CHAPTER - 2
COMPONENTS OF FOOD

NUTRIENTS
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.

CARBOHYDRATES
Carbohydrates are also called energy giving food. It is the main sources of energy. It is made up of carbon, hydrogen, and oxygen. There are three types of carbohydrates.

- **Sugars**: It is a simple carbohydrate having sweet taste. Sources of sugar are glucose, Sugarcane, milk and fruits; such as banana, apple, grapes, etc.
- **Starch**: It is a complex carbohydrate. It is a tasteless, colourless, white power. Sources of starch are: Wheat, maize, potato and rice.
- **Cellulose**: It is present in plant cell wall. It is a complex carbohydrate. Humans cannot digest cellulose.

PROTEIN
Protein helps in body growth and repairs the tissues so it is also called body building food. We get protein from milk, eggs, meat, fish and all kinds of pulse. Protein molecule is made of a large number of smaller molecules called amino acid. The daily requirement of protein for adults is 1 gram per kilogram of the body weight. When the body is building new tissue, more proteins are required, so growing children and pregnant lady need more protein.
FATS
Fats are made up of carbon, hydrogen and oxygen. Butter, ghee, milk, egg-yolk, nuts and cooking oils are the major sources of fat in our food. An adult needs about 35 g fat everyday. Our body stores the excess energy in the form of fat. This stored fat is used by the body for producing energy as and when required so fat is considered as energy bank in our body. Fats are essential for the absorption of vitamins A, D, E and K in the body. Fat in our body also prevents heat loss from the body surface.

VITAMINS
Vitamins are complex organic compounds which are essential for the growth and maintenance of our body. It does not provide energy. Our body requires vitamins A, C, D, E, K and B-complex. Our body can make only two vitamins, Vitamins D and K so other vitamins must be present in our food. The B complex vitamin is a mixture of several water-soluble vitamins. The important vitamins of this group are the vitamin B1, B2, B6 and B12.

Vitamin A
Vitamin A protects the eyes, skin and hair. So, vitamin A is necessary for good eyesight, healthy skin and hair. The various sources of vitamin A are the foods such as: Milk, Butter, Carrot, Fish liver oil, Eggs, Green vegetables, Mango and Papaya. All these food materials contain good amount of vitamin A.

Vitamin B1
Vitamin B1 is essential for growth, and proper functioning of the digestive system, heart, nerves and muscles. Vitamin B1 is present in good amounts in the following foods: Milk, Eggs, Meat, Wholegrain cereals (like wheat grains and rice], Potatoes, Yeast and Green Vegetables.

Vitamin C
Vitamin C is necessary for keeping teeth, gums and joints healthy. Vitamin C also increases the resistance of our body to infection and helps to fight diseases. Vitamin C is present in : Citrus fruits (such as Oranges, Lime and Lemon), Amla (Indian gooseberries), Tomato, Guava, and Green vegetables. Actually, almost all the fresh fruits and vegetables contain some vitamin C.

Vitamin D
Vitamin D is necessary for the normal growth of bones and teeth. Vitamin D helps our body to absorb calcium mineral from the food. And this calcium makes the bones and teeth hard and strong. Vitamin D is present in foodstuffs such as: Milk, Fish, Egg, Butter and Fish liver oil. Some vitamin D is also made in our body when the skin is exposed to sunlight. In our country,
the newborn babies are exposed to sunshine everyday. This is done to produce vitamin D in their body (which prevents a disease called rickets in children).

MINERALS
Our body needs minerals for its proper functioning, normal growth, and good health. Minerals are needed to build bones and teeth; formation of blood; coagulation of blood; and functioning of muscles, nerves and thyroid gland, etc. Minerals are needed by our body in small amounts. Some of the important minerals needed by our body are: Calcium, Phosphorus, Iron, Iodine, Sodium and Potassium.

Calcium and Phosphorus
Calcium is needed for making bones and teeth. Calcium also helps in the proper functioning of heart and other muscles, as well as in the clotting of blood. Children need more calcium than adults in comparison to their body weight because they grow fast and their bones and teeth are to be made largely from calcium salts. Some of the foods which are good sources of calcium are: Milk, Cheese, Eggs, Green leafy vegetables, and Fish.

Like calcium, phosphorus is needed for the formation of bones and teeth. Some of the sources of phosphorus in our food are: Milk, Pearl millet (Bajra), Banana, Pulses (Dal), and Green leafy vegetables. Milk is one food item which contains both calcium and phosphorus minerals in good amounts. So, we should drink milk daily to get strong bones and teeth.

Iodine
There is a thyroid gland situated in the neck of our body. It controls the growth of our body. Iodine is essential for the proper functioning of the thyroid gland which controls the growth of the body. Iodine helps thyroid gland to make a hormone which controls growth. The various sources of iodine in our food are: Sea-food (like Sea-fish), Fruits, Vegetables and Iodised salt.

Iron
Iron is needed to make haemoglobin present in red blood cells (which carries oxygen from the lungs to the body parts). Thus, iron is an important constituent of haemoglobin in the blood.
Some of the sources of iron in our food are: Spinach, Other green leafy vegetables, Apples, Eggs, Liver, Cereals (like Bajra), Pulses and Groundnuts.

ROUGHAGE (DIETARY FIBRE)

Roughage is the fibrous matter in food which cannot be digested. Roughage is mainly made of an indigestible carbohydrate called ‘cellulose’, which is present in plant cell walls. Roughage is also called dietary fibre (‘Dietary fibre’ means ‘fibre which can be eaten’). Like water, roughage does not provide any nutrients to our body. Though roughage has ‘no food value’ but its presence is essential in our food. Roughage is needed for the normal working of the digestive system. Roughage provides bulk to the food, keeps the food and waste matter (faeces) moving along the intestines and helps to prevent constipation. Roughage is provided mainly by the plant products which we include in our food. Some of the good sources of roughage (or dietary fibre) in our food are: Fruits, Vegetables and Wholemeal flour products (such as wholemeal chapati and wholemeal bread).

WATER

Water is essential for life but it has no ‘food value’ in our body. A person can live without food for several weeks but would die in a few days without water. Water provides a liquid in which other substances can dissolve and move within the body or eliminated from the body. Water is needed by our body:
(i) to transport digested food to the body cells
(ii) to transport important chemicals such as hormones around the body
(iii) to get rid of waste products from the body
(iv) to control and regulate the temperature of body

Balanced Diet: The diet which contains all the essential nutrients in the right proportion is called a balanced diet. The food we eat must have all the nutrients. It should provide the required energy. Deficiency of one or more nutrients in our food for a long time may cause certain diseases or disorders.

Pulses, groundnut, soybean, sprouted seeds (moong and Bengal gram), fermented foods (South Indian foods such as idlis), a combination of flours (missi roti, thepla made from cereals and pulses), banana, spinach, sattu, jaggery, available vegetables and other such foods provide many nutrients. Therefore, one can eat a balanced diet without expensive food materials.

DEFICIENCY DISEASES

A person may be getting enough food to eat, but sometimes the food may not contain a particular nutrient. If this continues over a long period of time, the person may suffer from its deficiency. Deficiency of one or more nutrients can cause diseases or disorders in our body. Diseases that occur due to lack of nutrients over a long period are called deficiency diseases.

Protein Deficiency Disease

The deficiency of proteins in the diet of small children causes a disease known as kwashiorkar. Kwashiorkar disease occurs in children of 1 to 5 years of age. Kwashiorkar develops when a mother stops feeding her child with breast milk due to the birth of another baby too soon. And after weaning (removing) from the protein-rich breast milk, the child from a poor family is given a diet consisting mainly of carbohydrates, having low protein content. Thus, kwashiorkar is a protein-deficiency disease.

Protein and Carbohydrate Deficiency Disease

The deficiency of proteins as well as carbohydrates in the diet of very small children (babies) causes a disease known as marasmus. Marasmus disease occurs in infants (or babies) of up to 1 year of age. Marasmus develops when infants below the age of one year are abruptly weaned.
away from breast milk and are subsequently given a less nutritive food which is deficient in proteins as well as carbohydrates. Such a food is inadequate for the normal growth and development of the child.

VITAMIN DEFICIENCY DISEASES
Deficiency (or lack) of various vitamins in the human diet gives rise to a number of diseases or disorders. Some of the vitamin deficiency diseases are: Night blindness, Beri-beri, Scurvy and Rickets.

Deficiency of Vitamin A
The deficiency of vitamin A weakens our vision [or eyesight] in dim light. Due to this a person having deficiency of vitamin A cannot see properly in dim light (or at night). The inability of a person to see properly in dim light (especially at night), is called night blindness. Thus, the deficiency of vitamin A in the diet causes a disease known as night blindness. Severe deficiency of vitamin A over a long period of time can lead to total blindness.

Deficiency of Vitamin B,
The deficiency of vitamin B1 in food causes a disease known as beri-beri. The symptoms of vitamin B| deficiency (or symptoms of beri-beri disease) are as follows: The muscles of the person become very weak and he has very little energy to do work. The person may suffer heart failure or become paralysed and then die.

Deficiency of Vitamin C
The deficiency of vitamin C causes a disease known as scurvy. The symptoms of vitamin C deficiency (or symptoms of scurvy disease) are: bleeding from the gums, loosening of teeth, and wounds do not heal easily.

Deficiency of Vitamin D
The deficiency of vitamin D in the diet of small children causes a disease known as rickets. A child suffering from rickets has bow legs (bent legs) and a pigeon-type chest. Actually, vitamin D helps in absorbing calcium mineral in the body which makes the bones (and teeth) strong. When there is deficiency of vitamin D, then the bones of the child remain ‘soft’ due to inadequate absorption of calcium from food. These soft bones bend easily under the child’s own body weight.

MINERAL DEFICIENCY DISEASES
Deficiency (or lack) of various minerals in the human diet also gives rise to a number of diseases or disorders. Some of the mineral deficiency diseases are: Bone & tooth decay problem, Goitre and Anaemia.

Deficiency of Calcium
When a child is born, its bones are soft. For the bones to become hard, calcium compounds must be supplied. If a child does not get sufficient amount of calcium, its bones remain soft and also leads to poor growth of teeth in children. Deficiency of calcium in adults causes brittle bones and teeth (which can break easily).

Deficiency of iodine
The deficiency of iodine mineral in the diet can cause goitre. Goitre is the abnormal enlargement of thyroid gland situated in our neck. This enlargement of the thyroid gland is caused by the deficiency of iodine. The main symptom of iodine deficiency for goitre disease) is that the neck of the person appears to be swollen.
Deficiency of Iron
Iron mineral is necessary for making haemoglobin present in our red blood cells. Deficiency of iron results in the blood containing too little haemoglobin. This leads to anaemia. Anaemia is a disease in which the level of haemoglobin in the blood is less than normal, reducing the oxygen-carrying capacity of blood. Thus, the deficiency of iron in the diet leads to a disease called anaemia. The main symptoms of iron deficiency (or anaemia disease) are: The person looks pale, feels very weak, tires easily, and loses weight. His nails also turn white.

Table: Some diseases/disorders caused by deficiency of vitamins and minerals

<table>
<thead>
<tr>
<th>Vitamin/Mineral</th>
<th>Deficiency disease/disorder</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>Loss of vision</td>
<td>Poor vision, loss of vision in darkness (night), sometimes complete loss of vision</td>
</tr>
<tr>
<td>Vitamin B1</td>
<td>Beriberi</td>
<td>Weak muscles and very little energy to work</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>Scurvy</td>
<td>Bleeding gums, wounds take longer time to heal</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Rickets</td>
<td>Bones become soft and bent</td>
</tr>
<tr>
<td>Calcium</td>
<td>Bone and tooth decay</td>
<td>Weak bones, tooth decay</td>
</tr>
<tr>
<td>Iodine</td>
<td>Goiter</td>
<td>Glands in the neck appear swollen, mental disability in children</td>
</tr>
<tr>
<td>Iron</td>
<td>Anaemia</td>
<td>Weakness</td>
</tr>
</tbody>
</table>

NCERT EXERCISE QUESTIONS AND ANSWERS

1. Name the major nutrients in our food.
   Ans:
   The major nutrients in our food are carbohydrates, proteins, fats, vitamins and minerals. In addition, food also contains dietary fibres and water.

2. Name the following:
   (a) The nutrients which mainly give energy to our body.
   (b) The nutrients that are needed for the growth and maintenance of our body.
   (c) A vitamin required for maintaining good eyesight.
   (d) A mineral that is required for keeping our bones healthy.
   Ans:
   (a) Carbohydrates and fats.
   (b) Proteins and minerals
   (c) Vitamin A
   (d) Calcium

3. Name two foods each rich in:
   (a) Fats
   (b) Starch
   (c) Dietary fibre
   (d) Protein
   Ans:
   (a) Butter, Groundnut.
   (b) Rice, Potato.
   (c) Whole grains, Fresh fruits.
   (d) Pulses, Fish.
4. Tick (✓) the statements that are correct.
   (a) By eating rice alone, we can fulfill nutritional requirement of our body. ( )
   (b) Deficiency diseases can be prevented by eating a balanced diet. ( )
   (c) Balanced diet for the body should contain a variety of food items. ( )
   (d) Meat alone is sufficient to provide all nutrients to the body. ( )
   Ans:
   (a) By eating rice alone, we can fulfill nutritional requirement of our body.  X
   (b) Deficiency diseases can be prevented by eating a variety of food items. ✓
   (c) Balanced diet for the body should contain a variety of food items. ✓
   (d) Meat alone is not sufficient to provide all nutrients to the body. ✓

5. Fill in the blanks.
   (a) ______________ is caused by deficiency of Vitamin D.
   (b) Deficiency of ______________ causes a disease known as beri-beri.
   (c) Deficiency of Vitamin C causes a disease known as ______________.
   (d) Night blindness is caused due to deficiency of ____________ in our food.
   Ans:
   (a) Rickets
   (b) vitamin B1
   (c) scurvy.
   (d) vitamin A
1. Which one of the following food item does not provide dietary fibre?
   (a) Whole grains        (b) Whole pulses        (c) Fruits and vegetables  (d) Milk

2. Which of the following sources of protein is different from others?
   (a) Peas                  (b) Gram                 (c) Soyabeanse          (d) Cottage cheese (paneer)

3. Which of the following nutrients is not present in milk?
   (a) Protein        (b) Vitamin C      (c) Calcium          (d) Vitamin D

4. Read the food items given below:
   (i) Wheat      (ii) Ghee    (iii) Iodised salt    (iv) Spinach (palak)
Which of the above food items are “energy giving foods”?
   (a) (i) and (iv)  (b) (ii) and (iv)  (c) (i) and (ii)  (d) (iii) and (iv)

5. Read the following statements about diseases.
   (i) They are caused by germs.
   (ii) They are caused due to lack of nutrients in our diet.
   (iii) They can be passed on to another person through contact.
   (iv) They can be prevented by taking a balanced diet.
Which pair of statements best describe a deficiency disease?
   (a) (i) and (ii)  (b) (ii) and (iii)  (c) (i) and (iv)  (d) (i) and (iii)

6. Given below are the steps to test the presence of proteins in a food item:
   (i) Take a small quantity of the food item in a test tube, add 10 drops of water to it and shake it.
   (ii) Make a paste or powder of food to be tested.
   (iii) Add 10 drops of caustic soda solution to the test tube and shake well.
   (iv) Add 2 drops of copper sulphate solution to it.
Which of the following is the correct sequence of the steps?
   (a) i, ii, iv, iii  (b) ii, i, iv, iii  (c) ii, i, iii, iv  (d) iv, ii, i, iii

7. The main carbohydrate which we eat in our food is:
   (a) canesugar         (b) glucose         (c) cellulose   (d) starch

8. Which of the following is considered to be body building food?
   (a) carbohydrates  (b) proteins       (c) fats       (d) vitamins

9. Which of the following is produced in our body when the skin is exposed to sunlight?
   (a) vitamin D      (b) vitamin B      (c) vitamin A     (d) vitamin C

10. The vitamin essential for good eyesight, healthy skin and hair is vitamin:
    (a) A             (b) B1            (c) C           (d) D

11. Which of the following foods is a good source of both calcium and phosphorus?
    (a) fish          (b) carrots       (c) milk        (d) oranges
12. The mineral essential for the proper functioning of the thyroid gland is:
   (a) calcium    (b) iodine    (c) iron    (d) potassium

13. Iodine solution turns blue-black when added to a food X. The food X is most likely:
   (a) a piece of butter    (b) a piece of bread
   (c) a cup of milk    (d) a boiled egg

14. When alkaline copper sulphate solution is added to a food item, then a violet colour is produced. The food item is most probably:
   (a) milk    (b) butter    (c) potato    (d) cooked rice

15. When a little of food item is rubbed on a sheet of paper, a translucent spot is produced. Which of the following is present in this food item?
   (a) proteins    (b) carbohydrate    (c) fat    (d) minerals

16. Which one of the following food nutrients should be present in greater amounts in the diet of a labourer than an office worker of the same age and weight?
   (a) carbohydrates    (b) proteins    (c) minerals    (d) vitamins

17. The cooking of food at high temperature destroys a major portion of:
   (a) carbohydrates    (b) vitamin B    (c) vitamin C    (d) fats

18. The disease caused by the deficiency of proteins in the diet of children is called:
   (a) marasmus    (b) rickets    (c) kwashiorkar    (d) scurvy

19. When a few drops of dilute iodine solution are added to a food, then a blue-black colour is produced. This food contains:
   (a) fat    (b) starch    (c) minerals    (d) proteins

20. Which of the following disease occurs in babies due to the deficiency of proteins as well as carbohydrates in their diet?
   (a) night blindness    (b) goitre    (c) kwashiorkar    (d) marasmus

21. A few drops of alkaline copper sulphate solution are added to some milk taken in a test-tube. The colour produced will be:
   (a) brown    (b) blue-black    (c) yellow    (d) violet

22. One of the following is not a vitamin deficiency disease. This one is:
   (a) scurvy    (b) rickets    (c) goitre    (d) beri-beri

23. The deficiency of vitamin D in children causes a disease known as:
   (a) beri-beri    (b) rickets    (c) anaemia    (d) goitre

24. The carbohydrate which produces blue-black colour with dilute iodine solution is:
   (a) glucose    (b) canesugar    (c) cellulose    (d) starch

25. Which one of the following will not give a violet colour with alkaline copper sulphate solution?
   (a) white of an egg    (b) yellow of an egg
   (c) milk    (d) cheese

26. The deficiency of vitamin C in the diet causes a disease known as:
   (a) rickets    (b) anaemia    (c) scurvy    (d) goitre
27. A woman is suffering from goitre. Her diet is deficient in:
   (a) vitamin B   (b) iron   (c) iodine   (d) calcium

28. Which one of the following helps in absorbing calcium mineral present in the diet into our body?
   (a) vitamin B1   (b) vitamin D   (c) vitamin A   (d) vitamin C

29. A child has bow legs (bent legs). He is suffering from the deficiency disease known as:
   (a) anaemia   (b) goitre   (c) scurvy   (d) rickets

30. Which of the following minerals is necessary to make haemoglobin present in the red blood cells?
   (a) iodine   (b) red phosphorus   (c) iron   (d) sodium

31. One of the following is necessary for keeping gum and teeth healthy. This is:
   (a) vitamin B   (b) vitamin D   (c) vitamin A   (d) vitamin C

32. Which of the following is not a function of water in our body?
   (a) to transport digested food   (b) to get rid of wastes   (c) to release energy   (d) to regulate body temperature

33. The vitamin which prevents rickets disease in children is:
   (a) vitamin A   (b) vitamin B   (c) vitamin C   (d) vitamin D

34. Roughage in our food is mainly made of:
   (a) starch   (b) cellulose   (c) glucose   (d) canesugar

35. Fill in the following blanks with suitable words:
   (a) Deficiency of iron in the diet causes a disease known as ________
   (b) Deficiency diseases can be prevented by eating a ________ diet.

36. Fill in the following blank with a suitable word:
   Iron is an important constituent of ______________ present in our blood.

37. Name the vitamin which is required for maintaining good eyesight.

38. Name the vitamin which keeps the teeth, gums and joints healthy, and helps fight diseases.

39. Name the vitamin which is necessary for the normal growth of bones and teeth

40. Which vitamin is produced in the human body when skin is exposed to sunlight?

41. Name the main vitamin present in (a) oranges, and (b) carrots.

42. Name an important mineral present in (a) apple, and (b) sea-fish.

43. Which mineral is needed to make haemoglobin present in our red blood cells.

44. Name the disease caused by the deficiency of:
   (a) Vitamin A   (b) Vitamin B1   (c) Vitamin C   (d) Vitamin D

45. Name the vitamin whose deficiency causes the disease:
   (a) beri-beri   (b) scurvy   (c) rickets   (d) night blindness

46. Name the nutrients present in our food which give mainly energy to our body.
47. Name the nutrient which is needed for the growth and repair of our body.
48. Name the main carbohydrate which we eat in our food.
49. Which carbohydrate is present in wheat, rice and potatoes?
50. Name two foods each rich in (a) fats, and (b) starch.
51. Name the major nutrients in our food.
52. In addition to calcium, which other mineral is needed for making bones and teeth?
53. Name a mineral which is needed for keeping bones and teeth healthy.
54. Which mineral is needed for the proper functioning of thyroid gland?
55. Name two food materials which contain a lot of water.
56. Name the component of our food which helps prevent constipation.
57. What is the other name of roughage?
58. Which component of food is mainly made of indigestible carbohydrate ‘cellulose’?
59. The examples of carbohydrates are: sugar, cellulose, glucose and starch. Which of these carbohydrates provides roughage in our food?
60. Name two components of food which do not provide any nutrients.
61. Name the solution which can be used to test the presence of starch in a food.
62. Which vitamin is easily destroyed by heat during the cooking of food?
63. What is the function of fats in our body? Name three sources of fat in our food.
64. Name the nutrient/nutrients whose deficiency causes marasmus disease in children.
65. Name the nutrient/nutrients whose deficiency causes kwashiorkor disease in children.
66. What is the cause of the disease called scurvy?
67. Name two diseases caused by the deficiency of iodine in the diet.
68. If a person looks pale, gets tired easily, loses weight, and his nails turn white, which deficiency disease is he suffering from?
69. How will you test the presence of fat in a given sample of food material?
70. Describe one test for detecting the presence of proteins in a food.
71. How will you test the presence of starch in a food?
72. What happens when a few drops of dilute iodine solution are put on the cut surface of a raw potato? What does it show?
73. How will you show that flour contains starch?
74. How will you show that groundnuts contain fat (or oil)?
75. Name the mineral whose deficiency causes anaemia. Write the symptoms of anaemia.
76. Who needs more proteins in his daily diet in relation to body weight: a growing child or a grown up man? Why?
77. How does the balanced diet of a man doing hard physical work differ from another man doing normal work?

78. Why does a labourer need more carbohydrates in his diet than normal?

79. State two pre-cooking practices which lead to the loss of nutrients in food materials.

80. Explain why, rice and pulses should not be washed repeatedly before cooking.

81. What happens when fruits and vegetables are first peeled and cut, and then washed?

82. Explain why, thick peels should not be removed from fruits and vegetables.

83. Why should we include some fresh fruits and raw vegetables in our diet?

84. What happens when water in which a food material is boiled during cooking, is thrown away later on?

85. Write down the main symptoms of vitamin C deficiency (or scurvy).

86. Name the vitamin whose deficiency causes rickets in children. Write the symptoms of disease called rickets.

87. What is the function of vitamin B1 in our body? Name two sources of vitamin B1.

88. Why do we need iodine in our diet? Name two sources of iodine in our diet.

89. What is night blindness? What causes night blindness?

90. Mention some effects of the deficiency of calcium in the diet.

91. What is the cause of goitre? Write the main symptom of goitre.

92. The neck of a person appears to be swollen. Name the deficiency disease he is suffering from. What is the cause of this disease?

93. What is a balanced diet? How does the balanced diet of a child differ from that of a grown up man?

94. State two beneficial effects of cooking food. Name two cooking practices which lead to the loss of nutrients in food materials.

95. What is the cause of the disease known as beri-beri? Write the main symptoms of beri-beri disease.

96. Name the disease caused by the deficiency of proteins in the diet of children. Give the symptoms of protein deficiency in children.