

## Classification of Food Elements

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#### 2.1 Introduction

Nearly six billion chemical factories work day and night. Many chemicals are produced in these factories from raw materials. These factories can search for their defects. Do you know what these factories are? If no, then we can tell you that these factories are our bodies, in which many chemical reactions take place which are necessary for our life.

To run this machine (our body), we need raw materials. These necessities are fulfilled by the nutrients present in the food that we eat.

Children! To keep our body fit, we need balanced diet. In this chapter, we will study about nutrients and balanced diet which is necessary to keep our body fit.

#### 2.2 Nutrients

The food that we eat is made up of different nutrients. Nutrients are of six types—Carbohydrates, Proteins, Fats, Vitamins, Minerals and Water. All these elements fulfill various needs of our body.

Nutrients are found in fibre, vegetables, fruits and cereals. All the nutrients play important roles in proper functioning of nervous system of the body.

Nutritional work of each element of food and its sources are described below—

**Carbohydrates**— They are important source of energy for the body. They provide nearly 72% of the total energy or calories required by the body. As the diesel provides energy to the car, in the same way carbohydrates provides energy to the body. Our body remain active for the whole day with this energy. Carbohydrates are of two types— sugar and starch. Starch are also called complex carbohydrates. Sugar and starch are easily digestible.

If more carbohydrates are consumed than required by the body, then excess carbohydrates are normally stored in liver and muscles in the form of fats and the weight of body increases.

#### Interesting Fact

Nutrients help in the proper growth of the body because they provide energy to the body.

Sugar is also called simple carbohydrates. It is obtained from fruits, honey and sugar.



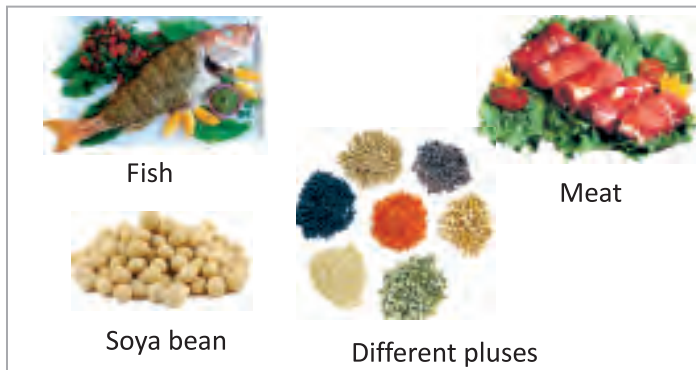
Sources of carbohydrates

## Activity

Presence of starch in any item is tested by iodine. Take a crushed potato in a test tube, add water in it and stir well. Add few drops of iodine solution in the test tube. Solution in the test tube will turn blue-black, which shows that starch is present in the potato.

**Protein** – Protein is called the body building element because it is the only nutrient which has presence of nitrogen. Nitrogen provides growth (shape of the body) to the body and helps in the building up of new cells and tissues.

Proteins are found in soya bean, yeast, cereals and pulses. Meat, fish and eggs are other sources of proteins. Small children need more protein because of their fast physical development.



Sources of protein

## Activity

### Test for protein

Take some water in a test tube and add a small amount of egg white in it. With the help of a dropper, add two drops of copper sulphate solution and ten drops of caustic soda in the test tube. Shake the test tube well and keep it aside for some time. Solution of test tube turns violet. This violet colour shows the presence of protein in egg white.

**Preparation of copper sulphate solution** – Copper sulphate solution can be prepared by adding 2 grams of copper sulphate in 100 ml of water.

**Preparation of caustic soda solution** – If 10 grams of caustic soda is added in 100 ml of water, then caustic soda solution can be prepared.

## Interesting Fact

- Lactose is present in milk.
- Milk of cow is sweet due to the presence of glutamine protein in it.

**Fats** – Fats are the main source of energy. They are used to cook food in the form of vegetable oils.

Almonds and butter are the other main source of fats. Fats give double energy to the body than carbohydrates and proteins. It helps to cushion our delicate body organs and protects them from injury. It prevents energy loss of the body.

Fats are found both in plants and animals.



Sources of fats

## Activity

Wrap some crushed peanuts in a piece of paper. Hold it in front of a source of light. You will see some spots of oil on the paper. This shows the presence of fats in it.

**Vitamins** – Vitamins are essential for the proper functioning of our body. These nutrients are required by our body in small quantity. Vitamins are of many types like vitamin A, B, C, D, E and K. Each type of vitamin has special type of working. It helps to control the growth. If our diet is lacking in any vitamin, we suffer from certain diseases.

**Vitamin A** – Vitamin A helps to keep eyes and skin healthy. Green and yellow vegetables, carrot, yellow fruits, tomato, eggs, fish oil, etc. are sources of vitamin A.

**Vitamin B** – Beri-Beri disease is caused in the absence of Vitamin B. Lack of appetite, headache and leg pain are the symptoms of beri-beri.

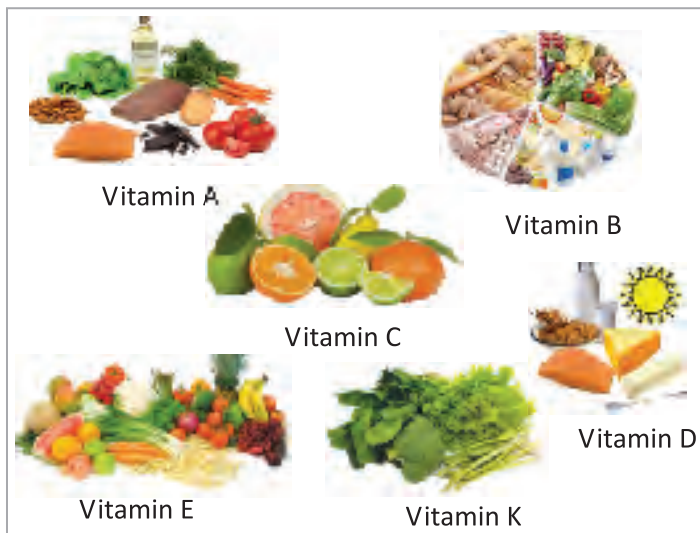
This disease is also called thiamin. Vitamin B is soluble in water. Cereals, green vegetables, soya bean, milk, cheese, eggs, fish, meat and sea food are good sources of vitamin B.

**Vitamin C** – Scurvy is caused due to the deficiency of vitamin C. Bleeding gums and joint pain are the main symptoms of this disease. Green leafy vegetables, lemon, orange and sour fruits are the good sources of vitamin C.

**Vitamin D** – This vitamin provides necessary

calcium to the bones and teeth. This calcium provides strength to the bones. Rickets disease is caused due to the deficiency of vitamin D. Soft and bent bones, swelling in knees, ankle and wrist are the symptoms of this disease. This disease can be prevented by sitting in the sun and by drinking milk.

**Vitamin E and K** – Vitamin E and K are soluble in fats, which must be fulfilled continuously by the food. Milk, butter, soya oil, vegetable oil, tomato, leafy vegetables are the main source of these vitamins.



### Vitamins

**Minerals** – Like vitamins, minerals are also needed for the proper working of our body. Minerals are present in our body in very little quantity.

Necessary minerals are 16. Main amongst them are sodium, iron, calcium, phosphorus and iodine. In the absence of these elements body may suffer from harmful result.

Green leafy vegetables, milk products, juicy sour fruits and fish are the main sources of minerals.

**Sodium** – Sodium is present in common salt. It helps in the proper functioning of the nervous system. Carrot, cauliflower, eggs, milk, almonds, turnip, radish, etc. are the important sources of sodium. Deficiency of sodium causes pain and spasm in the muscles.

**Calcium and Phosphorus** – Due to the deficiency of calcium and phosphorus, our bones become soft which causes rickets and the development of our skeleton stops.

Cereals, almonds, carrot, meat, eggs, milk, etc. are the important sources of calcium and phosphorus.

**Iron** – Iron helps in building up of haemoglobin. It is found in red blood cells and is responsible for transport of oxygen to all the cells of the body.

Dates, spinach, cereals, eggs, fish, etc. are the important sources of iron. Anaemia is caused by the deficiency of iron in diet.

**Iodine** – Iodine helps in the production of thyroxine hormone by the thyroid gland. It helps to control chemical reactions of our body.

Goitre is caused by the lack of iodine in the diet. A

Main Nutrients		
Element	Sources	Work
Protein	Soya bean, milk, egg, cheese, meat, etc.	Body development and repair of tissues, production of enzymes, hormones, etc.
Carbohydrates	Cereals, bread, fruits, vegetables, etc.	Source of energy
Fats	Milk, butter, meat, vegetable oil, cheese, etc.	Source of energy
Vitamins	Milk, butter, meat, green leafy vegetables, fruits, etc.	Safety from deficiency diseases and growth
Minerals	Cereals, meat, milk, green leafy vegetables, common salt, etc.	Provides strength to teeth and bones
Compounds of calcium, phosphorus and iron	Meat, fruits, etc.	Production of haemoglobin
Iodine	Iodized salt, sea food	Proper functioning of thyroid gland.
Water	All food items	Dissolving all items, element of blood formation (a connective tissue).

child suffering from goitre shows reduced physical and mental growth. Main sources of iodine are onion and sea food.

**Water** – For good health and proper transportation of blood to all the parts of body, water is necessary. 72% of water of our body is converted into blood. It helps to take nutrients to different parts of the body and also removes waste material from the body. It controls the body temperature. It helps to remove constipation. Removal of excessive amount of water from the body is called dehydration.

### Interesting Fact

Juice and milk are good sources of water.

**Roughage (Fibre)** – Roughage is a fibrous portion of our food. It is found in leafy vegetables salad, cereals and fruits.

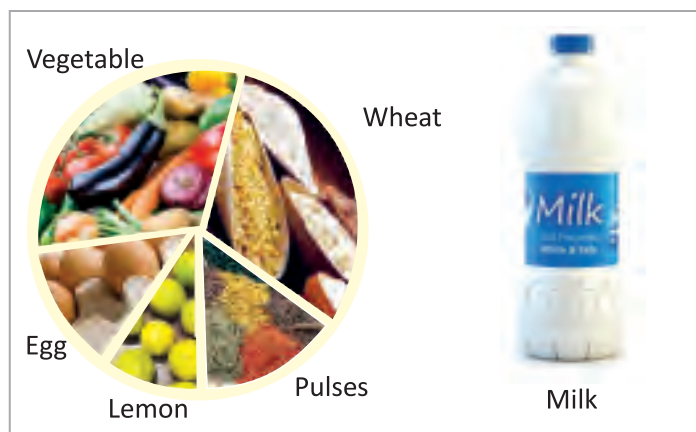
It is used for digestion and maintaining proper quantity of water in the body. It does not provide any nutrient to our body but is an essential component of our food. It helps our body to get rid of undigested food.

### 2.3 Balanced Diet

A diet containing all the nutrients in proper quantity is called a balanced diet. With the balanced diet, we can do all our work in a proper way. Body

Balanced Diet Table

Food Item	Vegetarian (Gram/Day)	Non-vegetarian (Gram/Per day)
Cereals	350	350
Pulses	90	60
Meat/Fish	–	50
Milk	300	100
Vegetables	100	100
Potato	75	75
Green leafy vegetables	100	100
Egg	–	1
Fats and oil	50	40
Sugar	40	40
Fruits	1	1
Lemon	1	1



Balanced diet

needs all the nutrients in proper quantity which is necessary for good health.

### 2.4 Protein Deficiency

Deficiency of protein causes two types of diseases in children, **Kwashiorkor** and **Marasmus**. These diseases are commonly found in developing countries of South-east Asia.



Children suffering from Kwashiorkor and Marasmus

Kwashiorkor is generally developed in the children of poor families in the age group of 1 to 3 years. In this disease, skin becomes dark and scaly and belly is protruded. This happens mainly when mother stops feeding the child and starts giving him carbohydrate rich diet.

Marasmus generally develops in the children of less than 1 year. Due to this disease, skin becomes rough, thin and wrinkled.

These diseases occur due to the malnutrition.

### Interesting Fact

Different tissues are formed from minerals. Due to these tissues, internal muscles are not damaged when we get hurt.

## 2.5 Vitamin Deficiency

Due to deficiency of vitamins, different body

functions are stopped. Therefore, deficiency of vitamins is very harmful.

### Some diseases / disorders and their symptoms caused by deficiency of vitamins

Vitamin and their sources	Functions	Deficiency disease caused	Symptoms
<b>Vitamin A</b> Green leafy vegetables, fruits, butter, egg white, cheese	Keeps eyes, hair and skin healthy	Night blindness	Low vision
<b>Vitamin B<sub>1</sub></b> Egg, whole grain	Helpful in digestion, controls activity of nervous system	Beri-Beri	Digestion problem
<b>Vitamin B<sub>2</sub></b> Egg, milk, green leafy vegetables	keeps mouth and skin healthy	Skin disease	Skin and intestinal diseases
<b>Vitamin B<sub>12</sub></b> Meat	Formation of Red Blood Cells	Anaemia	Pale skin and continuous headache
<b>Vitamin C</b> Citrus fruits, sprouts	Keeps teeth, gums and joints healthy	Scurvy	Wounds take longer time to heal, joint pain, bleeding gums, weakness
<b>Vitamin D</b> Egg, whole grain and sprouts	Development of bones	Rickets	Weak bones, muscles become loose
<b>Vitamin E-K</b> Milk, butter, soya oil, tomato, leafy vegetables	Blood transportation	Continuous flow of blood	Improper functioning of nervous system, weakness, irritation

### Activity

Make a chart of vitamins we get daily from a balanced diet.

## 2.6 Mineral Deficiency

Minerals are required in very less quantities, but their presence is necessary for the proper working of the body.

**Calcium Deficiency** – 99% of the calcium is used for the development of bones and teeth and rest of the calcium is used for the control of heart and muscles. Due to the deficiency of calcium, bones and muscles become soft.

**Anaemia** – Anaemia is a disease in which the level of haemoglobin is reduced than the normal level. This happens due to the deficiency of iron element.

A person suffering from this disease looks pale tires quickly and suffers from loss of appetite.

**Goitre** – This is caused by the lack of iodine. The thyroid gland situated in the neck region swells up and there is reduced production of thyroxine hormone produced by the thyroid gland. This disease can be prevented by consumption of iodized salt, taking pills of sodium or potassium iodide.



Goitre

### Activity

**Aim** : To show how to purchase best food items on the basis of cost, quality and nutrition.

**Material (per group)** – Pencil, Paper.

1. Prepare menu for 4 days of breakfast, lunch and dinner. This menu is for you. Your favourite food items must be added in the menu. There must be variety in the menu.
2. Suppose you are responsible for cooking these 12 foods. Prepare a list for purchasing raw materials.

3. Keep list of raw materials with you. Go to the shop and write the price of each item in your list. Compare the price of same item in different shops. Compare the quality of food items also. For eg, compare freshness of bread and eggs.

**Observation and result –**

1. Whatever you have learnt in this chapter about nutrition, use that information and see that whether

the type and quantity of food of your menu makes a balanced diet. What changes can you make in your food so that your menu contains different and balanced diet.

2. If you had to prepare these food items by yourself, then you would have to spend money carefully. Do you observe that the value of same item is different in different shops? Was the quality of that item same?

## Highlights

- Carbohydrates, protein and fats are three main nutrients.
- Carbohydrates provide energy to our body.
- Protein is necessary for growth and general functioning of the body.
- Excessive energy is obtained from fats, which increases our body weight.
- Fats provide double energy than protein and carbohydrates.
- 72% of water of our body is converted into blood and transports blood to all parts of the body.
- Roughage helps the digestive system to work properly. It also regulates the water level in the body.
- A diet containing all the nutrients in proper quantity is called a balanced diet.
- Deficiency of minerals can cause diseases like anaemia and goitre.
- Citrus fruits are the main source of minerals.
- Deficiency of calcium and phosphorus makes our bones soft.
- Deficiency of iodine causes goitre and mental retardness.
- Nearly 99% of calcium is used for the development of bones and teeth.

## Exercise



### A. Tick the correct option.

1. Sources of protein are :

- |               |                          |                   |                          |
|---------------|--------------------------|-------------------|--------------------------|
| (a) soya bean | <input type="checkbox"/> | (b) tea           | <input type="checkbox"/> |
| (c) sugar     | <input type="checkbox"/> | (d) None of these | <input type="checkbox"/> |

2. Starch is also called \_\_\_\_\_ carbohydrate :

- |          |                          |                   |                          |
|----------|--------------------------|-------------------|--------------------------|
| (a) good | <input type="checkbox"/> | (b) complex       | <input type="checkbox"/> |
| (c) hard | <input type="checkbox"/> | (d) None of these | <input type="checkbox"/> |

3. Deficiency of vitamin E causes :

- |                   |                          |                   |                          |
|-------------------|--------------------------|-------------------|--------------------------|
| (a) flow of blood | <input type="checkbox"/> | (b) deafness      | <input type="checkbox"/> |
| (c) burning       | <input type="checkbox"/> | (d) None of these | <input type="checkbox"/> |

4. Which disease is caused in children in the absence of vitamin A?

- |                      |                          |                     |                          |
|----------------------|--------------------------|---------------------|--------------------------|
| (a) Lack of appetite | <input type="checkbox"/> | (b) Night-blindness | <input type="checkbox"/> |
| (c) Scurvy           | <input type="checkbox"/> | (d) None of these   | <input type="checkbox"/> |

### B. Fill in the blanks :

1. Nutrients help in the proper functioning of \_\_\_\_\_ of the body.
2. Fats protect our body from \_\_\_\_\_.

3. Absence of sodium causes \_\_\_\_\_ and \_\_\_\_\_ in the muscles.
4. Percentage of calcium in the development of bones and teeth is \_\_\_\_\_.
5. Mental retardedness is caused due to the deficiency of \_\_\_\_\_.

**C. Write True or False :**

1. We need balanced diet to keep our body healthy. \_\_\_\_\_
2. Nutrients are of four types. \_\_\_\_\_
3. Sugar is obtained from fruits, honey and sugar. \_\_\_\_\_
4. Proteins are called body building elements. \_\_\_\_\_
5. Deficiency of vitamin A causes beri-beri. \_\_\_\_\_
6. Iodine is responsible for production of hormone by thyroid gland. \_\_\_\_\_

**D. Very short answer questions :**

1. What is the percentage of minerals in our body?
2. Roughage control which process of body?
3. What is anaemia?
4. Which disease is caused by the deficiency of iodine?
5. Which disease is caused by the deficiency of vitamin C?

**E. Short answer questions :**

1. Write definition of balanced diet.
2. Write name of any three vitamins and disease caused by their deficiency.
3. Draw a chart of balanced diet.
4. Explain protein deficiency.
5. Write a short note on water.



**Project Work**

- On a chart paper, show food items enriched with different nutrients and also show nutrients which we get from each food item.