

Publishers of
Educational charts for Technical Institutions & Schools

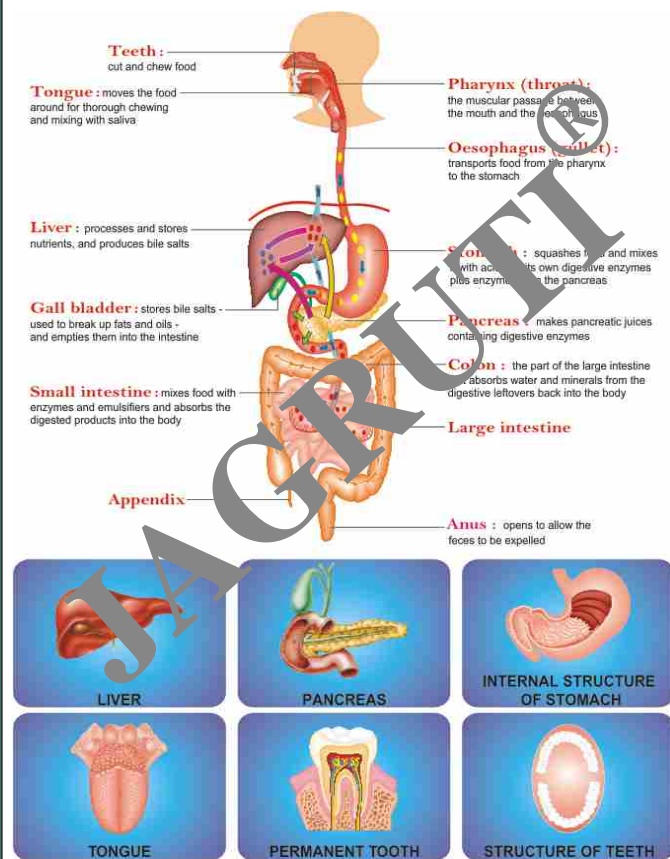
Album of photographs of General charts

Charts available in

Size : 24" x 38"

(with two PVC rollers)

THE DIGESTIVE SYSTEM



INDEX

SUBJECT		PAGE NO
1.	Human Physiology	3
2.	Biology	4-5
3.	Physics	6-8
4.	Chemistry	9-10
5.	Health and Diseases	11
6.	Nutrition	12
7.	Agriculture	13
8.	Environmental Science	14-15
9.	Geography	16-19
10.	Economics	20

HUMAN PHYSIOLOGY

Size : 24" x 38" with two individual rollers

HUMAN SKELETON

FRONT VIEW **BACK VIEW**

SKULL **HAND** **FOOT**

JOINTS

THE MUSCLES

FRONT VIEW **BACK VIEW**

NECK **HAND** **FOOT**

THE DIGESTIVE SYSTEM

MOUTH **PHARYNX** **ESOPHAGUS**

STOMACH **SMALL INTESTINE** **LARGE INTESTINE**

THE RESPIRATORY SYSTEM

NASAL CAVITY **ORAL CAVITY**

PHARYNX **TRACHEA** **BRONCHI** **ALVEOLI**

DIAPHRAGM **EXTERNAL RESPIRATION** **INTERNAL RESPIRATION**

THE BLOOD CIRCULATION

CIRCULATION OF HIGH-OXYGEN BLOOD **CIRCULATION OF LOW-OXYGEN BLOOD**

Blood circulation **Head Blood circulation**

HUMAN HEART

VERTICAL SECTION OF THE HUMAN HEART

THE CARDIAC CYCLE

THE NERVOUS SYSTEM

1. CNS (CENTRAL NERVOUS SYSTEM)

2. PNS (PERIPHERAL NERVOUS SYSTEM)

3. ANS (AUTONOMIC NERVOUS SYSTEM)

THE HUMAN EYE

VERTICAL SECTION OF THE HUMAN EYE **WORKING OF THE HUMAN EYE**

WAYS OF EYE VISION

Short sight / Myopia **Correcting short sight**

Long sight / Hypermetropia **Correcting long sight**

THE HUMAN EAR

EXTERNAL EAR **MIDDLE EAR** **INTERNAL EAR**

EXCRETORY SYSTEM

Human Urinary System

Human Skin

PHYSICS

Size : 24" x 38" with two individual rollers

MOTION AND TYPES OF MOTION 1

Motion: A body is said to be in motion if it changes its position with respect to its surroundings and is said to be at rest if it does not change its position with respect to surroundings.

Motion of a car with respect to trees

Types of Motion

- Translational Motion**
 - Rectilinear motion: straight line
 - Circular motion: circular path
 - Rotational motion: around an axis
- Rotational Motion**
 - A spinning top
 - Motion of the earth
 - Motion of an electric fan
- VA. Circular Motion**
 - Motion of a pendulum
 - A hand of a sewing machine

FORCE AND MOTION 2

Displacement and Velocity

Displacement: The shortest distance between the initial and final position.

Velocity: The rate of change of displacement with respect to time.

Speed: Total distance travelled / Total time taken

Acceleration: The rate of change of velocity is called acceleration.

Uniform circular motion: When an object moves in a circular path with uniform speed, its motion is called uniform circular motion.

NEWTON'S FIRST LAW OF MOTION 3

INERTIA

The tendency of a body to resist change in its state of motion is called inertia.

TYPES OF INERTIA

- INERTIA AT REST:** A body at rest tends to stay at rest.
- INERTIA OF MOTION:** A body in motion tends to stay in motion.
- INERTIA OF RESTRICTION:** A body tends to resist any change in its state of motion.

Newton's First Law of Motion or Law of Inertia: Every inanimate body continues in its state of rest or of uniform motion in a straight line unless an external unbalanced force acts on it.

NEWTON'S SECOND LAW AND THIRD LAW OF MOTION 4

Newton's Second Law of Motion

The rate of change of momentum is directly proportional to the impressed force and takes place in the direction in which the force acts.

$$F = kma \text{ (where } k = 1, a \text{ is constant)}$$

Newton's Third Law of Motion

For every action there is an equal and opposite reaction.

Example: A swimmer pushes the water backwards with her hands and feet to move in forward direction.

DISPLACEMENT / MOTION / ACCELERATION 5

Displacement and Velocity

Speed: Total distance travelled / Total time taken

Acceleration: The rate of change of velocity is called acceleration.

Uniform circular motion: When an object moves in a circular path with uniform speed, its motion is called uniform circular motion.

FORCE 6

No object moves of its own accord. Force is needed to make an object move.

Force is needed to set a stationary object in motion, to change the speed or direction of a moving object or to change the shape of an object.

Types of Forces

- Muscular Force:** The force applied using parts of the body like arms or legs is called muscular force.
- Mechanical Force:** The force applied by using machines is called mechanical force.

TYPES OF FORCES 7

Types of Forces

- Gravitational Force:** The force which attracts every object towards the earth.
- Magnetic Force:** The force exerted by a magnet is called magnetic force.
- Electrostatic Force:** The force exerted between two charged objects is called electrostatic force.

NEWTON'S LAW OF GRAVITATION 8

Newton's Law of Gravitation

Every object in the universe attracts every other object with a force which is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centres.

$$F = G \frac{m_1 m_2}{r^2}$$

Earth's Gravity: The force of gravitational attraction exerted by the earth on all other bodies towards its centre is called Earth's gravity.

THE PULL OF THE EARTH 9

ACCELERATION DUE TO GRAVITY

When an object is dropped from a height h , it falls with a constant acceleration g .

Acceleration due to gravity: The value of g on the surface of the earth is 9.8 m/s^2 .

Weight: The weight of a body is defined as the force with which the earth attracts it towards its centre.

$$W = mg$$

WORK 10

Work is said to be done when a force displaces a body through certain distance in the direction of the force.

Work done by a force: $W = F \times S$

Work done against a force: $W = -F \times S$

POSITIVE, NEGATIVE AND ZERO WORK

WORK AND ENERGY 11

Work: When force is applied and an object is set in motion in the direction of the applied force, work is said to be done.

Energy: The capacity to do work is called energy.

Forms of Energy

- Mechanical Energy:** Kinetic energy (energy of motion) and potential energy (energy of position).
- Thermal Energy:** Heat energy.
- Electrical Energy:** Energy due to electric charges.
- Magnetic Energy:** Energy due to magnets.

ENERGY 12

Energy of an object is its capacity for doing work. SI unit of energy is joule. CGS unit is erg.

Two Forms of Mechanical Energy

- KINETIC ENERGY:** It is the energy possessed by a body due to its motion.
- POTENTIAL ENERGY:** It is the energy possessed by a body due to its position or configuration.

LAW OF CONSERVATION OF ENERGY 13

LAW OF CONSERVATION OF ENERGY

Energy can neither be created nor be destroyed. It can be converted from one form to another. The total amount of energy in the universe remains constant.

Examples:

- Hydroelectric Power Station:** Potential energy of water is converted into electrical energy.
- Simple Pendulum:** Kinetic energy and potential energy interchange.
- Free falling body:** Kinetic energy increases and potential energy decreases.

PRESSURE - I 14

PRESSURE - I

Pressure is defined as the force acting perpendicular to the surface of an object per unit area.

$$P = \frac{F}{A}$$

Pressure in fluids: Liquids and gases exert pressure in all directions.

PRESSURE - II: THRUST, PRESSURE IN FLUIDS 15

THRUST

The force acting on an object perpendicular to its surface is called thrust.

PRESSURE IN FLUIDS

Liquids and gases exert pressure in all directions.

Pressure in liquids: Pressure increases with depth.

PRESSURE - III: LIQUID PRESSURE 16

LIQUID PRESSURE

Pressure exerted by a liquid at a point inside it is called liquid pressure.

Pressure in liquids: Pressure increases with depth.

Buoyant Force: The upward force exerted by a liquid on an object immersed in it.

PRESSURE - IV: PRESSURE EXERTED BY GASES 17

PRESSURE EXERTED BY GASES

Gases exert pressure in all directions.

Archimedes' Principle: When a body is immersed completely or partially in a fluid, it experiences an upward force that is equal to the weight of the fluid displaced by it.

Experiment to demonstrate Archimedes' Principle: A solid object is immersed in a liquid, and the weight loss is measured.

LIGHT 18

LIGHT

Light is a form of energy called electromagnetic radiation which causes sensation of vision.

Visible light: The part of the electromagnetic spectrum that is visible to the human eye.

Refraction of Light: The change in the direction of light when it enters obliquely from one medium to another transparent medium, is called refraction of light.

REFRACTION OF LIGHT - I 19

REFRACTION OF LIGHT - I

The Laws of Refraction:

- The incident ray, the normal to the interface, and the refracted ray all lie in the same plane.
- The ratio of the sine of the angle of incidence to the sine of the angle of refraction is a constant for a given pair of media.

Snell's Law: $n_1 \sin i = n_2 \sin r$

REFRACTION OF LIGHT - II 20

REFRACTION OF LIGHT - II

The apparent depth of an object in a liquid is less than its real depth.

Dispersion of White Light: White light is composed of seven colors.

Dispersion of White Light by a Prism: A white light ray is dispersed into its constituent colors by a glass prism.

PHYSICS

Size : 24" x 38" with two individual rollers

REFRACTION OF LIGHT - III

When rays of light fall on a surface they turn back. This is called the reflection of light.

Properties of Image formed in a plane mirror

- The image formed in a plane mirror is virtual and is of the same size as the object.
- The image formed in a plane mirror is laterally inverted.
- The image formed in a plane mirror is laterally inverted.
- Lateral inversion means the right side of an object is seen on the left side of the image.

THE LAWS OF REFLECTION

An Experiment to verify the Laws of Reflection

The Laws of Reflection :

- The incident ray, the reflected ray and the normal are all in the same plane.
- The incident ray and reflected ray are on opposite sides of the normal.
- The angle of incidence and angle of reflection are equal.

Types of Reflection :

- Regular reflection
- Irrregular reflection

Some articles of our hand are reflective of light

- Polishing
- Shining
- Reflection

PROPAGATION OF LIGHT-I

Linear Propagation of Light

Light travels in a straight line.

Formation of shadows

The shadow cast by a point source of light

The shadow cast by an extended source of light

PROPAGATION OF LIGHT-II

Solar Eclipse

Lunar Eclipse

The colours of sunlight

When a beam of sunlight falls on the prism at a slant, you will see a band of seven colours called the spectrum.

PROPAGATION OF LIGHT-III

The pinhole camera

Light is necessary for the growth of plants

The effect of different colours of light on the growth of plants.

Plants need light mainly for producing food. Chlorophyll in plants, convert light energy into chemical energy. This chemical energy is stored in plants in the form of food.

PASSAGE OF LIGHT THROUGH A PRISM

A prism

Dispersion of light by a prism

Recombination into white light

SCATTERING OF LIGHT

AN EXPERIMENT FOR OBSERVING SCATTERING OF LIGHT IN COLLOIDAL SOLUTION

OBSERVATIONS

When we look from the sides of the jar, blue light is observed due to scattering of blue light by the particles in the solution.

FORMATION OF RAINBOW

The formation of rainbow in the sky is a combined result of refraction, dispersion and reflection of sunlight by water droplets present in the atmosphere after it has rained.

MIRROR

MIRROR: A mirror is a reflecting surface.

CONCEPTS RELATED TO SPHERICAL MIRRORS

RULES FOR FORMING IMAGES BY A CONVEX MIRROR

IMAGES FORMED BY CONCAVE MIRROR

Position of Object, Position of Image, Nature of Image

Mirror Formula

$$\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

Mirror Magnification

$$m = \frac{h_2}{h_1} = \frac{v}{u}$$

IMAGES FORMED BY CONVEX MIRROR

Position of Object, Position of Image, Nature of Image

New Cartesian Sign Convention for Reflection by Spherical Mirrors

Convex Mirror

LENSES - I

Types of Convex Lenses, Types of Concave Lenses

Terms and Parts of Lens

Each surface of a lens is a part of a sphere

LENSES - II

CONVEX LENS

CONCAVE LENS

RULES FOR FORMING IMAGES BY A CONVEX LENS

LENSES - III

Principle Foci of Lenses

Image formed by a convex lens

Image formed by a concave lens

IMAGE FORMED BY A CONVEX LENS

Object at 2F₁, Image at 2F₂, Same size, Real and inverted

Object at infinity, Image at focus F₂, Highly diminished, Virtual and erect

Object at F₁, Image at infinity, Highly enlarged, Real and inverted

Object between F₁ and O, Image on the same side, Enlarged, Virtual and erect

IMAGE FORMED BY A CONCAVE LENS

Object at infinity, Image at focus F₂, Highly diminished, Virtual and erect

Object at any distance, Image between F₁ and O, Diminished, Virtual and erect

Power of a lens

The degree of convergence or divergence of incident light produced by a lens is called power of a lens.

Power of a lens is expressed in diopters (D)

$$P \text{ (in diopters)} = \frac{1}{f \text{ (in meters)}}$$

SIGN CONVENTION FOR REFRACTION BY LENSES

Cartesian sign conventions

Focal length f of convex lens is positive

Focal length f of concave lens is negative

MICROSCOPES

A Simple Microscope

A Compound Microscope

An Astronomical telescope

PRODUCTION OF SOUND

We hear different types of sounds in our daily life.

Sound is produced by the vibration of material bodies.

Vibration is necessary for sound to be produced.

Sound produced in Vibration by

- Human voice
- String
- Table
- Plate
- Comb
- Diaphragm of metal plates

What is Vibration?

When an object vibrates very fast following a fixed path from one side to the other and then back again, it is called a vibration.

PROPAGATION OF SOUND-I

The substance through which sound travels is called as medium.

Sound travels through a medium.

Sound travels faster through a solid than through a liquid and faster through a liquid than through a gas.

Sound travels through a vacuum.

Sound travels through a vacuum.

PROPAGATION OF SOUND-II

Reflection of Sound

Reflected sound heard distinctly from the original sound is called as an echo.

Sound gets reflected from hard surfaces.

Experiment to study the reflection of sound

Noise Pollution

Noise pollution is caused due to growth of industries, vehicles, increasing population, heavily played music systems, honking cars etc.

PHYSICS

Size : 24" x 38" with two individual rollers

PRODUCTION OF SOUND

Sound is a form of energy which produces sensation of hearing in our ear.

PRODUCTION OF SOUND
Sound is produced by the vibration of solids, liquids, and gases.

PROPERTIES OF SOUND
• Sound propagates in the form of waves.
• Sound is produced due to disturbance in a medium.
• Sound travels through solid, liquid and gas.
• Sound cannot travel through vacuum.

SOUND

Sound waves are longitudinal waves.

CHARACTERISTICS OF SOUND WAVES:
1. **AMPLITUDE** (A): The distance between two consecutive crests or troughs.
2. **PERIOD** (T): The time taken for two consecutive crests or troughs to pass a point.
3. **FREQUENCY** (f): The number of vibrations per second.
4. **VELOCITY** (v): The distance travelled by sound in one second.

RELATIONSHIP BETWEEN v, f, and λ:
 $v = f \lambda$

CHARACTERISTICS OF SOUND WAVES

Sound is produced by vibrating objects. It travels through a medium in the form of longitudinal waves.

CHARACTERISTICS OF SOUND WAVES:
1. **AMPLITUDE**: The height of the wave.
2. **PERIOD**: The time taken for one complete vibration.
3. **FREQUENCY**: The number of vibrations per second.
4. **VELOCITY**: The distance travelled by sound in one second.

REFLECTION OF SOUND

Reflection of sound occurs when sound waves strike a surface and bounce back.

REFLECTION OF SOUND FROM A PLANE SURFACE:
The angle of incidence is equal to the angle of reflection.

ECHO: Echo is the reflection of sound from a hard surface.

ULTRASONIC: Sound waves with frequency greater than 20,000 Hz are called ultrasonic.

APPLICATION OF REFLECTION OF SOUND

Echo is the reflection of sound from a hard surface.

APPLICATIONS:
1. **SONAR**: Used to measure the depth of the sea.
2. **ULTRASONIC**: Used in medical diagnosis (ultrasound).
3. **ARCHITECTURE**: Used to design concert halls and auditoriums.

MAGNETISM

Magnets are objects that attract iron and some other metals.

DIFFERENT TYPES OF MAGNETS:
1. **Bar Magnet**: A simple bar-shaped magnet.
2. **Disc Magnet**: A flat, circular magnet.
3. **Ring Magnet**: A magnet in the shape of a ring.

RIGHT HAND RULE:
If the fingers of the right hand are curled around a wire in the direction of current, the thumb points in the direction of the magnetic field.

MAGNETIC FIELD - I

Magnetic field is the region around a magnet where its magnetic force can be felt.

RIGHT HAND RULE:
If the fingers of the right hand are curled around a wire in the direction of current, the thumb points in the direction of the magnetic field.

MAGNETIC FIELD - II

Magnetic field lines are imaginary lines that represent the direction of the magnetic field.

RIGHT HAND RULE:
If the fingers of the right hand are curled around a wire in the direction of current, the thumb points in the direction of the magnetic field.

ELECTROMAGNETIC INDUCTION - I

Electromagnetic induction is the process of generating an electric current by changing the magnetic field.

CONCLUSION: An electric current is induced in a coil when the magnetic field through it changes.

ELECTROMAGNETIC INDUCTION - II

Electromagnetic induction is the process of generating an electric current by changing the magnetic field.

CONCLUSION: An electric current is induced in a coil when the magnetic field through it changes.

ELECTRIC MOTOR

An electric motor is a device that converts electrical energy into mechanical energy.

PRINCIPLE OF WORKING OF ELECTRIC MOTOR:
A current-carrying coil placed in a magnetic field experiences a force that causes it to rotate.

ELECTRIC CHARGE

Electric charge is a property of matter that causes it to experience a force when placed in an electric field.

STATIC ELECTRIC CHARGE: Charge that remains stationary on the surface of an object.

CURRENT ELECTRIC CHARGE: Charge that flows through a conductor.

ELECTRIC CURRENT - I

Electric current is the flow of electric charges in a conductor.

CONVENTION: The direction of electric current is taken to be the direction of flow of positive charges.

ELECTRIC CURRENT - II

Electric current is the flow of electric charges in a conductor.

CONVENTION: The direction of electric current is taken to be the direction of flow of positive charges.

THE ELECTRIC POTENTIAL AND P. D.

Electric potential is the amount of work done to move a unit positive charge from infinity to a point in an electric field.

POTENTIAL DIFFERENCE (P.D.): The work done to move a unit positive charge from one point to another in an electric field.

SIMPLE VOLTAIC CELL

A simple voltaic cell is a device that converts chemical energy into electrical energy.

CONSTRUCTION: A zinc plate is placed in a solution of zinc sulphate, and a copper plate is placed in a solution of copper sulphate. The two solutions are connected by a salt bridge.

ELECTRIC CURRENT - I

Electric current is the flow of electric charges in a conductor.

CONVENTION: The direction of electric current is taken to be the direction of flow of positive charges.

ELECTRIC CIRCUIT - II

An electric circuit is a closed loop through which electric current can flow.

COMPONENTS OF AN ELECTRIC CIRCUIT:
1. **Cell/Battery**: Provides the potential difference.
2. **Plug Key/Switch**: Controls the flow of current.
3. **Variable Resistor**: Changes the resistance in the circuit.
4. **Ammeter**: Measures the current.
5. **Voltmeter**: Measures the potential difference.
6. **Galvanometer**: Detects the presence of current.

HEATING EFFECT OF AN ELECTRIC CURRENT

The heating effect of an electric current is the production of heat when an electric current flows through a conductor.

JOULE'S LAW: The heat produced in a conductor is directly proportional to the square of the current, the resistance, and the time for which the current flows.

OHM'S LAW

Ohm's Law states that the current flowing through a conductor is directly proportional to the potential difference across it.

MATHEMATICAL EQUATION OF OHM'S LAW:
 $V = IR$

EMF AND POTENTIAL DIFFERENCE

EMF (Electromotive Force) is the work done by a cell to move a unit positive charge from the negative terminal to the positive terminal.

POTENTIAL DIFFERENCE (P.D.): The work done to move a unit positive charge from one point to another in an electric field.

WORLD OF MATTER

Matter is anything that has mass and occupies space.

STATES OF MATTER:
1. **Solid**: Particles are closely packed and have a fixed shape and volume.
2. **Liquid**: Particles are less closely packed and have a fixed volume but no fixed shape.
3. **Gas**: Particles are far apart and have no fixed shape or volume.

CHANGE OF STATE OF MATTER

Change of state of matter occurs when the physical conditions (temperature and pressure) change.

EXPERIMENT: To observe the change of state of matter.

UNDERSTANDING MATTER

Matter is anything that has mass and occupies space.

CLASSIFICATION OF MATTER:
1. **Element**: A substance that cannot be broken down into simpler substances.
2. **Compound**: A substance formed by the combination of two or more elements.
3. **Mixture**: A substance formed by the combination of two or more substances.

CHEMISTRY

Size : 24" x 38" with two individual rollers

ELECTROLYTIC CONDUCTORS

Conductor : Materials that allow electric current to pass through them are called conductors.
Conductors are of three types:
(1) Gaseous Conductors
(2) Metallic (Electronic) Conductors
(3) Electrolytic Conductors

ELECTROLYTIC CONDUCTORS

- Electrolytic conductors conduct electricity by the movement of ions and negative ions.
- All actual transfer of matter occurs during the passage of electricity through an electrolytic conductor.
- Dry cells and car batteries are applications of electrolytic conductors.

Electrolytes : Compounds are substances which in molten, or in dissolved state conduct electricity. (E.g. NaOH, ZnSO₄, H₂SO₄, AgNO₃, etc.)

Nonelectrolytes : Compounds are substances which in molten, or in dissolved state do not conduct electricity. (E.g. Sugar, urea, alcohol, Benzene, etc.)

Testing of Electrolyte and Non electrolyte

ELECTROLYSIS

ELECTROLYTIC CELL

An arrangement in which cathode and anode are in contact with an electrolyte placed so as to pass electric current through it is called an electrolytic cell.

Demonstration of Electrolysis of Copper Sulfate

(A) Current is passed through the solution for 15 minutes.
(B) Changes seen after 15 minutes:
(i) A brown deposit is seen at cathode.
(ii) The blue colour of the copper sulphate starts fading.

Application of Electrolysis - Electroplating

Electroplating is a process in which an object made up of a conducting material (usually metal), is coated with a thin active metal using electrolytic technique.

ACIDS AND BASES

Acid : A substance which has a sour taste and turns blue litmus to red is called an acid.
Base : A substance which has a bitter taste and turns red litmus to blue is called a base.

Indicator

Chemical substances that are used to detect the presence of acids or bases are called indicators.

Strength of Acids and Bases

pH Scale : A scale used to measure the strength of acids and bases. It ranges from 0 to 14.

Table 1 : Some common acids and their uses.

ACIDS, BASES AND THEIR REACTIVITY

1. Reactivity with Metals

When a metal reacts with an acid, it forms metal salt and hydrogen gas.

$$\text{Metal} + \text{Acid} \rightarrow \text{Metal Salt} + \text{H}_2$$

2. Reactivity of acids towards carbonates and bicarbonates

Acids react with carbonates and bicarbonates to form salt, water, and carbon dioxide.

$$\text{Acid} + \text{Carbonate/Bicarbonate} \rightarrow \text{Salt} + \text{H}_2\text{O} + \text{CO}_2$$

3. Reactivity of acids with metals and bases with metallic oxides

Acids react with metallic oxides to form salt and water. Bases react with metallic oxides to form salt and water.

4. Reactivity of acids and bases with each other

Acids react with bases to form salt and water. This is called neutralization.

$$\text{Acid} + \text{Base} \rightarrow \text{Salt} + \text{H}_2\text{O}$$

STATES OF MATTER

Every thing around us is made up of matter.

PROPERTIES OF MATTER

- Matter is made up of tiny particles called atoms and molecules. These particles have spaces between them.
- Matter occupies space.
- Matter has mass.

STATES OF MATTER

Solid : Particles are closely packed and have strong forces of attraction. They have a definite shape and volume.

Liquid : Particles are not so closely packed and have weaker forces of attraction. They have a definite volume but no definite shape.

Gas : Particles are far apart and have very weak forces of attraction. They have neither a definite shape nor a definite volume.

Changes of State :
Melting : Solid to Liquid
Boiling : Liquid to Gas
Condensation : Gas to Liquid
Freezing : Liquid to Solid
Sublimation : Solid to Gas
Deposition : Gas to Solid

CHANGE OF STATE OF MATTER

Evaporation

Evaporation is the process by which molecules from the liquid surface escape into the air as vapour.

Condensation

Condensation is the process by which molecules from the air come back to the liquid surface.

Boiling

Boiling is the process by which molecules from the liquid surface escape into the air as vapour at a fixed temperature.

Boiling Point : The temperature at which a liquid changes into a gas at a fixed pressure.

CLASSIFICATION OF MATTER

MATTER (Solid, Liquid or Gas)

Element : A substance that cannot be broken down into simpler substances by chemical means.

Compound : A substance that can be broken down into simpler substances by chemical means.

Mixture : A substance that contains two or more substances which are not chemically combined.

Types of Mixtures :
Homogeneous : Uniform composition throughout.
Heterogeneous : Non-uniform composition.

ELEMENTS, METALS, METALLOIDS AND NON METALS

Elements : Substances are made of elements. Some elements are metals, some are metalloids, and some are non-metals.

Metals

- Shiny (lustre)
- Good conductors of heat and electricity
- High melting and boiling points
- High tensile strength
- Most are solid at room temperature

Non-metals

- Dull (not shiny)
- Poor conductors of heat and electricity
- Low melting and boiling points
- Low tensile strength
- Most are gas or liquid at room temperature

METALS AND NON METALS : PHYSICAL PROPERTIES

Metals

- Shiny (lustre)
- Good conductors of heat and electricity
- High melting and boiling points
- High tensile strength
- Most are solid at room temperature

Non-metals

- Dull (not shiny)
- Poor conductors of heat and electricity
- Low melting and boiling points
- Low tensile strength
- Most are gas or liquid at room temperature

CHEMICAL PROPERTIES OF METALS - I

1. Reaction of Metals with Oxygen

Metals react with oxygen to form metal oxides.

$$\text{Metal} + \text{O}_2 \rightarrow \text{Metal Oxide}$$

2. Reaction of Metals with Water

Metals react with water to form metal hydroxides and hydrogen gas.

$$\text{Metal} + \text{H}_2\text{O} \rightarrow \text{Metal Hydroxide} + \text{H}_2$$

3. Reaction of Metals with Acids

Metals react with acids to form metal salts and hydrogen gas.

$$\text{Metal} + \text{Acid} \rightarrow \text{Metal Salt} + \text{H}_2$$

CHEMICAL PROPERTIES OF METALS - II

Reaction of Metals with Sulphur

Metals react with sulphur to form metal sulphides.

$$\text{Metal} + \text{S} \rightarrow \text{Metal Sulphide}$$

Formation of Sodium Chloride (Synthesis of Common Salt)

Sodium reacts with chlorine to form sodium chloride.

$$2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$$

ALUMINIUM - THE ELEMENT AND EXTRACTION

ALUMINIUM

- Atomic number : 13
- Electronic configuration : 2, 8, 3
- Position in Periodic Table : Group 13, Period 3

Extraction of Aluminium

(I) PRELIMINARY TREATMENT

(A) Bayer's Process : Bauxite is concentrated, then dissolved in sodium hydroxide to obtain alumina (Al₂O₃).

(II) ELECTROLYTIC REDUCTION OF ALUMINA

Alumina is dissolved in molten cryolite and electrolysed to produce aluminium metal.

IRON : THE ELEMENT AND EXTRACTION

IRON

- Symbol : Fe
- Atomic number : 26
- Electronic configuration : 2, 8, 14, 2
- Position in Periodic Table : Group 8, Period 4

Extraction of Iron

(1) PRELIMINARY TREATMENT

(A) Washing
(B) Magnetic Separation

(2) REDUCTION OF IRON OXIDE IN A HOT FURNACE

Iron oxide is reduced by carbon monoxide in a blast furnace to produce molten iron.

SULPHUR : THE ELEMENT

SULPHUR

- Symbol : S
- Atomic number : 16
- Electronic configuration : 2, 8, 6
- Position in Periodic Table : Group 16, Period 3

Occurrence of Sulphur

Sulphur occurs in nature as native sulphur and as metal sulphides.

CARBON & CARBON COMPOUNDS

CARBON

- Symbol : C
- Atomic number : 6
- Electronic configuration : 2, 4
- Position in Periodic Table : Group 14, Period 2

Carbon is a non-metallic element.

Carbon is found in nature as diamond, graphite, and fullerenes.

Carbon dioxide (CO₂)

Carbon dioxide is a colourless, odourless gas.

ALLOTROPES OF CARBON

Diamond

- Hardest natural substance
- Transparent
- High refractive index

Graphite

- Soft and slippery
- Good conductor of electricity
- Used in pencils

Fullerenes

Large molecules of carbon in the shape of hollow spheres, tubes, or cages.

HYDROCARBONS

HYDROCARBONS

Compounds containing only carbon and hydrogen are called hydrocarbons.

Classification

- Alkanes (Saturated)
- Alkenes (Unsaturated)
- Alkynes (Unsaturated)

Properties

- Flammable
- Insoluble in water
- Low boiling points

CARBON DIOXIDE (CO₂)

CARBON DIOXIDE (CO₂)

- Colourless and odourless gas
- Higher density than air
- Does not support combustion

Physical Properties

- It is colourless.
- It is odourless.
- It is soluble in water.

Chemical Properties

- CO₂ gas is neither combustible nor supporter of combustion.
- It is acidic in nature.
- It forms magnesium carbonate and heavy carbonates from the ores of metal particles.
- When CO₂ is passed through lime water it turns milky due to the formation of calcium carbonate.

HEAT

Production of Heat

Production of heat by burning fuel or conversion of some other forms of energy into heat.

Temperature

Temperature is a measure of the level of hotness or coldness in a substance.

Thermometer

A device used for measuring the temperature of a liquid or gas.

Clinical Thermometer

A thermometer used for measuring human body temperature.

MELTING AND BOILING POINT

Melting and Boiling Point

Melting point is the temperature at which a solid changes into a liquid. Boiling point is the temperature at which a liquid changes into a gas.

Effect of Pressure on Boiling Point

Boiling point increases with an increase in pressure.

EFFECTS OF HEAT - I

Change of a substance due to Heat

Heat causes changes in the state of matter.

Melting Point and Boiling Point

Melting point is the temperature at which a solid changes into a liquid. Boiling point is the temperature at which a liquid changes into a gas.

Expansion and Contraction of Solids due to Heat

Solids expand when heated and contract when cooled.

MEASUREMENT OF HEAT

MEASUREMENT OF HEAT

Heat is measured in calories and joules.

Specific Heat

Specific heat is the amount of heat required to raise the temperature of 1g of a substance by 1°C.

Calorimeter

A device used for measuring the heat of a reaction.

TRANSMISSION OF HEAT - I

CONDUCTION OF HEAT

Heat is transferred through a solid medium by the vibration of particles.

CONVECTION OF HEAT

Heat is transferred through a liquid or gas medium by the movement of particles.

RADIATION OF HEAT

Heat is transferred through a vacuum by electromagnetic waves.

TRANSMISSION OF HEAT - II

CONVECTION OF HEAT

Heat is transferred through a liquid or gas medium by the movement of particles.

RADIATION OF HEAT

Heat is transferred through a vacuum by electromagnetic waves.

HEALTH AND DISEASES

Size : 24" x 38" with two individual rollers

HUMAN HEALTH AND HYGIENE

HEALTH
Definition: Health is a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity.

OLD AND NEW CONCEPTS OF HEALTH

(a) The old concept
 POOR HEALTH (Disease, Weakness, Poor Health, Poor Living Habits, Poor Hygiene)
 GOOD HEALTH (No Disease, Strong Health, Good Living Habits, Good Hygiene)

(b) The new concept
 Physical health, Mental health, Social health, Moral health, Environmental health, Financial health, Spiritual health.

GENERAL MEASURES TO KEEP HEALTH

- 1) Health Education
- 2) Prevention of food and water contamination
- 3) No contamination of water and soil
- 4) Maternal and child health care
- 5) Immunisation against infectious diseases
- 6) Prevention and control of endemic diseases
- 7) Personal Hygiene
- 8) Community Hygiene

TYPES OF DISEASES

TYPES OF DISEASE

Based on time for which the disease lasts: Acute (Common cold, Cholera, Typhoid, TB)

Based on the cause of disease: Communicable (Infectious, Non-communicable, Parasitic)

Based on the mode of transmission: Airborne (Common cold, Measles, Mumps, Influenza, Tuberculosis, Typhoid, Cholera, Diphtheria, Tetanus, Botulism)

Based on the site of infection: Systemic (Typhoid, Cholera, Diphtheria, Tetanus, Botulism)

Based on the nature of the disease: Infectious (Common cold, Measles, Mumps, Influenza, Tuberculosis, Typhoid, Cholera, Diphtheria, Tetanus, Botulism)

MEANS OF SPREAD OF DISEASE

The spread of disease through AIR: Coughing, sneezing, talking, breathing.

The spread of disease through WATER: Drinking contaminated water, swimming in contaminated water.

The spread of disease through FOOD: Eating contaminated food, drinking contaminated milk.

The spread of disease through INSECTS: Mosquitoes, flies, lice, ticks, mites, fleas.

ORIGIN OF DISEASES

The disease originates due to the following factors:

- 1) **COLIBIOTIC CAUSES**
Change in the size, shape, rate of multiplication of the cells results in the disease condition. Example: Cancer.
- 2) **INFECTIONAL PATHOGENIC CAUSES**
Microbial causes include microbes such as protozoa, bacteria and viruses. Example: Malaria, leprosy, AIDS.
- 3) **GENETIC CAUSES**
Example: Sickle cell anaemia.
- 4) **Waterborne Diseases**
Example: Cholera, Typhoid, etc.
- 5) **Molecular causes**
Example: Sickle-cell anaemia.
- 6) **Genetic causes**
Example: Sickle cell anaemia.
- 7) **Environmental causes**
Example: Diarrhoea, malaria, intestinal parasites, hepatitis, etc.

GERMS AND SPREAD OF DISEASE-I

Germs have shown through their treatment that many diseases are caused by Micro-organisms. Micro-organisms are very very small. We cannot see them with the naked eye. They are living things. They are everywhere: in the air, in water, in the soil, in the bodies of animals, etc.

Diseases spread through air, water, food or some insects. Micro-organisms which cause such diseases enter through these agents into our body. They multiply and once inside the body, they may person contracts a disease.

The spread of Diseases through Water

Drinking the polluted water is the main cause of waterborne diseases. The polluted water is contaminated with germs. These germs enter the body through the mouth. The germs multiply and cause the disease.

GERMS AND SPREAD OF DISEASE-II

The spread of disease through food

- Food left uncovered is contaminated by germs because of flies or dust that settles on it. People get diarrhoea by eating such uncovered food.
- Food-handlers like those who cook, serve or sell the food have to handle the food. If their hands are dirty or contaminated with germs, the food which they touch also gets contaminated.

The spread of disease through air

- Tuberculosis, measles, mumps, diphtheria and influenza are spread through air.
- One person has Tuberculosis (TB) are present in the sputum of a person having TB. When they cough or sneeze, the germs are spread in the air. These germs enter the body of people who are nearby, through the air they breathe in.

Spread of diseases by insects

- Insects like mosquitoes, bees and some other insects spread diseases.
- When a female of anopheline mosquito bites a malaria patient it sucks victim's blood. Through this blood, germs of malaria pass on from a patient to mosquito's body. When the mosquito again bites some healthy person, malaria germs enter that person's body and cause the disease.

BACTERIAL DISEASES

BACTERIAL DISEASES

1) Tuberculosis
 It is caused by the bacterium Mycobacterium tuberculosis. It is spread through air. The germs are present in the sputum of a person having TB. When they cough or sneeze, the germs are spread in the air. These germs enter the body of people who are nearby, through the air they breathe in.

2) Cholera
 It is caused by the bacterium Vibrio cholerae. It is spread through water. The germs are present in the water. When a person drinks the contaminated water, the germs enter the body and cause the disease.

3) Typhoid
 It is caused by the bacterium Salmonella typhi. It is spread through food and water. The germs are present in the food and water. When a person eats the contaminated food or drinks the contaminated water, the germs enter the body and cause the disease.

4) Diphtheria
 It is caused by the bacterium Corynebacterium diphtheriae. It is spread through air. The germs are present in the sputum of a person having diphtheria. When they cough or sneeze, the germs are spread in the air. These germs enter the body of people who are nearby, through the air they breathe in.

VIRAL DISEASES

VIRAL DISEASES

1) Measles
 It is caused by the virus Measles virus. It is spread through air. The germs are present in the sputum of a person having measles. When they cough or sneeze, the germs are spread in the air. These germs enter the body of people who are nearby, through the air they breathe in.

2) Mumps
 It is caused by the virus Mumps virus. It is spread through air. The germs are present in the sputum of a person having mumps. When they cough or sneeze, the germs are spread in the air. These germs enter the body of people who are nearby, through the air they breathe in.

3) Polio
 It is caused by the virus Poliovirus. It is spread through water and food. The germs are present in the water and food. When a person drinks the contaminated water or eats the contaminated food, the germs enter the body and cause the disease.

DIETARY DEFICIENCY DISEASES

PROTEIN DEFICIENCY (PEM)

PEM is a condition caused due to inadequate animal food, quality and quantity of carbohydrates, proteins, fats and vitamins in the diet.

PEM occurs in two forms: Kwashiorkor and Marasmus.

KWASHIORKOR OR MARASMUS

Characteristics	Kwashiorkor	Marasmus
1) Growth rate	Reduced	Reduced
2) Appetite	Reduced	Reduced
3) Muscle wasting	Present	Absent
4) Fatty liver	Present	Absent
5) Moon face	Present	Absent
6) Swelling	Present	Absent
7) Edema	Present	Absent
8) Skin lesions	Present	Absent
9) Hair loss	Present	Absent
10) Stunted growth	Present	Absent

HEPATITIS

HEPATITIS
It is the diseased condition of liver.

It is caused by four types of virus, Hepatitis A, B, C and D.

MODE OF TRANSMISSION

Contaminated food and water, etc.

SYMPTOMS

Fever, loss of appetite, nausea, vomiting, etc.

TREATMENT AND PREVENTION

Rest, good hygiene habits and disinfection of contaminated things. Avoiding contact and contaminated needles, razors, tooth brushes, etc.

CANCER, LEPROSY, MALARIA

CANCER
It is a fatal disease caused by uncontrolled division of cells.

Agents causing Cancer:

- 1) Radiation
- 2) Chemical
- 3) Viruses
- 4) Miscellaneous

LEPROSY (HANSEN'S DISEASE)
It is a chronic infectious disease caused by Mycobacterium leprae. It is transmitted through a hole of infected female Anopheles mosquito.

MALARIA
It is a chronic infectious disease caused by Plasmodium parasites. It is transmitted through a bite of infected female Anopheles mosquito.

Symptoms of malaria:

- Periodic fever.
- Headache.
- Enlargement of spleen and varying degree of anaemia.

FIRST STAGE

SECOND STAGE

THIRD STAGE

AIDS

AIDS (ACQUIRED IMMUNE DEFICIENCY SYNDROME)
It is a set of chronic disorders because of a person's immunity is damaged.

It is caused by the Human Immunodeficiency Virus (HIV). HIV is a retrovirus i.e. its genetic material is RNA.

STRUCTURE OF HIV

MODE OF TRANSMISSION

Sexual intercourse, blood transfusion, sharing of needles, etc.

SYMPTOMS

Loss of weight, chronic diarrhoea, recurrent fever, etc.

TREATMENT AND PREVENTION

Antiretroviral drugs, safe sex, etc.

CHICKENPOX, RABIES

Types of Diseases:

- 1) Epidemic diseases
- 2) Communicable diseases
- 3) Contagious diseases

Chickenpox

Mode of Infection: Contaminated food and water, etc.

Main Symptoms: Rash, fever, etc.

Preventive Measures: Avoid contact with infected persons, etc.

Polio

Mode of Infection: Contaminated food and water, etc.

Main Symptoms: Paralysis, etc.

Preventive Measures: Polio vaccine, etc.

Rabies

Mode of Infection: Bite of an infected dog, monkey, etc.

Main Symptoms: Agitation, etc.

Preventive Measures: Vaccination, etc.

TUBERCULOSIS, TYPHOID, CHOLERA

Tuberculosis

Mode of Infection: Contaminated air.

Main Symptoms: Cough, weight loss, etc.

Preventive Measures: Avoid contact with infected persons, etc.

Typhoid

Mode of Infection: Contaminated food and water.

Main Symptoms: High fever, headache, etc.

Preventive Measures: Avoid contact with infected persons, etc.

Cholera

Mode of Infection: Contaminated water.

Main Symptoms: Watery stool, dehydration, etc.

Preventive Measures: Avoid contact with infected persons, etc.

ENTERITIS, DIARRHOEA

Enteritis

Mode of Infection: Contaminated food and water.

Main Symptoms: Abdominal pain, etc.

Preventive Measures: Avoid contact with infected persons, etc.

Diarrhoea

Mode of Infection: Contaminated food and water.

Main Symptoms: Frequent watery stools, etc.

Preventive Measures: Avoid contact with infected persons, etc.

AIDS

Mode of Infection: Sexual intercourse, blood transfusion, etc.

Main Symptoms: Weight loss, chronic diarrhoea, etc.

Preventive Measures: Safe sex, etc.

NUTRITION

Size : 24" x 38" with two individual rollers

NUTRIENTS IN FOOD

Carbohydrates	Proteins	Fats	Vitamins and Minerals
<p>Carbohydrates Rice, wheat, corn, pulses, green peas, sweet potatoes, millets, jowar, ragi, etc.</p> <p>Proteins Legumes and pulses, green gram, mung, soybean, pulses, milk, curries, paneer, eggs, meat, fish, poultry.</p> <p>Fats Vegetable oil, ghee, butter, coconut oil, etc.</p> <p>Vitamins and Minerals Fruits, vegetables, green leafy vegetables, milk, pulses, etc.</p>	<p>Proteins help in growth and maintenance</p>	<p>Fats Vegetable oil, ghee, butter, coconut oil, etc.</p>	<p>Vitamins and Minerals Fruits, vegetables, green leafy vegetables, milk, pulses, etc.</p>

Carbohydrates and Fats provide energy to body.

Proteins help in growth and maintenance.

Vitamins and Minerals are required for normal growth, development and maintenance of good health.

FOOD & ENERGY

Food Group	Food Sources	Functions
I Cereals	Rice, Wheat, Jowar, Ragi, Ragi, etc.	Supply mainly energy. Supply proteins, fats, vitamins, iron and fibres.
II Pulses and Legumes	Beans, Peas, Rajma, Bengal gram, Black gram, etc.	Provide mainly protein; supply B-vitamins, iron, fibre and some energy.
III Milk and milk products	Milk, curries, butter, paneer, cheese, vanaspathi, etc.	Supply proteins, fats, calcium and vitamins.
IV Fruits and Vegetables	Pear, Apple, Mango, Guava, Tomato, Pumpkin, Broccoli, green leafy vegetables, etc.	Supply vitamins, minerals, iron and fibres.
V Nuts	Almonds, groundnuts, coconuts, cashewnuts, etc.	Supply fat, calcium, vitamins.
VI Meat and Eggs	Meat, fish, eggs, etc.	Supply proteins, fats, vitamins.
VII Oils	Vegetable oils, oil seeds, ghee, etc.	Supply energy and essential fatty acids.

FOOD PYRAMID

FATS, OILS, SUGARS use sparingly

LEGUMES, PULSES
1-2 cups, cooked Beans

MEAT
100-300g or 3 eggs

FRUITS
2-4
Bananas, oranges, apples

VEGETABLES
3-5 cups of raw leafy vegetables

Cereals
3-5 cups of cooked rice

MILK, Curries, etc.
2-4 cups

FATS, OILS, SUGARS
use sparingly

Balanced diet food pyramid

A balanced diet is one which contains various groups of foods such as energy-rich foods (carbohydrates, fats), body-building foods (proteins, minerals) and vitamins in correct proportions to maintain good health.

FOOD AND DIET - I

Our meals consist of many food preparations such as vegetables, chapatis, meat and fish. In between, we eat and drink a variety of things at different times throughout the day. All that we eat during a day is together called as diet.

Balanced Diet

We must think of all those foods which we provide sufficient quantities of all constituents of food for our body needs. Also their proportions should be enough to meet the needs of the particular person. Such a diet is called a Balanced Diet.

Children & boys require more energy for the growth of their body. The growth is rapid. Therefore, they need more food.

The quantity of food a person needs depends upon the kind of work the person does. People who do heavy physical work need much more energy than people who do sedentary work. Therefore, people doing hard physical work need more food than people doing sedentary work.

FOOD AND DIET - II

Indian Diet

We eat preparations of sprouted pulses such as chana, moong, matar and arhar. These are rich in protein and vitamins. We also eat pulses and dal and use them in various ways. Sprouting increases the proportion of protein in the food material, making it more nutritious.

Malnutrition

We eat balanced diet which has all the nutrients for a healthy body. Malnourished children look extremely thin, skinny and have a pot belly. Their diet lacks food that are rich in starch and proteins. Their bodies do not grow properly. They cannot fight diseases.

Vitamin	Deficiency caused by lack of vitamin	Treatment
A	Xerophthalmia	Include leafy vegetables, like yellow vegetables, carrots, papayas, milk in diet.
B	Redness of the tongue, roughness of the skin	Include pulses, leafy vegetables, and milk in the diet.
C	Bleeding gums	Include amla, lemon, oranges and sprouts in the diet.
D	Bending of the bones of the legs, bending of the back	Expose the body to the early morning sun. Include milk, sardines and cod-liver oil in the diet.

DIGESTION OF FOOD

The process of transformation of food into soluble substances and their absorption into the blood is called digestion.

Mouth: Digestion of food begins as it is put in the mouth. Saliva, a digestive juice, mixes with the food and softens it. The bolus is then pushed into the oesophagus and from there into the stomach.

Stomach: In the stomach, the food is churned well. Digestive juices from stomach mix with the food and a thick mixture is formed. It is then pushed slowly into the small intestine.

Small intestine: In the small intestine, digestive juices from the liver, pancreas and small intestine mix with the food mixture and changes it into soluble substances. These soluble substances are absorbed into the blood vessels. The indigestible waste products are expelled from the body through anus.

Large intestine: The water in the food mixture and some soluble substances are absorbed in the large intestine. The undigested waste products are expelled from the body through anus.

Do not eat your meals hurriedly.
Chew & swallow your food properly before swallowing it.
Do not talk or be angry when you eat.
Eat well.
Drink as much water as you need.

FOOD AND NUTRITION

Different modes of taking food

Animals are heterotrophs

Nutrition in plants

Plants are autotrophs

Plants synthesize food with the help of light and chlorophyll from carbon dioxide in the air. The process is called photosynthesis.

Water + carbon dioxide + sunlight → food + oxygen + water

An experiment to show that carbon dioxide is needed for photosynthesis.

An experiment to show the transportation of water and minerals from the root to leaves.

Pumpkin chamber

Saffron solution

DIETARY DEFICIENCY DISEASES

PROTEIN DEFICIENCY (PEM)

PEM is a condition caused due to inadequate amount of protein and quality of nutrition in the diet. PEM occurs in children below 5 years of age. The most common form of PEM is Kwashiorkor and Marasmus.

PEM	Present	Absent
1) Oedema	Present	Absent
2) Fatty Liver	Absent or mild	May be very severe
3) Muscle wasting	Less than in Marasmus	Severe
4) Growth rate reduction in terms of body weight	Usually poor	Usually good
5) Appetite	Often	None
6) Moon face		

AGRICULTURE

Size : 24" x 38" with two individual rollers

AGRICULTURAL PRACTICES 1

Plants are nurtured by nature itself. Seeds of plants are distributed and dispersed in different ways, through wind, water and animals.

Fruits growing on trees burst open on drying. The seeds in them are carried away by the wind and water. Animals and scattered here and there, in favourable conditions, they take root and grow into seeds.

Seeds of trees like banyan are distributed through the dropping of birds.

AGRICULTURAL PRACTICES

The important steps in farm work are:

- 1) Tilling the land
 - (i) Ploughing stage
 - (ii) Sowing stage
 - (iii) Weeding stage
 - (iv) Harvesting stage
- 2) Harvesting
- 3) Threshing
- 4) Storing

AGRICULTURAL IMPLEMENTS & TOOLS 2

Plough

Wooden board

Pickaxe

Pump

Tissue culture

Spade

Scythe

Tissue culture : Growing living cells or groups of cells outside the plants or animals is called tissue culture. When the mass of polliculation are not available, tissue culture helps to produce plants exactly like the original ones.

FOOD QUALITY 3

FOOD QUALITY

Can be improved by:

- Good quality seeds
- Good soil
- Good water
- Good climate
- Good management
- Good storage

Animal Husbandry : The branch of agriculture which deals with the feeding, shelter, health and breeding of domestic animals. It includes:

- Cattle Farming**
- Poultry Farming**
- Crossbred Strains of Animals**

FOOD WASTAGE 4

(1) Ways of Quantitative wastage of Food

Producer

- Heat
- Frost
- Rain
- Humidity
- Contamination
- Spoilage
- Quality losses

Pre-marketing → **Transport** → **Storage** → **Marketing** → **Consumers**

Problems in Pre-marketing:

- Broken grain
- Excessive dehusking
- Trimming

Problems in Transport:

- Spillage
- Leakage
- Rodent infestation
- Spoilage
- Rancidity
- Over ripening

Problems in Storage:

- Spoilage
- Excessive dehusking
- Spoilage
- Spoilage

Problems in Marketing:

- Spoilage
- Spoilage
- Spoilage

(2) Qualitative Loss of Nutritive Value of Food

- (A) By faulty pre-marketing processes
- (B) By faulty preservation processes
- (C) By faulty cooking methods

FOOD AND PROTECTION OF FOOD 5

Carbohydrates : They are the most important nutrients. They provide energy to the body. They are found in cereals, pulses, fruits, and vegetables.

Proteins : They are essential for the growth and maintenance of the body. They are found in pulses, eggs, and meat.

Vitamins : They are essential for the health of the body. They are found in fruits, vegetables, and grains.

Minerals : They are essential for the health of the body. They are found in fruits, vegetables, and grains.

PROTECTION OF FOOD

- 1) By Preservation
- 2) By Preserving food
- 3) By use of chemical preservatives
- 4) By deterring microorganisms

ENVIRONMENTAL SCIENCE

Size : 24" x 38" with two individual rollers

ECOSYSTEM - I

ECOSYSTEM : Biotic factors, abiotic factors and their interactions with one another together form an ecosystem.

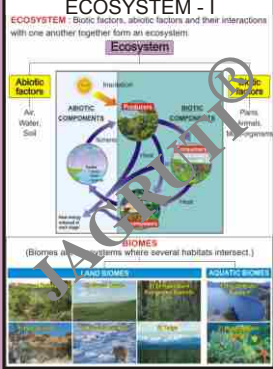
Abiotic factors : Air, Water, Soil

BIOTIC COMPONENTS : **Autotrophs** (Plants, Animals, Organisms) and **Heterotrophs** (Animals, Organisms)

ECOSYSTEMS : (Biomes are systems where several habitats intersect.)

LAND ECOSYSTEMS : Desert, Grassland, Forest, Tundra

AQUATIC ECOSYSTEMS : Freshwater, Marine



ECOSYSTEM - II

NICHE : Niche is the ecological role and function that an organism fills in an Ecosystem.

Autotrophs : The organisms that make their own food by the process of photosynthesis. All green plants are autotrophs.

Primary Consumers : The animals that feed on autotrophs.

Secondary Consumers : The animals that feed on primary consumers.

Apex Carnivore : The topmost carnivore which are not eaten by any other organism. They eat that factor.

Omnivores : Organisms that feed upon food of both autotrophic and heterotrophic organisms.

Detritivores : Organisms that feed upon dead bodies of autotrophic or heterotrophic organisms.

Decomposers : Organisms that decompose dead organisms and return the nutrients to the soil.



FOOD CHAIN

Linkages of organisms within an ecosystem with respect to feeding and feeding habits is called a food chain.

EXAMPLES OF SIMPLE FOOD CHAIN

1. Grass → Grasshopper → Frog → Snake → Eagle

2. Plant → Deer → Tiger

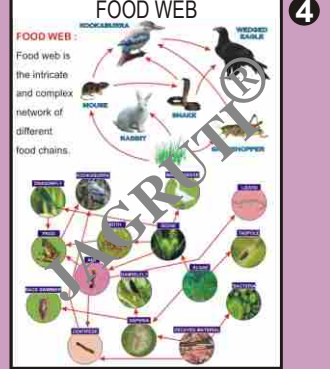
3. Plant → Rabbit → Fox

4. Plant → Insect → Bird (Kingfisher)



FOOD WEB

Food web is the intricate and complex network of different food chains.



ENERGY PYRAMID

ENERGY PYRAMID : Energy pyramid is the diagrammatic representation showing how the energy travels up in a food chain through different trophic levels.

Energy at each level is less than the level below it. That is, there is a loss of energy from one level to the next. The loss of energy is due to the fact that some of the energy is used for the maintenance of the organisms and some is lost as heat. The energy that is passed on to the next trophic level therefore is diagrammatically represented as a pyramid figure is formed.

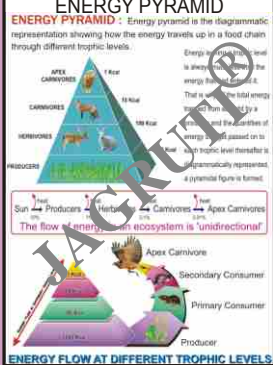
The flow of energy in an ecosystem is 'unidirectional'.

Apex Carnivore (Tiger)

Secondary Consumer (Snake)

Primary Consumer (Rabbit)

Producer (Plant)



SOLID WASTE MANAGEMENT

SOURCES AND TYPES OF SOLID WASTE :

1. DOMESTIC WASTE : Kitchen waste, plastic, paper, etc.

2. INDUSTRIAL WASTE : Sludge, effluents, etc.

3. HAZARDOUS WASTE : Medical waste, pesticides, etc.

4. CONSTRUCTION WASTE : Bricks, stones, etc.

5. ELECTRICAL WASTE : Old televisions, etc.

6. AGRICULTURAL WASTE : Crop residues, etc.

7. COMMERCIAL WASTE : Old clothes, etc.

8. HIGHER EDUCATION WASTE : Old books, etc.



COMMON METHODS & STAGES OF SOLID WASTE DISPOSAL

COMMON METHODS OF SOLID WASTE MANAGEMENT:

1. DOOR-TO-DOOR COLLECTION OF HOUSEHOLD WASTE : This is done by Corporation. There are vehicles called 'wheelerbarrows' which collect the waste from the door.

2. LANDFILL : In this method, collected waste is dumped in an outside area. It is not good as it causes leaching and ground water contamination.

3. DISPOSAL IN THE SEA : The waste collected in the coastal cities like Mumbai, Kolkata and Chennai is disposed in the sea.

STAGES OF PROPER SOLID WASTE MANAGEMENT:

1. WASTE SEPARATION AND SEGREGATION : This is done by the people. They separate the waste into different categories.

2. IMPROPER HANDLING AND TRANSPORTATION : Some people are careless that they do not handle the waste properly. They use open trucks to transport the waste.



SCIENTIFIC METHODS OF SOLID WASTE MANAGEMENT

1. Waste Separation

2. Composting

3. Vermicomposting

4. Secured Landfill

5. Pyrolysis

1. WASTE SEPARATION

2. COMPOSTING

3. VERMICOMPOSTING

4. SECURED LANDFILL

5. PYROLYSIS



ENERGY RECOVERY FROM A WASTE

BIOGAS PLANT : Energy from waste

About 150 tonnes of solid waste can produce 14000 m³ of biogas. This amount of biogas generates 1.2 MW of power and 45 tonnes of manure.

BIODIESEL : Biodiesel is a renewable energy source. It is produced from vegetable oils. It is a cleaner fuel than diesel. It is used in diesel engines.

RECYCLING : Recycling is the process of converting waste materials into new materials and objects. It is an important part of the waste management system.

1. REDUCE : Reduce solid waste at source means using less paper and less use of plastic carry bags.

2. REUSE : Reuse means making mature out of decomposable waste, making note-books out of unused papers.

3. RECYCLE : Recycle means separating plastic, metal, rubber, glass and sending it to recycling.



Degradation and Destruction of Ecosystems - I

(A) Natural Causes of Degradation of Ecosystems

1. Forest Fires

2. Floods

3. Droughts and Famines

4. Earthquakes

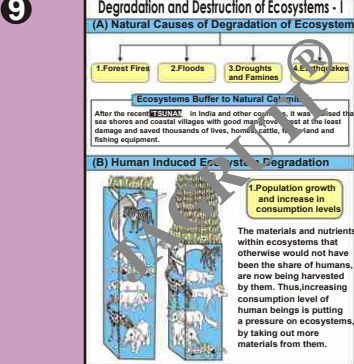
Ecosystems Buffer to Natural Causes

After the recent **tsunami** in India and other countries, it was found that the sea shores and coastal villages with good mangroves lost at the least damage and saved thousands of lives, animals, and fishing equipment.

(B) Human Induced Ecosystem Degradation

1. Population growth and increase in consumption levels

The materials and nutrients within ecosystems that otherwise would not have been the share of humans, are now being harvested by them. This increasing consumption level of human beings is putting a pressure on ecosystems, by taking out more materials from them.



Degradation and Destruction of Ecosystems - II

(B) Human Induced Ecosystem Degradation

1. Population growth and increase in consumption level

2. Migration

3. Urbanization

4. Industrialization and transport

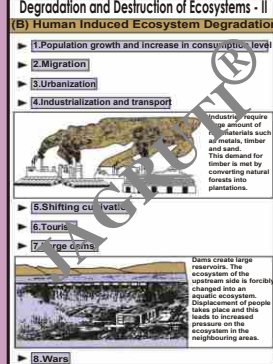
5. Shifting cultivation

6. Tourism

7. Large dams

8. Wars

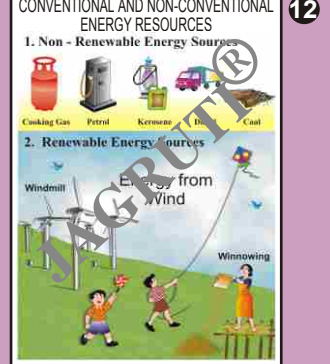
Human activities like deforestation, urbanization, and industrialization lead to ecosystem degradation. Shifting cultivation and large dams also have significant impacts on ecosystems.



CONVENTIONAL AND NON-CONVENTIONAL ENERGY RESOURCES

1. Non-Renewable Energy Sources : Cooking Gas, Petrol, Kerosene, Diesel, Coal

2. Renewable Energy Sources : Windmill, Energy from Wind, Winnowing

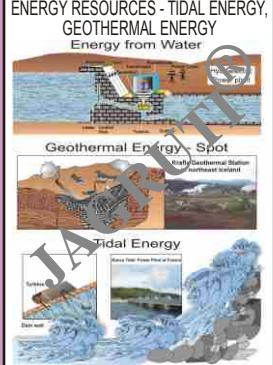


ENERGY RESOURCES - TIDAL ENERGY, GEOTHERMAL ENERGY

Energy from Water

Geothermal Energy Spot : Geothermal Energy (Southwest Iceland)

Tidal Energy : Tides are the rise and fall of the sea level. Tidal energy is the energy that is produced by the movement of the tides.



ENERGY RESOURCES - SOLAR ENERGY

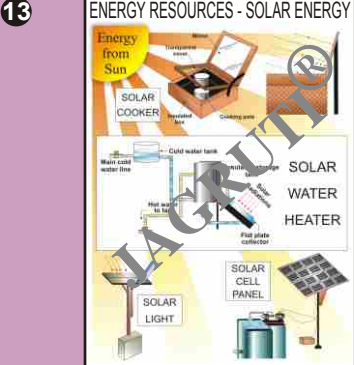
Energy from Sun

SOLAR COOKER : Solar cooker uses solar energy to cook food.

SOLAR WATER HEATER : Solar water heater uses solar energy to heat water.

SOLAR CELL PANEL : Solar cell panel converts solar energy into electricity.

SOLAR LIGHT : Solar light uses solar energy to provide illumination.



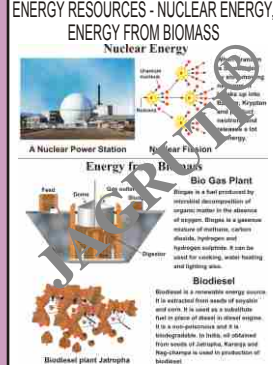
ENERGY RESOURCES - NUCLEAR ENERGY, ENERGY FROM BIOMASS

ENERGY FROM BIOMASS

Nuclear Energy : Nuclear energy is the energy that is released from the nucleus of an atom.

Bio Gas Plant : Bio gas plant produces biogas from organic waste.

Biodiesel : Biodiesel is a renewable energy source produced from vegetable oils.




DIFFERENT FORMS OF ENERGY

Energy of an object is its capacity for doing work. SI unit of energy is joule. CGS unit is erg.

DIFFERENT FORMS OF ENERGY

1. KINETIC ENERGY : It is the energy possessed by a body due to its motion.

2. POTENTIAL ENERGY : It is the energy possessed by a body due to its position or configuration.



LAW OF CONSERVATION OF ENERGY

LAW OF CONSERVATION OF ENERGY : Energy can neither be created nor be destroyed. It can be converted from one form to another. The total amount of energy in the universe remains constant.

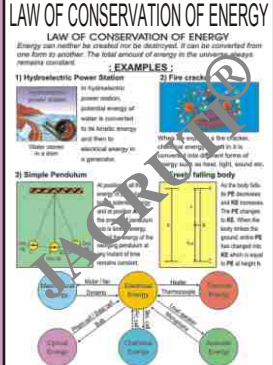
EXAMPLES :

1. Hydroelectric Power Station : In a hydroelectric power station, the potential energy of water is converted into kinetic energy and then into electrical energy.

2. Simple Pendulum : In a simple pendulum, the kinetic energy is converted into potential energy and vice versa.

3. Free falling body : In a free falling body, the potential energy is converted into kinetic energy.

4. Rocket : In a rocket, the chemical energy is converted into heat and then into kinetic energy.



INTERCHANGEABILITY OF DIFFERENT FORMS OF ENERGY

When we lift an object, energy stored in our body gets converted into kinetic energy of the moving object.

Muscle energy gets converted into electrical energy in a TV.

Electrical energy gets converted into heat energy in a heater.

Heat energy gets converted into mechanical energy in a steam engine.

Mechanical energy gets converted into electrical energy in a generator.

Electrical energy gets converted into light energy in a lamp.

Light energy gets converted into heat energy in a solar cooker.

Heat energy gets converted into mechanical energy in a steam engine.

Mechanical energy gets converted into electrical energy in a generator.

Electrical energy gets converted into light energy in a lamp.

Light energy gets converted into heat energy in a solar cooker.



AIR - I : OXYGEN

The thick envelope of air around the earth is called the atmosphere.

Atmospheric air contains oxygen, carbon dioxide, water vapour, inert gases etc.

Air is a homogeneous mixture of these gases.

OXYGEN

All living things use oxygen for respiration.

Oxygen is found in air in free state.

Oxygen is also present in water in dissolved state.

About 21% of air is oxygen.

Laboratory Preparation of Oxygen

Physical properties of Oxygen

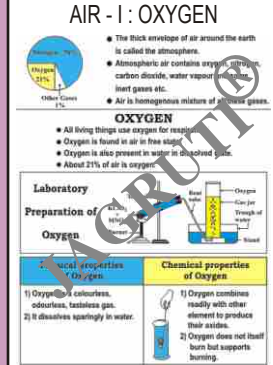
1) Oxygen is colourless, odourless, tasteless gas.

2) It dissolves sparingly in water.

Chemical properties of Oxygen

1) Oxygen combines readily with other elements to produce their oxides.

2) Oxygen does not burn but supports burning.



AIR - II : NITROGEN, CARBON DIOXIDE, WATER VAPOUR, INERT GASES

NITROGEN

78% of air is nitrogen.

Nitrogen is an important constituent of proteins.

Plants and animals cannot use nitrogen from the air.

Nitrogen fixation is necessary for plants to produce food.

CARBON DIOXIDE

The carbon dioxide in the atmosphere is about 0.03% of the total air.

Plants use carbon dioxide from the air during photosynthesis and release oxygen into the air.

The increase in carbon dioxide in air causes global warming.

The carbon dioxide dissolves only sparingly in water.

When carbon dioxide is dissolved in water, carbon dioxide is converted into water under pressure.

When carbon dioxide is dissolved in water, it forms carbonic acid.

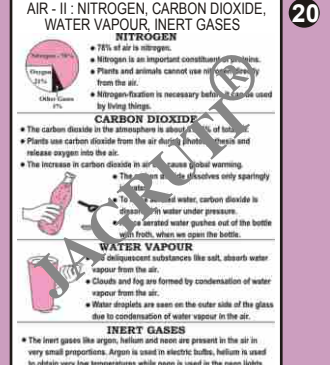
WATER VAPOUR

Water droplets are seen on the outer side of the glass due to condensation of water vapour in the air.

Clouds and fog are formed by condensation of water vapour from the air.

INERT GASES

The inert gases like argon, helium and neon are present in the air in very small proportions. Argon is used in electric bulbs, helium is used to obtain very low temperatures while neon is used in the neon lights.



GEOGRAPHY

Size : 24" x 38" with two individual rollers

THE UNIVERSE-I

THE SKY : If we observe the clear sky at night, we see innumerable stars against a dark background. This background that appears like a vault is called the sky.

A LIGHT YEAR : A ray of light covers a distance of 9.46,080 crore kilometers, if it travels straight up from its source for a period of one year. The distance travelled by light in one year is called one light year. One light year is a unit of distance.

Earth
3.8 light minutes
138,000 km

- A unit of year can be divided further into smaller units such as light months, light days, light hours, light minutes and light seconds.
- The distance between the sun and the earth in this new unit is 8.3 light minutes.
- The distance between the earth and the moon in this new unit is 1.28 light seconds.

THE UNIVERSE-II

A GALAXY : Due to the attraction between the stars, they form clusters or groups. Such a cluster of stars is called a galaxy. Galaxies have a bright central part and they spread out towards the periphery.

SPACE : Contiguous and infinite gaps between the celestial bodies. These gaps between the celestial bodies are near a total vacuum. Such contiguous regions between the celestial bodies is called space.

THE UNIVERSE

The Earth, The Solar System, The Milky Way, The Universe

- The universe is an all-inclusive concept.
- There are about 1000 galaxies in the universe.
- The universe comprises all these galaxies, the space within and between the galaxies and the energy existing in them.
- Scientists believe that the universe came into existence about 1300 crore years and since then, it has been continuously expanding.

OUR SOLAR SYSTEM

The Sun, the eight planets that revolve around the sun, the asteroids, dwarf planets and comets all together form our Solar System.

The eight planets according to their distance from the sun are,

- 1) Mercury is the planet nearest to the sun.
- 2) Venus is the planet nearest to earth.
- 3) Earth is the planet nearest to the planet farthest from the sun.
- 4) Mars is the planet nearest to earth.
- 5) Jupiter is the planet farthest from the sun.
- 6) Saturn is the planet farthest from the sun.
- 7) Uranus is the planet farthest from the sun.
- 8) Neptune is the planet farthest from the sun.

ARTIFICIAL SATELLITES : They are far-

- 1) Being used to study the sun and the atmosphere.
- 2) Water harvesting.
- 3) Communication and broadcasting programmes on radio & TV.
- 4) Geostationary satellites.
- 5) Being space wars.

THE SUN, THE EARTH AND THE MOON-I

THE MOTIONS OF THE MOON

The moon, while revolving around its orbit, revolves around the earth. The moon takes 29.5 days to complete its orbit. However, it takes 27.3 days to complete one revolution around the earth. As the earth and the moon revolve around the sun, one side of the moon always faces the earth and the other side always faces away from the earth.

EFFECTS OF THE MOON'S MOTIONS :

- 1) PHASES OF MOON AND MOON'S MOTION OF TIME
- 2) TIDES
- 3) ECLIPSES

From the earth we can see only the illuminated part of the moon. Due to the moon's revolution around the earth, the illuminated part seen from the earth appears to change from day to day. This changing view of the illuminated part of the moon is called a phase of the moon.

DUUE TO THE REVOLUTION OF THE MOON AROUND THE EARTH, WE HAVE GOT MONTH AS A UNIT OF TIME MEASUREMENT.

THE SUN, THE EARTH AND THE MOON-II

EFFECTS OF THE MOON'S MOTIONS - ECLIPSES

SOLAR ECLIPSES

1. PARTIAL SOLAR ECLIPSE AND TOTAL SOLAR ECLIPSE
2. ANNUULAR SOLAR ECLIPSE AND TOTAL SOLAR ECLIPSE

LUNAR ECLIPSES

TOTAL AND PARTIAL LUNAR ECLIPSE

THE MOON

The moon revolves around the earth. It is known as a satellite of the earth. It is a naturally body nearest to the earth. It is at an average distance of 3,84,400 km from the earth.

As the moon revolves around the earth, it also revolves around itself. The moon takes 27.3 days to complete one revolution around the earth. It takes the moon 29.5 days to complete one revolution around the earth. This is longer than the time it takes to revolve around the earth.

On Full Moon Day, the moon appears to be round. After that it waxes, or appears to get rounder and rounder till at last on New Moon Day, it is a thin crescent. The moon waxes or appears to get bigger again, every day.

These opposite appearances of the moon (on waxing and waning) is called the phases of the moon.

An Experiment to understand the phases of the moon

CONSTELLATIONS

On a clear moonless night we can see thousands of stars in the sky. Some of them form beautiful patterns. These patterns are called constellations. There are 88 constellations, 37 of which are in the northern sky while 51 constellations are in the southern sky.

According to ancient Indian Astrologers, there are 27 constellations or Nakshatras.

On summer nights, we can see a particular configuration of seven stars. It is called the Great Bear or Saptarshi in Marathi.

The constellation called Orion, the Hunter, is very brightly in the sky. It can be seen on winter nights. The three stars in the middle are said to be Orion's belt. The fainter stars below it are his dagger.

The constellation, Scorpius is seen in the southern sky just below the equator. Though we see 10-12 stars in the constellations Scorpius, the Antares is the brightest among them.

SHAPE OF THE EARTH

The shape of the earth is spherical (approximately).

- Its shape at the poles is slightly flattened.
- The Earth's equatorial diameter is 12,756 km and its polar diameter is 12,714 km.

Some Experiments to prove that the Earth is spherical

Observation of the ship coming towards the shore

OUR EARTH

Breakdown of earth around the sun and its various axes cause changes of climate. This results into changes in seasons. This results into changes in seasons.

FACTORS THAT SUPPORT LIFE

- (1) Atmosphere
- (2) Hydrosphere
- (3) Lithosphere

The structure of the Earth's interior

ATMOSPHERIC PRESSURE - I

A force is required to overcome the weight of the air or to change the direction of an object in motion. The force applied on an object to change the speed or to change the shape of an object.

When a force is applied to an object, it produces an equal pressure in all the other parts of the object. This is an important property of fluids.

Pressure = Force / Area

Fluids flow from a region of higher pressure to a region of lower pressure.

ATMOSPHERIC PRESSURE - II

The atmosphere around us is made of gases like nitrogen, oxygen, carbon dioxide, water vapour, dust particles.

The pressure exerted by the atmosphere is called atmospheric pressure.

The mean of the atmospheric column standing on a 10 cm x 10 cm area is about 1000 N.

We do not feel such a high pressure because the pressure inside our body is same as the pressure outside our body.

When we go to a higher altitude, the atmospheric pressure is lower. This is because air above the altitude is drawn and hence inside of the lungs the atmospheric pressure is higher. This pressure pushes it on the lungs.

An Experiment to measure the atmospheric pressure

Procedure : Fill a glass tube with mercury. Turn the tube and head it on a scale. The height of the mercury column is the atmospheric pressure.

Barometer : A barometer is a device used for measuring the atmospheric pressure. It consists of a glass tube filled with mercury. The atmospheric pressure pushes it on the mercury.

Barometer : A barometer is a device used for measuring the atmospheric pressure. It consists of a glass tube filled with mercury. The atmospheric pressure pushes it on the mercury.

Barometer : A barometer is a device used for measuring the atmospheric pressure. It consists of a glass tube filled with mercury. The atmospheric pressure pushes it on the mercury.

LOCATING A PLACE ON THE EARTH

Parallels of Latitude : The imaginary circular lines which are parallel to the equator (E), are called parallels of latitude.

Lines of Longitudes - Meridians : The imaginary semi-circular lines joining the North Pole and the South Pole are called meridians.

Grid : The network of parallels of latitude and lines of longitude is called a grid. It helps in locating places or boundaries.

Circle of illumination : Due to the sunrays, the half of the earth is lit up in its darkness. In the other half facing the sun, it is dark. The area of darkness and light is called the circle of illumination. It is also a great circle.

LOCAL TIME AND STANDARD TIME

The movement of the Earth around its axis is called the rotation of the Earth. The movement of the Earth around the sun is called the revolution of the Earth.

The time taken by the Earth to complete one rotation is 24 hours. When the Sun is in its highest position in the sky, it is called the Noon. It is called the Noon.

Position of Shadows and Noon

THE ATMOSPHERE

The layer of many gases surrounding the Earth is called the atmosphere. The atmosphere is made up of many layers. The layers of the atmosphere are called the layers of the atmosphere.

The composition of the atmosphere is as follows:

- (1) Gases : There are several gases in the atmosphere. The most common are nitrogen (78%) and oxygen (21%). Other gases such as carbon dioxide, water vapour, etc. are also present.
- (2) Water Vapour
- (3) Dust Particles

STRUCTURE OF ATMOSPHERE

- (1) Troposphere
- (2) Stratosphere
- (3) Mesosphere
- (4) Ionosphere
- (5) Thermosphere

THE BIOSPHERE

Biosphere : We live in a world of life. We live in a world of life. We live in a world of life.

The biosphere is the part of the Earth where life exists. It is the part of the Earth where life exists. It is the part of the Earth where life exists.

The biosphere is the part of the Earth where life exists. It is the part of the Earth where life exists. It is the part of the Earth where life exists.

The biosphere is the part of the Earth where life exists. It is the part of the Earth where life exists. It is the part of the Earth where life exists.

The biosphere is the part of the Earth where life exists. It is the part of the Earth where life exists. It is the part of the Earth where life exists.

HYDROSPHERE

Land and water distribution : The Earth is covered with water. The water is in the form of oceans, seas, lakes, rivers, etc.

Oceans and Climate : The oceans play a major role in the climate. They absorb heat from the sun and release it back into the atmosphere.

Oceans and Natural Resources : The oceans are a source of many natural resources. These include fish, oil, gas, etc.

CLIMATE

Water Cycle

INSTRUMENTS FOR MEASURING VARIOUS ELEMENTS OF WEATHER

- Barometer
- Thermometer
- Wind speed and direction meter
- Rain gauge
- Cloud recorder
- Hygrometer
- Stemometer
- Altimeter

OCEAN FLOOR / TEMPERATURE - SALINITY OF OCEAN WATERS

STRUCTURE OF THE OCEAN FLOOR

TEMPERATURE OF OCEAN WATER SURFACE

SALINITY OF OCEAN WATER

MOVEMENTS OF OCEAN WATER - I

(A) SEA WAVES

(B) TIDES

SPRING TIDES

NEAP TIDES

OCEAN CURRENTS

MOVEMENTS OF OCEAN WATER - II

TYPES OF TIDES

OCEAN CURRENTS

INTERIOR OF THE EARTH

INTERIOR OF THE EARTH

Crust (Average thickness 35 km)
Lithosphere (100 km)
Asthenosphere (290 km)
Inner core (1220 km)
Outer core (3480 km)

The outermost layer of the earth is known as the crust. The crust is divided into two parts: the upper part is called the lithosphere and the lower part is called the asthenosphere. The asthenosphere is about 100 km thick. The inner core is about 1220 km in radius and the outer core is about 3480 km in radius.

HOW EARTHQUAKE WAVES TRAVEL

The primary waves or P-waves travel through the solid outer core. The secondary waves or S-waves cannot travel through the liquid outer core. The study of earthquake waves has helped in determining the different layers of the interior and their boundaries.

21

SLOW EARTH MOVEMENT

SLOW EARTH MOVEMENTS

The movements of the earth's surface are called slow earth movements. They are of two types: folding and faulting.

FOLDING

Folding is the process by which the earth's crust is bent into rounded shapes. It is caused by the pressure of compression. The most common type of folding is the anticline, which is a fold that curves upward. Other types of folds include synclines, monoclines, and thrust faults.

FAULTING

Faulting is the process by which the earth's crust is broken into blocks along fractures called faults. The blocks are displaced relative to each other. The most common type of fault is the normal fault, which is a fault where the upper block has moved down relative to the lower block. Other types of faults include thrust faults and strike-slip faults.

ROCK MOVEMENT

Rock movement is the process by which rocks are displaced from their original positions. It is caused by the pressure of compression and tension. The most common type of rock movement is the anticline, which is a fold that curves upward. Other types of rock movements include synclines, monoclines, and thrust faults.

22

RAPID EARTH MOVEMENT

RAPID EARTH MOVEMENTS

Rapid earth movements are movements of the earth's surface that occur over a short period of time. They are of two types: earthquakes and volcanic eruptions.

EARTHQUAKE

An earthquake is a sudden shaking or trembling of the earth. It is caused by the release of energy in the form of seismic waves. The energy is released when two blocks of rock slip past each other. The most common type of earthquake is the strike-slip earthquake, which is caused by the horizontal sliding of two blocks of rock past each other. Other types of earthquakes include normal earthquakes and thrust earthquakes.

SEISMIC WAVES

Seismic waves are waves of energy that travel through the earth's interior. They are of two types: P-waves and S-waves. P-waves are primary waves and travel through both solid and liquid. S-waves are secondary waves and travel through solid material only.

TYPE OF EARTHQUAKE WAVES

There are three types of seismic waves: P-waves, S-waves, and surface waves. P-waves are the fastest and travel through both solid and liquid. S-waves are the slowest and travel through solid material only. Surface waves are the most destructive and travel along the surface of the earth.

TYPE OF VOLCANIC ERUPTION

There are three types of volcanic eruptions: effusive, explosive, and phreatic. Effusive eruptions are characterized by the flow of lava. Explosive eruptions are characterized by the release of gas and ash. Phreatic eruptions are caused by the boiling of water.

23

ROCKS AND ROCK TYPES

ROCK CYCLE

The rock cycle is the process by which rocks are formed, changed, and recycled. It is a continuous process that involves the transformation of rocks from one type to another. The rock cycle is driven by the forces of plate tectonics and the earth's internal heat.

TYPE OF ROCKS

There are three types of rocks: igneous rocks, sedimentary rocks, and metamorphic rocks. Igneous rocks are formed from the cooling and solidification of magma. Sedimentary rocks are formed from the accumulation and lithification of sediments. Metamorphic rocks are formed from the transformation of existing rocks under high temperature and pressure.

1. IGNEOUS ROCKS

Igneous rocks are formed from the cooling and solidification of magma. They are of two types: intrusive igneous rocks and extrusive igneous rocks. Intrusive igneous rocks are formed from magma that has cooled slowly underground. Extrusive igneous rocks are formed from magma that has cooled quickly on the surface.

2. SEDIMENTARY ROCKS

Sedimentary rocks are formed from the accumulation and lithification of sediments. They are of three types: clastic sedimentary rocks, organic sedimentary rocks, and chemical sedimentary rocks. Clastic sedimentary rocks are formed from the accumulation of fragments of other rocks. Organic sedimentary rocks are formed from the remains of plants and animals. Chemical sedimentary rocks are formed from the precipitation of minerals from a solution.

3. METAMORPHIC ROCKS

Metamorphic rocks are formed from the transformation of existing rocks under high temperature and pressure. They are of two types: foliated metamorphic rocks and non-foliated metamorphic rocks. Foliated metamorphic rocks have a layered appearance. Non-foliated metamorphic rocks do not have a layered appearance.

24

WEATHERING AND SOILS

MECHANICAL WEATHERING

Mechanical weathering is the process by which rocks are broken into smaller pieces without changing their chemical composition. It is caused by the physical forces of weathering. The most common type of mechanical weathering is frost weathering, which is caused by the expansion and contraction of water as it freezes and thaws. Other types of mechanical weathering include abrasion, exfoliation, and root wedging.

CHEMICAL WEATHERING

Chemical weathering is the process by which rocks are broken into smaller pieces and their chemical composition is changed. It is caused by the chemical reactions of weathering. The most common type of chemical weathering is oxidation, which is caused by the reaction of iron with oxygen. Other types of chemical weathering include hydrolysis and carbonation.

BIOLOGICAL WEATHERING

Biological weathering is the process by which rocks are broken into smaller pieces by the action of living organisms. It is caused by the physical and chemical actions of plants and animals. The most common type of biological weathering is root wedging, which is caused by the growth of plant roots in cracks and joints in rocks. Other types of biological weathering include the action of lichens and bacteria.

SOILS AND THEIR TYPES

Soil is the upper layer of the earth's crust that is formed by the weathering of rocks and the accumulation of organic matter. It is a complex system that is formed by the interaction of physical, chemical, and biological processes. There are many types of soils, but they can be classified into three main types: sand, silt, and clay. Sand is the largest particle size, silt is the middle particle size, and clay is the smallest particle size.

25

AGENTS OF EROSION - I

(A) THE EROSIONAL WORK OF A RIVER

Rivers are agents of erosion that shape the landscape. They erode the land by cutting channels and valleys. The erosion is caused by the physical forces of weathering and the chemical forces of weathering. The most common type of erosion is the V-shaped valley, which is formed by the downward erosion of a river. Other types of erosion include the gorge, the pot-hole, and the waterfall.

TRANSPORTATION AND DEPOSITIONAL WORK OF A RIVER

Rivers transport sediment and deposit it in various places. The sediment is transported in the form of suspended load, bed load, and wash load. The sediment is deposited in the form of alluvium, which is a deposit of sand, silt, and clay. The most common type of deposition is the flood plain, which is a flat area of land that is formed by the deposition of sediment during floods. Other types of deposition include the delta, the meander belt, and the oxbow lake.

26

AGENTS OF EROSION - II

(B) THE GLACIER

Glaciers are large masses of ice that move slowly over the land. They are formed by the accumulation and compression of snow. Glaciers erode the land by cutting U-shaped valleys and other features. The erosion is caused by the physical forces of weathering and the chemical forces of weathering. The most common type of erosion is the U-shaped valley, which is formed by the downward erosion of a glacier. Other types of erosion include the cirque, the horn, and the moraine.

(C) WIND - EROSION

Wind is an agent of erosion that shapes the landscape. It erodes the land by cutting sand dunes and other features. The erosion is caused by the physical forces of weathering and the chemical forces of weathering. The most common type of erosion is the sand dune, which is formed by the accumulation of sand. Other types of erosion include the sandstone arch, the mushroom rock, and the sandstone window.

TRANSPORTATION & DEPOSITION BY WIND

Wind transports sediment and deposits it in various places. The sediment is transported in the form of suspended load, bed load, and wash load. The sediment is deposited in the form of dunes, sandstone arches, and other features. The most common type of deposition is the sand dune, which is formed by the accumulation of sand. Other types of deposition include the sandstone arch, the mushroom rock, and the sandstone window.

27

AGENTS OF EROSION - III

(A) EROSION DUE TO GROUND WATER

Groundwater is an agent of erosion that shapes the landscape. It erodes the land by cutting caves and other features. The erosion is caused by the physical forces of weathering and the chemical forces of weathering. The most common type of erosion is the cave, which is formed by the dissolution of limestone. Other types of erosion include the stalactite, the stalagmite, and the sinkhole.

(B) EROSION DUE TO SEA WAVE

Sea waves are agents of erosion that shape the coastal landscape. They erode the land by cutting cliffs and other features. The erosion is caused by the physical forces of weathering and the chemical forces of weathering. The most common type of erosion is the cliff, which is formed by the downward erosion of a sea wave. Other types of erosion include the sea stack, the sea arch, and the sea cave.

LANDFORMS CREATED BY EROSIONAL WORK OF SEA WAVES

Sea waves create various landforms, including cliffs, sea stacks, sea arches, and sea caves. These landforms are formed by the erosion of the land by sea waves. The most common type of landform is the cliff, which is formed by the downward erosion of a sea wave. Other types of landforms include the sea stack, the sea arch, and the sea cave.

28

MAP READING

Map reading is the process of interpreting a map. It involves understanding the symbols and features on the map. The most common type of map is the physical map, which shows the physical features of the earth. Other types of maps include the political map, the thematic map, and the topographic map.

INDEX

The index is a list of symbols and features that are used on the map. It is used to identify the symbols and features on the map. The index is usually located in the bottom right corner of the map.

Legend

The legend is a key that explains the symbols and features on the map. It is used to identify the symbols and features on the map. The legend is usually located in the bottom left corner of the map.

29

FIELD VISIT

FIELD VISITS TO DIFFERENT ADMINISTRATIVE INSTITUTIONS

Field visits are an important part of geography education. They allow students to see the real world and understand the concepts they are learning in the classroom. Field visits can be to administrative institutions, such as the government offices, the police station, and the post office. They can also be to natural features, such as the forest, the river, and the sea.

REPORT

A report is a written account of what happened during a field visit. It should include the date, the time, the place, and the things that were seen and done. It should also include the names of the people who went on the field visit and the names of the institutions that were visited.

30

INDIA: LOCATION AND EXTENT

India is located in the southern part of the Asian continent. It is bounded by the Arabian Sea to the west, the Indian Ocean to the south, and the Bay of Bengal to the east. India is the seventh largest country in the world by area. It has a total area of 3,287,267 square kilometers. India is located between 8°N and 37°N north latitude and 68°E and 97°E east longitude. The southern tip of India is the southernmost point of the Asian continent. The maximum east-west extent is 3000 km and the north-south extent is 3200 km.

Location of India in Asia

31

INDIA: PHYSICAL DIVISIONS-I

India is divided into four major physical divisions: the Northern Mountainous region, the North Indian Plain region, the Indian Plateau region, and the Coastal Lowlands. The Northern Mountainous region is the highest and most rugged part of India. The North Indian Plain region is the largest and most fertile part of India. The Indian Plateau region is the second largest part of India. The Coastal Lowlands are the narrow strips of land along the coast of India.

INDIA

32

INDIA: PHYSICAL DIVISIONS-II

The Northern Mountainous Region

The Northern Mountainous Region is the highest and most rugged part of India. It is bounded by the Himalayas to the north and the Indian Plateau to the south. The region is characterized by high mountains, deep valleys, and a cold climate. The most important cities in the region are Jammu, Srinagar, and Shimla.

The North Indian Plain Region

The North Indian Plain Region is the largest and most fertile part of India. It is bounded by the Himalayas to the north and the Indian Plateau to the south. The region is characterized by flat land, fertile soil, and a hot climate. The most important cities in the region are Delhi, Lucknow, and Kolkata.

The Coastal Lowlands

The Coastal Lowlands are the narrow strips of land along the coast of India. They are bounded by the Arabian Sea to the west and the Bay of Bengal to the east. The region is characterized by low land, fertile soil, and a hot climate. The most important cities in the region are Mumbai, Chennai, and Kolkata.

33

INDIA: PHYSICAL DIVISIONS-III

The Indian Plateau Region

The Indian Plateau Region is the second largest part of India. It is bounded by the Himalayas to the north and the Indian Ocean to the south. The region is characterized by high land, fertile soil, and a hot climate. The most important cities in the region are Bhopal, Jaipur, and Hyderabad.

The Indian Islands

The Indian Islands are the small islands in the Indian Ocean. They are bounded by the Arabian Sea to the west and the Bay of Bengal to the east. The region is characterized by low land, fertile soil, and a hot climate. The most important cities in the region are Port Blair, Karaikal, and Pondicherry.

34

NORTH INDIAN MOUNTAINS

PHYSIOGRAPHY OF NORTH INDIAN MOUNTAINS

The North Indian Mountains are the highest and most rugged part of India. They are bounded by the Himalayas to the north and the Indian Plateau to the south. The region is characterized by high mountains, deep valleys, and a cold climate. The most important cities in the region are Jammu, Srinagar, and Shimla.

NATURAL VEGETATION AND ANIMALS

The North Indian Mountains have a variety of natural vegetation and animals. The most common types of vegetation are coniferous forests, deciduous forests, and alpine forests. The most common types of animals are the Himalayan monal pheasant, the Himalayan monal parakeet, and the Himalayan monal squirrel.

35

NORTH INDIAN MOUNTAINS: ECONOMIC DEVELOPMENT-I

ECONOMIC DEVELOPMENT

The North Indian Mountains have a variety of economic activities. The most important ones are tourism, agriculture, and mining. Tourism is the most important economic activity in the region. Agriculture is the second most important economic activity. Mining is the third most important economic activity.

36

NORTH INDIAN MOUNTAINS: ECONOMIC DEVELOPMENT-II

AGRICULTURE

The North Indian Mountains have a variety of agricultural activities. The most important ones are the cultivation of wheat, rice, and pulses. The most common types of crops are wheat, rice, and pulses. The most common types of animals are the Himalayan monal pheasant, the Himalayan monal parakeet, and the Himalayan monal squirrel.

INDUSTRIES

The North Indian Mountains have a variety of industries. The most important ones are tourism, agriculture, and mining. Tourism is the most important industry in the region. Agriculture is the second most important industry. Mining is the third most important industry.

TOURISM

The North Indian Mountains are a popular tourist destination. The most important tourist attractions are the Himalayas, the Indian Plateau, and the Indian Islands. The most common types of tourists are domestic tourists and foreign tourists.

37

NORTH INDIAN PLAINS - DESERT

PHYSIOGRAPHY OF THE RAJASTHAN PLAIN

The Rajasthan Plain is a large, flat area of land in the western part of India. It is bounded by the Arabian Sea to the west and the Indian Ocean to the south. The region is characterized by high land, fertile soil, and a hot climate. The most important cities in the region are Jaipur, Bikaner, and Jaisalmer.

NATURAL VEGETATION AND ANIMALS

The Rajasthan Plain has a variety of natural vegetation and animals. The most common types of vegetation are the thorn scrub forest, the dry deciduous forest, and the semi-arid forest. The most common types of animals are the Indian rhinoceros, the Indian elephant, and the Indian tiger.

38

RAJASTHAN: POPULATION AND SETTLEMENT

RAJASTHAN PLAIN

The Rajasthan Plain is a large, flat area of land in the western part of India. It is bounded by the Arabian Sea to the west and the Indian Ocean to the south. The region is characterized by high land, fertile soil, and a hot climate. The most important cities in the region are Jaipur, Bikaner, and Jaisalmer.

RAIN WATER HARVESTING IN RAJASTHAN

Rain water harvesting is a traditional practice in Rajasthan. It involves the collection and storage of rain water for use during the dry season. The most common types of rain water harvesting structures are the kunds, the tanks, and the wells.

KUNDS (TANKS) AND PONDS

Kunds, tanks, and ponds are traditional water harvesting structures in Rajasthan. They are used to collect and store rain water for use during the dry season. The most common types of kunds, tanks, and ponds are the kunds, the tanks, and the wells.

39

RAJASTHAN: ECONOMIC DEVELOPMENT

AGRICULTURE AND IRRIGATION

The Rajasthan Plain has a variety of agricultural activities. The most important ones are the cultivation of wheat, rice, and pulses. The most common types of crops are wheat, rice, and pulses. The most common types of animals are the Indian rhinoceros, the Indian elephant, and the Indian tiger.

DOMESTIC ANIMALS

The Rajasthan Plain has a variety of domestic animals. The most important ones are the Indian rhinoceros, the Indian elephant, and the Indian tiger. The most common types of domestic animals are the Indian rhinoceros, the Indian elephant, and the Indian tiger.

INDUSTRIES

The Rajasthan Plain has a variety of industries. The most important ones are tourism, agriculture, and mining. Tourism is the most important industry in the region. Agriculture is the second most important industry. Mining is the third most important industry.

TRANSPORTATION / TOURISM

The Rajasthan Plain is a popular tourist destination. The most important tourist attractions are the Rajasthan Desert, the Rajasthan Plateau, and the Rajasthan Islands. The most common types of tourists are domestic tourists and foreign tourists.

40

GEOGRAPHY

Size : 24" x 38" with two individual rollers

NORTH INDIAN PLAINS - WESTERN (PUNJAB & HARYANA) 41

PHYSIOGRAPHY: PUNJAB-HARYANA PLAIN
The plain is bounded by the Shiwalik ranges in the North, the Rajasthan desert in the South, Pakistan in west and Deccan ridge (Ajmer-Malwa range) in the East.

NATURAL VEGETATION AND ANIMALS

POPULATION & SETTLEMENT
Fertile culture is known for its wheat, sugarcane, cotton, oilseed and pulses, which have evolved over many centuries. Fertilisers and pesticides, Bt toxin, Bt-resistant and Bt-free are a strong reflection of 21st century culture.

ECONOMIC DEVELOPMENT
Irrigation, and irrigation is significant in the plains. The region is a major source of food grains.

TRANSPORTATION
The region has good road and rail network. The main cities are Ludhiana, Jalandhar, Patiala and Ferozshahpur.

NORTH INDIAN PLAINS : GANGA PLAIN 42

PHYSIOGRAPHY OF GANGA PLAIN
The Ganga belt is the world's most extensive plain of uninterrupted alluvium formed by the deposition of silt by riverine rivers.

NATURAL VEGETATION

POPULATION AND SETTLEMENT
The Ganga basin is one of the most densely populated areas of the world. It covers 30% of the total area of India and accommodates 22% of the population of the country.

ECONOMIC DEVELOPMENT: AGRICULTURE
The Ganga basin is the main source of food grains in India. It is a major source of wheat, rice, sugarcane, oilseeds, pulses, and other crops.

TRANSPORTATION
The Ganga basin is a major source of food grains in India. It is a major source of wheat, rice, sugarcane, oilseeds, pulses, and other crops.

NORTH INDIAN PLAINS : ASSAM PLAIN 43

PHYSIOGRAPHY: ASSAM PLAIN
The Assam valley or the Brahmaputra Valley is the western continuation of the Great Plains of India. It is a vast alluvial plain in the north-eastern part of India.

NATURAL VEGETATION & ANIMAL LIFE

ECONOMIC DEVELOPMENT: AGRICULTURE
Rice is the most important and common and cultivated all over Assam. Tea is another important crop. Assam is also famous for its silk.

POPULATION AND SETTLEMENT
Rice is the most important and common and cultivated all over Assam. Tea is another important crop. Assam is also famous for its silk.

PENINSULAR PLATEAU REGION - CENTRAL HIGHLAND - I 44

This region extending from the southern rim of the Aravalli Range up to the Narmada Valley is called the Central Highlands. It mostly comprises of the peninsular area that forms a part of Ganga River basin.

1. Aravalli Mountains
The main block of Aravalli is represented by the Malwa Plateau and Ajmer. The highest peak is in the Aravalli Range.

2. The East Rajasthan Upland
The region extends to the east of the Aravalli Range. It is a part of the Central Highlands.

3. Deccan Plateau
The Deccan Plateau is a large plateau in western and central India. It is bounded by the Western Ghats to the west and the Eastern Ghats to the east.

4. Ghats
The Ghats are a series of mountain ranges that run parallel to the Western Ghats and the Eastern Ghats.

PENINSULAR PLATEAU REGION - CENTRAL HIGHLAND - II 45

NATURAL VEGETATION AND ANIMALS

ECONOMIC DEVELOPMENT

1. AGRICULTURE
The Deccan Plateau is a major source of food grains in India. It is a major source of wheat, rice, sugarcane, oilseeds, pulses, and other crops.

2. MINING
The Deccan Plateau is rich in minerals. It is a major source of iron, coal, and other minerals.

3. INDUSTRIES
The Deccan Plateau is a major source of food grains in India. It is a major source of wheat, rice, sugarcane, oilseeds, pulses, and other crops.

4. TOURISM
The Deccan Plateau is a major source of food grains in India. It is a major source of wheat, rice, sugarcane, oilseeds, pulses, and other crops.

PENINSULAR PLATEAU REGION - DECCAN - I 46

PHYSIOGRAPHY: THE DECCAN PLATEAU
This triangular region in the south of India is known as the Deccan Plateau. It is an inverted triangle with its base in the north and its apex in the south.

SUB-DIVISIONS OF THE DECCAN PLATEAU

1. SATPURA RANGES
This is a group of ranges that runs parallel to the Western Ghats. It is a part of the Central Highlands.

2. BHAMARAPUR PLATEAU
This is a plateau that is bounded by the Western Ghats to the west and the Eastern Ghats to the east.

3. KARNATAKA TABLELAND
This is a plateau that is bounded by the Western Ghats to the west and the Eastern Ghats to the east.

4. THE EASTERN PLATEAU
This is a plateau that is bounded by the Western Ghats to the west and the Eastern Ghats to the east.

PENINSULAR PLATEAU REGION - DECCAN - II 47

NATURAL VEGETATION AND ANIMALS

POPULATION AND SETTLEMENT

ECONOMIC DEVELOPMENT

1. AGRICULTURE
The Deccan Plateau is a major source of food grains in India. It is a major source of wheat, rice, sugarcane, oilseeds, pulses, and other crops.

2. MINING
The Deccan Plateau is rich in minerals. It is a major source of iron, coal, and other minerals.

3. INDUSTRIES
The Deccan Plateau is a major source of food grains in India. It is a major source of wheat, rice, sugarcane, oilseeds, pulses, and other crops.

4. TOURISM
The Deccan Plateau is a major source of food grains in India. It is a major source of wheat, rice, sugarcane, oilseeds, pulses, and other crops.

THE GHATS, COASTAL PLAINS AND ISLANDS 48

PHYSIOGRAPHY: WESTERN GHATS
The Western Ghats run parallel to the Arabian Sea through the entire length of the peninsula. The distance of approximately 1000 km. These Ghats have the edge of the plateau called satyaprasts.

THE WESTERN COASTAL PLAINS

1. The Gujarat Coast
This is the longest coast in India. Gujarat has the longest coast.

2. The Konkan Coast
This is the second longest coast in India. It is a part of the Western Ghats.

3. The Malabar Coast
This is the third longest coast in India. It is a part of the Western Ghats.

PHYSIOGRAPHY: EASTERN GHATS
The Eastern Ghats are located along the eastern coast of India. They extend from the Deccan Plateau in the north to the Bay of Bengal in the south.

THE EASTERN COASTAL PLAINS

1. The North Coast
This coast starts from a little south of the Western Ghats. It is a part of the Eastern Ghats.

2. The Coromandel Coast
This coast starts from a little south of the Western Ghats. It is a part of the Eastern Ghats.

3. The Andhra Coast
This coast starts from a little south of the Western Ghats. It is a part of the Eastern Ghats.

INDIA : CLIMATE 49

The climate of India is greatly influenced by:
(i) Latitudinal extent of India
(ii) The Himalayas Mountains in the North
(iii) Large Oceanic areas in the South

The climate of India is of Monsoon type.

Formation of Monsoon Winds
Monsoon winds are winds that change their direction seasonally. South-west monsoon winds blow from the southwest towards the Indian subcontinent. North-east monsoon winds blow from the northeast towards the Indian subcontinent.

North-east Monsoon Winds
The cool and dry north-east monsoon winds blowing over the Indian subcontinent are known as the North-east monsoon. These winds give rise to the dry season in the country.

The Indian Meteorological Department has identified four seasons of the Indian climate:
(1) **Summer** (from March to May)
(2) **Rainy Season** (from June to September)
(3) **Period of Retreating Monsoon** (October and November)
(4) **Winter** (December to February)

INDIA : RIVERS 50

CLASSIFICATION OF RIVERS

1. Himalayan Rivers
(i) Indus (ii) Ganga (iii) Brahmaputra

2. Peninsular Rivers
(i) Godavari (ii) Krishna (iii) Kaveri (iv) Narmada (v) Tapi (vi) Mahanadi (vii) Cauvery (viii) Gomti (ix) Chambal (x) Betwa (xi) Son (xii) Gandak (xiii) Ghaghara (xiv) Gomti (xv) Gomti (xvi) Gomti (xvii) Gomti (xviii) Gomti (xix) Gomti (xx) Gomti

3. Monsoon Rivers
(i) Narmada (ii) Tapi (iii) Mahanadi (iv) Cauvery (v) Gomti (vi) Gomti (vii) Gomti (viii) Gomti (ix) Gomti (x) Gomti (xi) Gomti (xii) Gomti (xiii) Gomti (xiv) Gomti (xv) Gomti (xvi) Gomti (xvii) Gomti (xviii) Gomti (xix) Gomti (xx) Gomti

INDIA : MARINE WEALTH 51

India has ocean wealth on its three sides:
(i) **Arabian Sea**: Rich in fish, shellfish, and other marine life.
(ii) **Bay of Bengal**: Rich in fish, shellfish, and other marine life.
(iii) **Andaman Sea**: Rich in fish, shellfish, and other marine life.

INDIA : ANIMAL RESOURCES

Main Sanctuaries in India:
(1) Dudhpora (2) J & K (3) Nagarjuna (4) Nagarjuna (5) Nagarjuna (6) Nagarjuna (7) Nagarjuna (8) Nagarjuna (9) Nagarjuna (10) Nagarjuna (11) Nagarjuna (12) Nagarjuna (13) Nagarjuna (14) Nagarjuna (15) Nagarjuna (16) Nagarjuna (17) Nagarjuna (18) Nagarjuna (19) Nagarjuna (20) Nagarjuna

MINERAL WEALTH & ENERGY RESOURCES- I 52

Products obtained in the process of refining mineral oil

Cooking Gas
Petrol
Fuel for planes
Kerosene
Diesel
Grease / Wax
Tar

INDIA : MINERAL WEALTH & ENERGY RESOURCES- II 53

Important Coal and Mineral Oil Fields

Important Centres of Generating Electricity

Types of Electricity
Based on the source of energy, there are three types of electricity:
(1) **Hydroelectricity**: Generated from the energy of flowing water.
(2) **Thermal Electricity**: Generated from the heat of coal, oil, or gas.
(3) **Nuclear Electricity**: Generated from the energy of nuclear reactions.

INDIA : POPULATION AND LIFE OF THE PEOPLE 54

INDIA : Occupational of the People : Agriculture

INDIA : Occupational of the People : Industry

INDIA : INDUSTRIES 55

AGRO-BASED INDUSTRIES

FOREST-BASED INDUSTRIES

ANIMAL-BASED INDUSTRIES

MINERAL-BASED INDUSTRIES

INDUSTRIES MANUFACTURING MACHINERY

TRANSPORT, COMMUNICATION & TRADE 56

Means of Communication

Means of Transport

THE CONTINENT OF AFRICA 57

SAHARA DESERT
Africa abounds in the world's largest deserts. The Sahara Desert is the largest desert in the world. It is a part of the African continent.

INDIAN OCEAN
The Indian Ocean is the second largest ocean in the world. It is a part of the Indian subcontinent.

HEAVY SNOW ON PINE TREE FOREST
The heavy snow on pine tree forest is a common sight in the Himalayas. It is a part of the Indian subcontinent.

THE CONTINENT OF NORTH AMERICA 58

THE GREAT RANGES, CANADA, SIERRA NEVADA, etc.
The Great Ranges, Canada, Sierra Nevada, etc. are a part of the North American continent.

INDIAN OCEAN
The Indian Ocean is the second largest ocean in the world. It is a part of the Indian subcontinent.

HEAVY SNOW ON PINE TREE FOREST
The heavy snow on pine tree forest is a common sight in the Himalayas. It is a part of the Indian subcontinent.

THE CONTINENT OF SOUTH AMERICA 59

LAMAS
Lamas are a common sight in the Andes. They are a part of the South American continent.

SURICATAS
Suricatas are a common sight in the Andes. They are a part of the South American continent.

INDIAN OCEAN
The Indian Ocean is the second largest ocean in the world. It is a part of the Indian subcontinent.

UNITED STATES OF AMERICA - I 60

STATUE OF LIBERTY
The Statue of Liberty is a symbol of freedom. It is a part of the United States of America.

NATURAL RESOURCES
The United States of America is rich in natural resources. It is a part of the United States of America.

INDIAN OCEAN
The Indian Ocean is the second largest ocean in the world. It is a part of the Indian subcontinent.

GEOGRAPHY

Size : 24" x 38" with two individual rollers

UNITED STATES OF AMERICA - II

TRANSPORT FACILITIES IN THE USA

THE TOURISM INDUSTRY IN THE USA

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

BRAZIL

CLIMATE

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

EGYPT

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

TANZANIA

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

SOUTH AFRICA - I

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

SOUTH AFRICA - II

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

THE CONTINENT OF ANTARCTICA

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

THE CONTINENT OF AUSTRALIA

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

THE CONTINENT OF EUROPE - I

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

THE CONTINENT OF EUROPE - II

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

GERMANY

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

ITALY

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

MAHARASHTRA : NATURAL RESOURCES - I

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

MAHARASHTRA : NATURAL RESOURCES - II

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

MAHARASHTRA : NATURAL RESOURCES - III

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

OCCUPATION

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

AGRICULTURE - I

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

AGRICULTURE - II

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

AGRICULTURE - III

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

MAHARASHTRA : INDUSTRIES

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

TRANSPORTATION, COMMUNICATION AND TOURISM - I

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

TRANSPORTATION, COMMUNICATION AND TOURISM - II

WATER RESOURCES

WILDLIFE

AGRICULTURE

INDUSTRIES

MAJOR CITIES

ECONOMICS

Size : 24" x 38" with two individual rollers

INTRODUCTION OF ECONOMICS

ECONOMIC PROGRESS OF HUMAN BEING

Economics is the study of how people choose to use their scarce resources like time, money, labour, land, equipments etc.

DEFINITION OF ECONOMICS

CLASSICAL ECONOMICS (Adam Smith, David Ricardo, Thomas Malthus, M. C. Mill)

MODERN ECONOMICS (John Maynard Keynes, Alfred Marshall, Leonie Stein, J. M. Keynes)

IMPORTANCE OF STUDY OF ECONOMICS

1. INDIVIDUAL LEVEL
2. POLITICAL RESPONSE
3. GOVERNMENT POLICY

The study of economics helps us to know the best ways to improve our standard of living. It helps us to understand the role of government in the economy and to make decisions about the best way to use our resources.

BASIC CONCEPTS OF ECONOMICS

HUMAN WANTS

Necessaries	Comforts	Luxuries
Food, clothing, shelter, education, etc.	Car, television, air-conditioning, etc.	Gold, diamonds, etc.

GOODS
Goods which are scarce and have utility.

Tangible Goods
Goods which can be seen and felt by touch.

Intangible Goods
Goods which cannot be seen or touched. (e.g. services, education, etc.)

UTILITY, VALUE, PRICE AND DEMAND

UTILITY
Ability to meet a human want.

VALUE
A person's willingness to pay for a commodity.

PRICE
The rate at which a commodity is exchanged for other goods or services.

DEMAND
A person's willingness to pay for a commodity.

SOURCES OF INCOME - I

MEANING OF PERSONAL INCOME

Personal income is the sum total of earnings received by a person during a given period of time.

PERSONAL INCOME = **WAGES** + **PROFITS** + **RENTS** + **INTEREST** + **DIVIDENDS**

VARIOUS SOURCES OF INCOME: AGRICULTURE

FOOD CROPS: Wheat, rice, sugarcane, cotton, etc.

CASH CROPS: Tobacco, sugarcane, etc.

BALUJA SYSTEM
Earlier, Baluja system was practiced in rural parts of Maharashtra. Baluja system consisted of twelve balujas like Carpenter, Blacksmith, Potter, etc.

SOURCES OF INCOME - II

INCOME FROM AGRO-BASED INDUSTRIES

Transport helps in internal and external trade. It also promotes tourism and employment.

MODERN SOURCE OF INCOME

Transport and Communication are the backbone of the economic system.

INCOME FROM PROFESSIONALS

DOCTOR, LAWYER, D.A., CYBER CAFE, etc.

FAMILY BUDGET

TYPES OF BUDGET

1. SURPLUS BUDGET
2. DEFICIT BUDGET
3. BALANCED BUDGET

COMPONENTS OF A BUDGET

RECEIPT: Personal services, Income tax, etc.

EXPENDITURE: Education, Healthcare, Entertainment, etc.

GOOD FAMILY BUDGET

- 1) Projects individuals from getting into financial problems.
- 2) Brings economic stability in the family.
- 3) Brings economic efficiency.
- 4) Brings financial planning for the improvement of standards.

INTRODUCTION OF ECONOMY

MEANING OF ECONOMY

We observe many activities happening around us such as farming, manufacturing, mining, transport, communication etc. which are called productive activities.

An economy is a combination of these activities and services provided.

TYPES OF ECONOMY

CAPITALIST ECONOMY	SOCIALIST ECONOMY	MIXED ECONOMY
It is a free market economy where the means of production are managed by private individuals. For e.g. USA.	It is a socialist economy where the means of production are managed by the government. For e.g. China.	It is a co-existence of both, public and private sector. In this case means of production are owned and managed by the government as well as private individuals. For e.g. India.

FEATURES OF ECONOMY

1. CERTAIN GEOGRAPHICAL AREA
2. NATURAL RESOURCES
3. POPULATION
4. REGIONAL DISTRIBUTION

The main features of characteristics of economy are given below:

1. CERTAIN GEOGRAPHICAL AREA
Indian economy exists about 32,87,263 Sq. Km. of land with 28 states and 7 union territories. It occupies 2.4% of total land area of the world.

2. NATURAL RESOURCES
Natural resources refer to the resources which are freely given. It includes land, mountains, water, sunshine, soil, forests, minerals, etc.

3. POPULATION
Supply of labour is a crucial factor in the economy. A large population improves the quality of the economy. A large population is used in productive activities.

4. REGIONAL DISTRIBUTION
On the basis of nature of activities, various productive activities are mainly classified into four sectors:

- (i) Primary Sector: It includes agriculture, mining, etc.
- (ii) Secondary Sector: It includes manufacturing, construction, etc.
- (iii) Tertiary Sector: It includes services like transport, communication, banking, insurance, etc.
- (iv) Quaternary Sector: It includes information technology, etc.

BASIC PROBLEMS OF ECONOMY

BASIC ECONOMIC PROBLEMS

1. What to produce?
2. How to produce?
3. For whom to produce?
4. How much to produce?

It is necessary for every economy to decide for what to produce? how to produce? for whom to produce? and how much to produce?

INFLATION

INFLATION: If there is an increase in price level, there is an inflation. Inflation results in the decline of the value of the money.

CAUSES OF INFLATION

1. Increase in demand for goods and services.
2. Increase in money supply.
3. Increase in production.
4. Rapid growth in money supply.
5. Increase in cost of production.

EFFECTS OF INFLATION

1. Decrease in purchasing power.
2. Increase in cost of living.
3. Increase in unemployment.
4. Increase in government expenditure.
5. Increase in government revenue.

MEASURES TO CONTROL INFLATION

1. Monetary Measures
2. Fiscal Measures
3. Income Measures
4. Direct Measures

PUBLIC DISTRIBUTION SYSTEM & CONSUMER PROTECTION

PUBLIC DISTRIBUTION SYSTEM (PDS)

It is a system of distribution of essential commodities to the public at a fixed price.

TARGETED PUBLIC DISTRIBUTION SYSTEM

It is a system of distribution of essential commodities to the public at a fixed price, but only to the poor.

CONSUMER PROTECTION

Consumer protection is a legal provision to ensure the rights of consumers.

RIGHTS OF CONSUMERS (JAG GRIHAK SHAKTI):

1. Right to be heard
2. Right to choose
3. Right to safety
4. Right to information
5. Right to be heard