



# Components of Food

## Prior Knowledge

*In the previous classes, I have learnt that:*

- We need food to get essential nutrients for our growth and development.
- We should eat all kinds of food to get different nutrients.
- We must always choose a healthy diet.

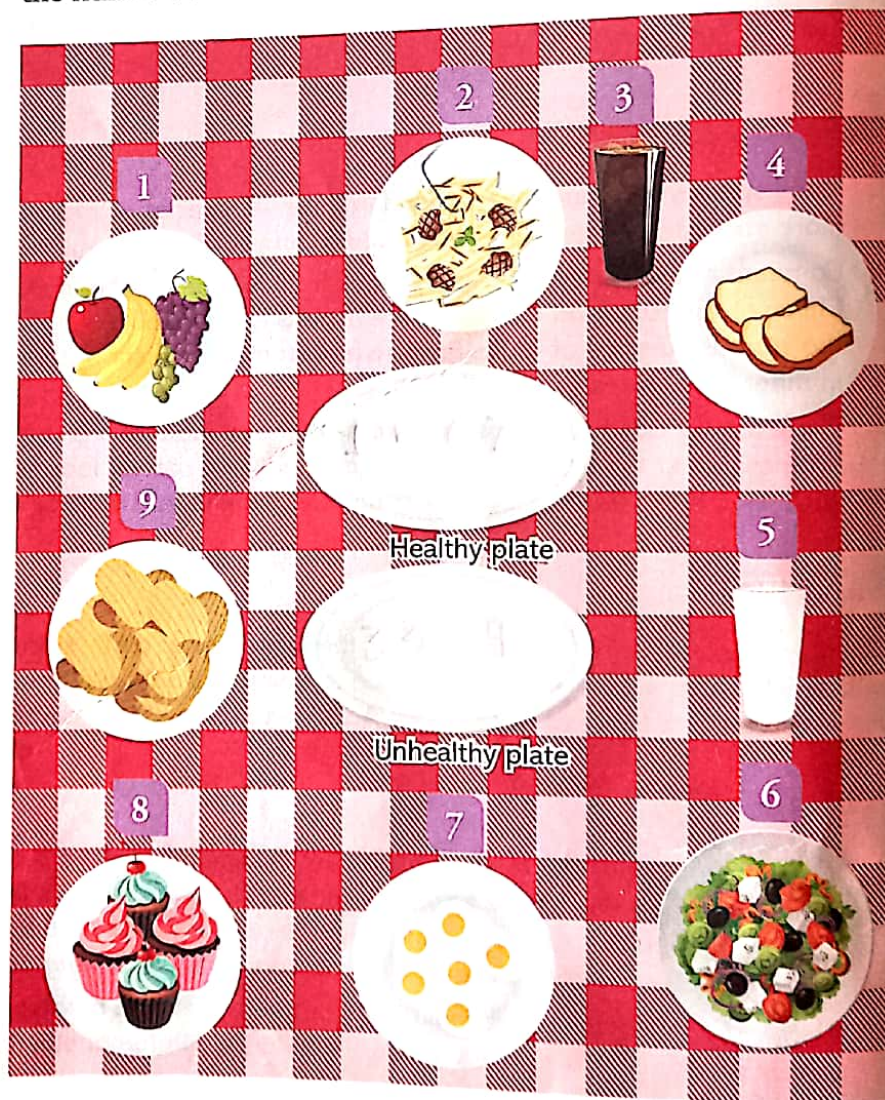
## Learning Objectives

*In this chapter, I will learn about:*

- Nutrients present in food
- Importance of balanced diet
- Deficiency diseases and their causes
- Tips to preserve nutrients in food

## Let's Get Going

Categorize the food items given below as healthy or unhealthy. Which food item do you think should go in which plate? Write the number of each food item in the corresponding plate.



Which plate is nutritious? Which plate would you pick up?



In Chapter 1, we have learnt about the importance of food. Food contains substances called **nutrients** which are essential for the proper growth and development of our body.

## NUTRIENTS

There are five main nutrients: carbohydrates, fats, proteins, vitamins and minerals. These nutrients perform different functions in our body and keep us healthy. Based on these functions, foods containing these nutrients are classified into three important groups.

- **Energy-giving food:** *Food items that provide us with energy are called energy-giving food.* These food items are rich in carbohydrates and fats. A few examples of energy-giving food are potato, banana, sugar, milk, wheat and rice.
- **Body-building food:** *Food items that help in the growth and repair of damaged or worn out tissues in the body, are called body-building food.* These food items are rich in proteins. A few examples of body-building food are milk, pulses, fish, meat and cheese.
- **Protective food:** *Food items that protect us from various diseases are called protective food.* These food items are rich in vitamins and minerals. A few examples of protective food are pulses, milk, fish, tomato, fruits and green leafy vegetables.

Now, let us learn about each of these nutrients in detail.

## Carbohydrates

Our body requires energy to do work and other activities. Carbohydrates are the main source of energy. These form a major part of the staple diet of people living all over the world. Carbohydrates can be classified as simple carbohydrates and complex carbohydrates.

**Simple carbohydrates:** These are also called **sugars**. Glucose is an example of simple sugar. Simple sugars are easily absorbed by the blood and provide energy to our body immediately. This is one of the reasons why patients who are unable to take in solid food, are injected with glucose. Table sugar, milk and honey are some sources of sugars.

**Complex carbohydrates:** Starch is a complex carbohydrate. Complex carbohydrates are first broken down into simple carbohydrates. Simple carbohydrates are then absorbed by the blood to provide energy to the body. Thus, starch gives energy much slowly than sugars. Wheat, rice, maize and potatoes are some food sources that are rich in starch.

### Remember

Cellulose is also a complex carbohydrate that forms a major part of our diet. It cannot be digested in human body. So, it does not provide energy to our body.

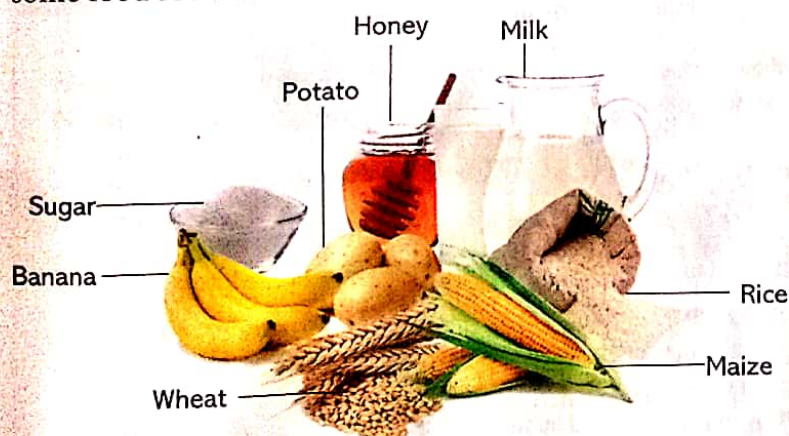


Fig. 2.1 Carbohydrate-rich food sources

### Science in Action

Keeping in mind the health risks of high sugar intake, artificial sweeteners are developed in laboratories. These artificial sweeteners are made either by using chemicals or by modifying existing natural sweeteners. These do not have any nutritional value and only add sweetness to the food or drinks.



## Fats

Like carbohydrates, fats also provide energy to our body. For the same amount of food consumed, fats give almost twice the energy released by the same quantity of carbohydrates. Fats are required for the proper development and functioning of the brain and nervous system.

Fats can be broadly classified into two types: saturated fats and unsaturated fats.

**Saturated fats:** These are usually solid at room temperature. For example, butter and *ghee*.

**Unsaturated fats:** These are usually liquid at room temperature. For example, vegetable oils.

We get fats from both plant and animal sources. Plants give us vegetable oils (mustard oil, sunflower oil and groundnut oil) and nuts (almonds and cashews). Egg yolk, milk products (ghee and butter) and meat are some fat-rich foods that we get from animal sources.

### Your Task

Eating too much of fat-rich food can lead to being overweight or obese. This can lead to the onset of various other health problems. Do some research on the various health problems associated with obesity. Write a report in 200 words on obesity and related health risks. List some ways to prevent obesity and related health risks.



Fig. 2.2 Fat-rich food sources

## Proteins

Proteins are the building materials of cells in our body. They are required for the growth, repair and replacement of worn-out tissues. Muscles are also made up of proteins. We get proteins from both plant and animal sources. Soya beans, pulses, peas and groundnuts are some plant sources of proteins. Meat, egg white, fish, milk and cheese are some animal sources of proteins.

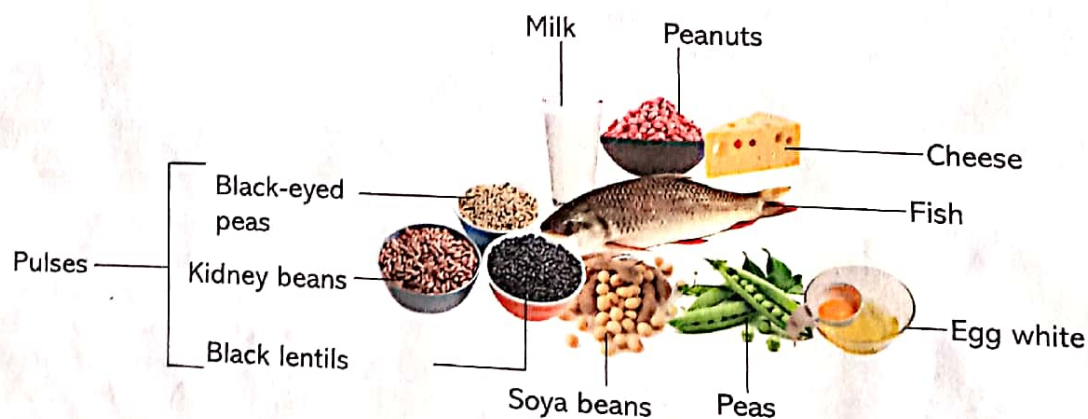


Fig. 2.3 Protein-rich food sources



## Let's Try



**Aim:** To test the presence of starch in some food samples

**Materials required:** Various food samples, test tubes, water and iodine solution

**Principle involved:** When iodine is added to starch, the colour of iodine changes to blue-black

**Procedure:**

1. Crush the food sample and transfer to a test tube.
2. Add some water to the test tube and shake it well.
3. Now, add a few drops of iodine solution to the test tube. Observe and record what you see.
4. Repeat the same process with other food samples.
5. Record your observations in the table given below.

S. No.	Food sample	Observation (Blue-black colour appears or not)	Inference (Starch present or not)
1	Bread		
2	Brinjal		
3	Ginger		
4	Banana		
5	Cooked dal		

**Conclusion:** The food items that change the colour of iodine solution to blue-black have starch.

## Let's Try



**Aim:** To test the presence of fats in the given food sample

**Materials required:** Food sample and plain paper

**Procedure:**

1. Wrap the food sample in a paper.
2. Crush the food sample wrapped in the paper.
3. Unwrap the paper and remove the crushed food sample.
4. Observe the paper.

**Observation and conclusion:** If the paper becomes translucent, the food sample contains fats.

## Let's Try



**Aim:** To test the presence of proteins in the given food sample

**Materials required:** Food sample (cooked dal), copper sulphate solution, caustic soda solution, droppers, test tubes and test tube stand

**Principle involved:** When caustic soda and copper sulphate solutions are added to protein, the colour changes to violet

**Procedure:**

1. Take a teaspoon of the given food sample in a test tube and add about 5 ml of water to it.
2. Using a dropper, add two drops of copper sulphate solution to the test tube.
3. Using another dropper, add about ten drops of caustic soda solution to the test tube.
4. Shake the test tube and leave it undisturbed in the test tube stand for about 5 minutes.

**Observation and conclusion:** If the colour of the solution in the test tube changes to violet, the food sample contains proteins.



## Knowledge Check



A. Write the main nutrient present in the given food items.

1. Dal

2. Bread

3. Egg yolk

4. Rice

B. Match the following.

1. Simple carbohydrate

a. Butter

2. Complex carbohydrate

b. Egg white

3. Saturated fats

c. Glucose

4. Unsaturated fats

d. Starch

5. Proteins

e. Mustard oil

## Vitamins

Vitamins play a vital role in the growth and development of the human body. Vitamins are required only in small amounts. These help us in developing immunity against many diseases. There are different types of vitamins namely vitamin A, vitamin C, vitamin D, vitamin E, vitamin K and vitamin B-complex. Vitamin B-complex is actually a group of vitamins (vitamin B1, vitamin B2, vitamin B3, vitamin B5, vitamin B6, vitamin B7, vitamin B9 and vitamin B12).

Depending on their solubility in water, vitamins are of two types: fat soluble and water soluble.

**Fat soluble vitamins:** Vitamins A, D, E and K are fat soluble vitamins. Fat soluble vitamins are stored in the fat tissues of the body and are used when needed.

**Water soluble vitamins:** Vitamin B-complex and vitamin C are water soluble vitamins. Since these vitamins are not stored in the body, these have to be supplied regularly through food.

Table 2.1 lists functions and sources of important vitamins.

### Remember



In addition to dietary sources, it is found that when sunlight falls on the skin, certain reactions take place producing vitamin D. It is therefore termed as the sunshine vitamin.

Table 2.1 Different vitamins, their functions in the body and their sources

Vitamin	Function in the body	Food sources
Vitamin A	Needed for proper vision and improves immunity	Carrots, oranges, ripe yellow fruits, soy milk, green leafy vegetables
Vitamin B-Complex (B1, B2, B3, B5, B6, B7, B9 and B12)	Helps in metabolism	Whole grains, beans, soya bean, curd, liver, meat, fish
Vitamin C	Maintains healthy bones and teeth, prevents cell damage, supports immunity	Citrus fruits (orange, lemon), broccoli, spinach, tomato
Vitamin D	Maintains strong bones and teeth, aids in calcium absorption	Cod liver oil, eggs, mushrooms
Vitamin E	Needed for absorption of vitamin A, protects body tissues from damage	Mango, guava, sunflower seeds, spinach, nuts, almonds
Vitamin K	Helps to build strong bones, helps in blood clotting problems	Green leafy vegetables, cabbage, egg yolk, liver



## Minerals

Minerals are needed for the formation of bones, teeth and red blood cells. Minerals help in proper functioning of the muscles and in maintaining normal heartbeat. Depending on the requirement in the body, minerals are divided into two groups: major minerals and trace minerals.

**Major minerals:** These minerals are required in large quantities by the body. For example, calcium, magnesium, potassium and sodium.

**Trace minerals:** These minerals are required in lesser quantities by the body. For example, iron, zinc, copper and iodine.

Milk products, green leafy vegetables, fish, iodized salt, fruits, seeds and pulses are a few sources of minerals.



Fig. 2.4 Sources of minerals

### Science in Action

It is not always possible to meet body requirements of vitamins through diet only. Therefore, artificial vitamins have been synthesized. These are called vitamin supplements. Vitamin C, the first artificial vitamin, was synthesized in 1935. Since then a whole range of vitamins are synthesized artificially.



## Roughage or dietary fibre

Dietary fibre, also known as roughage, consists of a group of complex carbohydrates, such as cellulose. Although it does not provide any nutrient to the body, it should be included in our daily diet. It helps in bowel movement, that is, in removal of the undigested food from the body, thereby preventing constipation. Whole wheat grains, tomato, cauliflower, soya bean, orange and apple are a few sources of roughage.

### Real World

Infants and small children are more prone to dehydration than older children and adults. This is because infants and small children lose more water.

## Water

Our body is made up of about 70 per cent water. Water is required for all the body functions and to maintain the body temperature. It is a major component of blood and aids in digestion. The body loses water as sweat and urine, which help to remove toxins from body. To make up for the lost water, the body requires a constant supply of water throughout the day. Drinking about 8–10 glasses of water daily keeps the body healthy. Excessive loss of water leads to dehydration which is harmful for the body, and can sometimes be fatal. Other sources of water include fruits, vegetables and milk. Water is added to most cooked dishes.