

Science Notes Part 16 To 20

16] Basis of classification

There is great diversity among living organisms found on the planet earth. They differ in their size, shape, habitat, mode of nutrition and other ways of life. The biodiversity of the earth is enormous.

We call such a variety among living organisms as biodiversity. Even though there is such a variety and diversity among them, the living organisms show a lot of similarities and common features so that they can be arranged into many groups. In order to understand and study them systematically, these living organisms mainly the plants and animals are grouped under different categories.

The system of sorting living organisms into various groups based on similarities and dissimilarities is called classification.

Need for classification

It is not possible for anyone to study all the organisms. But if they are grouped in some convenient way, the study would become easier. Classification allows us to understand diversity better.

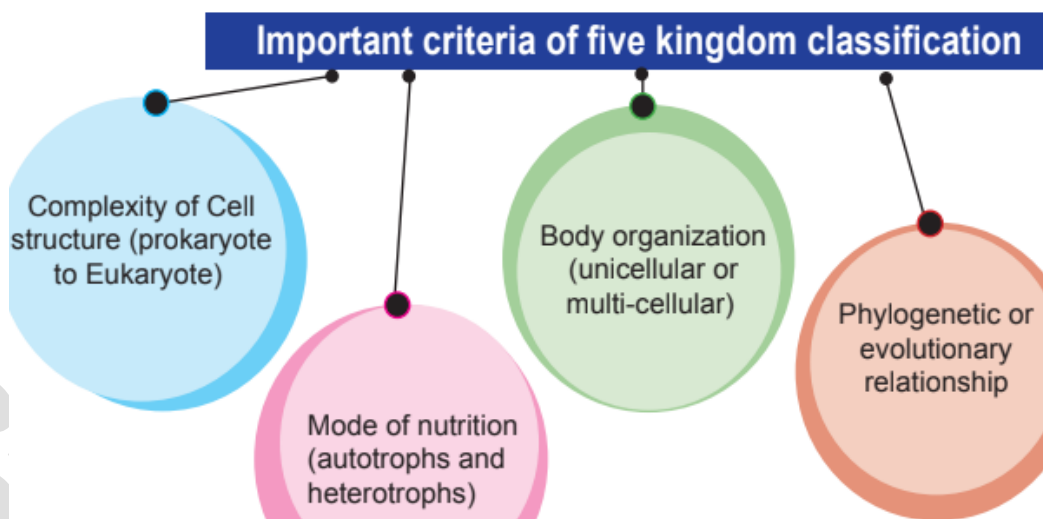
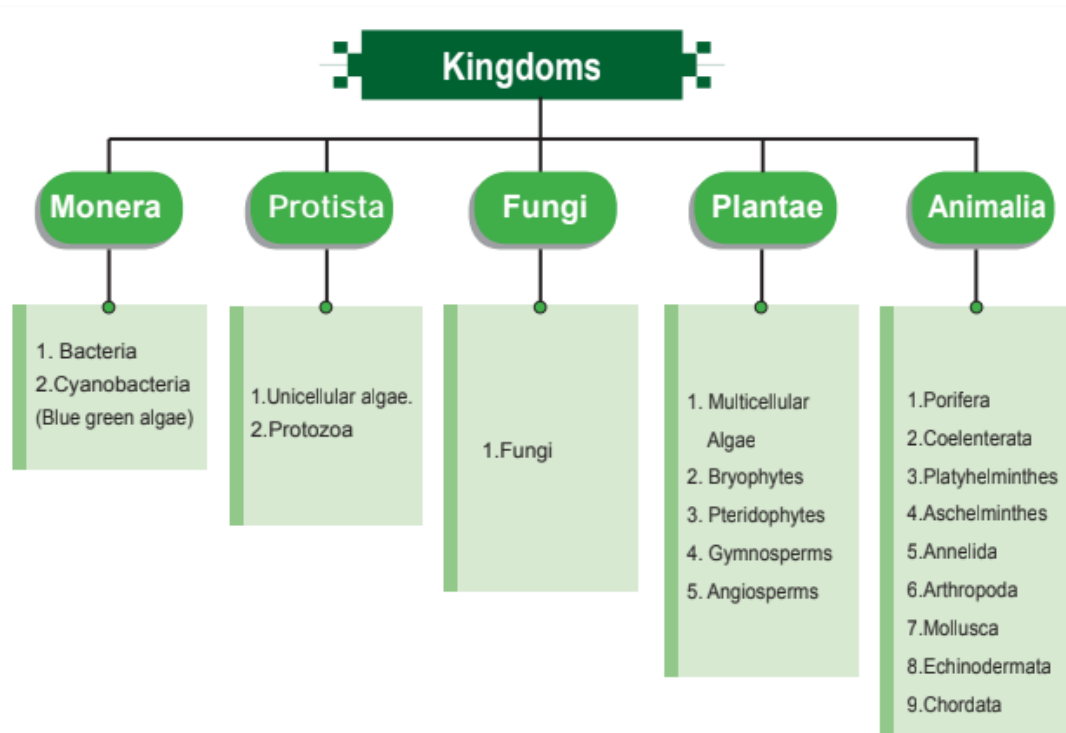
Necessity for classification

1. Classification helps us to identify the living organisms easily.
2. It helps us to learn about different kinds of plants and animals, their features, similarities and differences.
3. It enables us to understand how complex organisms evolve from simple ones.

The five kingdom classification

R.H. Whittaker (1920–1980) was an American plant ecologist. He was the first to propose the five kingdom classification of the world's biota, based on their evolutionary relationships. In 1969 he classified the organisms into five kingdoms. This classification has been accepted by all scientists.

The Five Kingdoms are Monera, Protista, Fungi, Plantae and Animalia.



Kingdom of Monera

General features

- The kingdom Monera comprises all bacteria and the cyanobacteria.
- They are Primitive unicellular. (single cell organisms).
- They do not have a true nucleus (prokaryotic).
- Their mode of nutrition is autotrophic or heterotrophic.
- They cause diseases like diphtheria, pneumonia, tuberculosis, leprosy etc.
- They are also used in manufacture of antibiotics to cure many diseases.

Discovery of Bacteria

In 1675 Anton Von Leewvenhoek, a Dutch scientist, discovered bacteria. He called the bacteria as 'animalcules'. Anton Von Leewvenhoek is called as the father of bacteriology. Bacteria are considered as the first formed organisms in the world.

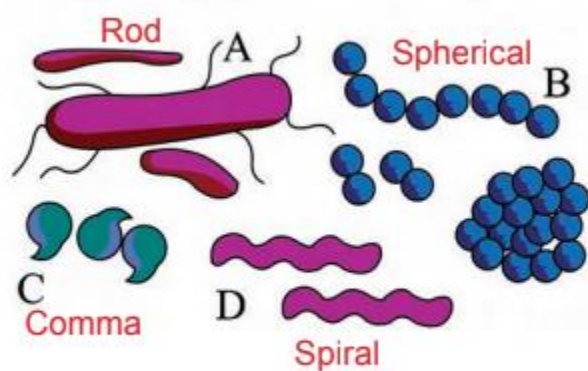


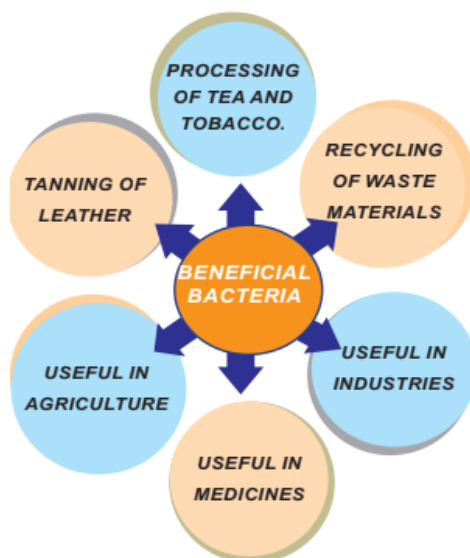
Fig 4.2 Bacteria shapes

Shape of Bacteria

The shape of bacteria varies in different species. The important shapes are

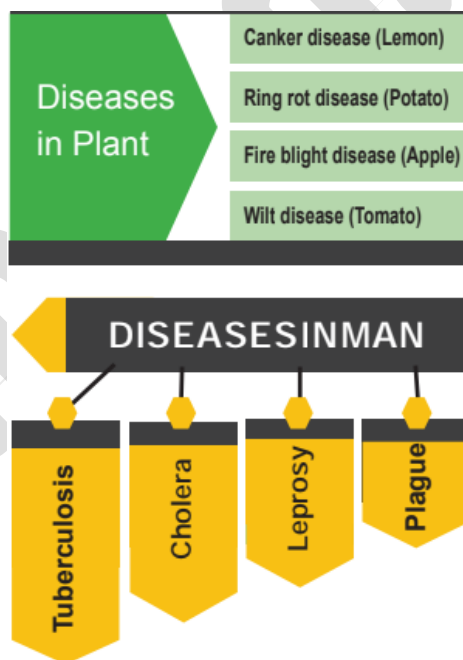
- (A) rod
- (B) spherical
- (C) comma
- (D) spiral.

Beneficial bacteria



Harmful Bacteria

Bacteria cause many diseases in plants and human beings.



Kingdom of Protista

General features

- The kingdom Protista includes unicellular eukaryotes.
- Animals and plants of Protista live in sea as well as in fresh water.
- Some are parasites. Though they are single celled they have the capacity of performing all the body activities.

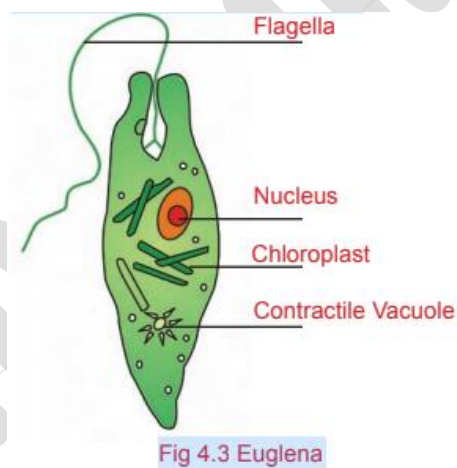
- They have nucleus enclosed by a nuclear membrane (eukaryotic).
- Some of them possess chloroplast and make their food by photosynthesis. e.g. Euglena

There are two main groups of protista.

1. Plant like protista which are photosynthetic are commonly called microalgae. They can be seen only under a microscope. They occur as single cells or filaments or colonies. eg. Chlamydomonas, Volvox etc. Algae are autotrophs.

2. Animal like Protista are often called Protozoans. Protozoans include Amoeba and Paramecium like animals. The Paramecium, which consists of cilia, belongs to class Ciliata. Amoeba which consists of pseudopodia belongs to class Sarcodina. All unicellular plants are collectively called phytoplanktons and unicellular animals as zooplanktons.

Euglena, a protozoan possesses chloroplast and make their food by photosynthesis. It has two modes of nutrition. In the presence of sunlight it is autotrophic and in the absence of sunlight it is heterotrophic. This mode of nutrition is known as mixotrophic and hence they form a border line between plants and animals.



Kingdom of Fungi General features

This kingdom Fungi includes Yeast, Moulds, Mushrooms (Kaalaan), Toadstools, Puffballs and Penicillium

- Fungi are eukaryotic and mostly multicellular. The body is made up of filamentous hyphae.
- Their mode of nutrition is heterotrophic (obtain their nutrients from other organisms) since they lack the green pigment chlorophyll.
- They have cell walls, made of a tough complex sugar called chitin.
- Fungi act either as decomposers (decay-causing organisms) or as parasites (live in other organisms) in nature.
- Mould fungi grows on stale bread, cheese, fruit or other food.

Penicillium is a fungus. It lacks chlorophyll. It lives as saprophyte. The body consists of filamentous structures. The antibiotic penicillin is extracted from it. The Penicillin is also known as “**the queen of drugs**”.

Yeast is an unicellular organism and oval in shape. It is a saprophytic fungus. It is useful for the preparation of alcohol by fermentation process. Conversion of sugar solution into alcohol with the release of carbon dioxide by yeast is called fermentation. It is also used in bakery.

Kingdom of Plantae

General features

Kingdom Plantae includes all multicellular plants of land and water.

1. Algae (Multicellular)

eg. Laminaria, Spirogyra, Chara

2. Bryophytes

eg. Riccia, Moss

3. Pteridophytes

eg. Ferns

4. Gymnosperms

eg. Cycas, Pinus

5. Angiosperms

eg. Grass, Coconut Mango, Neem (veppa maram)

- Plantae are multicellular eukaryotes.
- The plant cells have an outside cell wall that contain cellulose.
- They show various modes of nutrition. Most of them are autotrophs since they have chlorophyll.
- Some plants are heterotrophs. eg. Cuscuta is a parasite.
- Nepenthes and Drosera are insectivorous plants.

Kingdom of Animalia

General features

- This kingdom includes all multicellular eukaryotic animals.

- All animals show heterotrophic mode of nutrition. They directly or indirectly depend on plants for their basic requirements particularly the food.
- They form the consumers of an ecosystem.
- The cells have plasma membrane.
- They have contractibility of the muscle cells.
- They have well developed, controlled and coordinated mechanisms.
- They can transmit impulses due to the presence of nerve cells
- Some groups of animals are parasites e.g. tapeworms and roundworms. Most members of the animal kingdom can move from place to place. However, some animals, such as adult sponges and corals are permanently attached to a surface.

Kingdom Animalia includes the following phyla

S.N	PHYLUM	CHARACTERS	EXAMPLES
1.	Porifera	Pore bearers	eg. Sponges
2.	Coelenterata	Common body cavity and digestive cavity	eg. Hydra, Jelly fish
3.	Platyhelminthes	Flatworms	eg. Tape worm (Taenia)
4.	Aschelminthes	Thread-like worms	eg. Round worm (Ascaris)
5.	Annelida	Body is segmented	eg. Nereis, Earthworm
6.	Arthropoda (insect group)	Have jointed legs	eg. Centepede, Cockroach, Scorpion
7.	Mollusca	Soft bodied with shells	eg. Snail, Octopus, Sepia.
8.	Echinodermata	Spiny skinned	eg. Star fish, Sea-cucumber.
9.	Chordata	Have backbone	eg. Fish, Frog, Man.

Binomial Nomenclature

History of classification

Aristotle categorized organisms into plants and animals.

- Hippocrates, the Father of Medicine, listed organisms with medicinal value.
- Aristotle and Theophrastus classified the plants and animals on the basis of their form and habitat.
- John Ray introduced the term species.
- Carolus Linnaeus organized a simple naming system for plants. So, he is known as Father of Taxonomy. He developed the Binomial System of nomenclature, which is the current scientific system of naming the species.

Necessity for Binomial Nomenclature

In the earlier period, organisms were referred by their common names. Since common names or vernacular names were in the local languages, they differed at different places resulting in total confusion. They were not universally applicable.

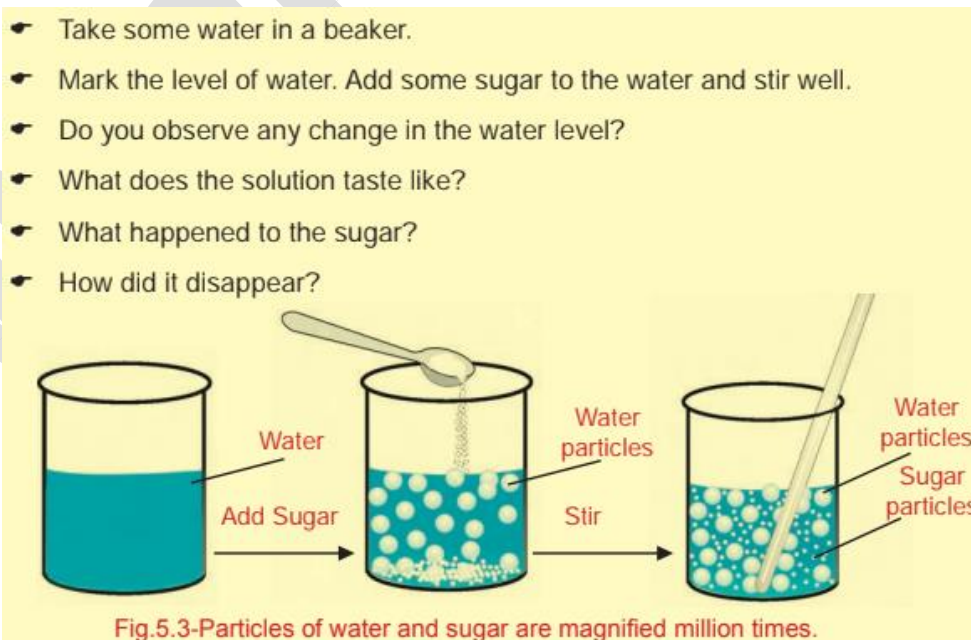
In order to avoid this confusion, a scientific system of naming organism which is universally followed was evolved. So Linnaeus devised a system of naming animals and plants with two names. This is called binomial nomenclature. Basic Principles of Binomial Nomenclature

1. Scientific names must be either Latin or Latinized.
2. The name of the genus begins with a capital letter.
3. The name of the species begins with a small letter.
4. When printed, the scientific name is given in italics.
5. When written by hand, name should be underlined.

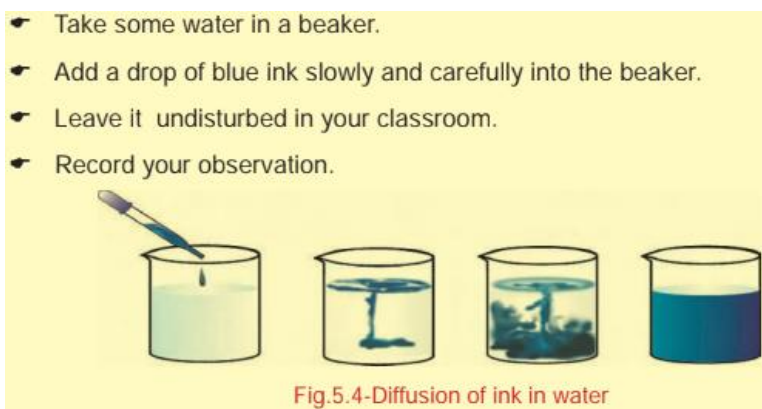
17] Matter In Our Surroundings

We are surrounded by a number of objects. eg : iron, wood, water, air etc. We do not see air but we feel its presence. All these things occupy space and have mass. In the World of Science, matter is anything that has mass and occupies space. There are different kinds of matter. Here, we learn about matter based on its physical properties.

PHYSICAL NATURE OF MATTER



From the above activity you can notice that there is no change in the water level but the taste is sweet. It indicates that the sugar is completely dissolved in water. When you dissolve sugar in water, the molecules of sugar occupy the space between molecules of water and get uniformly distributed in water. It is understood that there exists a space between the molecules in matter.



From the above activity you can understand that the molecules of matter continuously move and mix with each other.



Fig.5.5-Stream of water remains together

The above activity shows that molecules of matter have force of attraction between them. This force binds the molecules together. Force of attraction between the molecules (Inter molecular forces) varies from one kind of matter to another. The structure and properties of matter – whether they are hard or soft, coloured or transparent, liquid or gas- depends on the way in which the atoms and molecules are arranged.

STATES OF MATTER

Matter can exist in three physical states, i.e., solid, liquid and gas.

Solid

Solids are characterized by definite shape, size and volume. In solids, the molecules are very closely arranged because the force of attraction between the molecules is very strong. They are incompressible.

Liquid

Liquids occupy definite volume but have no definite shape. It takes the shape of the container as shown in fig 5.11. Do you know why? The inter molecular force of attraction between the molecules in a liquid is less when compared to solids and these molecules are loosely packed. This allows the liquid to change its shape easily. They are negligibly compressible. A few examples for matter that exist in liquid state are water, oil, juice etc. From the fig 5.12 you can also see how the molecules are loosely arranged in liquids.



Fig. 5.11. Liquid takes the shape of the container

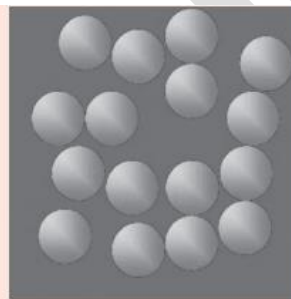


Fig 5.12. Loose arrangement of molecules in liquid

Gas

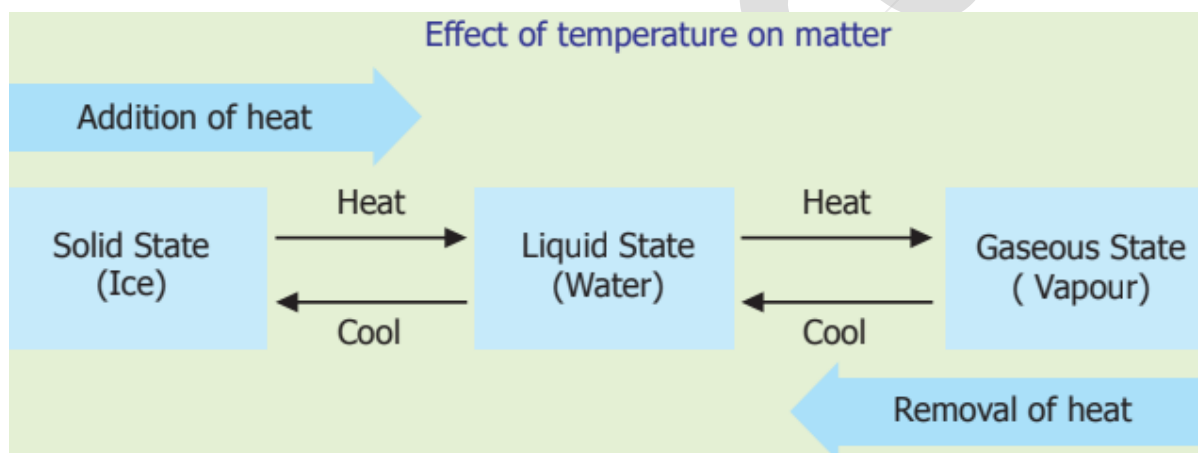
The atoms or molecules of matter that always occupies the whole of the space in which they are contained is called a gas. It neither occupies a definite volume nor possesses a definite shape. The inter molecular force of attraction between the molecules of a gas is negligibly small, because the molecules are very loosely packed.

The molecules are distributed at random throughout the whole volume of the container. Gases are highly compressible when compared to solids and liquids. Gases will expand to fill the space of the container. The Liquefied Petroleum Gas (LPG) cylinder that we get in our home for cooking and the oxygen supplied to hospitals in cylinders are compressed gases. These days Compressed Natural Gas (CNG) too, is used as fuel in vehicles. In Delhi, CNG gas is used as a fuel in buses.

Properties of Solid, Liquid and Gas

S.No	SOLID	LIQUID	GAS
1	Have definite shape and volume	Have definite volume but no definite shape	Have neither definite shape nor definite volume
2	Cannot flow	Can flow from higher level to lower level	Can flow very easily and quickly in all directions
3	Intermolecular space is minimum	Intermolecular space is moderate	Intermolecular space is maximum
4	Intermolecular forces are maximum	Intermolecular forces are less than solid	Intermolecular forces are negligible
5	They are incompressible	They are compressible to an extent	They are easily compressible

EFFECT OF TEMPERATURE ON SOLID, LIQUID AND GAS



On varying the temperature, you can notice that matter will change from one state to another. For example ice (solid) in the container, on heating, becomes water (liquid) and on further heating, it changes into water vapour(gas).

Water can exist as three states of matter.

- Solid, as ice.
- Liquid, as water
- Gas, as water vapour.

What happens to the particles of matter during the change of states? How does this change of state take place? Don't we need answers to these questions? On increasing the temperature of solids, the kinetic energy of the particles (molecules/atoms) increases. Due to the increase in kinetic energy, the particles start vibrating with greater speed. The energy supplied by heat overcomes the forces of attraction between the particles. The particles leave their fixed positions and start moving more freely. A stage is

reached when the solid melts and is converted into a liquid. The temperature at which a solid melts to become a liquid is called its melting point. The melting point of ice is 0°C

When we supply heat energy to water, the particles (molecules or atoms) start moving even faster. At a certain temperature, a point is reached when the particles have enough energy to break free from the forces of attraction between each other. At this temperature the liquid starts changing into gas. The temperature at which a liquid starts boiling is known as its boiling point. The boiling point of water is 100°C

Particles from the bulk of the liquid gain enough energy to change to the vapour state. So, we infer that one state of matter can be changed into another state by varying the temperature.

18] Measurement

The measure of a surface is known as area. Area is the extent of plane surface occupied. The area of the plot of land is derived by multiplying the length and breadth.

Area = length $\times$ breadth

The unit of area will be metre $\times$ metre = (metre)² read as square metre and written as m^2

Derived Quantities

Quantities got by the multiplication or division of fundamental physical quantities are called derived quantities. Area is a derived quantity as we obtain area from the fundamental physical quantity - length. Volume and density are some other derived quantities. One square metre is the area enclosed inside a square of side 1m. Other units of measurement



The area of a surface is 10m^2 Means that it is equivalent to 10 squares each of side of 1m

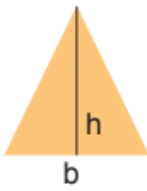
Breadth, height, depth, distance, thickness, radius, diameter are all different measures of length.

Sl.No.	Unit of length	Unit of area
1.	centimetre (cm)	square centimetre (cm ²)
2.	millimetre (mm)	square millimetre (mm ²)
3.	feet (ft)	square feet (ft ²)

Area of agricultural fields is measured in acre and hectare 1 Acre = 4047 m² = 100 cent

1 hectare = 2.47 acre

The surfaces need not be a rectangle or square always. We use the following formulae to calculate the area of some regular objects. (i.e.) objects which have definite geometric shape.

S.No.	Shape	Figure	Area	Formula
1.	Square		length x length	l^2
2.	Rectangle		length x breadth	$l b$
3.	Triangle		$\frac{1}{2}$ x base x height	$\frac{1}{2} bh$
4.	Circle		π x radius x radius	πr^2 $\pi = \frac{22}{7}$ or 3.14

Volume

The space occupied by a body is called its volume. Objects of smaller size occupy less volume and objects of larger size occupy more volume

Volume of some regular objects is obtained by multiplying the base area by their height.

Volume = base area $\times$ height

It is, $m^2 \times m = m^3$ which is known as cubic metre.

The volume may also be expressed with different units depending upon the unit of measurement.

Unit of length	Unit of volume
milli metre (mm)	cubic millimetre (mm^3)
centimetre (cm)	cubic centimetre (cm^3)

The volume of an object is $10m^3$ means that it is equivalent to 10 cubes each of side 1m.

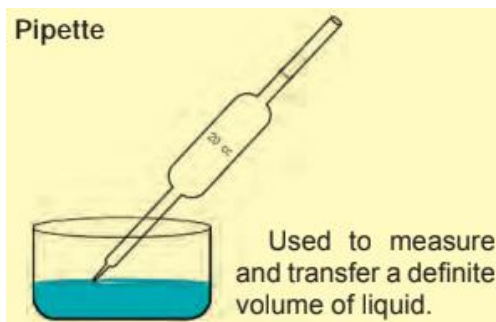
One cubic metre is the volume of a cube of side 1m.

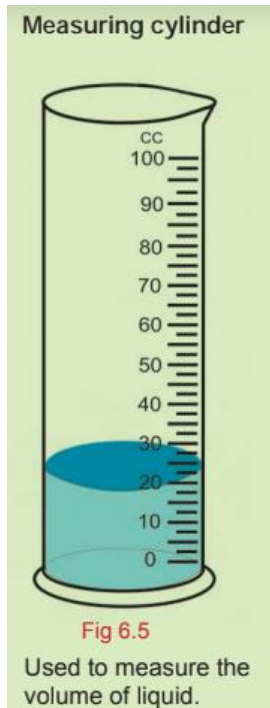


Measuring liquids

Volume of liquid is measured in litres.

1 litre = 1000 cm^3 . One cubic centimetre is otherwise known as 1 millilitre written as ml.





Burette

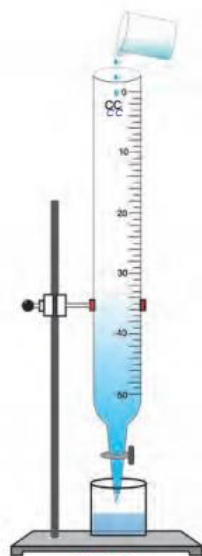
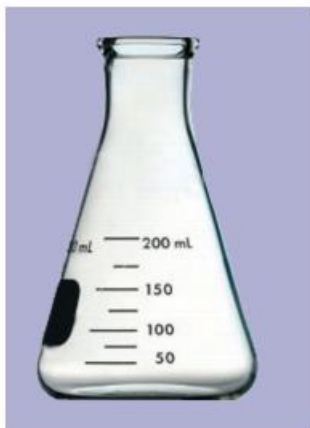


Fig 6.6
Used to make a small fixed volume of liquid to flow.

Measuring flask**Fig 6.7**

Designed to hold a fixed volume.

Density

The lightness or heaviness of a body is due to density. If more mass is packed into the same volume, it has greater density. So, the iron ball will have more mass than the sponge of same size. Therefore iron has more density. Density is the mass of unit volume of the substance

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

The SI unit of density is kg/m^3 .

If a substance is lighter than water, it will float; but if it is heavier than water, it will sink.

Measurement of time

The earlier clocks like the sundial , water clock and hour glass were not very accurate. There was the need to have more accurate and precise instruments . The earliest pendulum clocks which had weights and a swinging pendulum satisfied this need.

Simple pendulum

The back and forth motion of the swing is an example of oscillatory motion. You can observe the same in pendulum clocks, which work on the principle of the simple pendulum.

A simple pendulum is a small metallic ball (bob) suspended from a rigid stand by an inelastic thread.

When the bob is pulled gently to one side and released, it moves to and fro. One complete to and fro motion is called one oscillation. i.e. from one end (extreme) to the other end and back. The time taken to complete one oscillation is called time period.

The distance between the point of suspension and the centre of the bob is called length of the pendulum. Amplitude is the distance upto which the bob is pulled from the position of rest.

Astronomical distances

Astronomical Unit is the average distance between the earth and the sun.

1 Astronomical Unit = 149.6 million kilometre (14.96 crore km).

1 AU = 1.496×10^{11} m

Light year is the distance travelled by light in vacuum in one year.

1 Light year = 9.46×10^{12} km (9,46,000 crore kilometres). (or)

1 Light year = 9.46×10^{15} m.

19] Motion

Speed

Two of the most exciting events in any sports meet is the 100m dash and 4x100m relay. Though all athletes run the same distance, the athlete who runs the distance in the shortest time will be the winner. In other words, the athlete who has the highest speed or is the fastest will win.

The most obvious feature of an object in motion is speed. It is a measure of how fast or slow an object is moving.

Speed of a body is the distance travelled by the body in one second.

$$\text{SPEED} = \frac{\text{DISTANCE TRAVELLED}}{\text{TIME TAKEN}}$$

Distance travelled is measured in metre and time in second

Therefore, the unit of speed is metre / second . [m / s].

It can also be expressed in kilometre / hour [km / h]

What do you mean by saying the speed of a car is 50 km/h?

It means that the car travels a distance of 50 km in one hour.

$$\begin{aligned} 1 \text{ km} &= 1000 \text{ m} \text{ and} \\ 1 \text{ hour} &= 60 \times 60 \text{ s} = 3600 \text{ s} \end{aligned}$$

$$\begin{aligned} \text{So, } 1 \text{ km/h} &= \frac{1000 \text{ m}}{3600 \text{ s}} \\ &= \frac{5}{18} \text{ m/s} \end{aligned}$$

Example :

$$\text{a) } 2 \text{ km/h} = 2 \times \frac{5}{18} \text{ m/s}$$

$$\text{b) } 3 \text{ km/h} = 3 \times \frac{5}{18} \text{ m/s}$$

If you know the speed of an object, you can find out the distance covered by it in a given time. All you have to do is to multiply the speed and time.

- Distance covered = Speed x Time

Variable Speed

The speed of a bus during a journey may vary. When the bus is nearing a bus stop, its speed decreases.

On the highways the bus travels with greater speed. But in a city or town it travels with less speed due to heavy traffic.

The bus has different speeds at different time intervals. So we say that it has variable speed.

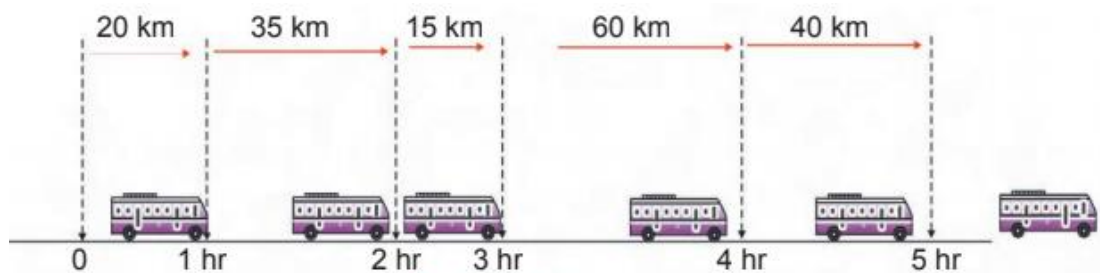


Fig 7.2. Variable speed

For such bodies, we can calculate the average speed:

$$\text{Average speed} = \frac{\text{Total distance travelled}}{\text{Total time taken}}$$

If a body moves with the same speed at all times we say that it has uniform speed.

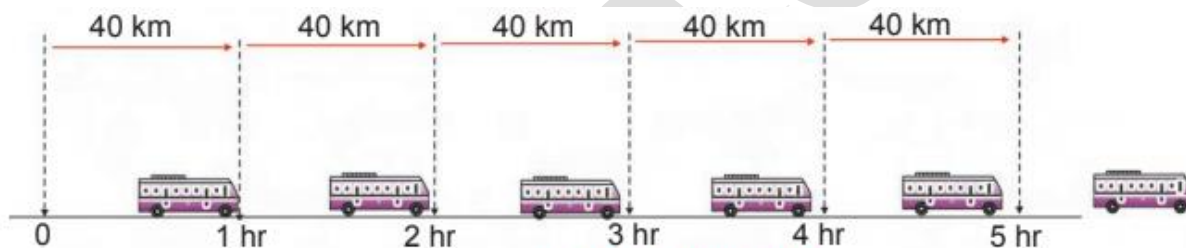


Fig 7.3. Uniform speed

Graphical representation

Speedometer with odometer

Why is graphical representation used?

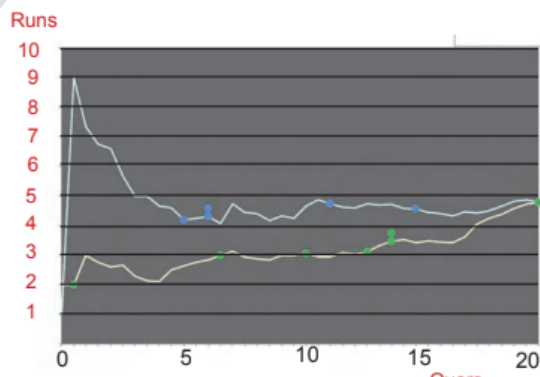


Fig 7.4. Graphical representation

When you are given a set of numbers which are relative to one another, it may not give you a clear idea of the relationship between them.

If the same numbers are represented on a graph, it gives a beautiful visual representation and a clearer idea of the relation.

Hence, change of distance with time may be represented by a distance - time graph.

Distance – Time graph

S.No	Time in minutes	Distance in km
1	0	0
2	5	5
3	10	10
4	15	15
5	20	20
6	25	25
7	30	30

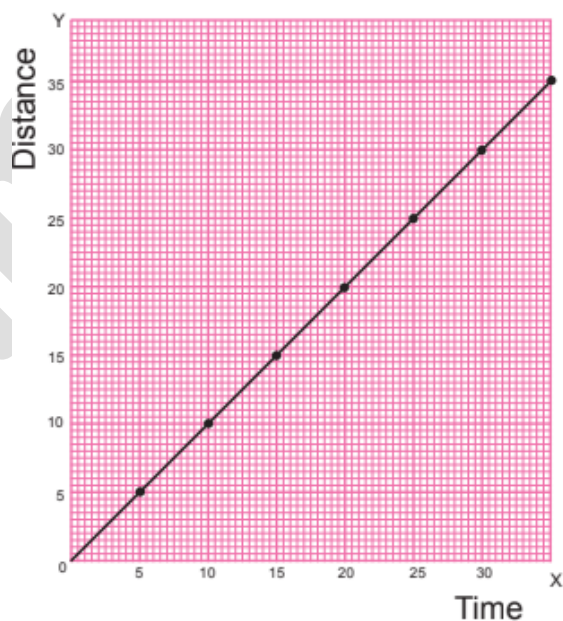


Fig 7.5. Distance Time Graph

VELOCITY



Displacement is the shortest distance between two points in a particular direction. In the picture, it is represented by a dotted line.

Velocity is the displacement of a body in one second.

$$\text{VELOCITY} = \frac{\text{DISPLACEMENT}}{\text{TIME TAKEN}}$$

Its unit is m / s.

Velocity is nothing but speed in a definite direction.

ACCELERATION

Acceleration is the measure of change in velocity.

Acceleration is the change of velocity in one second.

$$\text{Acceleration} = \frac{\text{Change in velocity}}{\text{Time taken}}$$

Its unit is m / s²

If a car has an acceleration of 5 m/s² every second its velocity increases by 5 m/s.

If the velocity of a moving body decreases, we say that it has negative acceleration or retardation or deceleration.

Example : A train slows down to stop at a station.

Acceleration due to gravity

As the ball rises, its velocity gradually decreases till it becomes zero i.e., the body is decelerated. When the ball falls down its velocity gradually increases i.e., it is accelerated.

The deceleration or acceleration is due to the earth's gravitational force.

It is known as acceleration due to gravity. It has an average value of

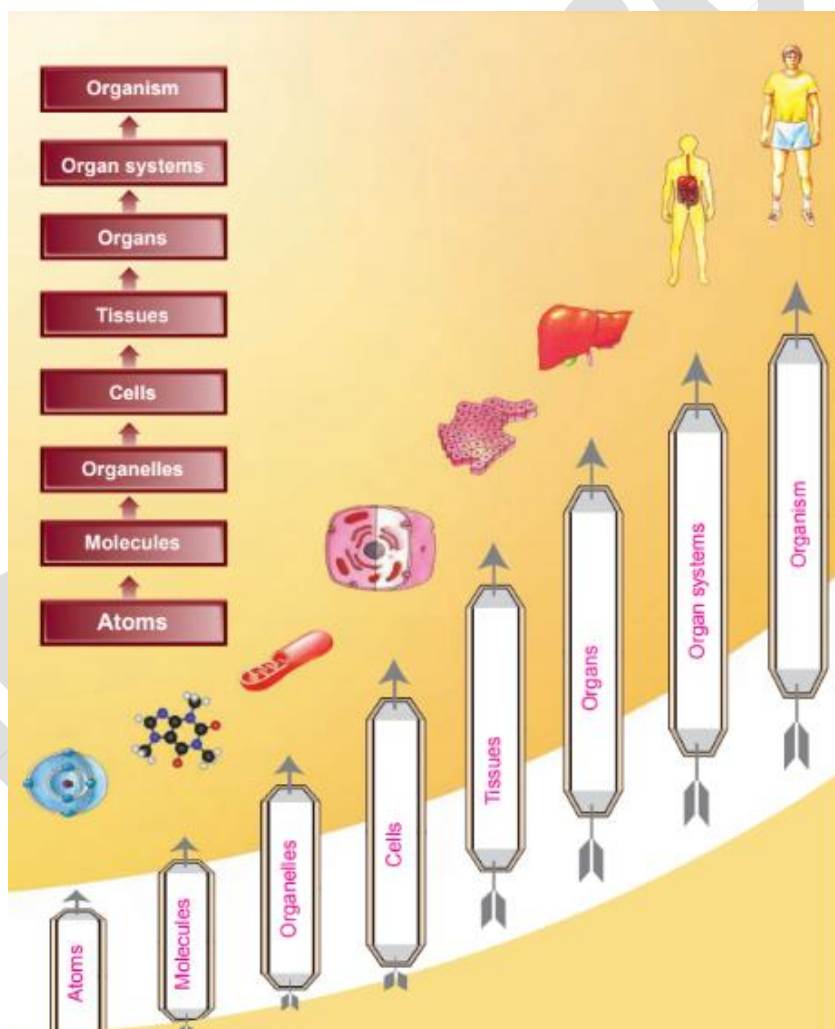
$$9.8 \text{ m/s}^2$$

on the surface of the earth and is represented as g .

$$g = 9.8 \text{ m/s}^2$$

This means that the velocity of a body decreases by 9.8 m/s every second when it is thrown up and the velocity increases by 9.8 m/s every second when it falls down.

20] Human Body-form And Function



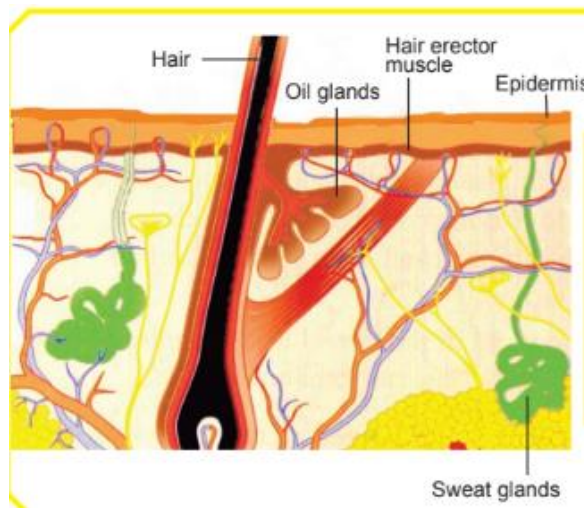
Structure and functions of the Human organ systems

Our body is made up of many organ systems. There are about ten organ systems in our body. Let us study about human organ systems in brief.

1. The Integumentary System

The Integumentary System includes the skin, hair, nails, sweat glands and oil glands.

- The skin is the heaviest organ of our body and it weighs about 7 kg.
- The Skin is a sense organ. It helps us to feel the pain.



Functions:

1. It protects the inner parts of the body.
2. It works as an excretory organ by way of sweating.
3. It acts as a sense organ.
4. It helps to produce Vitamin D.

2. The Digestive System

The digestive system consists of mouth, food pipe, stomach, liver, intestines and the secretory glands.

Functions:

1. Ingests and digests different types of food.
2. The digested food molecules are absorbed and distributed through the bloodstream.
3. The undigested food is egested as waste.

3. The Respiratory System

Respiration is essential for the survival of living organisms. It is a process in which food is broken down into simpler forms with the help of oxygen and enzymes.

Functions:

1. Lungs procure oxygen from the surrounding and conduct it to the tissues through the bloodstream. (Inspiration)
2. Oxygen is used to combust the food and the carbondioxide produced in this process is released into the surrounding through lungs.(Expiration).

4. The Skeletal System

The Skeletal System includes bones and other tissues such as cartilages and ligaments. in our body. The Skeletal System is made up of 206 bones. All the bones are connected by joints and form the framework of the body.

Functions:

1. The Skeletal System provides a framework to the body and enables body movements.
2. It protects many internal organs such as brain, heart, lungs etc.
3. Bone marrow produces blood cells like Red Blood Cells, White Blood Cells and Platelets.

5. The Muscular System

The Muscular System is made up of three types of muscles. They are skeletal muscles (striated muscle), smooth muscles (non-striated muscle) and cardiac muscles. Skeletal muscles are attached to the bones. Smooth muscles are found in the walls of blood vessels and in the lining of hollow organs such as stomach, intestines etc. Cardiac muscle is exclusively found in the heart.

Functions:

1. Skeletal muscles give shape to the body and make the movements of our body possible.
2. These muscles generate the heat required for maintaining our body temperature.
3. Other muscles enable movements in the internal organs.

6. The Circulatory System

The Circulatory System transports substances from one part of the body to another. It is made up of the heart and the blood vessels. The heart is the pumping organ. It pumps the blood into the blood vessels, which carry the blood to all parts of the body and bring it back to the heart.

Functions

1. Blood transports nutrients, oxygen, wastes and hormones.
2. It regulates the water level and the body temperature.

7. The Nervous System

The Nervous System is composed of the brain, the spinal cord and the nerves. The nervous system is divided into two types. They are the Central Nervous System (CNS) and the Peripheral Nervous System (PNS). There are five sense organs, which help us to know the outside world. They are eyes, nose, ears, tongue and skin. The CNS consists of the brain and the spinal cord. The PNS consists of the cranial nerves and the spinal nerves.

8. The Endocrine System

A group of ductless glands in our body form a system called the Endocrine System. These glands secrete certain chemicals called hormones. These hormones are transported to the target organs through blood and regulate various functions of the body.

9. The Excretory System

The Excretory System helps in the elimination of wastes from our body. It comprises a pair of kidneys, a pair of ureters, a urinary bladder and urethra. The blood is filtered and the waste is separated to form urine, which is expelled periodically.

10. The Reproductive System

The Reproductive System is mainly composed of testes in males and ovaries in females. The testes produce male gametes called sperms. The ovaries produce female gametes called eggs. This system helps in producing new individuals for the survival of human race.

1.2. The Body and ITS Health as understood in the Indian System of Health Care

Health Care is prevention of illness and treatment for illness. Most of the rural people rely on two types of medicines. They are the Siddha and the Ayurveda systems of medicine.

Siddha system of medicine (Tamil maruthuvam) Siddha vaidhya is an indigenous traditional system originated in Tamilnadu. It has references from age- old literature such as 'Thirumandiram', 'Thirukkural' and 'Tholkappiam'. The Siddha is a traditional Tamil system of medicine which is also practised in the neighbouring states of Kerala, Karnataka and Andhra Pradesh. The Siddha Medical System was founded by a group of 18 spiritual people called Siddhars. The word 'Siddhar' is derived from "Siddhi" which means "Eternal Bliss". Agastiyar, being the first Siddhar, is called the Father of Siddha Medicine.

The concept of the Siddhars is "FOOD IS MEDICINE, MEDICINE IS FOOD". Diet and lifestyle play major roles in maintenance of good health and in curing diseases. The medicines are prepared from plants (mooligai), metals and minerals (dhatu) and animal products (jeeva). Around 1,200 herbs are used in the preparation of Siddha medicine. The concept of treatment is to treat the sick with leaves, and subsequently with roots of the herbs. If the severity of illness is not reduced, then they go for powders (paspam).

Some of the medicines used in Siddha are Chooranam, Mathirai, Thailam, Legiyam, Rasayanam, Paspam, Chendooram and so on.

Ayurveda

Ayurveda is a 'System of healing using natural means' (herbs). It which originated in India. 'Ayurveda' means the Science of Life (Ayur = Life, Veda = Science).

The object of Ayurveda is to counteract the imbalance of Vaatham, Pitham and Kabam which originate from the body. This system of healing is believed to treat the ailments of body, mind and spirit. The most amazing part of Ayurveda is that it includes almost all methods of healing like Yoga, Meditation, Purification and so on. In this system, herbs, massages, diet and exercises are used individually and collectively to cure a number of ailments.

Homeopathy Medicine

Homeopathy is a form of alternative medicine, first proposed by the German Physician Samuel Hahnemann, in 1796.

Unani Medicine

Unani Medicine is a form of traditional medicine based on the teachings of the Greek physician Hippocrates and the Roman physician Galen, and is developed into an elaborate medical system by the Arab and the Persian physicians.

DISEASES, DISORDERS AND PREVENTION

Diabetes mellitus

The food that we eat is broken down into glucose. Glucose is a source of energy needed for all living beings. Insulin is a hormone secreted by pancreas to control glucose level. When the glucose level in blood exceeds the normal limit (80-120mg/dl), the person is said to be affected by Diabetes.

Diabetes is not a disease but a disorder. It may lead to harmful conditions like obesity, hypertension, heart ailments, etc., It is caused due to lack of physical activity, unhealthy food habits and lack of insulin.

DVANTAGES OF PHYSICAL ACTIVITY

Physical exercise is essential for all human beings. Aerobic exercises supply oxygen efficiently to the muscles, heart, lungs and the circulatory system. A good supply of oxygen to the body is a sign of good health.

Some examples of aerobic exercises are:

1. Jogging
2. Playing basketball
3. Playing football
4. Swimming
5. Cycling
6. Brisk walking for a long distance
7. Yoga and aerobic dancing

These exercises can be followed daily.

Advantages of physical exercise

1. Exercise makes the muscles of the heart, lungs and various parts of the body strong. Children must be physically active for at least 60 minutes everyday.
2. It burns unwanted calories, reduces weight and prevents obesity.
3. It helps in lowering the blood glucose level.
4. It helps in reducing blood cholesterol level.
5. It reduces hypertension and improves the quality of life.

Preservation of Food

There are certain food items which get spoiled soon at room temperature due to the excess of moisture content in them. Such food items are called perishable food. eg. fruits, vegetables, milk, meat etc.

There are certain food items which do not get spoiled at room temperature as they are dry in nature. Such food items are called as non-perishable food. eg. rice.

In order to avoid wastage of food from spoilage, food items are processed and preserved in different ways. The milk we get in sachets is an example. There are several methods of preserving food. Some are age-old methods and others are the results of modern development in science.

What is preservation of food?

The process of keeping the food for a long time without spoilage is called preservation of food.

The Purpose of Food Preservation

1. To prevent food from spoilage.
2. To retain the colour, taste and nutritive value of the food.
3. To make food available throughout the year.
4. To add variety to our meal.

Methods of Preservation

Preservation involves prevention of the growth of bacteria, fungi and other microorganisms in the food. Even the action of the enzymes within the food should be prevented. Some common methods of preserving food are: drying, freezing, heating, addition of salt or sugar. Some modern methods like irradiation is also used to preserve food. Let us study some of the common methods of food preservation.

Drying

This method involves the removal of water content from the food by drying. The harvested cereal grains are properly dried in the sun to reduce the moisture in them. This prevents the food from the attack of insects, fungi and bacteria.

Heating

Heating is a method of food preservation. It kills the microorganisms and denatures the enzymes present in the food. Hence food is stored safely. eg. boiling of milk before it is stored or used. Whenever we think of heating, the word 'pasteurized milk' comes to our mind. The process of heating milk at a temperature of 70°C to 75°C for some time and immediately cooling is called pasteurization. This method was discovered by Louis Pasteur.

Freezing

Frozen food like meat and fish at very low temperature prevents water activity in the food material. Thus the microbial growth and enzyme activity can be prevented.

Addition of salt: When salt is added to food, it removes the water from food by osmosis. When there is no moisture in the food, microorganism and enzymes cannot act on the food. Food like meat, fish, gooseberry, lemon, tamarind, raw mangoes etc. are preserved by salting.

Addition of sugar: When sugar is added to food, sugar dissolves in the water content of the food and does not allow the water to be available. So, in the absence of water, microbes do not grow. Hence the food is preserved. Preservation of food by adding sugar not only saves the food from spoilage, but also produces new food such as jam, jelly, murrabbas, squash etc.

Fast food and its ill Effects

Fast food is liked by almost everyone today for many reasons. Fast food is easy and convenient to be cooked within a short time. Its taste and flavour is also appreciated by everyone. Food, today is no more home cooked wholesome food but processed with multiple additives. Fast food, if eaten in large quantities on a regular basis can cause many ailments like obesity, diabetes, high blood pressure etc..

Fast food covers a wide range of products, like processed food, pre- prepared food like burgers, fries, vadai, samosa, bajjis etc. These food items are unhealthy and do not contain the nutrients and vitamins of a wholesome home- cooked meal.

They are low on the nutritional elements and hardly provide any benefit to the body. Food like pastas, pizzas, burgers, noodles, bajjis, samosas etc. are high on the taste quotient.

Fast food, if consumed on a regular basis over a period of time, can have devastating effects on the overall health of an individual. Most families have a number of earning individuals, which leave them with no time or energy to do conventional cooking using fresh food ingredients.

Negative effects of fast food

1. Fast food item have a very high energy density. Food item with a high energy density confuse the brain's control system.
2. Continuous intake of fast food leads to weight gain and obesity. This is because fast food interferes with the normal appetite control systems.
3. The human appetite was designed for low energy density food and not for high energy density food.
4. Fast food may speed up the risk of clogged arteries, which may lead to heart attacks. Fast food meals are high in saturated fats, low quality carbohydrates and high salt content. Our body requires fibre and healthier saturated fats. Fast food represents a dietary pattern that is the opposite of what is recommended for a healthy body.

“Fast food can be delicious but it is a silent killer”.

Science Today – Irradiated Food preservation

Heating, drying, pickling, cold storage are some traditional methods of preserving food. But, nowadays, food can be preserved by some modern methods like irradiation – a process by which food is exposed to X-rays, Gamma rays or Ultraviolet rays. These rays are powerful enough to kill the bacteria and the moulds.

Will irradiation destroy the taste and nutritional value of the food? No, Irradiation does not destroy the taste or nutritive value of foods. Onions, potatoes, sprouted grams etc. remain fresh, when exposed to radiation. Some people are of the opinion that irradiation may lead to formation of toxic substances, but it is not so.