

Based on the **National Curriculum Framework**; adheres to the latest **NCERT** guidelines covering the latest **CBSE** and **ICSE** syllabus.

General Science

Text Book for Class VI

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Syllabus

Sub-theme	Questions	Key concepts	Resources	Activities/ Processes
1. FOOD				20
Sources of food	What are the various sources of our food? What do other animals eat?	Plant parts and animal products as sources of food; herbivores, carnivores, omnivores	Examples of food from different parts of plants and of food from animals sources.	Germination of seeds such as moong, chickpea etc.; preparing a chart on food habits of animals and food culture of different regions of India.
Components of food	What is our food made up of? Why do we eat a variety of food?	Carbohydrates, fats, proteins, vitamins, minerals, fibres, their sources and significance for human health; balanced diet; diseases and disabilities due to food deficiencies	Mid Day Meal; Charts, pictures/films of children suffering from food deficiencies and disabilities.	Studying the variety of food in different regions in India; preparing a menu of balanced diet in the context of the diversity of foods eaten in different parts of the country. Classifying foods according to food components; test for starch, sugars, proteins and fats.
Cleaning food	How do we separate the grains after harvesting the wheat /rice crop?	Threshing, winnowing, handpicking, sedimentation, filtration	Talking to some elders about practices after harvesting the crop; kit materials.	Discussion on threshing, winnowing, handpicking; experiments on sedimentation, filtration. Separating a mixture of salt and sand.
2. MATERIALS				26
Materials of daily use	What are our clothes made of? How did people manage when there were no clothes? Are some of our clothes made of materials obtained from plants? In what kinds of places do these plants grow? Which parts of the plants are used for making clothes?	Different types of cloth materials – cotton, wool, silk and synthetics. Development of clothing materials Plant fibres, especially cotton and jute; production of cotton, jute and other locally available plant fibres; types of soil required for the growth of different fibrous plants	Sharing of prior knowledge with parents and community. Archaeological and historical accounts Sharing of prior knowledge with parents and community.	Whole class discussion. Simple activities to distinguish among different types of cloth Whole class discussion. Field survey/ collecting information on locally available plant fibres (coconut, silk cotton, etc.)
Different kinds of materials	What kinds of things do we see around us?	Grouping things on the basis of common properties.	Materials, kit items	Collecting and grouping things on the basis of gross properties e.g. roughness, lustre, transparency, solubility, sinking/floating using prior knowledge, through experiments.
How things change/ react with one another	In what ways do things change on being heated? Do they change back on being cooled? Why does a burning candle get shorter?	Some changes can be reversed and others cannot be reversed.	Prior knowledge, kit items	Experiments involving heating of air, wax, paper, metal, water to highlight effects like burning, expansion/ compression, change of state. Discussion on other changes which cannot be reversed – growing up, opening of a bud, ripening of fruit, curdling of milk.

Sub-theme	Questions	Key concepts	Resources	Activities/ Processes
	How much salt can be dissolved in a cup of water?	Solubility, saturated solutions Amount of substance dissolving varies with temperature. At the same temperature amounts of different substances that dissolve varies.	Salt, sugar and other common substances, kit items	Experiments for testing the solubility of commonly available substances. Experiments on the effect of heating and cooling on solubility. Comparison of solubilities of different substances using non-standard units (e.g. spoon, paper cone).

3. THE WORLD OF THE LIVING

36

Things around us	Are all things around us living? What is the difference between living and non-living? Are all living things similar? Do all living things move? Where do plants and animals live? Can we grow plants in the dark?	Living/non-living characteristics; habitat; biotic, abiotic (light, temperature, water, air, soil, fire)	Recollection of diversity of living organisms and the habitat where they live.	Listing of things around us, listing of characteristics after making observations say on size, colour, shape etc., categorisation; observations on habitat; observing germination of seeds, also observing under dark conditions; growth and development of domestic animals, hatching of birds' eggs etc., developing drawing skills.
The habitat of the living	How does habitat affect plants and animals? How do fish live in water?	Habitat varies – aquatic, deserts, mountains, etc. – plants and animals show adaptation; other plant part modifications like tendrils, thorns, etc. Animals in deserts and water.	Potted plants or seeds, pots, etc; thermometer, any water plants, any xerophytic plants, Information on desert and aquatic plants and animals.	Listing the diverse set of living organisms around us; prepare herbarium specimens of different leaves, plants; studying modifications in plants and animals; observing how different environmental factors (water availability, temperature) affect living organisms.
Plants – form and function	What is the structure and function of various parts of the plants - stem, leaf and roots? How do different flowers differ from one another? How does one study flowers?	Morphological structure and function of root, stem and leaves. Structure of the flower, differences	Plants, flowers, blade, hand lens.	Studying plant parts – types of stems, roots, leaves, seeds; experiment to show conduction by stem, activity to show anchorage by roots, absorption by roots. Study of any flower, counting number of parts, names of parts, cutting sections of ovary to observe ovules.
Animals – form and function	What is inside our bodies? How do animals move? Do all animals have bones in their bodies? How do fishes move? And birds fly? What about snakes, snails, earthworms?	Structure and functions of the animal body; Human skeletal system, some other animals e.g. fish, bird, cockroach, snail	Observation of nature; model of skeleton, X-rays of arms or legs, chest, hips, jaws, vertebral column (could be given in the textbook)	Activities to study X-rays, find out the direction in which joints bend, feel the ribs, backbone etc. Observation/ discussion on movement and skeletal system in other animals

Sub-theme	Questions	Key concepts	Resources	Activities/ Processes
4. MOVING THINGS, PEOPLE AND IDEAS				12
Moving	<p>How did people travel from one place to another in earlier times?</p> <p>How did they know how far they had travelled?</p> <p>How do we know that something is moving?</p> <p>How do we know how far it has moved?</p>	<p>Need to measure distance (length). Measurement of length.</p> <p>Motion as change in position with time.</p>	<p>Everyday experience; equipment (scale etc.) to measure length.</p> <p>Stories for developing contexts for measuring distances</p>	<p>Measuring lengths and distances. Observation of different types of moving objects on land, in air, water and space.</p> <p>Identification and discrimination of various types of motion. Demonstrating objects having more than one type of movement (screw motion, bicycle wheel, fan, top, etc.) Observing the periodic motion in hands of a clock/watch, Sun, moon, Earth.</p>
5. HOW THINGS WORK				28
Electric current and circuits	<p>How does a torch work?</p> <p>Do all materials allow current to flow through them?</p>	<p>Electric current. Electric circuit (current flows only when a cell and other components are connected in an unbroken loop)</p> <p>Conductor Insulator</p>	<p>Torch. Cell, bulb or LED, wires, key</p> <p>Mica, paper, rubber, plastic, wood, glass metal clip, water, pencil (graphite), etc.</p>	<p>Activity using a bulb, cell and key and connecting wire to show flow of current and identify closed and open circuits. Making a switch.</p> <p>Opening up a dry cell</p> <p>Experiment to show that some objects (conductors) allow current to flow and others (insulators) do not.</p>
Magnets	<p>What is a magnet?</p> <p>Where on a magnet do things stick?</p> <p>How is a magnet used to find direction?</p> <p>How do two magnets behave when brought close to each other?</p>	<p>Magnet</p> <p>Poles of a magnet</p> <p>A freely suspended magnet always aligns in a particular direction. North and South poles.</p> <p>Like poles repel and unlike poles attract each other.</p>	<p>Magnet, iron pieces</p> <p>Magnet, iron pieces, iron filings, paper</p> <p>Bar magnet, stand, thread, compass</p> <p>Two bar magnets, thread, stand</p>	<p>Demonstrating how things are attracted by a magnet. Classification of objects into magnetic/non-magnetic classes.</p> <p>Activity to locate poles of a magnet; activity with iron filings and paper</p> <p>Activities with suspended bar magnet and with compass needle</p> <p>Activities to show that like poles repel and unlike poles attract.</p>
6. NATURAL PHENOMENA				26
Rain, thunder and lightning	<p>Where does rain come from?</p> <p>How do clouds form?</p>	<p>Evaporation and condensation, water in different states.</p> <p>Water cycle</p>	<p>Everyday experience; kit items</p>	<p>Condensation on outside of a glass containing cold water; activity of boiling water and condensation of steam on a spoon. Simple model of water cycle. Discussion on three states of water.</p>

Sub-theme	Questions	Key concepts	Resources	Activities/ Processes
Light	Which are the things we can see through?	Classification of various materials in terms of transparent, translucent and opaque.	Previous experience, candle/torch/lamp, white paper, cardboard box, black paper.	Discussion, observation; looking across different materials at a source of light.
	When are shadows formed? Do you get a shadow at night – when there is no light in the room, no moonlight or other source of light? What colour is a shadow?	A shadow is formed only when there is a source of light and an opaque material obstructs a source it. A shadow is black irrespective of the colour of the object.	Child's own experience, candle/torch/lamp, white paper, black paper, coloured objects.	Discussion; observing shadow formation of various objects of different shapes, and of same shape and different colours; playing and forming shadows with the hands in sunlight, in candle light, and in a well lit region during daytime; making a pinhole camera and observing static and moving objects.
	On what kinds of surfaces can we see images?	Reflecting surfaces; images are different from shadows.	Experience, objects with polished surfaces, mirror etc.	Observing differences between the image and the shadow of the same object

7. NATURAL RESOURCES

26

Importance of water	What will happen to soil, people, domestic animals, rivers, ponds and plants and animals if it does not rain this year? What will happen to soil, people, domestic animals, plants and animals living in rivers and ponds, if it rains heavily ?	Importance of water, dependence of the living on water. Droughts and floods	Experience, newspaper reports	Estimation of water used by a family in one day, one month, one year. Difference between need and availability. Discussion. Activity : plant growth in normal, deficient and excess water conditions
Importance of air	Why do earthworms come out of the soil when it rains?	Some animals and plants live in water; some live on land and some live in upper layers of soil; but all need air to breathe/to respire.	Experience	Discussion
Waste	Do you throw away fruit and vegetable peels and cuttings? Can these be re-used? If we dump them anywhere, will it harm the surroundings? What if we throw them in plastic bags?	Waste; recycling of waste products; things that rot and things that don't. Rotting is supported by animals/animal and plant products.	Observation and experience	Survey of solid waste generation by households; estimation of waste accumulated (by a house/ village/ colony etc.) in a day, in a year; discussion on 'what is waste'; Activity to show that materials rot in soil, this is affected by wrapping in plastics.

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Subjectwise Division of Chapters

Physics



- Measurement and Motion
- Light, Shadow and Reflections
- Electricity and Circuits
- Magnets

Chemistry



- Separation of Substances
- Fibre to Fabric
- Sorting Materials into Groups
- Changes Around Us
- Water for Life
- Air Around Us

Biology



- Food and its Sources
- Components of Food
- Characteristics of Living Things
- Plants – Form and Function
- Body Movements
- Organisms and their Surroundings
- Waste and its Management

Food and its Sources

Let us learn about

- Food and its importance
- Varieties of food
- Food from plants and animals
- Classification of animals based on their food habits
 - herbivores, carnivores and omnivores

There is an old saying which states, “you are, what you eat.” But what exactly do we eat? The substances which we eat or drink is called **food**. Why do we need food? Let us compare our body to a car. What happens to a car if there is no fuel in its tank? It stops running. Fuel is the substance which runs the car. Similarly, food is the fuel which living organisms require to keep functioning. Imagine a day when you miss your breakfast. What happens then? You feel hungry and weak. It is because your body does not get its fuel, *i.e.* food.

Living organisms require food for the following purposes :

- It provides energy to carry out various day-to-day activities.
- It helps in growth and repair or replacement of worn out cells and tissues.
- It protects the body from various diseases and keeps us healthy.

Varieties of Food

People in different states of India eat different kinds of food. Pulses, vegetables and chapattis are major food items eaten in the northern parts of India. Similarly, rice, curd and curry are major food items eaten in the southern and eastern parts of our country. Some people eat meat, eggs and fish also.



North Indian food



South Indian food

We also eat different food items in different meals during the day. Let us understand this through an activity given below.

Activity 1

Discuss with your friends and write the food items usually eaten at different meals.

Name	Food items eaten		
	at breakfast	at lunch	at dinner

From the above activity, we can conclude that different food items are eaten in different meals. Non-vegetarians eat meat, eggs and fish while vegetarians do not.

Food Ingredients

The raw materials needed to prepare any food items are called its **ingredients**. Some food items are eaten in raw form such as salad, nuts, fresh vegetables and fruits while others are eaten in cooked form such as rice, chapatti and pulses. Some food items are prepared with just one or two ingredients while others are made with more than two.

Activity 2 Make a list of your favourite food items and their ingredients.

Food item	Ingredients
Boiled rice	Water and Rice
Idli	Rice, Urad dal, Salt and Water

Sources of Food

We have learnt the names of various ingredients above. Now, the question arises, where do we get these ingredients from? To answer this question, just think what are the sources of the above ingredients.

We obtain milk, eggs, meat, honey, etc. from animals. We obtain fruits, vegetables, spices, pulses and cereals from plants. So, we can say that plants and animals are the main sources of our food.



Plants as Source of Food

Plants are the major source of food for human beings and animals.

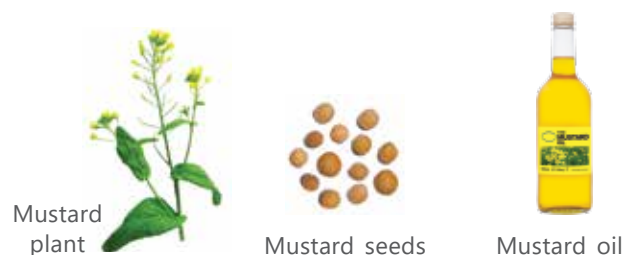
Green plants are called **producers** as they prepare their own food. Food is obtained from different parts of a plant like roots, stems, leaves, flowers, seeds, and fruits.

The parts of a plant which are eaten directly or are used to prepare food are called **edible parts**.

Examples of various edible parts of plants are listed below.

Roots : carrot, turnip, radish, beetroot
Stems : potato, ginger, onion, sugarcane
Leaves : spinach, mint, cabbage, coriander
Flowers : cauliflower, broccoli
Seeds : rice, wheat, maize
Fruits : mango, banana, apple

Some plants have two or more edible parts. *For example*, the leaves and stem of mustard plant are eaten as vegetable while its seeds are used to extract oil which is used to prepare food.



Foods obtained from plants are of different types such as fruits, vegetables, cereals, pulses, oil, tea, and spices.

Spices such as coriander, chilli, cardamom, cumin, and clove are also obtained from different parts of the plants. These spices add flavour and aroma to our food.



Coriander Chilli Cardamom Cumin Clove



Mushroom



Sprouted salad

Food can also be obtained from non-green plants. These include edible fungi, *e.g.* mushrooms.

Sprouted seeds of some plants are used as food. These sprouted seeds are very nutritious as well as rich in proteins and vitamins.

Activity 3

Aim : To make sprouted seeds.

Materials required : A piece of muslin cloth, water and a small bowl of green gram or chickpea seeds.

Procedure : 1. Take some seeds of green gram or chickpea.
2. Wash them thoroughly and soak them in water overnight.
3. Next day take out the seeds from the water.
4. Wrap the seeds in wet muslin cloth and leave them aside for one more day.

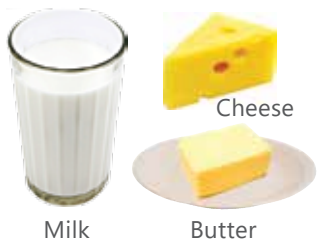
Observation : A small white structure may have grown out of the seeds. These seeds are sprouted seeds.



Animals as Source of Food

Animals provide us food in the form of milk, meat, fish, egg, and honey.

Milk is a natural wholesome food. It is mainly obtained from milk yielding animals, *e.g.* cow, buffalo, goat, and camel.



Milk

Cheese

Butter

Several food products like cheese, butter and curd are prepared from milk.

Meat is animal flesh eaten as food. It is mainly obtained from meat yielding animals, *e.g.* hen, goat and fish.

Egg is considered as a super-food. It is obtained from the poultry birds, *e.g.* hen, duck and turkey.



Egg

Honey is a sweet thick liquid produced by honeybees. It nourishes the body and promotes good health. It is the only food that includes all the substances necessary to sustain life. Honeybees collect the sweet juice (nectar) present in the flowers, convert it into honey and store it in their hive. Rearing of honeybees on a large scale is called **apiculture**.



Bee on flower

Honey

Learn More

A swarm of bees will fly 90,000 miles, the equivalent of three orbits around the Earth to collect 1 kg of honey.



What do Animals Eat ?

Animals eat a variety of food. On the basis of their food habits animals are classified into three groups.

Herbivores : Animals that eat only plants and plant products are called **herbivores**. Herbivores have muscular tongue and flat molar teeth. Cow, goat, deer, and elephant are some examples of herbivores.



Goat



Elephant

Carnivores : Animals that eat only flesh of other animals are called **carnivores**. Carnivores have long, pointed and widely spaced canine teeth. Lion, tiger and wolf are some examples of carnivores.



Wolf



Tiger

Omnivores : Animals that eat both plants as well as flesh of other animals are called **omnivores**. Omnivores have flat molar teeth and sharp incisors. Human beings, bear and crow are some examples of omnivores.



Crow



Other groups of animals with special eating habits include scavengers, decomposers and parasites.

Scavengers : Animals which mainly feed on dead bodies of animals are called **scavengers**, e.g. vulture, hawk, jackal, rat, and hyena.



Vulture



Jackal

Decomposers : Organisms such as bacteria and fungi which break down the bodies of dead or decaying organisms into simpler substances are called **decomposers**. They can be referred to as nature's recyclers.



Fungi

Scavengers and decomposers are very useful for us as they help in keeping our surroundings clean and healthy.

Parasites : Small organisms which live on or inside the bodies of other animals for food are called **parasites**. Some parasites are microscopic in size, e.g. virus while others can be seen by naked eye, e.g. flea, leech and louse.



Leech



Louse

Activity 4

Write the food items eaten by each animal in the given table.

Animal	Food
Cow	
Wolf	
Bear	
Elephant	
Lion	
Dog	

From the above table we can conclude :

- Some animals eat plants, some eat flesh and some eat both plants and animals.

WORD POWER

- Carnivore** : an animal that eats only flesh of other animals
- Edible** : suitable for use as food
- Food** : any substance that people or animals eat or drink
- Herbivore** : an animal that eats only plants
- Ingredient** : foods or substances that are combined to make a particular dish
- Nectar** : sweet juice from flowers collected by honeybees
- Omnivore** : an animal that eats on both, plants and animals
- Parasite** : an organism which lives on or inside bodies of other animals for food
- Scavenger** : an animal that feeds on dead animals
- Sprout** : germinated seeds with tiny roots that can be eaten either raw or cooked

POINTS TO REMEMBER

- Food is the basic need for all living organisms to survive.
- Food serves mainly for energy, growth and repair or replacement of worn out cells and tissues.
- Food is obtained from both plants and animals.
- Green plants prepare their own food but human beings and animals depend on plants or other animals for food.
- Food is obtained from different parts of a plant like roots, stems, leaves, flowers, seeds, and fruits.
- Animals are classified on the basis of the food they eat as herbivores, carnivores and omnivores.
- Animals with special eating habits include scavengers, decomposers and parasites.

ASSESSMENT 1

A. Tick the correct option.

- Food is required by living beings for
 energy growth repairing cells all of these
- An edible stem is
 spinach potato pulses cauliflower
- An animal product used as food is
 milk honey egg all of these
- Nectar is converted into honey by
 ant honeybee cow wasp
- An example of a spice is
 wheat bean clove plum
- Food obtained from a non-green plant is
 radish almond mushroom apple

B. Fill in the blanks.

- The materials needed to prepare any food item are called its _____.
- When we eat radish, we eat _____ of a plant.
- Rearing of honeybee on a large scale is called _____.
- Scavengers and _____ help to keep our surroundings clean and healthy.
- _____ live on or inside bodies of other animals for getting food from them.
- The parts of a plant which are used as food are called _____ parts.
- Broccoli and cauliflower are examples of _____.

C. State whether the following statements are True or False.

- A vegetarian is a herbivore. _____
- Every food item is made up of one or more ingredients. _____
- People in different regions eat different kinds of food. _____
- Green plants prepare their own food. _____
- Organisms that eat dead animals and plants are called omnivores. _____
- The food we eat protects our body from diseases. _____
- Sprouts are rich in proteins and vitamins. _____

D. Answer each of the following questions in a few words.

1. Name three carnivores.
2. Name four edible parts of a plant.
3. Name two food items which require only two ingredients.
4. Name two root vegetables.
5. Name two poultry birds.

E. Answer each of the following questions in few sentences.

1. Why do we eat food?
2. Why are green plants called producers?
3. Why are decomposers called nature's recyclers?
4. Name three plants and their parts that are edible.
5. What are parasites? Name two parasites.

F. Answer each of the following questions in detail.

1. Write a note on animals as a source of food.
2. Write a note on plants as a source of food.
3. How is honey produced and collected?
4. Explain the different categories of animals on the basis on their food habits.
5. What is the difference between scavengers and decomposers?



1. It is often said that we should start our day with a good breakfast. Explain.
2. Discuss the ways in which the scavengers and decomposers help in maintaining the ecological balance.
3. Where do non-green plants obtain their food from?



Group Discussion

- Why and how can we avoid wastage of food?
- Why does India have a huge variety of food?

PROJECT IDEAS

- Make a list of food items eaten by people in different regions of India.
- Write down the recipe of a dish belonging to a state other than yours.

Components of Food

Let us learn about

- Nutrients – Carbohydrates, Fats, Proteins, Vitamins and Minerals
- Functions and sources of nutrients
- Water and roughage
- Importance of balanced diet
- Deficiency diseases

All living organisms need food to stay alive. The food contains some special components called **nutrients**.

Nutrients provide energy which enables the body to function efficiently. Nutrients are essential for growth, maintenance and repair of cells and tissues.

Types of Nutrients

Nutrients are divided into five major groups. These are –

- Carbohydrates
- Proteins
- Minerals
- Fats
- Vitamins

Other than these nutrients, our body also needs –

- Water
- Roughage (fibre)

The presence as well as quantity of these nutrients varies in different food items.

Most food items usually have more than one nutrient but one particular nutrient may be present in much larger amount than the others. *For example*, egg has more proteins than fats and vitamins. So, egg is a 'protein rich' source of food.

Let us understand the role of these nutrients in our diet and know the various foods that provide these nutrients.

Carbohydrates

Carbohydrates are the main source of energy for the body. They are easily used by the body for various life sustaining activities.

Carbohydrates are of two types – simple carbohydrates and complex carbohydrates.

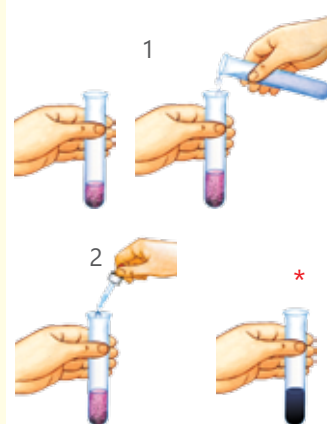
Simple carbohydrates are commonly known as sugar. They provide us instant energy. Foods that contain simple carbohydrates include table sugar, honey, milk, yogurt, chocolate, fruit and fruit juice, jam, and biscuit.



Complex carbohydrates are commonly known as starch. Plants store energy in the form of starch. Complex carbohydrates have a higher nutritional value than simple carbohydrates. They are converted into simple carbohydrates during digestion. Foods that contain complex carbohydrates

Activity 1

- Aim** : To test the presence of starch in a foodstuff.
- Materials required** : Samples of potato, carrot, boiled rice, tomato, bread, iodine solution, water and test tubes.
- Procedure** : 1. Put a sample of potato in a test tube and add some water to it.
2. Add 2-3 drops of iodine solution to the test tube.
3. Observe the change in colour of the solution.
• Repeat the above process with other food samples.
- Observation** : In some test tubes, the colour of the solution changed to blue-black while in some it did not.
- Conclusion** : Solution of food stuff containing starch turns blue-black.



include potato, sweet potato, spinach, broccoli, beans, lentils, whole grains and other leguminous plants and vegetables.

Learn More

Excess intake of sugar and starch can result into a disease called diabetes. The diabetic people are advised not to take excess sugar and starch.

Fats

Fats are energy giving foods. They provide almost double the amount of energy as compared to carbohydrates. Fats are essential for the body in moderate quantity. They act as insulator helping us to maintain the correct body temperature.

Fats are essential for proper brain function. They provide cushion and protect our vital

organs. Without fats our organs would be more prone to damage. They are the building blocks of hormones and also insulate the nervous system tissues in the body.

Foods that contain fats include butter, cream, vegetable oils, ghee, nuts, fish and meat.

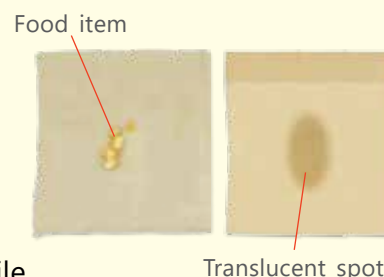


Learn More

Excess storage of fats in the body can cause cholesterol deposition which leads to obesity and heart diseases.

Activity 2

- Aim** : To test the presence of fats in a food item.
- Materials Required** : Food samples of walnut, groundnut and paper.
- Procedure** : 1. Wrap the food sample in a small piece of paper.
2. Crush the food sample wrapped in the paper.
3. Straighten the paper.
4. Dry the paper by keeping it in sunlight for a while.
• Repeat the above process with other food samples.
- Observation** : An oily patch (translucent spot) may be observed on the paper.
- Conclusion** : A food item that contains fat leaves an oily patch (translucent spot) on the paper.

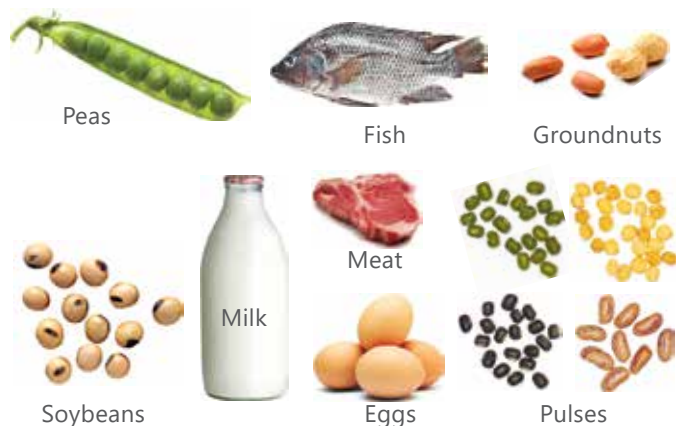


Proteins

Proteins are the building blocks of life. They build, maintain and repair or replace the worn out cells and tissues in the body. Muscles, organs, and immune system are built mostly of proteins. They help in the growth of the body and protect us from various diseases.

Proteins can also provide energy when carbohydrates and fats are in short supply.

Food containing proteins are called body-building foods. Foods that contain proteins include pulses, peas, soybeans, groundnuts, meat, fish, eggs, and milk.



Vitamins

The term vitamin was given by a Polish scientist Casimir Funk. Vitamins are essential for the proper functioning of our body. They are required by the body in very small quantities as compared to carbohydrates, fats and proteins. Vitamins are necessary for keeping us fit and healthy. They play important roles in body functions such as metabolism, immunity and digestion. They are known as protective foods as they protect the body against various diseases. They also help in keeping the bones, teeth, gums, and eyes healthy.



Learn More

One carrot provides more than 200% of required daily intake of vitamin A.

The leaves of tomato plants are poisonous but the fruit of tomato plant has vitamins that are very good for us.

Activity 3

Aim : To test the presence of proteins in a foodstuff.

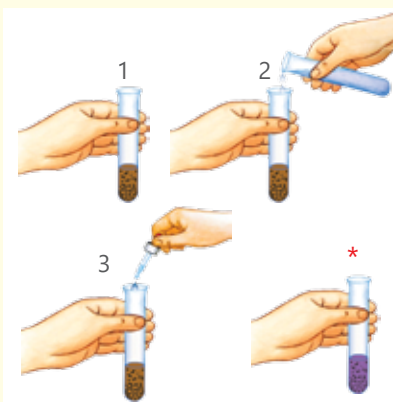
Materials required : Food samples, test tube, water, copper sulphate solution and caustic soda solution.

Procedure :

1. Mash or grind the foodstuff and put it into a test tube.
2. Add some water to the test tube and shake the test tube.
3. Add a few drops of copper sulphate solution and caustic soda solution to the test tube.
4. Shake the test tube and allow it to stand for a few minutes.

Observation : A violet colour may be observed in the solution.

Conclusion : A violet colour indicates presence of proteins in the food stuff.



Vitamins are of several types like vitamin A, vitamin B complex, vitamin C, vitamin D, vitamin E, and vitamin K.

Vitamins B and C dissolve in water. These are known as water-soluble vitamins. They are not stored in our body. We need a continuous supply of these vitamins in our diet.

Vitamins A, D, E and K dissolve in fat before being absorbed into the blood. These are known as fat-soluble vitamins. They are stored in our body and used whenever needed by the body. They are not needed everyday in our diet.

Learn More

Our body prepares vitamin D by itself in the presence of sunlight.

Each vitamin plays a specific role in our body. Shortage of any of these vitamins over a long period leads to deficiency diseases.

The best way to meet your vitamin needs is to eat a balanced diet containing a variety of foods. If you cannot meet your needs through food alone, you may require dietary supplements.

The table given below lists some important vitamins, their functions and food sources.

Vitamin	Function	Food Sources
A	Keeps skin, hair and eyes healthy	Papaya, mango, pumpkin, carrot, milk and milk products, cod liver oil
B	Helps in digestion and proper functioning of the heart and nerves	Milk, green vegetables, peas, eggs, yeast, cereals
C	Helps in healing wounds and fights infections	Citrus fruits and vegetables – gooseberry (amla), lemons, oranges, tomatoes
D	Helps the body to absorb calcium which makes bones and teeth strong	Sunlight, milk, butter, eggs, cod liver oil
E	Keeps the body and skin healthy	Almonds, egg yolk, wheat grains, vegetable oils, green leafy vegetables
K	Helps in blood clotting	Cheese, wheat bran, green leafy vegetables – spinach, lettuce, cabbage

Minerals

Like vitamins, minerals are essential nutrients needed by our body in small amounts. Minerals help the body to grow, develop, and stay healthy. They do not give energy but are required by the body for various functions, *e.g.* building strong bones, formation of red blood cells, proper functioning of circulatory and nervous system, etc.

The table given below shows important minerals, their functions and food sources.

Minerals	Function	Food Source
Calcium	Strengthens bones and teeth	Milk, milk products, meat, eggs, green vegetables
Phosphorus	Strengthens bones and teeth	Milk, meat, fish, eggs, pulses, vegetables, whole grains
Iron	Forms haemoglobin in blood which carries oxygen in the body	Green leafy vegetables, apple, lentils, nuts, meat, egg yolk,
Iodine	Helps in proper functioning of thyroid gland, regulates growth and metabolism	Seafood, iodized salt, mineral water, foods grown in iodine-rich soil
Sodium and Potassium	Regulates the total amount of water in the body, keeps muscles and nerves working properly	Table salt, milk, pulses, fruits, vegetables

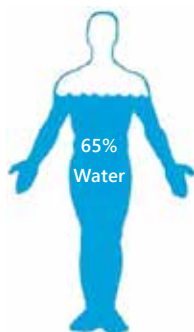
Activity 4

- Aim** : To show that fruits and vegetables contain water.
- Materials required** : Tomato, lemon, orange, melon.
- Procedure** : Cut each item into small pieces. Squeeze the pieces with your hands, applying a little force.
- Observation** : Droplets of juice are produced from the pieces.
- Conclusion** : Fruits and vegetables contain water (in the form of juice).



Water

Water is essential for the human body to function. It helps us in transporting substances and maintaining temperature of the body. It also helps in absorption of food and excretion of waste materials from the body in the form of urine and sweat.



Human body

About 65% of our body weight is that of water. Extreme shortage of water in the body can lead to dehydration. We get most of the water for our body from liquids like water, milk, juice, and from fresh fruits and vegetables.

Learn More

Dehydration causes loss of body salts and leads to weakness in the body. An Oral Rehydration Solution (ORS) is given to the patient to recover the loss of salts and water.

Roughage

Roughage is also known as **dietary fibre**. It mainly consists of the indigestible plant carbohydrates called **cellulose**. It is the component of food that our digestive system cannot absorb. Intake of roughage is essential for effective bowel movement. It helps in retaining water and prevents constipation. It adds bulk to the food and gives a sense of filling after the meal.

Major sources of roughage are salad, corn cob, vegetables, fruits, and skinned grains.

Learn More

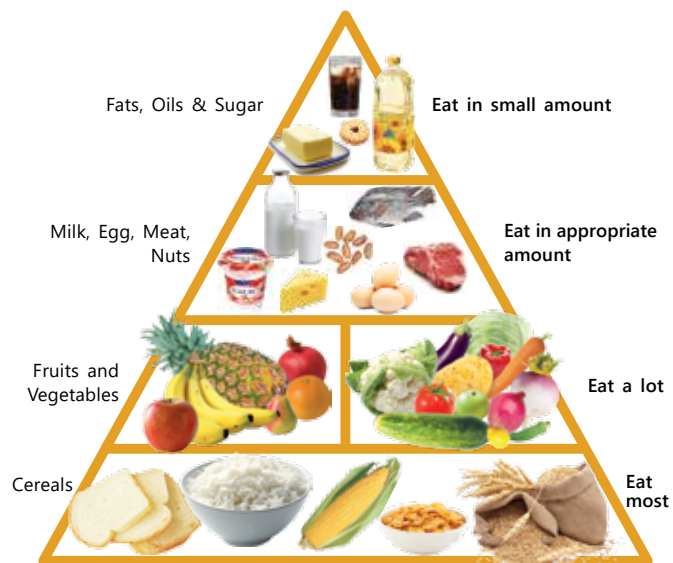
Roughage may reduce the risk of developing certain forms of cancer including oral cancer and stomach cancer.

Balanced Diet

Human body cannot get all nutrients from only one kind of food. It requires different types of foods containing all the essential nutrients.

A diet that contains all the essential nutrients in adequate amount required for proper growth and functioning of the body is called a **balanced diet**. In a balanced diet, energy giving foods, body building foods and protective foods are present in the right proportion.

It is not easy to determine the amount of food that will provide us the required amounts of nutrients. This is where the balanced diet food chart comes in.



Proportion of various nutrients in a balanced diet

Learn More

Junk food has no significant nutritional value and is high in sugar, salt, fat and calories. Increase in the consumption of junk food is directly associated with the rise in obesity, tooth decay, high blood pressure, etc.

Our diet differs according to the age group, sex, health condition and type of work done by a person. *For example*, growing children, pregnant ladies and lactating mothers need more proteins as proteins are body-building food components.

Just eating a balanced diet does not mean that we are getting all the nutrients. It should also be cooked properly. *For example*, use of excess water while cooking, results in loss of considerable amounts of proteins and minerals.

Vitamin C gets destroyed easily by heat during cooking. Similarly, overheating, over boiling and deep frying not only destroy the nutritive value of the food but also add

useless calories. Steaming and baking the food are considered better cooking practices than boiling and frying.

Washing of fruits and vegetables after peeling and cutting can cause loss of various nutrients from them. It is better to wash them before cutting.

Deficiency Diseases

Dietary habits play a significant role for maintaining good health of all humans. Poor intake of various nutrients can lead to deficiency of nutrients.

The deficiency of one or more nutrients in our body is known as **malnutrition**. If the deficiency of nutrients continues for a long period, it may lead to certain diseases called **deficiency diseases**.

The following table gives information about the various deficiency diseases, the lack of nutrients which cause them and their symptoms.

Deficiency disease	Nutrients	Few symptoms of the disease
Marasmus	Carbohydrates and Proteins	Weakness, severe weight loss, slow physical growth and loss of stamina
Kwashiorkor	Proteins	Patchy skin, change in hair colour, enlarged belly, diarrhoea, swelling on face and limbs, damaged immune system, drowsiness and tiredness
Night blindness	Vitamin A	Poor vision, loss of vision in darkness
Beriberi	Vitamin B	Weak muscles, loss of sensation in hands and feet, difficulty in walking
Scurvy	Vitamin C	Bleeding gums, low immunity, wounds do not heal easily
Rickets	Vitamin D	Deformities in bone formation and structure, bone becomes soft and bent
Bone and tooth decay	Calcium	Weak bones, tooth decay
Goitre	Iodine	Swollen glands in the neck
Anaemia	Iron	Weakness, shortness of breath, pale complexion



Marasmus



Kwashiorkor



Scurvy



Rickets



Goitre

Carbohydrates	: substances such as sugar or starch that are the main source of energy for our body
Cellulose	: an indigestible carbohydrate which is a constituent of the roughage in our diet
Energy	: the capacity to put efforts into an activity or work
Fats	: substances which store energy and provide twice the amount of energy as compared to carbohydrates
Haemoglobin	: pigment found in red blood cells responsible for transporting oxygen in blood
Minerals	: nutrients needed by our body in small amount to maintain good health
Obesity	: condition caused by excessive accumulation of fats which leads to increase in body weight
Proteins	: body-building natural substances found in meat, eggs, etc. needed for growth and repair of our body
Roughage	: the component of food that our digestive system cannot absorb
Vitamins	: nutrients needed by our body in small amount for proper functioning of the body

POINTS TO REMEMBER

- Food contains some special components called nutrients.
- Nutrients include carbohydrates, fats, proteins, vitamins and minerals.
- Carbohydrates are the main source of energy used by the body for various life sustaining activities.
- Fats act as insulator helping us to maintain the correct body temperature.
- Proteins build, maintain and replace the worn out cells and tissues in the body.
- Vitamins and minerals protect the body against various diseases.
- Water helps in transporting substances and maintains body temperature.
- Intake of roughage is essential for effective bowel movement.
- A balanced diet contains all nutrients in adequate amount for proper growth and functioning of the body.
- Lack of one or more nutrients in our food over a long period of time can cause deficiency diseases.

ASSESSMENT 2

A. Tick the correct option.

1. An oily translucent patch on a paper shows that food item contains
 protein carbohydrate mineral fat
2. The component of food required for healthy digestion is
 mineral vitamin roughage fat
3. Iodine solution is used to test the presence of
 fat in food starch in food protein in food water in food

4. For strong bones and teeth, we need
 vitamin A vitamin D vitamin E vitamin K
5. Proteins can provide energy when there is a short supply of
 vitamins minerals
 carbohydrates and fats water and roughage
6. The mineral essential for normal functioning of the thyroid gland is
 iron calcium iodine fluoride
7. Deficiency of one or more nutrients in our body can lead to
 scurvy malnutrition obesity beriberi

B. Fill in the blanks.

- _____ are needed for healthy growth and proper functioning of an organism.
- _____ and _____ are energy providers to the body.
- Fats act as _____ helping us to maintain the correct body temperature.
- _____ are required in very small quantities in comparison to carbohydrates, fats and proteins.
- Vitamin _____ helps in the clotting of blood.
- Seafood is a good source of _____.
- Water makes up about _____ of the total weight of a human body.

C. State whether the following statements are True or False.

- Cellulose is a carbohydrate that provides energy to our body. _____
- Absence of a particular vitamin or mineral can cause a deficiency disease. _____
- Sugar is a simple carbohydrate which gives us instant energy. _____
- Balanced diet should contain a variety of food items. _____
- Swelling of neck is a symptom of goitre. _____
- We get water only from liquids we drink. _____
- Calcium and phosphorus are required for healthy teeth and bones. _____

D. Answer each of the following questions in a few words.

- Name the nutrients that provide energy.
- Name two food items that are rich in fat.
- Name two diseases caused due to deficiency of proteins.
- Name the component of food that prevents constipation.
- Name three food items that are rich in proteins.
- Name three sources of vitamin C.
- Name the disease caused by the deficiency of vitamin A.

E. Answer each of the following questions in few sentences.

1. What are nutrients? Name the different types of nutrients.
2. Write some factors that decide a balanced diet for an individual.
3. What is the difference between fat-soluble vitamins and water-soluble vitamins?
4. What is roughage? Why it is important for the body?
5. What are fats? List two main functions of fats in the body.
6. What is the difference between simple carbohydrates and complex carbohydrates?

F. Give reasons to justify the following statements.

1. Glucose is taken by athletes.
2. Water is essential for body to function.
3. Children need more proteins in their diet than adults.
4. Food should be cooked properly to keep its nutritive value.
5. We should include vitamins and minerals in our diet.

G. Answer each of the following questions in detail.

1. How can we test the presence of fats in food items?
2. What is a balanced diet? Why it is necessary to include different types of foods in the diet?
3. Why are carbohydrates important to us? Name some sources of carbohydrates.
4. What are deficiency diseases? Name three deficiency diseases and their causes.
5. Name three minerals and vitamins each needed by our body. Also, write one function of each.



1. Water does not provide energy to our body but we should drink 6-8 glasses of water everyday. Why?
2. A person is suffering from constipation. What would you advise the person to include in the diet and why?
3. Calcium supplements are taken by elderly people. Why?
4. Exposing oneself to sunlight is very useful. Give reasons.
5. Malnutrition causes deficiency diseases. Does over nutrition (excess of nutrition) in diet also cause any harm?



Group Discussion

- Eating fast food is not a healthy habit.

PROJECT IDEAS

- Keeping concepts of balanced diet in your mind, prepare a diet chart for the food items which you are going to eat in a week.
- Make a table of food items like vegetables, fruits, cereals, pulses, biscuits, etc. and find the nutritional value of each item.

Separation of Substances

Let us learn about

- Substances – Pure and Mixture
- Need for separation of substances from a mixture
- Methods used for separating mixtures
- Principles of solution and solubility

We use a large number of substances in our daily life such as water, sugar, salt, milk, etc. Among them some substances are pure, made of only one kind of material, while others are mixtures of two or more substances. Thus, substances around us can be classified into two major groups - Pure substances and Mixtures.

Pure Substance

A **pure substance** is a substance which is made up of only one kind of substance, *e.g.* salt or sugar.

Mixture

A **mixture** is a physical combination of two or more different substances. Any combination of solid, liquid or gas can be a mixture. *For example*, air is mixture of various gases like nitrogen, oxygen, carbon dioxide, and argon. It also contains water vapour, dust and smoke particles.

The substances present in a mixture are called its **components**. Thus, oxygen, nitrogen, carbon dioxide, argon, water vapour, dust and smoke particles are the components of air.

Mixtures are of two types – Homogeneous mixture and Heterogeneous mixture.

A **homogeneous mixture** is a mixture in which the components are uniformly

distributed throughout the mixture. Every part of a homogeneous mixture has the same properties. *For example*, if you dissolve a spoonful of sugar in a glass of water, the particles of sugar get uniformly dissolved in water. A spoonful of such a mixture, taken from any part, will appear and taste the same.

A **heterogeneous mixture** is a mixture in which the various components are not uniformly distributed throughout the mixture. All parts of a heterogeneous mixture do not have the same properties. *For example*, if you dissolve a spoonful of sand in a glass of water, the particles of sand are distributed unevenly in the water. Some parts of the mixture contain more sand particles than other parts.



Tea
(Homogeneous mixture)



Muddy water
(Heterogeneous mixture)

Separation of Mixtures

Separation is a process used to separate a mixture of substances into two or more distinct components.

Need for Separating Mixtures

Separation of a mixture into its components becomes necessary for the following reasons :

- (a) To remove non-useful components from a mixture.
- (b) To remove harmful components or impurities from a mixture.
- (c) To obtain other useful components from a mixture.

Consider the following examples :

- We separate tea leaves from the tea before drinking it. This is done with the help of a strainer to remove the non-useful components from the tea.
- We separate stones, insects, etc. from rice or pulses before cooking. This is done to remove the harmful components present in them.



Churning of milk

- We churn the milk to obtain butter. This is done to get another useful component from milk.

Let us learn about the different methods used to separate a mixture into its components.

Methods of Separation

If you have a bowl full of apples, oranges and pears, and are asked to separate them, you will separate them by picking out each kind of fruit and putting them into different piles. But what method would you follow to separate mixtures made from tiny components?

The method used to separate components of a mixture depends on :

- (a) The type of mixture.
- (b) The properties of the components it contains.
- (c) The component of the mixture that is to be retained.

Separation of Solids from Other Solids

We can separate a mixture having two or more solid components by using one of the following methods :

1. Handpicking
2. Threshing
3. Winnowing
4. Sieving
5. Magnetic Separation

Handpicking

Take a packet of grains. Spread it on a white sheet of paper. Separate the pieces of stones, husk and other particles from the grains and keep them into separate piles.

The practice of separating solid substances or impurities from other solids by hand is called **handpicking**. This method is convenient to use when the components :

- are mixed in small quantities.
- can be easily picked by hands.
- have different sizes, shapes and colours.



Handpicking

Threshing

Food grains such as wheat and rice, when harvested, are cut along with their stalks. These stalks are put together in bundles and thereafter the grains are separated from them. **Threshing** is the process of separating grains from the stalks. Threshing can be done in the following ways:

- By beating the stalks on a hard surface.
- By allowing animals like bullocks to trample the stalks.
- By using machines such as thresher.



Manual threshing

Winnowing

Winnowing is the process used to separate lighter components of a mixture from the heavier ones with the help of wind or blowing air.

Winnowing is commonly used by farmers to separate dry straw pieces and husk from grains. Dry straw and husk particles are lighter than grains.

During winnowing, the mixture is made to fall from a height. The lighter components such as dry straw pieces and husk are blown away by the wind while the heavier grains fall down to form a heap.

The separated husk and dry straw pieces can be used for many purposes such as fodder for cattle.



Winnowing

Sieving

Sieving is a method of separating components of mixture that are of different sizes using a sieve. A sieve is a net or mesh which has holes of the same size.



Sieve

Sieving is adopted when one of the components of a mixture is larger than the other. The size of holes of the selected sieve should be just smaller than the size of the larger component. This allows the smaller components of the mixture to pass through the sieve while the larger components are left behind in the sieve.

Sieving is commonly used at home to separate bran from the wheat flour. The fine particles of flour pass through the sieve, while the thicker particles of bran remain on the sieve as they are too big to pass through these holes.



Sieving

Sieving is also used at construction sites to separate stones and pebbles from sand.

Learn More

Sieving wheat flour is not advisable as wheat bran which is removed during sieving contains nutrients and is also a rich source of fibre.

Magnetic Separation

Magnetic separation is used to separate a mixture where one of the component is magnetic in nature (such as iron) and others are non-magnetic (such as sand). This method uses a magnet to separate the magnetic components from the non-

magnetic components. *For example*, a mixture of iron filings and sand can be separated by bringing a magnet close to the mixture. The magnetic iron filings stick to the magnet while the non-magnetic sand is left behind.

Magnetic separation is used in many fields and industries. *For example*, it is used in junkyard to separate iron objects from other non-magnetic substances.



Scrap iron picked up by magnet

Separation of Insoluble Solids from Liquids

Solid substances, such as sand and dust particles, that do not dissolve in liquids are called **insoluble solids**. The particles of such solids can be separated from their mixture with a liquid by using one of the following methods :

1. Sedimentation and decantation
2. Filtration

Sedimentation and Decantation

Insoluble solids mixed in a liquid may be heavier than the liquid. If such a mixture is left undisturbed for some time, the heavier solid particles settle down at the bottom of the container, leaving clear liquid at the top. The process of allowing heavy insoluble solid components in a liquid to settle down is called **sedimentation**. The solid particles that settle down are called **sediments**.

Learn More

The process of sedimentation can be speeded up by using another process called loading. During this process, a piece of alum is moved inside the container containing muddy water. The alum particles settle on the mud particles, making them heavier. Thus, the mud particles settle down quickly.

The clear liquid obtained after sedimentation can be poured slowly into another container. The process of pouring a clear liquid from one container to another is called **decantation**.

Activity 1

Aim : To separate the mixture of sand and water using sedimentation and decantation.

Materials required : Sand, water and two glass tumblers.

Procedure : 1. Add two spoonfuls of sand to some water in a glass tumbler.
2. Stir the mixture and let it stand for sometime.
3. Slowly pour out the clear liquid into the empty glass tumbler.

Observation : On keeping the mixture for sometime, sand settles down at the bottom of the glass tumbler and the clear liquid is seen above. The water collected after decantation is clear.



Filtration

During the process of decantation, some solid particles may flow along with the liquid into the second container. This liquid can be purified further by using the process of filtration.

Filtration is the process of separating an insoluble solid from a liquid by passing it through a filter. A filter is a kind of sieve through which the liquid can pass through but the solid particles cannot. Special filter papers are used in the laboratory to filter mixtures of insoluble solids in liquids.



Filtering tea through strainer

The clear liquid obtained after filtration is called **filtrate**. The solid particles left in the filter are called **residue**.

Filtration is commonly used in our homes for separating tea leaves from tea, removing pulp from fruit juices, in preparation of cottage cheese (paneer), etc.

Activity 2

Aim : To obtain clear water from muddy water using filtration.

Materials required : A funnel, a filter paper, muddy water in a beaker, an empty beaker and a stand.

Procedure : 1. Fold the filter paper in the form of a cone as shown in the diagram. Fix this cone onto a funnel and keep a beaker below the funnel.
2. Take the beaker containing the muddy water.
3. Slowly pour the muddy water into the funnel.

Observation : The clear liquid passes through the funnel and is collected in the beaker below. The particles of mud remain trapped on the filter paper.



Learn More

Kidneys filter nearly 180 litres of blood everyday and thus, help to get rid of waste products from the body.

Separation of Soluble Solids from Solution

Solid substances such as salt and sugar that dissolve completely in liquids to form solution are called **soluble solids**. You cannot separate these dissolved solids from liquids by any of the methods of separation discussed above. These soluble

solid substances are separated from their solution by evaporation and distillation.

Evaporation

Evaporation is the process of conversion of a liquid into its vapour form at a temperature below its boiling point. This method is commonly used to obtain a soluble solid from its solution. In this method, the solution is heated. The liquid evaporates leaving behind the soluble solid, dissolved in it, as a residue.

The process of evaporation takes place in all water bodies in nature. Evaporation is used to obtain common salt from sea water. Sea water contains a large amount of salts dissolved in it. Near the seashore, sea water is collected in the shallow pits and allowed to stand in the sunlight. In a few days, the sea water evaporates completely leaving behind the solid salts. The salt obtained is then purified to get common salt.



Making salt by evaporation

Activity 3

Aim : To separate soluble solid (salt) from a liquid (salt solution).

Materials required : A beaker containing distilled water, a burner, a tripod stand and common salt.

Procedure : 1. Dissolve some common salt into distilled water in a beaker.
2. Place the beaker on the stand over the burner (*as shown in the figure*).
3. Light the burner and heat the solution till all the water evaporates completely.

Observation : The water evaporates and salt is left behind in the beaker.

Conclusion : Evaporation can be used to separate a soluble solid from its solution.



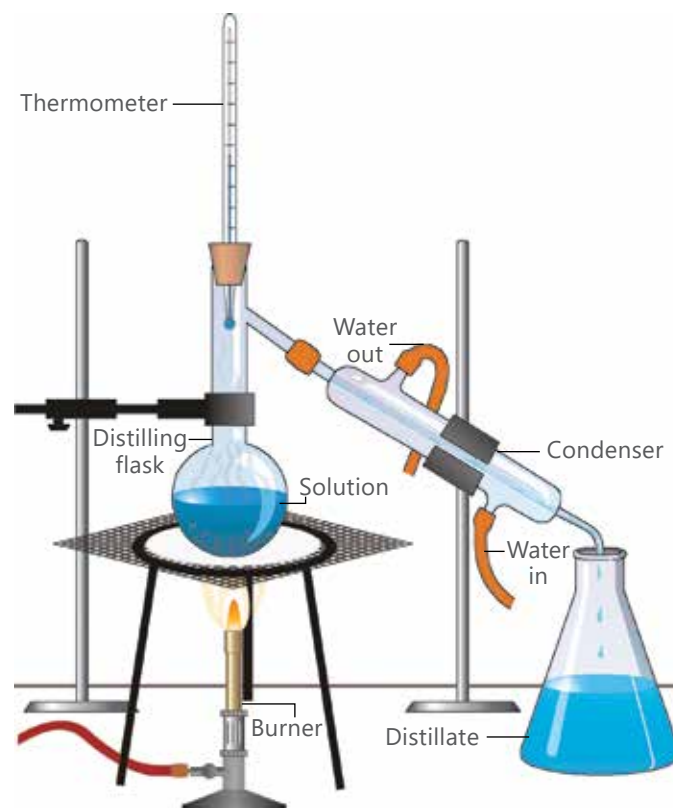
Distillation

Distillation is the process by which a pure liquid is obtained from its solution by evaporating it and then condensing the vapours obtained. In this method, the solution is heated so that the liquid evaporates. As the liquid evaporates to form vapours, they are passed through a condenser where they are cooled to get the pure liquid. The pure liquid thus obtained is known as **distillate**.

Distilled water used in laboratories is obtained using this method.

Learn More

Condensation is the process of converting vapour of a liquid back into its liquid form. It is done by cooling the vapours below the boiling point of the liquid.



Distillation of water in laboratory

Learn More

A mixture of two immiscible (insoluble) liquids such as oil and water can be separated using a separating funnel. This method is based on the differences in the densities of the liquids. The heavier liquid which settles below is drained out first from the funnel into a beaker, and then the lighter liquid is drained out into another beaker.



Separating funnel ▶

Separation using more than One method

More than one method of separation are required to separate mixtures which contain three or more components in them. Consider a mixture of sand, salt and water. How would you separate these?

First, you will separate sand from the mixture using either sedimentation and decantation or filtration. Then, you will use distillation to separate salt and water.

Solution and Solubility

A **solution** is a homogenous mixture where one or more substances are completely dissolved into the other. It is composed of a solute and a solvent. A **solute** is a substance dissolved in the solution. A **solvent** is a liquid that dissolves a solute. Thus, in a solution, a solute gets dissolved into a liquid, known as solvent.

For example, in a sugar solution, sugar is dissolved in water. Thus, sugar is the solute and water is the solvent.

Many solids and gases can be dissolved into liquids as a solute. Liquids may also be dissolved into other liquids.

In a solution, the component present in the larger amount is called the solvent and the other component is called the solute. The concentration of a solute in a solution is a measure of how much of that solute is dissolved in the solvent.

Solutions are closely related to our everyday lives. The air we breathe, the liquids we drink, and the fluids in our body are all solutions.

The ability of a solute to get dissolved in a solvent to form a homogeneous mixture is called **solubility**. Different solutes dissolve in a solvent in different proportions.

The factors affecting the solubility of a substance in a solvent are :

1. **Heat/Temperature** - solubility of a substance increases with the increase in temperature.
2. **Size of solute particles** - solubility of a substance increases with decreasing size of solute particles.
3. **Stirring** - solubility of a substance becomes faster on stirring the solution.

Saturated Solution

A solution in which the maximum amount of solute has been dissolved at a particular temperature is called a **saturated solution**. This means no more solute can be dissolved in the solution at that temperature. You can dissolve more solute to the saturated solution by heating the solution.

Learn More

A saturated solution becomes unsaturated on heating and more solute can be dissolved in it. If we cool down a saturated solution, the solubility of the solute decreases and the excess solute solidifies in the form of crystals.

Let us understand the concept of saturated solution with the help of an activity.

Activity 4

Aim : To prepare a saturated solution and study the effect of temperature on it.

Materials required : Beaker, spoon, water, salt, burner and tripod stand.

Procedure : 1. Take a beaker and fill it half with water.
2. Add one teaspoon full of salt and stir it well.
3. Go on adding salt, one teaspoon full at a time, and stir.
(After adding a few spoons of salt, you will find that some salt remains undissolved and settles at the bottom of the beaker which means that no more salt can be dissolved in the water. This solution is now said to be saturated solution.)
4. Heat the solution and stir it. The undissolved salt at the bottom dissolves in the solution

Observation : The solubility of saturated solution increases as the temperature of the solution is raised.



Saturated solution



On heating, suspended salt dissolves

Universal Solvent - Water

Water can dissolve a wide range of substances in it as compared to any other liquid and is known as a **universal solvent**. This property of water enables our body to absorb many substances like vitamins and minerals that are water soluble. Water enables the excretion of waste material from our body. Many chemical reactions in our body take place in the presence of water.

Water transports minerals present in the soil to all parts of the plant. Oxygen and carbon dioxide dissolved in water help in the survival of aquatic plants and animals.

WORD POWER

Condensation : a process in which a gas changes into its liquid form on cooling

Decantation : a process of transfer of clear liquid separate from the sediments

Distillation : a process of obtaining a pure liquid from a solution by condensation of its vapours

Evaporation : a process in which a liquid changes into its gaseous form at a temperature below its boiling point

Filtration : a process of separation of undissolved solids from a liquid using a filter

Handpicking : a process of separating solids of different sizes by hand

Magnetic Separation : a process of separating magnetic components from the non-magnetic components using a magnet

Mixture : a physical combination of two or more different substances

Sedimentation : a process of settling down of heavier insoluble solid components in a liquid

Sieving : a process of separating solids of different sizes using a sieve

Winnowing : a process of separating heavier solids from lighter solids by the action of wind

POINTS TO REMEMBER

- Substances can be classified into two categories – pure substances and mixtures.
- A mixture is a combination of two or more different substances. Any combination of solid, liquid or gas can be a mixture.
- Separation is a process used to separate a mixture of substances into two or more distinct components.
- Handpicking, threshing, winnowing, sieving and magnetic separation are the methods used to separate mixtures of solids.
- Sedimentation, decantation and filtration are used to separate insoluble solids from their mixtures.
- Soluble solids can be separated from their solution by evaporation and distillation.
- A solution is a homogenous mixture where one or more substances are completely dissolved into the other.
- The ability of a solute to get dissolved in a solvent to form a homogeneous mixture is called solubility.
- A solution in which the maximum amount of solute has been dissolved at a particular temperature is called a saturated solution.
- Water is the universal solvent.

ASSESSMENT 3

A. Tick the correct option.

1. A mixture of sand and iron filings is best separated by
 sedimentation winnowing handpicking magnetic separation
2. The process of transferring the clear fluid without disturbing the insoluble heavy particles in a mixture is called
 filtration sedimentation decantation sieving
3. Air is
 a pure substance a heterogeneous mixture
 a homogeneous mixture a compound of oxygen and nitrogen
4. A mixture contains particles of two solids of almost the same size but different weight (solid X is light while solid Z is heavy). They can be separated by:
 filtration sieving handpicking winnowing
5. Sahil wants to separate pebbles of different sizes. The easiest way to separate them would be
 winnowing sieving handpicking all of these
6. Solubility of solute can be increased by
 stirring heating using fine form all of these
7. The separation technique that involves heating a solution until the liquid changes into a gaseous state is known as
 vapourisation evaporation filtration decantation

B. Fill in the blanks.

1. Salt and water make a _____ mixture.
2. Water is a universal _____.
3. Threshing of grain is often followed by _____.
4. A _____ is a filtering device with very fine holes of the same size.
5. The process that can be used to separate a mixture of iron and sulphur is _____ separation.
6. All parts of a _____ mixture do not have same properties.
7. The substances that make up a mixture are called its _____.
8. The solubility of a solute in water _____ with rise in temperature.

C. State whether the following statements are True or False.

1. A mixture of salt and water is separated by sieving. _____
2. The direction of the wind is important in handpicking. _____
3. Butter can be separated from milk by churning. _____
4. Many chemical reactions in our body take place in the presence of water. _____
5. Filtration is the method used for preparing paneer. _____
6. In a solution, a solvent is the substance dissolved in a liquid. _____
7. A liquid can be converted into its vapour form by the process of decantation. _____
8. Grain and husk can be separated by the process of winnowing. _____

D. Answer each of the following questions in a few words.

1. Give two examples of heterogeneous mixtures.
2. What happens to the solubility of salt with rise in temperature?
3. What do we call the substance that remains on filter paper?
4. Name the processes that take place in the formation of raindrops.
5. In which method of separation, the simultaneous process of evaporation and condensation take place?
6. Name two immiscible liquids.

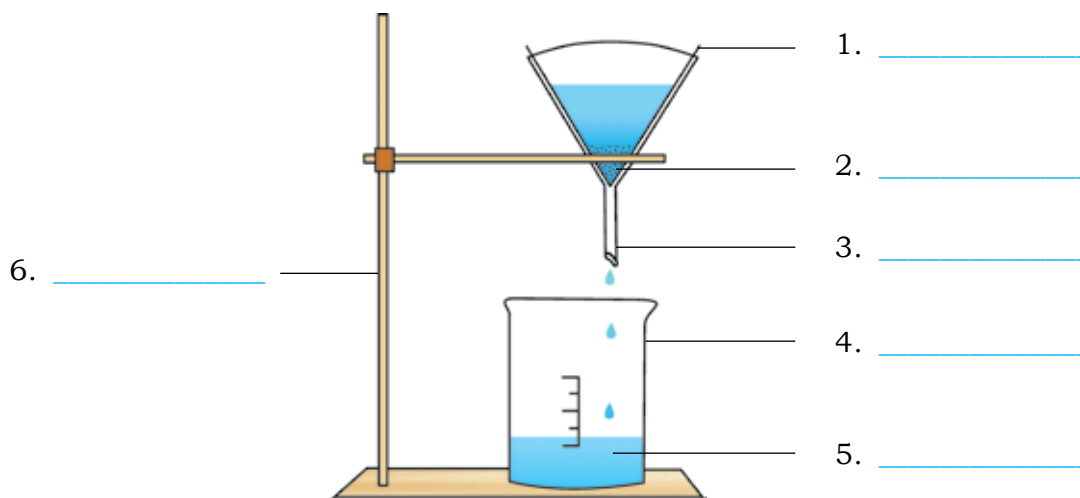
E. Answer each of the following questions in few sentences.

1. On what basis will you choose a method of separation?
2. Which type of components of a mixture can be separated by sieving?
3. When is the practice of handpicking used?
4. What do you understand by saturated solution?
5. Why is water called a universal solvent?

F. Answer each of the following questions in detail.

1. What is a mixture? Why do we need to separate a mixture? Give two examples.
2. How would you separate a mixture of salt, moong dal and chalk powder? List all steps.
3. How is common salt obtained from sea water?
4. Why is filtration better than sedimentation and decantation? Explain with an example.
5. Explain how solubility of a solute depends on various factors.
6. Differentiate between the following –
 - (a) Heterogeneous mixture and homogeneous mixture
 - (b) Evaporation and condensation

G. Label the figure.



1. A mixture of sugar and water cannot be separated by filtration. Why?
2. A bottle contains either salt or chalk powder. How will you find out what it has without tasting it?
3. Anya is trying to separate mustard seeds and sand using a sieve. But each time she finds her sieve empty. Can you tell the reason behind it?
4. Why does sky become clear after a shower of rain?



Group Discussion

- How are impurities separated from water in big cities to make it suitable for drinking?

PROJECT IDEAS

- Find out about industrial and commercial applications of the various methods of separation. Prepare a project report with illustrations about these applications.