाविक और अवचेतन
(D) भाषा प्रक्रमण

6. भाषा अर्जन होता है जब .....
(A) बच्चे को व्याकरण के नियम पढ़ाए जाते हैं।
(B) बच्चे को पुरस्कार या दंड दिया जाता है।
(C) बच्चे को भाषा के अवसर मिलते हैं।
(D) बच्चा बिना सचेतन ध्यान के भाषा ग्रहण करता है।

7. 'भाषा–अर्जन क्षमता–
(A) जन्मजात होती है (B) अर्जित की जाती है
(C) सीखी जाती है (D) सप्रयास होती है

8. निम्नलिखित में से कौन–सा भाषा–अर्जन के व्यवहारवादी सिद्धान्त से संबंधित नहीं है?
(A) सक्रिय अनुकूलन
(B) खाली बर्तन
(C) प्रयास तथा त्रुटि
(D) सामाजिक अंतःक्रिया

9. विद्यार्थी प्रथम भाषा सीखते हैं
(A) मैत्रीपूर्ण वातावरण में
(B) पढ़ाए जाने वाले वातावरण में
(C) औपचारिक वातावरण में
(D) प्राकृतिक वातावरण में

10. जब हम ..... के बारे में अध्ययन करते हैं तो भाषा अर्जन उपकरण शब्दावली से परिचय प्राप्त करते हैं।
(A) वायगोत्सकी (B) पैव्लॉव
(C) चॉम्सकी (D) पियाजे

11. भाषा अर्जन की अवस्थाओं के सही क्रम को चुनिए।
(A) बबलाना, किलकारी मारना (कूइंग), एक शब्दीय अवस्था, टेलीग्राफिक वाचन तथा दो शब्दों वाली अवस्था
(B) किलकारी मारना, बबलाना, किलकारी मारना, एक शब्दीय अवस्था, टेलीग्राफिक वाचन तथा दो शब्दों की अवस्था
(C) किलकारी मारना, बबलाना, किलकारी मारना, टेलीग्राफिक वाचन, एक शब्दीय अवस्था तथा दो शब्दों की अवस्था
(D) किलकारी मारना, बबलाना, किलकारी मारना, एक शब्दीय अवस्था, दो शब्दों की अवस्था तथा टेलीग्राफिक वाचन

12. प्रथम भाषा अर्जन के लिए कौन–सा सही है?
(A) यह प्राकृतिक रूप से अर्जित की जाती है।
(B) इसके लिए प्रशिक्षण की आवश्यकता है।
(C) इसके लिए औपचारिक निर्देश की आवश्यकता है।
(D) यह बच्चे के सचेत प्रयासों के पश्चात अर्जित होती है।

13. जब शिशु 2–3 महीनों की आयु में स्वर ध्वनियों को बोलने में सक्षम हो जाते हैं, उस अवस्था को क्या कहते हैं?
(A) बबलाना
(B) किलकना (कूइंग)
(C) एक शब्दीय बुदबुदाना
(D) रूप विधान (मॉर्फीम)

14. प्रथम भाषा अर्जन क्या है?
(A) शिक्षार्थी के सचेत प्रयास हैं।
(B) विद्यालय की प्रमुख गतिविधि है।
(C) प्रशिक्षण के द्वारा होती है।
(D) प्राकृतिक प्रक्रिया है।

15. निम्नलिखित से कौन–सा भाषा अधिगम के लिए एक आदर्श क्रियाकलाप की तरह अधिमान्य नहीं है?
(A) प्रासंगिक कार्यों में उद्देश्यों के लिए लिखना।
(B) व्याकरणिक रूप एवं प्रतिमानों का अभ्यास करना (ड्रिलिंग)
(C) लेखों एवं वृत्तांतों में भाषा इकाई पर ध्यान देना।
(D) समझ के साथ पढ़ना न कि केवल मात्र लेख का कूटवाचन करना।

उत्तरमाला

1. (A) **2.** (B) **3.** (B) **4.** (C) **5.** (C)
6. (C) **7.** (A) **8.** (D) **9.** (D) **10.** (C)
11. (A) **12.** (A) **13.** (B) **14.** (D) **15.** (B)

Chapter

1

Reading Comprehension

(A) : Prose

Important Questions

Direction (Q. No. 1 to 9)

Read the passage given below and answer the questions that follow by choosing the correct/most appropriate options :

1. The telecommunication market is the second largest in the world. The subscriber base was 1.1 billion at the end of 2020. Strong consumer demand and favourable policies of the Indian government played an instrumental role in the growth of this industry. The first commercial mobile phone service in India was launched by Modi Group along with the Australian giant, Telstra. Because of the high call rates per minute, only the top income earners were able to use mobile phones back then. However, since the 1990s mobile communication has become more and more popular, and services provided went beyond just texting and calling.
2. With a variety of smartphones and Internet packages flooding the market mobile communication become an integral part of everyday life. The smartphone industry in India saw a steady growth over the years- around 42 percent of all Indian mobile subscribers owned at least one smartphone in 2020. Indeed this little device has seeped into the everyday life so much that Indians were spending more than three hours per day on their smartphones the same year. Early 2019 saw a growth of over 160% in app downloads compared to the previous two years.
3. Various operators have taken over the wireless market leading to a fierce competition for the leading position in the mobile service market. The leading private players such as Vodaphone, Reliance Jio and Airtel continuously strive for customer satisfaction and offer increasing gigabytes of data per day in addition to unlimited free calls. Simply to retain their customer base, initiatives such as 'Digital India' and 'Make in India' also provided huge employment opportunities in the mobile manufacturing industry in the country since 2014.
4. By 2024 and by the end of 2027 percentage of mobile subscription would be with 5G technology and with an estimation of around 343 million subscriptions.

1. Choose the correct option :
The phenomenal increase in the growth of telecommunication market was owing to :
(a) low mobile call rates.
(b) radical reforms in telecommunication industry.
(c) sophisticated technology.
(d) strong consumer demand.
(A) (a) and (b) (B) (a) and (c)
(C) (c) and (d) (D) (a) and (d)

2. Which of the following statements is **not true** according to the passage ?
(A) Mobile communication has become an integral part of everyday life.
(B) The first commercial mobile was launched by Modi Group and Telstra.
(C) High call rates restricted the use of smartphone to the rich.
(D) The term 'traditional services' refers to texting and calling.

3. Select the correct option :
(A) Telstra is an American telecom giant.
(B) Indians have been using the mobile phone since 1985
(C) A variety of smartphones and Internet packages are flooding the market.
(D) Indian telecom industry is doing better than the U. S. in terms of popularity

4. The term 'gigabytes' refers to :
(A) malware
(B) phishing
(C) storage capacity
(D) speed

5. The purpose of the author of the report is to :
(A) highlight the problems faced by the telecom industry.
(B) advise the telecom players how to improve their services.
(C) trace the growth of the telecom industry
(D) encourage investors to invest in the fast growing telecom industry.

6. Which of the following words is similar in meaning to the word, 'launched' as used in para 1 of the passage?
(A) hurled
(B) introduced
(C) popularised
(D) familiarised

7. Which of the following words is most opposite in meaning to the word, 'steady' in para 2 of the passage?
(A) erratic
(B) unstable
(C) difficult
(D) disappointing

8. Which part of speech is the underlined word in the following sentence?
There is a <u>fierce</u> competition in the telecommunication industry.
(A) Noun
(B) Adverb
(C) Adjective
(D) Pronoun

9. Which part of the following sentence contains an error?
<u>If it will rain</u> (a) <u>in time</u> (b)
<u>the farmers will have</u> (c) <u>a good crop</u> (d)
(A) (d) (B) (c)
(C) (a) (D) (b)

Direction (Q. No. 10 to 18)

Read the passage given below and answer the questions that follow :

The future of water will be a gamble-resting entirely on the way we decide to play the game here. Either we continue to use water irresponsibly, threatening the very existence of this planet, or we adopt sustainable and smart water management practices to build a water secure future.

By 2050, India's total water demand will increase by 32 percent from now. Industrial and domestic sectors will account for 85 percent of the additional demand. Over-exploitation of ground-water, failure to recharge acquifers and reduction in catchment capacities due to uncontrolled urbanisation are all causes of the precarious tilt in the water balance.

If the present rate of groundwater persists, India will have only 22 percent of the present daily per capita water available in 2050, possibly forcing the country to import its water.

Optimists believe that India's people some 1.7 billion by 2050, will have integrated water efficient practices into their daily lives. If the ambitious water sustainability goals set by global industries and governments are testament we dare say that the world has begun to recognize water as a resource after all.

While beverages giants are focussed on returning water to the communities where they manufacture their drinks, food processing players are engaging with farmers and upstream actors to minimise water usage across the supply claim and textile houses are evangelising the concept of sustainable fashion. Companies have realised the risks emanating from the possibility of a water-scarce future. This has triggered companies to re-engineer processes, implement water optimizing, technologies, establish water audit standards, and use a collaborative approach to deal with the water crisis.

10. The problem of acute water scarcity in future cannot be dealt with by companies through :
(A) implementing water optimizing technologies
(B) discovering a viable substitute for water.
(C) re-engineering processes
(D) establishing water audit standards.

11. Which one of the following words is most similar in meaning to the word 'threatening' as used in the passage ?
(A) menacing (B) coercing
(C) persisting (D) frightening

12. Which one of the following words is most opposite to the meaning of the word 'increase' as used in the passage ?
(A) perceive (B) achieve
(C) relieve (D) decrease

13. Identify the clause in the underlined part of the following sentence :
He breathed his last in the village <u>where he was born</u>.
(A) Adjective clause
(B) Adverb clause
(C) Principal clause
(D) Noun clause

14. What part of speech is the underlined word in the following sentence ?
I do not know <u>why</u> he is so curious about it.
(A) Noun clause
(B) Principal clause
(C) Adverb clause
(D) Adjective clause

15. We will face a severe water-scarcity problem in future mostly because :
(A) water is not a renewable source.
(B) by 2050, demand for water will increase considerably.
(C) we do not use water responsibly.
(D) ground-water level water is steadily decreasing.

16. Which of the following will NOT lead to a severe water imbalance ?
(A) over-exploitation of water.
(B) failure to recharge acquifers.
(C) uncontrolled urbanisation.
(D) flawless water infrastructure.

17. Persistent ground water depletion will NOT necessitate :
(A) shutting down of industries
(B) adoption of smart water management technologies
(C) using water judiciously
(D) import of water

18. Optimists cannot pin their hope for better water management on :
(A) reducing demand for water by using new technologies.
(B) discovering new ways of augmenting water supply
(C) treating sea water for domestic and industrial sectors
(D) integrating water efficient practices into daily use.

Direction (Q. No. 19 to 27)

Read the passage given below and answer the questions that follow, by selecting the correct/ most appropriate options :

1. Each drop represents a little bit of creation and of life itself. When the monsoon brings to northern India the first rains of summer, the parched earth opens its pores and quenches its thirst with a hiss of ecstasy. After baking in the sun for the last few months, the land looks cracked, dusty and tired. Now, almost overnight, new grass springs up, there is renewal everywhere, and the damp earth releases a fragrance sweeter than any devised by man.

2. Water brings joy to earth, grass, leaf-bud, blossom, insect, bird, animal and the pounding heart of man. Small children run out of their homes to romp naked in the rain. Buffaloes, which have spent the summer listlessly around lakes gone dry, now plunge into a heaven of muddy water. Soon the lakes and rivers will overflow with the mansoon's generosity. Trekking in the Himalayan foothills, I recently walked for kilometres without encountering habitation. I was just scolding myself for not having brought along a water-bottle, when I came across a patch of green on a rock face. I parted a curtain of tender maiden hair fern and discovered a tiny spring issuing from the rock-nectar for the thirsty traveller.

3. I stayed there for hours, watching the water descend, drop by drop, into a tiny casement in the rocks. Each drop reflected creation. That same spring, I later discovered, joined other springs to form a swift, tumbling stream, which went cascading down the hill into other streams until, in the plains, it became part of the river. And that river flowed into another mightier river that kilometres later emptied into the ocean. Be like water, taught Laotzu, philosopher and founder of Taoism. Soft and limpid, it finds its way through, over or under any obstacle. It does not quarrel; it simply moves on.

19. Which part of the following sentence contains an error ?

He knew	that he will
(a)	(b)
go back	on his promise
(c)	(d)

(A) (d) (B) (a)
(C) (b) (D) (c)

20. Which of the following statements is not true ?
(A) The damp earth releases a sweet fragrance.
(B) There is renewal everywhere.
(C) New grasses spring up.
(D) The sweltering heat comes to an end.

21. The earth does not look ..... before the onset of the monsoon.
(A) tired (B) cracked
(C) brown (D) dusty

22. Children respond to the first rains of summer by :
(A) singing songs.
(B) giving shouts of joy.
(C) floating paper boats in water
(D) running and playing in the rain

23. The tiny spring issuing from the rock is hidden by :

(A) tall grass
(B) thick moss
(C) maiden hair fern
(D) bushes and creepers

24. To become part of a river, a tiny drop has to :
(A) merge its identity.
(B) have lot of strength.
(C) depend on external forces.
(D) suffer a lot

25. Which of the following words is most similar in meaning to the word 'pounding' as used in para 2 of the passage ?
(A) sinking (B) shaking
(C) benumbing (D) palpitating

26. Which one of the following words is most opposite in meaning to the word 'descend' (para 3) as used in the passage ?
(A) zoom (B) flow
(C) ascend (D) hover

27. Which part of speech is the underlined word in the following sentence ?
Almost overnight new grass spring up.
(A) Adverb (B) Preposition
(C) Pronoun (D) Adjective

Direction (Q. No. 28 to 36)

Read the passage given below and answer the questions that follow :

The future of water will be a gamble-resting entirely on the way we decide to play the game here. Either we continue to use water irresponsibly, threatening the very existence of this planet, or we adopt sustainable and smart water management practices to build a water secure future.

By 2050, India's total water demand will increase by 32 percent from now. Industrial and domestic sectors will account for 85 percent of the additional demand. Over-exploitation of ground-water, failure to recharge acquifers and reduction in catchment capacities due to uncontrolled urbanisation are all causes of the precarious tilt in the water balance.

If the present rate of groundwater persists, India will have only 22 percent of the present daily per capita water available in 2050, possibly forcing the country to import its water.

Optimists believe that India's people some 1.7 billion by 2050, will have integrated water efficient practices into their daily lives. If the ambitious water sustainability goals set by global industries and governments are testament we dare say that the world has begun to recognize water as a resource after all.

While beverages giants are focussed on returning water to the communities where they manufacture their drinks, food processing players are engaging with farmers and upstream actors to minimise water usage across the supply claim and textile houses are evangelising the concept of sustainable fashion. Companies have realised the risks emanating from the possibility of a water-scarce future. This has triggered companies to re-engineer processes, implement water optimizing, technologies, establish water audit standards, and use a collaborative approach to deal with the water crisis.

28. The problem of acute water scarcity in future cannot be dealt with by companies through :
(A) implementing water optimizing technologies
(B) discovering a viable substitute for water.
(C) re-engineering processes
(D) establishing water audit standards.

29. Which one of the following words is most similar in meaning to the word 'threatening' as used in the passage ?
(A) menacing (B) coercing
(C) persisting (D) frightening

30. Which one of the following words is most opposite to the meaning of the word 'increase' as used in the passage ?
(A) perceive (B) achieve
(C) relieve (D) decrease

31. Identify the clause in the underlined part of the following sentence :
He breathed his last in the village where he was born.
(A) Adjective clause
(B) Adverb clause
(C) Principal clause
(D) Noun clause

32. What part of speech is the underlined word in the following sentence ?
I do not know why he is so curious about it.
(A) Noun clause
(B) Principal clause
(C) Adverb clause
(D) Adjective clause

33. We will face a severe water-scarcity problem in future mostly because :
(A) water is not a renewable source.
(B) by 2050, demand for water will increase considerably.
(C) we do not use water responsibly.
(D) ground-water level water is steadily decreasing.

34. Which of the following will NOT lead to a severe water imbalance ?
(A) over-exploitation of water.
(B) failure to recharge acquifers.
(C) uncontrolled urbanisation.
(D) flawless water infrastructure.

35. Persistent ground water depletion will NOT necessitate :
(A) shutting down of industries
(B) adoption of smart water management technologies
(C) using water judiciously
(D) import of water

36. Optimists cannot pin their hope for better water management on :
(A) reducing demand for water by using new technologies.
(B) discovering new ways of augmenting water supply
(C) treating sea water for domestic and industrial sectors
(D) integrating water efficient practices into daily use.

Direction (Q. No. 37 to 43)

Read the passage given below and answer the questions that follow by choosing correct/most appropriate option :

1. There is consistent, strong evidence to prove that the SARS CoV-2 virus, behind the COVID-19 pandemic, is predominantly transmitted through air, according to a new assessment published on Friday in The Lancet journal. The analysis by six experts from the UK, the US and Canada says public health measures to fail to treat the virus as predominantly the airborne route leaves the people unprotected and allows the virus to spread. Although some studies in the past have suggested that COVID-19 may spread through air, overall scientific literature on the subject has been inconclusive. In July last year, over 200 scientists from 32 nations wrote to WHO, saying there is evidence that the Corona virus is airborne, and even smaller particles can infect people. "The evidence supporting airborne transmission is overwhelming, and evidence supporting large droplet transmission is almost non-existent", said Jose-Luis Jimenez, from the University of Colorado Boulder in the US. "It is urgent that the World Health Organization and other public health agencies adapt their description of transmission to the scientific evidence so that the focus of mitigation is put on reducing airborne transmission," Jimenez said. Studies have confirmed these events cannot be adequately explained by close contact or touching shared surfaces or objects, the researchers said in their assessment.

2. They noted the transmission rates of SARS-CoV-2 are much higher indoors than outdoors, and transmission is greatly reduced by indoor ventilation. The term cited previous studies estimating that silent- asymptomatic or pre-symptomatic transmission of SARS-CoV-2 from people who are not coughing or sneezing accounts for at least 40 percent of all transmission.

37. Which of the following statements is not true about the transmission of SARS-CoV-2?
(A) It is transmitted through air.
(B) Transmission rates of the disease are much higher indoors than outdoors.
(C) It is not transmitted via close contact or touching shared surfaces or objects.
(D) It could be transmitted through asymptomatic patients to a healthy person.

38. According to experts from the UK, the US and Canada the SARS-CoV-2 virus.
(A) spreads through human contact.
(B) affects the elderly the most.
(C) proves fatal to people with weak immune system
(D) the airborne route leaves people unprotected.

39. What, according to Jimenez, should WHO and other public health organisations do to effectively deal with the problem?
(A) To find a scientific cure for permanent extinction of the virus.
(B) To find scientific ways to reduce the airborne transmission
(C) Issue guidelines regarding Covid-19 protocol and make them mandatory for all.
(D) To adapt their description of transmission to scientific evidence to reduce airborne transmission.

40. Choose the correct option to fill in the blank in the following sentence :
..... was the first to establish the fact that Covid-19 pandemic prominently spreads through air.
(A) World Health Organisation
(B) Jose-Luis Jimenez
(C) Research studies
(D) Lancet Journal

41. Which of the following words has the same meaning as the word, 'overwhelming' as used in paragraph 1 of the passage?
(A) strong (B) transparent
(C) clear (D) close

42. Which of the following words is opposite in meaning to the word, 'consistent' as used in para 1 of the passage?
(A) excellent (B) dependable
(C) marvellous (D) astonishing

43. Which part of the following sentences contains an error?
He asked him (a) why was he reluctant (b)
to accept (c) such a good offer (d)
(A) (a) (B) (d)
(C) (b) (D) (c)

Direction (Q. No. 44 to 50)
Read the passage given below and answer the questions by choosing the correct/most appropriate options.

Over the last few years, e-commerce has become an indispensable part of the global retail framework. Like many other industries, the retail landscape has undergone a substantial transformation following the advent of the Internet, and thanks to the ongoing digitalization of modern life, consumers from virtually every country now profit from the perks of online transactions. As Internet access and adoption are rapidly increasing around the globe, the number of digital buyers worldwide keeps climbing every year. According to the latest calculations, e-commerce growth will accelerate even further in the future.

Internet users can choose from various online platforms to browse, compare, and purchase the items or services they need.

While some websites specifically target B2B (business-to business) clients, individual consumers are also presented with a vast number of digital possibilities. As of 2020, online market places account for the largest share of online purchase worldwide. Leading the global ranking of online retail websites in terms of traffic is Amazon. In terms of gross merchandise value (GMV), Amazon ranks third behind Chinese competitors Taobao and Tmall. Both platforms are operated by the Alibaba Group, the leading online commerce provider in Asia. One of the most visible trends in the world of e-commerce is the unprecedented usage of mobile devices. As the adoption of mobile devices is progressing at a rapid pace, especially in regions that lack other digital infrastructure, mobile integration will continue to shape the shopping experience of the future. M commerce is particularly popular across Asia, with South Korea generating up to 65 per cent of their total online transaction volume via mobile traffic.

44. Read the following statements :
(a) E-commerce growth has reached its saturation point.
(b) Consumers from a few countries stand to gain from the perks of online transactions.
(A) (a) is true and (b) is false.
(B) (b) is true and (a) is false.
(C) Both (a) and (b) are false.
(D) Both (a) and (b) are true.

45. Which of the following is not true according to the passage?
(A) The traditional modes of doing business have become a matter of the past.
(B) Amazon leads the global ranking of online retail websites in terms of traffic.
(C) The arrival of computer has revolutionised the methods of doing business.
(D) The number of digital buyers keeps climbing every two years.

46. The retail landscape has undergone a substantial change because :
(A) every consumer in the world is using the digital mode.
(B) most consumers are techno savvy.
(C) governments all over the world are trying to popularise e-commerce.
(D) the arrival of computer has revolutionised the methods of doing business.

47. What accounts for the increasing popularity of mobile devices in certain regions of the world?
(A) Ease of use
(B) Lack of other digital infrastructure
(C) Low cost of mobile devices
(D) Incentives by mobile phone manufacturers.

48. Which of the following is not supported by evidence in the passage?
(A) Amazon ranks third in terms of gross merchandise.
(B) Taobao is operated by Amazon.
(C) Tmall is trying hard to compete with Amazon.
(D) Alibaba group is the leading commerce provider in both Europe and Asia.

49. Which of the following words is nearest in meaning to the word 'advent' as used in the passage ?
(A) departure (B) arrival
(C) postponement (D) engagement

50. Which part of speech is the underlined word in the following sentence?
Internet users can choose <u>from</u> various online platforms.

(A) Pronoun (B) Conjunction
(C) Preposition (D) Noun

Direction (Q. No. 51 to 58)

Read the passage given below and answer the question that follow selecting the correct/ most appropriate options.

Loss of Learning During the Pandemic (extract)

School closure due to the COVID-19 pandemic has led to complete disconnect from education for the vast majority of children or inadequate alternatives like community based classes or poor alternatives in the form of online education, including mobile phone-based learning. One complete academic year has elapsed in this manner, with almost no or little curricular learning in the current class. But this is only one kind of loss of learning. Equally alarming is the widespread phenomenon of 'forgetting' by students of learning from the previous class– this is regression in their curricular learning. This includes losing foundational abilities such as reading with understanding and performing addition and multiplication, which they had learnt earlier and become proficient in, and which are the basis of further learning. These foundational abilities are such that their absence will impact not only learning of more complex abilities but also conceptual understanding across subjects. Thus, this overall loss of learning-loss (regression or forgetting) of what children had learnt in the previous class as well as what they did not get an opportunity to learn in the present class –is going to lead to acumulative loss over the years, impacting not only the academic performance of children in their school years but also their adult lives. To ensure that this does not happen, multiple strategies must be adopted with rigorous implementation to compensate for this overall loss of learning when schools reopen.

This study, undertaken in January 2021, reveals the extent and nature of the'forgetting/ regression' kind of learning loss (*i.e.* what was learnt earlier but has been now lost) among children in public schools across primary classes because of school closure during the COVID-19 pandemic. The study covered 16067 children in 1137 public schools in 44 districts across 5 states. It focused on the assessment of four specific abilities each in language and mathematics, across classes 2-6.

These four specific abilities for each grade were chosen because these are among the abilities for all subsequent learning–across subjects–and so the loss of any one of these would have very serious consequence on all further learning.

An assessment of the learning levels of children when schools closed as well of their current status were necessary to understand any such regression. The former was best done through teachers who have been deeply engaged with their learners, and thus had a reliable assessment of children's abilities, when schools closed in March 2020. Therefore, this baseline assessment of children's learning levels, *i.e.* where they were assessed on specific abilities in language and mathematics when school closed, was done based on a comprehensive analysis by the relevant teachers, aided by appropriate assessment tools. All abilities associated with the previous class were not assessed; a few abilities critical for further learning were carefully identified and assessed. These are referred to as specific abilities in the document. 'End-line' was the assessment of the same children's proficiency on these very same abilities in January 2021, which was done by administering oral and written tests.

51. Pick the correct option to justify :

Assertion (A) : School closure due to the COVID-19 pandemic has led to complete disconnect from education.

Reasoning (R) : Vast majority of the children are being taught through community-based classes, inadequate online or phone-based classes.

(A) A is true and R is false
(B) A is false and R is true
(C) Both A and R are true and R is the correct explanation for A
(D) Both A and R are true and R is not the correct explanation of A

52. Given below are 4 real life situation pertaining to school education. Which of the following option is correct :

(a) COVID-19 Pandemic has led to complete school closure.
(b) One complete academic year has been totally Lost.
(c) Little or almost no curricular learning has taken place.
(d) Widespread "forgetting" of learning from previous class.

(A) (a) & (b) (B) (c) & (d)
(C) (a) & (c) (D) (b) & (d)

53. Pick the option which best gives the meaning of the word 'pandemic' as used in the passage.

(A) widespread disease.
(B) a chronic disease.
(C) a disease confined to one region.
(D) a disease that has spread all over the world.

54. Study the following statements :

(a) School closure had led to forgetting by students of what they had learnt in the previous year.
(b) Lack of foundational abilities will impact further learning.

(A) (a) is right and (b) is wrong.
(B) (b) is right and (a) is wrong.
(C) Both (a) and (b) are right.
(D) Both (a) and (b) are wrong.

55. Pick the correct option to justify/show how loss of learning can be remedied.

Assertion (A) : It can be ensured that learning loss does not happen.

Reason (R) : However, rigorous implementation of multiple strategies have to be used for maintain curricular achievement.

(A) A is true but R is false
(B) Both A and R are false butRis the correct explanation of A
(C) Both A and R are true and R is the correct explanation of A
(D) A is false but R is true

56. Pick the right option to show how a baseline tool can be made to make a comprehensive assessment.

(a) Assess all grade level competencies included in curriculum.
(b) Assess skills/abilities that lead to future complex learning in language and maths.
(c) Assess all advanced concepts and skills in all subjects.
(d) Assess core language skills and foundational maths operations and numericals.

(A) (a) & (b)
(B) (a) & (c)
(C) (b) & (d)
(D) (c) & (b)

57. Pick the option which is opposite in meaning to the word "proficiency" used in the passage.

(A) advanced abilities
(B) inadequacy
(C) competence
(D) incompetence

58. 'in the <u>form</u> of .....

The underline word is a :

(A) Noun (B) Pronoun
(C) Adjective (D) Adverb

Direction (Q. No. 59 to 66)

Read the passage given below and answer the questions that follow by selecting the correct/ most appropriate options :

As science progresses, superstitions ought to grow less. On the whole, that is true. However, it is surprising how superstitions linger on. If we are tempted to look down on savage tribes for holding such ideas, we should remember that even today, among most civilised nations,

a great many equally stupid superstitions exist and are believed in by a great many people.

Some people will not sit down thirteen at a table; or will not like to start anything important on a Friday; or refuse to walk under a ladder. Many people buy charms and talismans because they think they will bring them luck. Even in civilised nations today, many laws are made on the basis of principles which are just as much unproved. For instance, it is often held as a principle that white people are by nature superior to people of other colours. The ancient Greeks believed that they were superior to the people of Northern and Western Europe. The only way to see if there is anything in such a principle is to make scientific studies of a number of white and black and brown people under different conditions of life and find out just what they can and cannot achieve.

If is, however, true that the increase of scientific knowledge does reduce superstition and also baselesss guessing and useless arguments and practices. Civilised people do not argue and get angry about what water is composed of. The composition of water is known, and there is no argument about it.

59. Who believe in superstitions ?
(A) Only some civilised nations.
(B) Only some tribals.
(C) All tribals and some civilized nations.
(D) All civilised nations.

60. Study the following statements.
(a) Ancient Greeks were superior to other European nations.
(b) Science helps us fight superstitions.
(A) (a) is wrong and (b) is right.
(B) Both (a) and (b) are right.
(C) Both (a) and (b) are wrong.
(D) (a) is right and (b) is wrong.

61. Which part of speech is the underlined word in the following sentence ?
On the whole <u>that</u> is true.
(A) Pronoun (B) Conjunction
(C) Preposition (D) Determiner

62. Identify the part of speech of the underlined word in the following sentence.
It is <u>often</u> held that as a principle.
(A) Adverb (B) Adjective
(C) Preposition (D) Pronoun

63. Fill in the blank in the following setence.
.....is opposite in meaning to the word, 'superior'.
(A) Prior (B) Inferior
(C) Lower (D) Higher

64. The statement which best sums up the passage is :
(A) Irrational beliefs decline with the advancement of science.
(B) Civilized nations are no less superstitions than the savage tribes.
(C) We are very different from the savage nations in our beliefs.
(D) Superstitions disappear with the advancement of science.

65. We should not despise the savage tribes because :
(A) they indulge in useless arguments.
(B) the have stopped being superstitious.
(C) we are no less superstitions than they are.
(D) they do not believe in science.

66. Which of the following has a scientific basis for it ?
(A) Number thirteen is inauspicious.
(B) Talismans and charms always bring luck.
(C) Fridays are as good as other days.
(D) We should not walk under a ladder.

(B) : Poetry

Direction (Q. No. 67 to 72)
Read the poem given below and answer the questions that follow by choosing the correct/most appropriate options :

Behold her, single in the field,
Yon solitary Highland Lass!
Reaping and singing by herself;
Stop here, or gently pass!
Alone she cuts and binds the grain,
And sings a melancholy strain;
O listen! For the Vale profound
Is overflowing with the sound.
No Nightingale did ever chaunt
More welcome notes to weary bands
Of travellers in some shady haunt,
Among Arabian sands:
A voice so thrilling ne'er was heard
In spring-time from the Cuckoo-bird,
Breaking the silence of the seas
Among the farthest Hebrides.
Will no one tell me what she sings?-
Perhaps the plaintive numbers flow
For old, unhappy, far-off things,
And battles long ago :
Or is it some more humble lay,
Familiar matter of to-day?
Some natural sorrow, loss or pain,
That has been, and may be again?

67. The poem suggests that
(A) The song the girl is singing is meant for others.
(B) The poet is greatly moved by the song.
(C) The song that the girl is singing is one of ecstasy.
(D) The theme of the song concerns familiar matters of today.

68. The song is addressed to
(A) the travellers who pass by her.
(B) herself.
(C) the vale around her.
(D) the poet.

69. The phrase 'a melancholy strain' means
(A) a playful song
(B) a lilting song
(C) a sad song
(D) a mysterious song

70. The tone of the poem is :
(A) cheerful (B) passionate
(C) loud (D) sad

71. Which figure of speech is used in 'Among Arabian sands.'
(A) Metaphor (B) Metonymy
(C) Personification (D) Alliteration

72. Which figure of speech has been used in the lines :
"Breaking the silence of the seas
Among the farthest it Hebrides"
(A) Metaphor (B) Simile
(C) Personification (D) Assonance

Direction (Q. No. 73 to 78)
Read the poem given below and answer the questions that follow by choosing the best/ appropriate options :

The crucified planet Earth
Should it find a voice
and a sense of irony,
might now well say
of our abuse of it,
"Forgive them Father,
They know not what they do"
The irony would be that we know what
we are doing.
When the last living thing
has died on account of us,
how poetical it would be
If Earth could say,
in a voice floating up
perhaps
from the floor
of the Grand Canyon
"It is done"
People did not like it here.

73. Who is the speaker of the line, "Forgive them, Father, they know not what they do"in the above poem?
(A) The Earth (B) People
(C) The heavens (D) The planets

74. Identify and name the figure of speech used in'Crucified Earth'?
(A) Personification (B) Conceit
(C) Allegory (D) Paradox

75. A sense of destructive fear pervades the poem. What prompts the poet to signal this note on apocalypse?
(A) People did not like being on Earth.
(B) Earth itself no longer welcomes humans.
(C) God did not grant them forgiveness.
(D) Man has recklessly ruined and exploited nature.

76. Which of the following is not true according in the extract?
(A) We do not know what we are doing.
(B) We are destroying what sustains us.
(C) We are waiting for a saviour.
(D) We are too naïve to understand the implications of our actions.

77. "People did not like it here" is an example of :
(A) hyperbole (B) sarcasm
(C) paradox (D) metonymy

78. According to the poet, if the Earth is given a chance for any utterance, what would it say to God?
(A) Stop the extinction of mankind.
(B) Forgive the wrongful deeds of men.
(C) Fix responsibility for the mindless destruction of the Earth.
(D) Give people the strength to resist temptation.

Direction (Q. No. 74 to 84)

Read the poem given below and answer the questions by choosing the correct/most appropriate options :

Boats sail on the rivers,
And ships sail on the seas;
But clouds that sail across the sky
Are prettier than these.
There are bridges on the rivers,
As pretty as you please;
But the bow that bridges heaven,
And overtops the tree,
And builds a road from earth to sky,
Is prettier far than these.

79. The main idea in the poem, 'Rainbow' is that :
(A) rainbow are extremely beautiful.
(B) man-made things have a beauty of their own.
(C) God-made things are more beautiful than man-made things.
(D) both rainbows and ships are a source of joy.

80. The prominent literary device used by the poet in this poem is :
(A) repetition (B) assonance
(C) synechdoche (D) metonymy

81. In the second half of the poem, the poet compares a bridge to :
(A) heaven (B) a rainbow
(C) a river (D) a road

82. The literary device used in the lines "And ships sail on the sea" is :
(A) alliteration (B) metaphor
(C) simile (D) hyperbole

83. Which of the following underscores the symbolic significance of the rainbow?
(A) The rainbow is more beautiful than boats and ships.
(B) It has a transitory existence.
(C) Its beauty has a bewitching effect on man.
(D) It links the earth with heaven.

84. The poet thinks of the rainbow
(A) as a kind of road to happiness
(B) as a kind of road to heaven
(C) as a kind of road to salvation
(D) as a kind of road to the sky

Direction (Q. No. 85 to 90)

Read the poem given below and answer the questions/complete the statements that follow by choosing the appropriate options from the given ones.

My mistress bent that brow of hers;
Those deep dark eyes where pride demurs
When pity would be softening though,
Fixed me a breathing while or twos
With life or death in the balance right!
The blood replenished me again;
My last thought was at least not vain :
Iand my mistress, side by side
Shall be together, breathe and ride,
So, one day more am I deified,
Who knows next but the world may end to-night?

85. Study the following statements :
(a) The lover's fate hangs in balance
(b) The beloved is easily persuaded
(c) Her pride stands in the way of her lover's success
(d) There is a conflict between pride and pity
(A) (a) and (b) are both correct
(B) (b) and (c) are both correct
(C) (c) and (d) are both correct
(D) (a) and (b) are both wrong

86. Study the following statements :
(A) The poet is a dejected lover
(B) He loses heart very soon
(C) He knows that ultimately he will win her love
(D) His request is a matter of life and death for him

87. What was the poet's last thought?
(A) his request for a ride together
(B) that his beloved would accept his love
(C) that she would raise her beautiful brow
(D) that his breathing would start again

88. 'Am I deified' the figure of speech used in the expressions is :
(A) Simile (B) Metaphor
(C) Personification (D) Imagery

89. 'with life and death in the balance' the figure of speech in the expression is :
(A) Simile (B) Metaphor
(C) Hyperbole (D) Personification

90. Study the following statements :
(a) At the end the lover feels that he is in Heaven.
(b) At least his one request has been granted.
(A) (a) is right and (b) is wrong
(B) (b) is right and (a) is wrong
(C) Both (a) and (b) are right
(D) Both (a) and (b) are wrong

Direction (Q. No. 91 to 96)

Read the following stanza and answer the questions/complete the statements by choosing the best options from the ones that follow :

Strange fits of passion have I known
And I will dare to tell.
But in the lover's ear alone.
What once to me be fell
When she I loved looked every day
Fresh as a rose in June
I to her cottage beat my way
Beneath an evening moon.
Upon the moon I fixed my eye.
All over the wide lea.
With quickening pace
My horse drew nigh.
Those path so dear to me.

91. 'Strange fits of passion' means
(A) strange fantasies
(B) strange fears that plague the mind

(C) strange anecdotes
(D) strange dreams

92. 'evening moon' here symbolises :
(A) night time (B) romanticism
(C) fear of death (D) bright future

93. 'Lea' (line 11) means :
(A) waste land (B) open grass land
(C) fertile land (D) desert area

94. Which figure of speech is used by the poet in the line 'Fresh as a rose in June'?
(A) Metaphor (B) Hyperbole
(C) Simile (D) Onomatopoeia

95. 'With quickening pace'
The underlined word is a/an.....
(A) Noun (B) Verb
(C) Adjective (D) Adverb

96. What is the structure of the poem?
(A) Sonnet (B) Blank verse
(C) Free verse (D) Lyric

Direction (Q. No. 92 to 102)

Read the poem given below and answer the questions that follow by selecting the correct/ most appropriate options :

I think that I shall never see
A poem lovely as a tree.
A tree whose hungry mouth is prest
Against the earth's sweet flowing breast;
A tree that looks at God all day,
And lifts her leafy arms to pray;
A tree that may in Summer wear
A nest of robins in her hairs;
Upon whose bosom snow has lain;
Who intimately lives with rain.
Poems are made by fools like me,
But only God can make a tree.

97. Identify and name the figure of speech used in 'Poems are made by fools like me'.
(A) Hyperbole
(B) Metaphor
(C) Personification
(D) Simile

98. The word, 'mouth' in line 3 refers to the ..... of the tree.
(A) roots (B) crown
(C) branches (D) trunk

99. The tree passes its mouth against the sweet earth's flowing breast to
(A) express its love for it.
(B) express its gratitude to it.
(C) draw sustenance from it.
(D) draw inspiration from it.

100. The tree prays to God by
(A) providing shade to travellers.
(B) swinging its branches.
(C) lifting her arms.
(D) producing fruit and flowers.

101. Which of the following statements is not true in the context of the poem ?
(A) It lives closely with rain
(B) The tree welcomes the snow on its bosom.
(C) The tree symbolizes strength and stability
(D) The tree allows birds to build their nests in it.

102. Name the figure of speech used in lines 3 and 4.
(A) Alliteration (B) Simile
(C) Personification (D) Metonymy

Answer Key

(A) : Prose

1. (D)	**2.** (D)	**3.** (C)	**4.** (C)	**5.** (C)
6. (B)	**7.** (B)	**8.** (C)	**9.** (C)	**10.** (B)
11. (A)	**12.** (D)	**13.** (A)	**14.** (A)	**15.** (A)
16. (D)	**17.** (A)	**18.** (C)	**19.** (C)	**20.** (D)
21. (C)	**22.** (D)	**23.** (C)	**24.** (A)	**25.** (D)
26. (C)	**27.** (A)	**28.** (B)	**29.** (A)	**30.** (D)
31. (A)	**32.** (A)	**33.** (A)	**34.** (D)	**35.** (A)
36. (C)	**37.** (C)	**38.** (D)	**39.** (D)	**40.** (D)
41. (A)	**42.** (B)	**43.** (C)	**44.** (C)	**45.** (D)
46. (B)	**47.** (B)	**48.** (A)	**49.** (B)	**50.** (C)
51. (A)	**52.** (C)	**53.** (D)	**54.** (C)	**55.** (C)
56. (C)	**57.** (D)	**58.** (A)	**59.** (C)	**60.** (A)
61. (A)	**62.** (A)	**63.** (B)	**64.** (A)	**65.** (C)
66. (C)				

(B) : Poetry

67. (B)	**68.** (B)	**69.** (C)	**70.** (D)	**71.** (D)
72. (C)	**73.** (A)	**74.** (A)	**75.** (D)	**76.** (C)
77. (D)	**78.** (B)	**79.** (C)	**80.** (A)	**81.** (B)
82. (A)	**83.** (D)	**84.** (B)	**85.** (C)	**86.** (D)
87. (A)	**88.** (B)	**89.** (C)	**90.** (C)	**91.** (B)
92. (A)	**93.** (B)	**94.** (C)	**95.** (C)	**96.** (D)
97. (D)	**98.** (A)	**99.** (C)	**100.** (C)	**101.** (C)
102. (C)				

❑❑

Pedagogy

1. Learning and Acquisition

1. Introduction

- Mankind in the early ages observed other living creatures making noises to communicate their feelings.
- Gradually, human beings also acquired the skill of communicating a large number of things through what we now call language.
- Human beings alone have the complex skill of using language through speech and writing. We use our vocal organs to make different sounds, sound clusters, words, phrases and sentences. Language is the result of evolution and convention.
- No language was created in a day or by a single person. It is mutually created by a group of humans to communicate.
- Languages also change and die, grow and expand, unlike human institutions.
- Every language is a convention of a community that passes down from generation to generation.
- Language plays an important role in human life. We try learning and using language as a means of communication as well as a social symbol of humanity.
- By using the language, one can make statements, convey facts or information, explain or report something and maintain social relations. English is considered to be an international link language.

2. Meaning and Definitions of Language

- The word **'Language'** is derived from the Latin word **'Lingue'** which means 'produced with the tongue'. Hence language means a thing which is produced with the tongue. Let's see some of the definitions by linguistics.
- "Language is a purely human and non-instinctive method of communicating ideas, emotions and desires by means of a system of voluntarily produced symbols."

  —Edward Sapir
- "Language is a set of arbitrary vocal symbols by means of which a social group communicates."

  —Block and Tragers
- "Language is a set of human habits, the purpose of which is to give expression to human thoughts and feelings especially to impart them to others." **—Otto Jespersen**
- According to Bolinger, "Language is species specific."
- **According to H.A. Gleason,** "Language is one of the most important and characteristic forms of human behaviour."

3. Characteristics of Language

Language is an inseparable part of human society. Human civilization has been possible only through language . Language is basically human. It is different from animal communication. Let's look at some of the characteristics of language;

- **Language is Learnt :** Language is not a born activity as crying and walking. It is not an automatic process. It has to be learnt. Any learner learns the language by imitation and practice.
- **Language is Acquired :** Behavior Language is acquired behaviour. If a baby or man is shifted to another community or cultural group, he will acquire the language spoken by that cultural community. For example; if an Indian family is settled in the United States, the children of the family will acquire the English language with an American accent.
- **Language is a System :** Language is a system like a human body, just as the body functions through different organs such as the brain, heart, lungs. In the same way, language functions through sounds, words and structures.
- **Language is Vocal :** The language is primarily observed speech. Speech is a fundamental thing as language learning, reading and writing are secondary. Through speech and modulation of speech, we get a clear picture of English inflection.
- **No Language on Earth is Static :** Every language is undergoing changes in its grammar, vocabulary, structure and phonology with the course of time.
- **Language is for Communication :** The main purpose of language is communication. Since it is so, a person's speech must be intelligible to others. For this, he must acquire the right pronunciation and intonation.
- **Language is Arbitrary :** There is no relationship between the words of a language and its meaning. The relationship between word and meaning is arbitrary. There is no reason why a language is called 'Language' in English, 'Bhasha' in Hindi and 'Zaban' in Urdu.

- **Language is Based on Cultural Experiences :** Every language is the product of a particular society and culture. 'Good morning', 'Thank you', 'Sorry' and such kinds of words reveal the culture of English people. In each language, there are words that show the specific culture of that community, such as; 'Asslamu alaykum', 'Khuda Hafiz', 'Shaba khair', etc shows the culture of Urdu speaking people.
- **Language is Made of Habits :** A person can be said to have learnt a language when he can speak it without any conscious efforts. No language can be learnt without sufficient practice. A language is learnt by use and not by rules. Learning a language is a process of habit formation.
- **Language is Unique Each Language is Unique :** No two languages are alike. They cannot have the same set of patterns of structures, sounds, grammatical rules or words. The sounds, structures, and vocabularies of every language have their own specialty.

4. Functions of Language

M. A. K. Halliday (1975) explained seven basic functions of language in his book, 'Exploration in the functions of language'. These seven basic functions can be summarised as follows :

- **The Instrumental Function :** The instrumental function refers to the use of language as an instrument to make the recipient do something. For ex: Requesting (Please, give me a glass of water.
- **The Regulatory Function :** The regulatory function of language refers to the use of language to regulate the behaviour of others. Instruction or teaching can be regarded as a type of communicative behaviour intended to cause the addressee to do something. It also includes advising and suggesting. For ex: You should take some rest. (Advising).
- **The Interaction Function :** 'The interactional function of language refers to the use of language in the interaction between 'self and others'. It is a 'me and you' function. It is the contact-oriented function. It includes greetings (Good Morning, Happy Diwali, Happy Eid, Congratulations), sympathy (I share your sorrow, Keep patience, Allah will help you), gratitude (Thanks a lot, Thank you for your guidance, we are grateful for your contribution), compliments (Your dress is very good. How beautiful she is!), hostility (Go to hell, Get out of here), etc.
- **The Personal Function :** The word 'personal' means private or of a particular person. The personal function of language refers to the use of language to express personal feelings and meanings. It aims at a direct expression of the speaker's attitude towards what he is speaking about. For ex: A poem, a speech, expression of love and sorrow etc.
- **The Heuristic Function :** The heuristic function of language refers to language as a means of investigating reality, a way of learning about things that are using language to learn and to discover. It is the use of language for inquiry or questioning.
- **The Imaginative Function :** The imaginative function of language refers to language used to create a world of the imagination. It is the use of language for its own sake to give pleasure imaginatively and aesthetically.For example: "If I was an apple and grew on a tree I think I'd drop down on a nice boy like me; I wouldn't stay there, giving nobody joy, I'd fall down at once and say, Eat me, my boy!" **—Anonymous**
- **The Representational Function :** The representational function of language refers to language used to communicate information. It is the use of language to convey a message which has specific reference to the processes, persons, objects, qualities, states and relations of the real world around us. For example : books, newspapers, magazines, novels, use of language in mass media etc.

5. Scope of Language

- English is the most widely spoken language in the world. The scope of Language is briefly explained below :
  - **Self-maintaining :** When a child is protecting his own interests, justifying his claims or behaviour, criticising or even threatening others.
  - **Directing :** When a child is monitoring his own actions, or telling someone else what to do.
  - **Language in a Transdisciplinary Programme:** Language is involved in all learning that goes on in a school, in both the affective and effective domains. Learners listen, talk, read and write their way to negotiating new meanings and understanding new concepts. Language provides a vehicle for inquiry. In an inquiry-based classroom, teachers and students enjoy using language, appreciating it both functionally and aesthetically.

6. Language Acquisition

- Language acquisition is based on neuro-psychological processes. Language acquisition is opposed to learning and is a subconscious process similar to that by which children acquire their first language . Hence, language acquisition is an integral part of the unity of all languages.
- Language acquisition is one of the central topics in cognitive science. Every theory of cognition has tried to explain it; probably no other topic has aroused such controversy.

Stages of Language Acquisition

- Around the world, people seem to acquire their primary language in pretty much the same sequence and in just about the same way. Research on speech perception finds the same overall pattern of progression.
- They develop from more general to more specific abilities. That is, as infants we are initially able to distinguish among all possible phonetic contrasts. But over time

we lose the ability to distinguish non native contrasts in favour of those used in our native language environment.

- Infants have remarkably acute languagelearning abilities. They show these abilities even from an early age.
- Within the first few years of life, we humans seem to progress through the following stages in producing language: Cooing, which comprises vowel sounds mostly.
- **Cooing** is the infant's oral expression that explores the production of vowel sounds.
- The **cooing** of infants around the world, including deaf infants, is indistinguishable across babies and languages. Infants are actually better than adults at being able to discriminate sounds that carry no meaning for them . They can make phonetic distinctions that adults have lost.
- During the cooing stage, hearing infants also can discriminate among all phones, not just phonemes characteristic of their own language.
- **Babbling,** which comprises consonant as well as vowel sounds; to most people's ears, the babbling of infants growing up among speakers from different language groups sounds very similar .
- At the **babbling** stage, deaf Language Acquisition infants no longer vocalise. The sounds produced by hearing infants change.
- **Babbling** is the infant's preferential production largely of those distinct phonemes both vowels and consonants—that are characteristic of the infant's own language .
- **One-word Utterances;** these utterances are limited in both the vowels and the consonants they utilise . Eventually, the infant utters his or her first word. It is followed shortly by one or two more. Soon after, yet a few more follow.
- The infant uses these one word utterances — termed **holophrases :** to convey intentions, desires, and demands. Usually the words are nouns describing familiar objects that the child observes (example; car, book, ball, baby, toy, nose) or wants (*e.g.* mama, dada, milk, cookie).
- By 18 months of age, children typically have vocabulary of 3 to 100 words.
- The young child's vocabulary cannot yet encompass all that the child wishes to describe.
- As a result, the child commits an overextension error.
- An overextension error is erroneously extending the meaning of words in the existing lexicon to cover things and ideas for which a new word is lacking. For example, the general term for any four legged animal may be 'doggie'.
- Two-word utterances and telegraphic speech. Gradually, between 1.5 to 2.5 years of age, children start combining single words to produce two-word utterances. Thus begin an understanding of syntax. These early syntactical communications seem more like telegrams than conversation. The articles, prepositions, and other functional morphemes are usually left out. Hence, linguists refer to these early utterances with rudimentary syntax as telegraphic speech. *e.g.* "want juice", doggie bite", "mommy sit". These simple pairings of words convey a wealth of information about a child's intentions and needs. Basic adult sentence structure (present by about age 4 years), with continuing vocabulary acquisition. Vocabulary expands rapidly.
- It more than triples from 300 words at about 2 years of age to about 1000 words at 3 years of age.
- Almost incredibly, by age of 4, children acquire the foundations of adult syntax and language structure.
- By the age of 5 years, most children also can understand and produce quite complex and uncommon sentence constructions.
- By the age of 10 years, children's language is fundamentally the same as that of adults.
- Normal children can differ by a year or more in their rate of language development, though the stages they pass through are generally the same regardless of how stretched out or compressed.

7. Defining Language Learning

- Language learning is a conscious process, the product of either formal learning situations or a self-study programme. Hence, language learning is an integral part of the unity of all languages .

8. Language Acquisition and Cognitive Science

- Language acquisition is not only inherently interesting; studying it is one way to look for concrete answers to questions that permeate cognitive science.
- The scientific study of language acquisition began around the same time as the birth of cognitive science, in the late 1950's.
- The historical catalyst was Noam Chomsky's review of Skinner's Verbal Behaviour .
- At that time, Anglo-American natural science, social science, and philosophy had come to a virtual consensus about the answers to the questions listed above.
- The mind consisted of sensorimotor abilities plus a few simple laws of learning governing gradual changes in an organism's behavioural repertoire. Therefore language must be learned, it cannot be a module, and thinking must be a form of verbal behaviour, since verbal behaviour is the prime manifestation of "thought" that can be observed externally.
- Chomsky argued that language acquisition falsified these beliefs in a single stroke: children learn languages that are governed by highly subtle and abstract principles, and they do so without explicit instruction or any other environmental clues to the nature of such principles. Hence language acquisition depends on an innate, species-specific module that is distinct from general intelligence.

- Much of the debate in language acquisition has attempted to test this once-revolutionary, and still controversial, collection of ideas.
- The implications extend to the rest of human cognition.

9. Principles of Language Learning

- Children can learn any language as easily as walking, running, playing, etc. People generally assume that those who study in English medium schools are good at English and those who study in government schools are poor in English.
- Language learning has little to do with the medium of school. It rather depends on teachers' application of principles of language learning. Let us see the principles of language learning.
  - **Habit Formation :** Language learning is a habit formation process. It is a process during which various language habits are formed. Therefore, listening, speaking, reading and writing habits are to be formed consciously and unconsciously.
  - **Practice and Drill :** Language learning is a habit-forming process. For this purpose sufficient practice and drill is needed.
  - **Oral Approach :** A child learns to speak his mother tongue before reading or writing it. This principle should be adopted in learning and teaching a second or a foreign language.
  - **Natural Order of Learning Listening :** Speaking-Reading-Writing (LSRW) is the natural order of learning a language. In this order, a child learns his or her mother tongue without any formal instruction. So this natural order of learning should be considered while teaching English.
  - **Multi-Skill Approach :** All the four language skills are to be given their due importance when learning or teaching them. No skill should be overemphasised or neglected.
  - **Selection and Gradation :** One should proceed from simple to difficult in language learning; therefore, vocabulary and structures of language should be selected and graded as per their frequency, teachability and difficulty level.
  - **Situational Approach :** The English language should be taught in situations which is the natural way in which a child learns his mother tongue.
  - **Exposure :** A child learns his mother tongue because he is exposed to it. While learning a foreign language like English, exposure to it helps in learning it.
  - **Imitation :** The child learns his mother tongue by imitation. The English teacher must provide a good model of speech before the learners. Audio-visual aids should be used.
  - **Motivation :** Motivation plays an important role in learning a language. Thus, learners should be motivated.
  - **Accuracy :** The English teacher should insist on accuracy in all aspects of language learning. So learners follow their teachers and consider them as a role model.
  - **Purpose :** Purpose of language learning should be decided in the beginning. So it becomes a simple affair to design a course suitable for the purpose.
  - **Multiple Approaches :** The English teacher should not stick to a particular method of teaching. He should use all methods, approaches and techniques of teaching English as per the needs and requirements of learners.
  - **Interest :** The teacher should generate a great deal of energy and interest among learners so they will pay attention to learning a language.
  - **Correlation :** If teaching-learning of English is correlated with real life then learner will realise the need of language learning and will take interest in it.

10. Nature of English Language

- English is a varied language that has absorbed vocabulary from many languages of the world. English is the most dynamic language in the world. Let us discuss the nature of English language :
  - **Receptive** : Receptiveness is regarded as an extraordinary nature of the English language. It has maintained its open door policy. It has adopted and accepted thousands of words from European, Asian, African, Indian, Japanese, Chinese and other languages. We can see a great impact on classical languages like Latin, Greek, Arabic, French and Sanskrit on English. English has the richest vocabulary due to its receptiveness .
  - **Heterogeneous :** As English contains vocabulary from many languages, it has become heterogeneous in nature.
  - **Systematic :** The system of English language functions through sounds, words and structures. The system of sound is known as phonology. The system of words is called morphology whereas the system of structures is named as syntax.
  - **Unique :** English is unique in its nature. English is not 100% French, not German or Arabic, not Latin or Greek. English is English. English differs from other languages in its sounds, words, structures and functioning.
  - **Dynamic :** English is a dynamic language. It is constantly changing. These changes are regular and systematic. If you study the history of the English language, you will come to know the difference

between Old English, Medieval English and Modern English.

- **Creative :** English is a highly creative language, that's why it has the richest literature in the world. A writer or speaker can write or speak something he has never written or said before. English literature has a wide variety of prose and poetry, fiction and nonfiction writing, such as; novels, short stories, travelogues, fairy tales, science fiction, drama, songs etc.
- **Productive :** English is also highly productive. One can make thousands and lakhs of sentences with its words. There is no need to learn by rote English sentences. We can produce sentences without effort. People speak and write in different ways and styles best still, the words and sentence structures are the same.
- **Symbolic :** English is symbolic. Every English word, phrase or sentence represents some object, activity or idea.
- **Modifiable :** English is extremely modifiable. It penetrates, fuses and assimilates with the local language of a given country to emerge in different modified and extended forms of English to be accepted, understood and enjoyed universally, such as; Indian English, American English, British English, Australian English etc.
- **Grammatical :** English has its own grammatical rules and structures of sentences. These grammatical rules and sentence structures are necessary for proper relationship of the words in a sentence and to avoid ambiguity. It also clarifies the acceptable and unacceptable forms of sentences.

11. Concepts Associated with Acquisition and Learning

Piaget's Concept

This concept states that learning starts with adaptation, assimilation and accommodation. He also said that classification was also important to learning the language.

- Certain words and sounds needed to be grouped together to better understand and use them in speech.
- Through assimilation, the learner takes the information and changes it to make it suitable for him.

Concept of Chomsky

Chomsky states that every person possesses a Language Learning Device or (LLD) which is a hypothetical tool hard-wired into the brain.

- It helps children in rapidly learning and understanding a language.
- He also states that all children are born with an understanding of the rules of language; they simply need to acquire vocabulary.

Vygotsky's Concept of Learning and Acquisition

Vygotsky was of the opinion that social interaction played an important role in the development of cognition.

- According to him, 'community' also plays a central role in the process of making meaning and learning is a necessary and universal aspect of the process of developing culturally organised, specifically human psychological function.
- In other words, higher mental processes in the individual have their origin in social processes. He places more emphasis on the role of language in cognitive development.

Pavlov's Concept of Learning

Pavlov propounded a new theory of learning known as Classical Conditioning.

- According to him classical conditioning is a reflexive or automatic type of learning in which a stimulus acquires the capacity to evoke a response that was originally evoked by another stimulus.
- Classical conditioning is based on habit formation. Pavlov was of the view that humans learn due to some stimulus.

12. Theories of Language Acquisition

Theory and the central idea associated with author

Theory	Central Idea	Individual most often associated with theory
Behaviourist	Children imitate adults. Their correct utterances are reinforced when they get what they want or are praised	Skinner
Innateness	A child's brain contains special language learning mechanisms at birth	Chomsky
Cognitive	language is just one aspect of a child's overall intellecutal development	Piaget
Interaction	This theory emphasises the interaction between children and their care givers.	Bruner

13. Behaviouristic Theory

- The behaviourist psychologists developed their theories while carrying out a series of experiments on animals. They observed that rats or birds, for example, could be taught to perform various tasks by encouraging habit-forming.
- Researchers awarded desirable behaviour. This was known as positive reinforcement.
- Undesirable behaviour was punished or simply not rewarded — negative reinforcement.
- The behaviourist **B. F. Skinner** then proposed this theory as an explanation for language acquisition in humans. In Verbal Behaviour (1957), he stated: "The basic processes and relations which give verbal behaviour its special characteristics are now fairly well understood.
- Much of the experimental work responsible for this advance has been carried out on other species, but the results have proved to be surprisingly free of species restrictions.
- Recent work has shown that the methods can be extended to human behaviour without serious modifications."
- Skinner suggested that a child imitates the language of its parents or carers. Successful attempts are rewarded because an adult who recognises a word spoken by a child will praise the child and/or give it what it is asking for.
- The linguistic input was key — a model for imitation to be either negatively or positively reinforced.
- Successful utterances are therefore reinforced while unsuccessful ones are forgotten. No essential difference between the way a rat learns to negotiate a maze and a child learns to speak.

Limitations of Behaviourism Theory

- While there must be some truth in Skinner's explanation, there are many objections to it.
- Language is based on a set of structures or rules, which could not be worked out simply by imitating individual utterances. The mistakes made by children reveal that they are not simply imitating but actively working out and applying rules. For example, a child who says "drinked" instead of "drank" is not copying an adult but rather over-applying a rule.
- The vast majority of children go through the same stages of language acquisition. Apart from certain extreme cases, the sequence seems to be largely unaffected by the treatment the child receives or the type of society in which s/he grows up.
- Children are often unable to repeat what an adult says, especially if the adult utterance contains a structure the child has not yet started to use. Few children receive much explicit grammatical correction. Parents are more interested in politeness and truthfulness.

14. Innateness Theory

- Noam Chomsky published a criticism of the behaviourist theory in 1957. In addition to some of the arguments listed above, he focused particularly on the impoverished language input children receive.
- This theory is connected with the writings of Chomsky, although the theory has been around for hundreds of years.
- Children are born with an innate capacity for learning human language. Humans are destined to speak.
- Children discover the grammar of their language based on their own inborn grammar.
- Certain aspects of language structure seem to be preordained by the cognitive structure of the human mind.
- This accounts for certain very basic universal features of language structure: every language has nouns/verbs, consonants and vowels.
- It is assumed that children are preprogrammed, hard-wired, to acquire such things. Yet no one has been able to explain how quickly and perfectly all children acquire their native language.
- Every language is extremely complex, full of subtle distinctions that speakers are not even aware of. Nevertheless, children master their native language in 5 or 6 years regardless of their other talents and general intellectual ability.
- Acquisition must certainly be more than mere imitation; it also doesn't seem to depend on levels of general intelligence, since even a severely retarded child will acquire a native language without special training.
- Some innate feature of the mind must be responsible for the universally rapid and natural acquisition of language by any young child exposed to speech.
- Chomsky concluded that children must have an inborn faculty for language acquisition.
- According to this theory, the process is biologically determined - the human species has evolved a brain whose neural circuits contain linguistic information at birth.
- The child's natural predisposition to learn language is triggered by hearing speech and the child's brain is able to interpret what s/he hears according to the underlying principles or structures it already contains.
- This natural faculty has become known as the Language Acquisition Device (LAD).
- Chomsky did not suggest that an English child is born knowing anything specific about English, of course. He stated that all human languages share common principles. (For example, they all have words for things and actions — nouns and verbs.)
- It is the child's task to establish how the specific language s/he hears expresses these underlying principles. For example, the LAD already contains the concept of verb

tense. By listening to such forms as "worked", "played" and "patted", the child will form the hypothesis that the past tense of verbs is formed by adding the sound /d/, /t/ or / id/ to the base form. This, in turn, will lead to the "virtuous errors" mentioned above. It hardly needs saying that the process is unconscious.

- Chomsky does not envisage the small child lying in its cot working out grammatical rules consciously! Chomsky's ground-breaking theory remains at the centre of the debate about language acquisition.
- However, it has been modified, both by Chomsky himself and by others. Chomsky's original position was that the LAD contained specific knowledge about language. .

Limitations of Chomsky's Theory

- Chomsky's work on language was theoretical.
- He was interested in grammar and much of his work consists of complex explanations of grammatical rules.
- He did not study real children.
- The theory relies on children being exposed to language but takes no account of the interaction between children and their caretakers. Nor does it recognise the reasons why a child might want to speak, the functions of language.

15. Cognitive Theory

- The Swiss psychologist Jean Piaget (1896-1980) placed acquisition of language within the context of a child's cognitive development.
- He argued that a child has to understand a concept before s/he can acquire the particular language form which expresses that concept.
- Cognitive theory views language acquisition within the context of the child's broader intellectual development. Since the cognitive theory of language acquisition is based on Piaget's theory of cognitive development, a brief description and understanding of this theory is must.
- Piaget suggested that children go through four separate stages in a fixed order that is universal in all children.
- Piaget declared that these stages differ not only in the quantity of information acquired at each, but also in the quality of knowledge and understanding at that stage.
- He suggested that movement from one stage to the next occurred when the child reached an appropriate level of maturation and was exposed to relevant types of experiences. Without experience, children were assumed incapable of reaching their highest cognitive ability.
- Piaget's four stages are known as the sensorimotor, preoperational, concrete operational and formal operational stages.
- The sensory motor stage in a child is from birth to approximately two years. During this stage, a child has relatively little competence in representing the environment using images, language, or symbols. An infant has no awareness of objects or people that are not immediately present at a given moment. Piaget called this a lack of object permanence. Object permanence is the awareness that objects and people continue to exist even if they are out of sight.
- In infants, when a person hides, the infant has no knowledge that they are just out of sight.
- According to Piaget, this person or object that has disappeared is gone forever to the infant.
- The preoperational stage is from the age of two to seven years.
- The most important development at this time is language.
- Children develop an internal representation of the world that allows them to describe people, events and feelings.
- Children at this time use symbols, they can pretend when driving their toy car across the couch that the couch is actually a bridge. Although the thinking of the child is more advanced than when it was in the sensorimotor stage, it is still qualitatively inferior to that of an adult.
- Children in the preoperational stage are characterised by what Piaget called egocentric thoughts.
- The world at this stage is viewed entirely from the child's own perspective. Thus a child's explanation to an adult can be uninformative. Three-year-olds will generally hide their face when they are in trouble—even though they are in plain view, three-year-olds believe that their inability to see others also results in others' inability to see them.
- A child in the preoperational stage also lacks the principle of conservation.
- This is the knowledge that quantity is unrelated to the arrangement and physical appearance of objects.
- Children who have not passed this stage do not know that the amount, volume or length of an object does not change length when the shape of the configuration is changed.
- If you put two identical pieces of clay in front of a child, one rolled up in the shape of a ball, the other rolled into a snake, a child at this stage may say the snake piece is bigger because it is rolled out.
- Piaget declared that this is not mastered until the next stage of development.
- The concrete operational stage lasts from the age of seven to twelve years of age.
- The beginning of this stage is marked by the mastery of the principle of conservation.
- Children develop the ability to think in a more logical manner and they begin to overcome some of the egocentric characteristics of the preoperational period.
- One of the major ideas learned in this stage is the idea of reversibility.
- This is the idea that some changes can be undone by reversing an earlier action. An example is the ball of clay that is rolled out into a snake piece of clay.

- Children at this stage understand that you can regain the ball of clay formation by rolling the piece of clay the other way. Children can even conceptualise the stage in their heads without having to see the action performed.
- Children in the concrete operational stage have a better understanding of time and space.
- Children at this stage have limits to their abstract thinking, according to Piaget.
- The formal operational stage begins in most people at age twelve and continues into adulthood.
- This stage produces a new kind of thinking that is abstract, formal, and logical. Thinking is no longer tied to events that can be observed.
- A child at this stage can think hypothetically and use logic to solve problems. It is thought that not all individuals reach this level of thinking.
- Most studies show only forty to sixty percent of American college students and adults fully achieve it.
- Piaget's suggestion, that cognitive performance cannot be attained unless cognitive readiness is brought about by maturation and environmental stimuli, has been instrumental in determining the structure of educational curricula.
- Cognitive theory of language acquisition suggests that a child first becomes aware of a concept, such as relative size, and only afterward do they acquire the words and patterns to convey that concept.
- Simple ideas are expressed earlier than more complex ones even if they are grammatically more complicated—Conditional mood is one of the last.
- Conceptual development might affect language development: if a child has not yet mastered a difficult semantic distinction, he or she may be unable to master the syntax of the construction dedicated to expressing it.
- The complexity of a grammatical form has a demonstrable role in development: simpler rules and forms appear in speech before more complex ones, all other things being equal. For example, the plural marker -s in English (*e.g.* cats), which requires knowing only whether the number of referents is singular or plural, is used consistently before the present tense marker -s (he walks), which requires knowing whether the subject is singular or plural and whether it is a first, second, or third person and whether the event is in the present tense .
- There is a consistent order of mastery of the most common function morphemes in a language. Here's an example from English: first— -ing, then in and on, then the plural -s, last are the forms of the verb to be. Seems to be conditioned by logical complexity: plural is simple, while forms of the verb require sensitivity to both number and tense.
- A good example of this is seriation. There will be a point in a child's intellectual development when s/he can compare objects with respect to size. This means that if you gave the child a number of sticks, s/he could arrange them in order of size.
- Piaget suggested that a child who had not yet reached this stage would not be able to learn and use comparative adjectives like "bigger" or "smaller".
- Object permanence is another phenomenon often cited in relation to cognitive theory.
- During the first year of life, children seem unaware of the existence of objects they cannot see.
- An object which moves out of sight ceases to exist. By the time they reach the age of 18 months, children have realised that objects have an existence independently of their perception.
- The cognitive theory draws attention to the large increase in children's vocabulary at around this age, suggesting a link between object permanence and the learning of labels for objects.
- Clearly there is some link between cognitive development and language acquisition; Piaget's theory helps explain the order in which certain aspects of language are acquired.

Limitations of Cognitive Theories

- This theory does not explain why language emerges in the first place.
- Apes also develop cognitively in much the same way as young children in the first few years of life, but language acquisition doesn't follow naturally from their development.
- Bees develop the cognitive ability to respond to many shades of colour, but bees never develop any communication signals based on shades of colour.
- During the first year to 18 months, connections of the type explained above are possible to trace but, as a child continues to develop, it becomes harder to find clear links between language and intellect.
- Some studies have focused on children who have learned to speak fluently despite abnormal mental development.
- Syntax in particular does not appear to rely on general intellectual growth.

16. Input or Integrationist Theories

- In contrast to the work of Chomsky, more recent theorists have stressed the importance of the language input children receive from their care-givers.
- Language exists for the purpose of communication and can only be learned in the context of interaction with people who want to communicate with the person.
- Interactionists such as Jerome Bruner (1966,68) suggest that the language behaviour of adults when talking to children (known as child-directed speech or CDS) is specially adapted to support the acquisition process.

- This support is often described as scaffolding for the child's language learning.
- Bruner also coined the term Language Acquisition Support System or LASS in response to Chomsky's LAD.
- It has been noted that the turn-taking structure of conversation is developed through games and non-verbal communication long before actual words are uttered.
- Children do not hear sentences in isolation, but in a context.
- Many models of language acquisition assume that the input to the child consists of a sentence and a representation of the meaning of that sentence, inferred from context and from the child's knowledge of the meanings of the words.

Limitations of Input Theories

- These theories serve as a useful corrective to Chomsky's early position and it seems likely that a child will learn more quickly with frequent interaction.
- However, it has already been noted that children in all cultures pass through the same stages in acquiring language.
- We have also seen that there are cultures in which adults do not adopt special ways of talking to children, so child directed speech may be useful but may not be essential.
- As stated earlier, the various theories should not be seen simply as alternatives. Rather, each of them offers a partial explanation of the process.
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2. Principle, Methods and Approaches of Teaching English

1. Introduction

- In any society, language is important to communicate productively. Without an intelligible language, the geometrical progression of any society is impossible. The best example is the story of Babel in the Holy Bible.
- Briefly, during the time of Noah, people were wicked and God punished all of them with the great flood except Noah, his family members, and male and female from every species in the animal kingdom.
- After the great flood, the people became sinful once again and they knew God would be angry with them and He would punish them once again with the destructive flood. Therefore, they wanted to escape from the anger of God by constructing a tower. God knew their plan and He confused the tongues of the people and they could not build the tower anymore due to the incomprehensibility of the language they were speaking to one another.
- This incident proves the point that our lives would become terrible if we do not know or comprehend a language. In addition to political, economic, social and religious reasons, we need language(s) to communicate and to lead our lives well; Hence, we learn as many languages as possible and that's where the method(s) and approaches to language teaching come into action.
- Here, we shall know about various methods and approaches that are used in language teaching – starting from the Grammar-Translation method to the Natural approach – Traditional to Humanistic approaches.

2. Different Principles of Language Teaching

- In India, English is taught as a second language and as a foreign language.
- For an English teacher, it is essential to teach in such a manner that desired goals can be achieved. Therefore, a sound knowledge of the principles of teaching the English language is needed.
- Many scholars have given different classification of principles of language teaching at secondary level but they can be grouped into three major categories viz
- **Principle of Interactive Language Teaching**
  - **Principle 1 :** The student is the language learner.
  - **Principle 2 :** Language learning and teaching are shaped by student needs and objectives in particular circumstances.
  - **Principle 3 :** Language learning and teaching are based on normal uses of language, with communication of meanings (in oral or written form) basic to all strategies and techniques.
  - **Principle 4 :** Classroom relations reflect mutual liking and respect, allowing for both teacher personality and student personality in a non-threatening atmosphere of cooperative learning.
  - **Principle 5 :** Basic to use of language are language knowledge and language control.
  - **Principle 6 :** Development of language control proceeds through creativity, which is nurtured by interactive, participatory activities.
  - **Principle 7 :** Every possible medium and modality is used to aid learning.
  - **Principle 8 :** Testing is an aid to learning.

General Principles of Teaching English

- The modern approach to all language learning and teaching is the scientific one and is based on sound linguistic principles.
- The principles discussed below in no way claim finality.
- They are subject to change in the light of new facts exposed by linguists and language users.
- These principles are general principles and are applicable to English language.