FOOD : (SOURCES & COMPONENTS)

INTERODUCTION

In our country, an individual eats food 3 - 4 times a day. The food consumed at a particular time of the day constitute a **meal.** For example, food taken in the morning constitute a meal called the **breakfast.** Similarly, foods eaten in the afternoon are a part of **lunch,** and those eaten in the evening or night is the **dinner.**

Ingredients in Food Items : Food items may be eaten raw or cooked. Raw food items include fruits like banana or apple. Just a single material or ingredient forms the food item in the above example. Think of cooked food items like rice, dal, roti or chapati and vegetable curry.

These food items may consist of two or more ingredients as given.

WHY DO WE NEED FOOD ?

Food is required by the body for the following purposes.

(i) For energy requirement to perform various functions of body to sustain life.

(ii) For growth : You have seen yourself growing. Without proper food, your growth would not be possible.

(iii) For repair of damaged or injured body parts ; when you get hurt, your skin is damaged and the blood is lost. Repair of such damaged parts takes place by the addition of new cells.

(iv) For protection from diseases and infection.

FOODS EATEN BY LIVING ORGANISMS

All living things need food. Most plants can manufacture their own food. Animals, however, require ready-made food and thus they eat either plants or other animals. Different animals eat different kinds of food.

You must have seen earthworms burrowing in the soil. They swallow soil. Mosquitoes suck the blood of other animals. Mosquito causing malaria sucks the blood of man. Birds feed on small insects, worms and fruits. On the basis of their food habit, animals are of three types :

(i) **Herbivores :** Animals which eat plants and plant products — these are called herbivores. e.g. Cow, sheep, deer elephant etc.

(ii) **Carnivores :** Animals which eat flesh of other animals are called carnivores. e.g. Lion, Tiger, Fox, Wolf etc.

(iii) **Ommivores :** Animals eating both plants and animals are called omnivores e.g. Humans, crow, squirrels and cockroaches.

SOURCES OF FOOD

Food Item	Ingredients	Sources
Idli	Rice	Plant
	Urad dal	
	Salt	
	Water	
Chicken curry	Chicken	Animal
	Spices	
	Oil/ghee	Plants/Animals
	Water	
Kheer	Milk	Animal
	Rice	Plant
	Sugar	

Both plants and animals provide us food (and a number of other useful products such as medicines, paper, timber and fibres.

Plants as Source of Food : Foods obtained from plants are of different types — cereals, pulses, vegetables, fruits, oils, sugar, tea, coffee and spices.

Plant Parts and Animal Products as Food

Plants are one source of our food. Which parts of a plant?

We eat many leafy vegetables. We eat fruits of some plants. Sometimes roots, sometimes stems and even flowers. Have you ever eaten pumpkin flowers dipped in rice paste and fried?

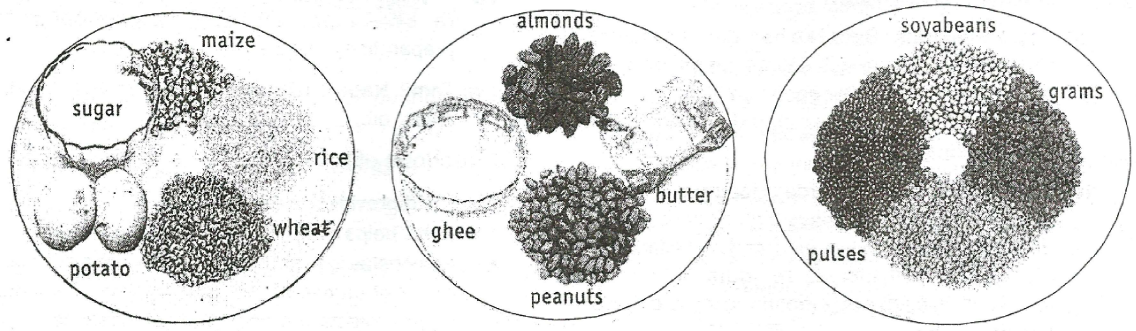
Try it!

Some plants have two or more **edible** (eatable) parts. Seeds of mustard plants give us oil and the leaves are used as a vegetable. Can you think of the different parts of a banana plant that are used as food ? Think of more examples where two or more parts of a single plant are used as food.

(i) **Cereals** are the most important sources of food for man and animals. They are rich **sources of carbohydrates.** Three most important cereals are wheat, rice and maize. These cereals are obtained from grains (biologically, grains are fruits of a plant).

(ii) **Pulses** or Legumes (commonly called 'dals') are rich in proteins and are obtained from plants.

(iii) **Vegetables :** Are rich sources of vitamins, minerals and roughage. Water content in vegetables is high (70 to 90 per cent) and their food value is low. The following list gives some common vegetables along with the part used.



a. Food items rich in carbohydrates b. Food items rich in fats c. Food items rich in proteins

Different food items contain different types of nutrients.

Common name	Part used
Carrot, Radish	Roots
Sweet potato	Root
Potato, Onion	Stems
Cabbage, Spinach	Leaves
Methi	Stem and leaf
Tomato	Fruit

(iv) **Fruits** have high water content, low food value, but are rich in minerals and vitamins. In common usage, the term 'fruit' is used for those which are usually eaten without cooking. Common fruits are banana, mango, apple, grapes, pineapple, guava, orange, litchi, and so on.

(v) **Sugars** are produced by the green plants through photosynthesis. Chief sugar producing plants are sugarcane and sugarbeet.

In case of sugarcane, the plant used is the stem, while in sugarbeet, it is the root.

(vi) **Tea and coffee** are common beverages, Tea is obtained from leaves, while coffee is obtained from seeds.

(vii) **Spices** have no food value and are used for adding flavour to food. Before the advent of refrigeration, spices were also used for preserving foods.

The major spices produced are pepper (kali mirch), cardamon (ilaichi), ginger (adrak), turmeric (haldi) and chillies (mirch).

Other spices of importance are cloves (loung), saffron (kesar), fennel (saunf), cumin (jeera), coriander (dhania), asafoetida (heeng), fenugreek (methi), nutmeg (jaiphal) and thyme (ajwain).

(viii) **Oils :** Major oil yielding plants are cotton, groundnut, mustard, coconut, soyabean and sunflower.

Animals as Sources of Food : Animals provide us food in the form of milk, meat, fish, eggs and honey.

(i) Milk - yielding animals : Cow and buffalo.

(ii) Meat - yielding animals : Sheep, goat and pig.

Meat of pig is called pork.

(iii) Poultry animals : Birds like hen, duck and turkey.

Poultry products are rich sources of proteins and have right kind of fat for good health.

Animals which provide meat and egg are called poultry animals.

(iv) Fish : Fish is a major source of food rich in animal proteins. Fish proteins have high digestibility and growth-promoting value. Also, cod and shark liver oils are rich in vitamin - D. In india, fish are found both in fresh water (ponds, lakes and rivers) and sea water.

Fresh Water Fishes : Catla, Labeo, Cirrhina, Barbus, Mystus, Clarius.

Sea Water Fishes : Hilsa, cat fish, sardines, ribbon fish, red mullet, pomfret, bombay duck. Rearing and management of fish on a large scale is known as pisciculture. Fish are eaten in various forms – cooked, in dried form, pickled form and canned form.

(v) Honey bees : The insects which provide us honey are known as honey bees. The honey bees collect necter (sweet juice) from flowers, convert it into honey and store it in their nest, which is known as the beehive. A beehive has small compartments called as combs. The shape and size of the comb depends on the type of bees.

The rearing of honey bees on a large scale is known as apiculture. The place used for the rearing of honey bees is called an "apiary". What is Honey ? Honey is produced by honey bees from the necter of flowers. It consists of water, sugar minerals and enzymes. It is an antiseptic (which destroys the growth of micro organisms) and is easily digestible. For this reason, honey is used in medicines.

Fodd habits of people : In our country, people of different states have different food habits. Food habits are affected by food production and supply. For example, rice is the common food in the south of India, while wheat is commonly eaten in the North. Let us know the food habits of people in different Indian states.

(i) Andhra Pradesh : Rice, dry vegetable preparation, arhar dal, upma, dosa rasam, curd, pickle etc.

(ii) Bihar : Rice chapati, sattu (flour of roasted gram), dal, bainagan ka bharta (brinjal preparation), bachka (thin slices of vegetales coated with besan), bhujya (of potato and oninon), pappad, chutni etc.

(iii) Gujarat : Chapati, rice dal, vegetable preparaton, lassi (buttermilk), thepla (fried chapatis made of

wheat flour), dhokla, khandvi etc.

(iv) Punjab : Roti, parantha, missi roti, butter, lassi (buttermilk), pulses, curd, sarson ka saag, chole, gajar ka halwa, dahi bhalla etc.

(v) Rajasthan : Bajra, dalia, roti, dal, kachori, sev (a besan preparation), vadi (moong dal preparation), dal-bati.

(v) Tamil Nadu : Idli, dosa, rice sambhar, banana chips, etc.

Functions of food :

- Food provides energy.
- Food helps in growth and development.
- Food helps in the replacement of worn out tissues, repair of damaged cells and healing of wounds.
- Food protects the body against diseases.

Basal metabolic rate (BMR) : The smallest amount of energy that body needs to keep alive is called basal metabolic rate (BMR).

SOME STEPS TO AVOID WASTAGE OF FOOD

Food in our country is not available in sufficient quantity to all people. Some do not have enough money to buy. Because of this reason, these people suffer from diseases. So we must ensure the following :

1. Food that is produced should not be allowed to (i) get spoiled, or (ii) eaten away by animals like rats and squirrets.
2. We should eat only that much quantity of food which is required by our body. Excess eating will lead to obesity (growing fat).
3. In parties or even in our homes we should not leave food uneaten in our plates.

BALANCED DIET

• A balanced diet is one which provides proper amount and proportion of fats, carbohydrates, proteins, vitamins and minerals, needed for the growth and maintenance of the body. A balanced diet should have three main qualities :

1. It should be rich in essential nutrients like minerals and vitamins.
2. It should provide the exact amount of raw materials needed for growth, development, repair and replacement of body tissues.
3. It should provide the right amount of energy required by the body.

What Do Different Food Items Contain ?

Each dish is usually made up of one or more ingredients. which we get from plants or animals. These ingredients contain some components that are needed by our body. These components are called **nutrients.** The major nutrients in our food are named carbohydrates, proteins, fats, vitamins and minerals. In addition, food contains dietary fibres and water which are also needed by our body.

CLASSIFICATION OF FOOD

• Food can be classified under three different categories on the basis of its functions :

(i) Energy giving food : Carbohydrates and fats, eg. cereals, sugars, oils, etc.

(ii) Body building food : Proteins, minerals and fats, eg. pulses, beans, milk, fish, etc.

(iii) Protective food : Vitamins & minerals, eg. vegetables, fruits, milk, etc.

BASIC CONSTITUENTS OF FOOD

(a) Carbohydrates : Carbohydrates are organic compounds of carbon, hydrogen and oxygen.

- They are the main source of energy in our body.
- One gram of carbohydrate yields about 4 kilocalories of heat energy.
- A major portion of our food consists of carbohydrates, e.g., rice, chapatis.
- If excess amount of carbohydrates are present in the body, they the converted into fats and stored under the skin and around various organs of the body.

Some examples of carbohydrates :

- **Cellulose :** It is the chief constituent of plant cell wall.
- **Starch :** It is main stored food of plants.
- **Glycogen :** It is main stored food of animals.

(i) Sources of carbohydrates : The carbohydrates in our food are obtained mainly from the plant sources like wheat, rice, maize, potato etc.

(ii) Biological significance of carbohydrates :

- Carbohydrates serve as an important structural material in some animals and in all plants, where they constitue the cellulose framework. e.g. cellulose in plants.
- Carbohydrates are used as respiratory fuel in animal cells.
- Some carbohydrates have highly specific functions e.g. ribose and deoxyribose in the nucle oprotein of the cells, the lactose of milk.
- Starch, and sugars are the two carbohydrates which provide most of the energy to our body.

(b) Fats :

- Fats are composed of carbon, hydrogen and oxygen.
- They have a lower oxygen content than carbohydrates.
- They are very important sources of energy.
- One gram of fat yields 9 kilocalories of energy.
- A layer of fat under the skin helps to reduce the amount of heat loss from the body in cold weather conditions.
- Every fat molecule consists of three molecules of fatty acids and one molecule of glycerol.
  - Fats are insoluble in water but soluble in organic solvents like alcohol, ether, benzene, etc.

  (i) Sources of fats : Fats are supplied to our body by different foods like butter, ghee, cheese, groundnut etc. All the cooking oils (like ground-nut oil, coconut oil) provide us fats.

  (ii) Biological significance of fats :
  - Fat deposits under the skin to protect various tissues.
  - It provides a steady source of energy.
  - Fats also help in forming of cell membranes and other organelles.
  - They help in transportation of fat-soluble vitamins in our body.

- Fat is deposited in more amount in persons those require more energy like growing children and sportsmen etc.

(c) Proteins :

The name protein was coined by Berzelius in 1838.

- Chemically proteins are polymers of molecular units called as amino acids.
- The amino acids are linked together by a peptide bonds. There are about 20 amino acids that take part in the formation of proteins. The 20 amino acids are further divided into two groups :
- Essential amino acids : They are also 10 in number. They are synthesized in a human body and are obtained from food so they are called as essential amino acids. e.g., Methionine, Leucine and tryptophan.
- Non-essential amino acids : They are also 10 in number. They are synthesized in a human body & are thus termed as non – essential amino acids. e.g., Alanine, Asparagine, Aspartic acid and cystine.

(i) Sources of proteins : Pulses, peas, beans, nuts, cheese, milk are the important sources of proteins.

(ii) Biological significance of proteins :

- They act as a structural components of cell. They are essential for growth and repair of the body.
- They help to catalyze various reactions occurring in our body.
- They play important roles as hormones, antibodies, etc.
- All the enzymes are made up of proteins.
- Haemoglobin, the respiratory pigment of animals is a conjugated protein composed of globin and haem (pigment).

(d) Vitamins :

Vitamins are organic compounds essential for the growth of the body. They are required by the body in very small quantities. Vitamins are classified into two types.

(A) Fat soluble Viamins A, D, E, K.

(B) Water soluble Viamins B and C.

(i) Source of Vitamin : These are obtained from fruits, cod liver etc.

(ii) Biological significance of Vitamin : They keep the body healthy and prevent it from diseases. If the diet does not contain the required amount of vitamins, it results in vitamin deficiency diseases.

(e) Minerals : Human body requires about fifteen different kinds of minerals, e.g.-

- Calcium and phosphorus are needed for the growth of bones and teeth.
- Iron is needed for the formation of haemoglobin in blood.
- Iodine, sodium, potassium and zinc are necessary for a good healthy body.

(i) Source of minerals : Meat, eggs, milk green vegetables and fruits are rich in minerals.

(ii) Biological singinificance of minerals : Minerals are required by the body in trace amounts and are essential for growth, repair and replacement processes. They from a major part of many body chemicals and tissues.

Besides these nutrients, our body needs **dietary fibres** and water. Dietary fibres are also known as roughage.

(f) Roughage : Cellulose forms the fibre content in food and that fibre content is called roughage. Roughage keeps the digestive system in good working condition.

(i) Source of Roughage : It is a plant fibre found in vegetables, fruits, peas, beans, maize and in the barn which surrounds wheat grains.

(ii) Biological significance of Roughage :

- It absorbs water and poisonous waste from food during digestion.
- It helps in the formation of urine and faeces.
- It regulates the body temperature.
- It is an essential part of blood and digestive juices.

TEST FOR CARBOHYDRATES, FATS & PROTEINS

(a) Test for carbohydrates :

Take few drops of iodine solution & add it in to boiled rice or potato. The formation of blue-black colour confirms the presence of starch (carbohydrate).

(b) Test for fats :

When ghee/butter rubbed on white paper, that portion of paper turns translucent indicating the presence of fats.

(c) Test for proteins :

Take the few drops of egg albumin in a test tube and add a few drops of concentrated nitric acid to it.

- The white colour of the albumin changes to yellow.

  Now, pour the acid out of the test tube but keep the white of the egg in the test tube.
- Add a few drops of ammonium hydroxide to it.
- The colour changes to violet which shows the presence of proteins.

DEFICIENCY DISEASES

The main cause of deficiency diseases in our country is poverty. A vast majority of our people are not able to buy quality food items in desired quantities. In the long run they become weak and sick. Its effect on children is more serious.

- **Diseases due to Deficiency of Carbohydrates :**

  Carbohydrates are the chief sources of energy for the body. This energy is used by the body for performing various functions.

  Deficiency of sufficient carbohydrates in the diet leads to (i) body weakness, and (ii) loss of stamina, as sufficient quantity of energy is not available to the body for performing various functions.

- **Diseases due to deficiency of Protein :** Proteins are body-building food and serous diseases, like kwashiorkor and marasmus, develop in case of children if the proteins are not sufficient in

their diet. It is for this reason that the children are often advised to take a protein-rich diet—enough milk, pulses, eggs, meat and fish,

- **Symptoms of Kwashiorkor**
  - (i) Protruding belly
  - (ii) Dark and scaly skin, brownish hair
  - (iii) Stunted growth ; usually underweight
  - (iv) Swollen legs due to accoumulation of water
  - (v) Loss of appetite
  - (vi) Anaemia
  - (vii) Mental retardation
  - (viii) Reduced resistance to diseases

- **Kwashiorkor** and marasmus are diseases which result from PEM.

DID YOU KNOW ?
Should we eat polished rice and wheat flour ? Much of the food we eat is "processed" food. Polished rice and wheat flour (maids) are the examples of "processed" foods. Processing removes many of the B vitamins. Beri-beri is caused by a lack of vitamins B_1. We should, therefore, try to eat foods that are not processed or polished.

Vitamin / Mineral	Deficiency disease / disorder	Symptoms
Vitamin - A (Retinol)	Night blindness	Poor vision in dark
Vitamin - B1 (Thiamine)	Beri-Beri	Weak muscles & very little energy to work.
Vitamin - C (Ascorbic acid)	Scurvy	Bleeding gums.
Vitamin - D (Calciferol)	Rickets	Bones become soft & bent.
Vitamin - E (Tocoferol)	Infertility	Low production of sperm or ova.
Vitamin - K (Phylloquinone)	Clotting time delayed	Bleeding time exceed.
Calcium	Bone and tooth decay	Weak bones & tooth decay
Iodine	Goitre	Glands in the neck appear swollen, mental disability in children
Iron	Anaemia	Weakness.