

# 1

## Components of Food



*"The food we eat consists of carbohydrates, fats, proteins, vitamins, water, minerals & fibres".*

### Introduction

We know the importance of food, it is required for growth, maintenance of the body and also to protect us from diseases.

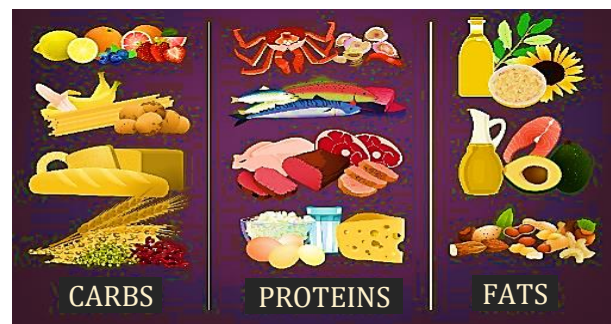
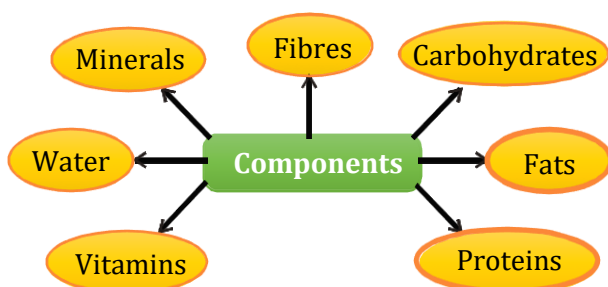
We eat a large variety of food and people from different parts of our country have different food habits. Some people prefer rice, others take chapatis or meat and fish.

### Components of food

Nutrients are the substances in the food that every living organism need to make energy, grow, develop and reproduce.

There are seven essential components or substances called nutrients in our food. They are -

- |                   |            |                                    |                    |
|-------------------|------------|------------------------------------|--------------------|
| (i) Carbohydrates | (ii) Fats  | (iii) Proteins                     | (iv) Mineral salts |
| (v) Vitamins      | (vi) Water | (vii) Fibre (also called roughage) |                    |



Components of food

There are two main types of nutrients.

- (i) **Macronutrient** : It consists of carbohydrates, fats and proteins which are required in large amount in the diet.
- (ii) **Micronutrient** : It consists of vitamins and minerals which are required in small amount in the diet.

## Carbohydrate

Carbohydrates are as important to body as fuel is to car. These are the common energy-giving compounds. There are two major types of carbohydrates in food: sugar and starch. Sugar is used to provide energy immediately. Starch releases energy more slowly than sugar.

Foods rich in carbohydrates are potato, sweet potato, bread, rice, wheat, honey, common sugar, jaggery (gur) and milk. Most food items usually have more than one nutrient. However, in a given raw material, one particular nutrient may be present in much larger quantity than in others. For example, rice has more carbohydrates than other nutrients. Thus, we say that rice is a “carbohydrate rich” source of food.



Some sources of carbohydrates



**Do You Remember ?**

- The glucose drip will give you some strength even without eating food.



**Active  
Biology**

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### Aim

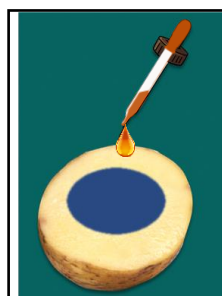
To test for the presence of starch in food.

### Method

Place a drop of iodine solution on the food sample.

### Observations and conclusions

Blue-black colour appears where iodine solution is applied. It indicates the presence of starch.



**Preparation of iodine solution:** Take tincture iodine solution from first aid box in your school in a test tube and dilute it by adding water. Iodine solution is ready to use.

**SPOT LIGHT**

## Fats

Fats too provide us energy, producing more energy than carbohydrates.

Fat- rich foods are -

- (i) Milk products such as butter and cheese
- (ii) Vegetable oils such as coconut oil, groundnut oil
- (iii) Nuts
- (iv) Milk
- (v) Animal fat from meat.

Oil and ghee contain fat. Ghee is used in many north Indian dishes.

**SPOT LIGHT**

Fats provide more than double the energy provided by carbohydrates but still carbohydrates are the preferred source of energy because fats make energy available at a slower pace.



(a) Plant sources



(b) Animal sources

Some sources of fats

## Functions of fat

- (i) Efficient source of energy.
- (ii) Forms an insulating layer beneath the skin to prevent excessive heat loss. e.g., blubber in polar bear.
- (iii) Formation of fat-soluble vitamins and various hormones.



## Aim

To show the presence of fats in food.

## Method

- (i) Take some amount of butter.
- (ii) Rub some amount of butter on the paper or put a drop of oil on the paper.
- (iii) Let the paper dry and then hold it in front of a source of light.





### Observations and conclusions

The paper becomes smooth, oily and more translucent (some light can pass through it). Hence, it proved that butter contains fats due to which the paper turns translucent.



### On what factors the nutritional requirement of the body depends?

#### Explanation

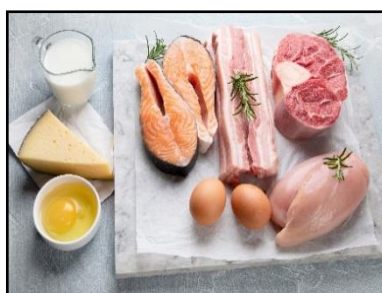
The nutritional requirement of the body depends upon the age, sex and kind of work a person does like a growing child needs more carbohydrates & proteins than an ageing person. Similarly, a man needs more nutrients than a woman, person who do physical labour needs more energy giving foods.

#### Proteins

These are body-building foods. Proteins help the body in its growth, repair of body cells and tissues. Protein sources of plant origin include pulses, soyabeans, peas and to a lesser extent cereals. Meat, eggs, cheese, milk and fish provide proteins of animal origin.



(a) Plant sources



(b) Animal sources

Some sources of proteins



- Soyabean is excellent source of protein, particularly for vegetarians (people who do not eat meat). Soya beans are also used to make soya milk.



## Aim

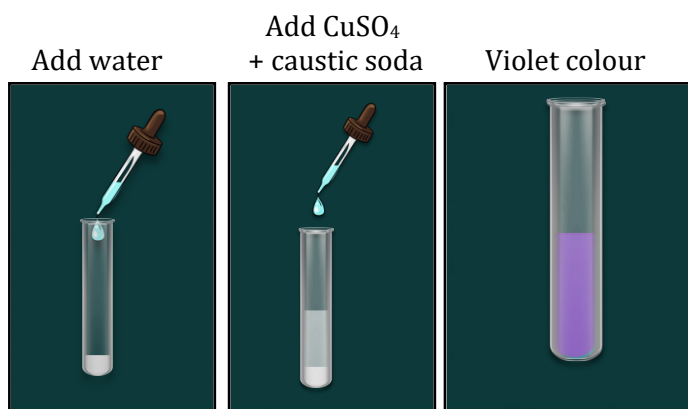
To show the presence of proteins in food.

## Method

- (i) Take a small quantity of a food item for testing. If the food you want to test is solid, you first need to make a paste of it or powder it.
- (ii) Grind or mash a small quantity of the food item.
- (iii) Put some of this in a clean test tube, add 10 drops of water to it and shake the test tube.
- (iv) Now, using a dropper, add two drops of solution of copper sulphate and ten drops of solution of caustic soda to the test tube.
- (v) Shake well and let the test tube stand for a few minutes.

## Observations and conclusions

A violet colour indicates presence of proteins in the food item.



Protein test

**Preparation of copper sulphate ( $\text{CuSO}_4$ ) solution:** It can be prepared by dissolving 2 gram (g) of copper sulphate in 100 millilitre (mL) of water.

**SPOT LIGHT**

**Preparation of solution of caustic soda ( $\text{NaOH}$ ):** It can be prepared by dissolving 10g of caustic soda in 100 mL of water.

**SPOT LIGHT**



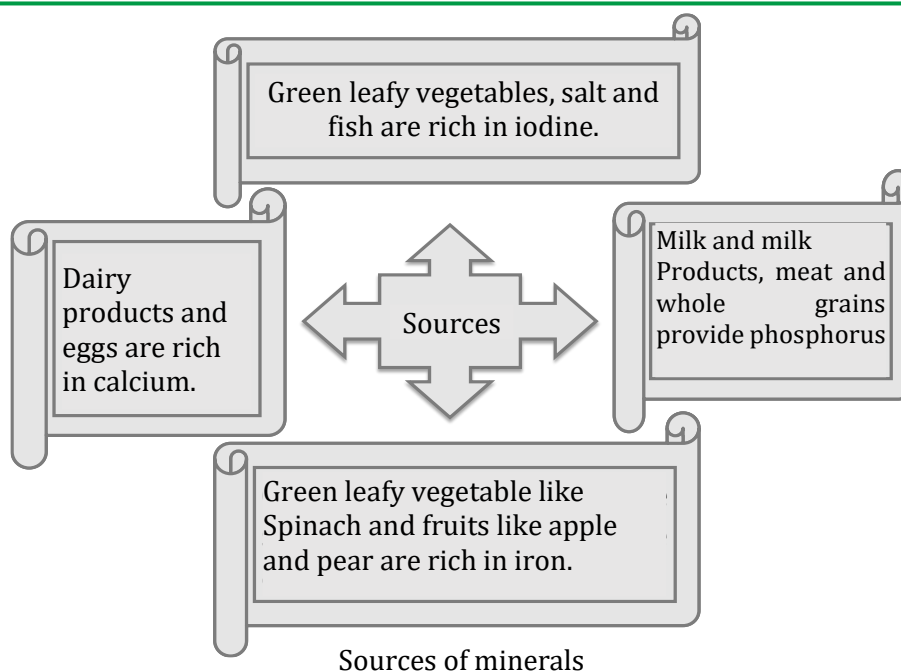
1. Which nutrients mainly give energy to our body?
2. Which nutrient is needed for the growth and development of our body?
3. Why are wrestlers and sportsmen recommended to have egg, meat and fish as a part of their diet?

## Mineral Salts

Mineral salts are important for various body functions. They are required in small quantities and are obtained from the food we take in. Minerals have no energy value. Rich sources are milk, cheese, green leafy vegetables (like spinach), pulses, meat and eggs.

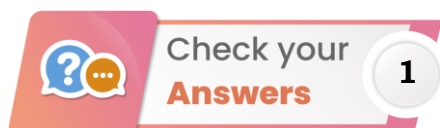


Sources of mineral



### Three main groups of food -

Energy-giving foods (Carbohydrates & Fats)	Body building foods (Proteins)	Protective foods (Vitamins & Minerals)
Cereals (wheat, rice, maize) Sugar Jaggery (gur) Potato Sweet potato Honey Oils and fats	Milk Pulses (peas, soyabean) Cheese Eggs Fish Meat	Fruits Green leafy vegetables (spinach, cabbage, cauliflower) Other vegetables (carrot, tomato) Milk Eggs



1. Carbohydrates and fats
2. Proteins
3. Sportsmen and wrestlers are recommended to have egg, meat and fish as a part of their diet because they contain high amount of protein which is essential for growth and development of muscles.

### Vitamins

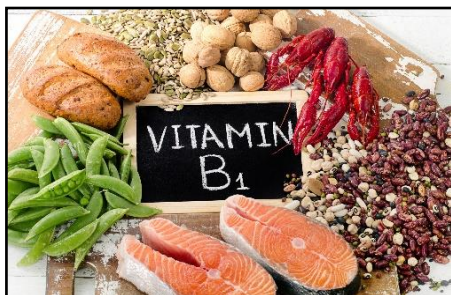
Vitamins are neither body building nor energy giving food but are very important for proper functioning of our bodies. Some vitamins can be produced by our body, but most have to be supplied through food.

Vitamins are classified into two types

Fat soluble vitamins - A, D, E, K.



## Water soluble vitamins - B and C



Some sources of Vitamin B<sub>1</sub>



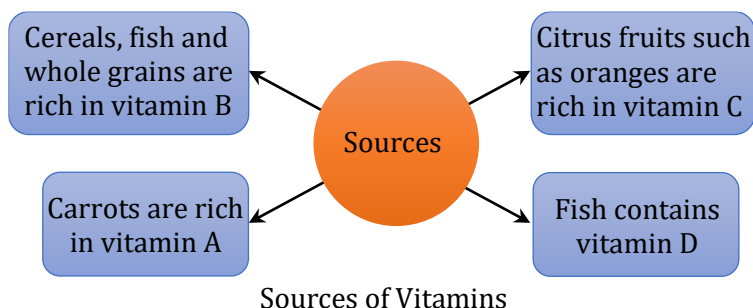
Some sources of Vitamin C



Some sources of Vitamin D



Some sources of Vitamin A



Sources of Vitamins



### What is the importance of vitamins in our diet?

#### Explanation

Vitamins help in protecting our body against diseases. They also help in keeping our eyes, bones, gums, skin and teeth healthy.

#### Water

Water is indispensable. About 70 percent of our body weight is that of water. It helps the body in various functions. It is a means of transporting substances in the organism. It helps to maintain a constant body temperature. Water helps in the absorption of food and excretion of waste products from the body in form of urine and sweat. Our body needs 2-3 litres of water every day.



Some vitamins are very sensitive to heat and light. For example, vitamin C is easily destroyed during cooking. Therefore, vitamin C rich food should be eaten raw.

**SPOT LIGHT**







### How can we get adequate amount of water in our diet?

#### Explanation

Most of the water can be obtained by drinking liquids such as water, tea, milk, juices. In addition to this, water is also added to food while cooking. Some fresh vegetables and fruits also contain some amount of water.



#### Aim

To demonstrate the presence of water in food.

#### Method

- (i) Take a sample of food and weight it.
- (ii) Now, keep the dish in an oven at 80-90°C or in sunlight for a few days.
- (iii) Weight the food sample again.

#### Observations and conclusions

There is a reduction in weight of the food sample. So, we can conclude that, loss of water has taken place.



#### Dietary fibres / Roughage

Roughage is the fibrous indigestible material in food that promotes the elimination of wastes from large intestine. Fibres mainly come from plants. Fibre is the substance that gives plants their form. The fibres that we eat are known as dietary fibres. Whole grains and pulses, potatoes, fresh fruits and vegetables are main sources of roughage.



Sources of roughage



Roughage does not provide any nutrient to our body, but is an essential component of our food and adds to its bulk. This helps our body get rid of undigested food.

**SPOT LIGHT**

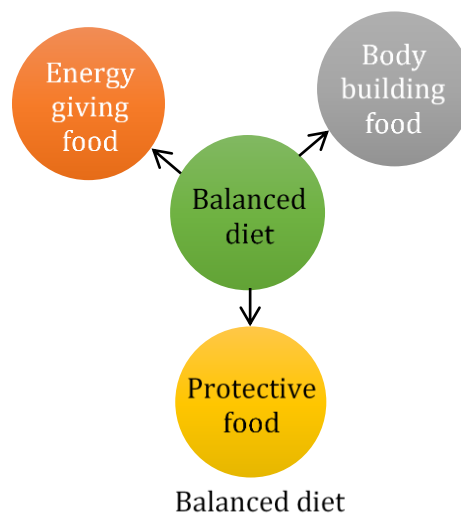


## Balanced Diet

A diet that contains adequate amount of different components of food required for the healthy functioning of our body is called a balanced diet.

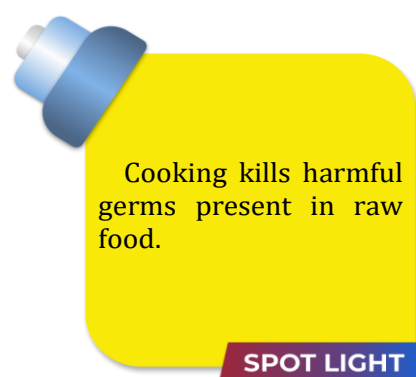
According to scientists, a balanced diet must include foodstuffs from the following four basic food groups:

- (i) **Milk group:** Includes milk and milk products.
- (ii) **Meat group:** Includes meat (chicken, fish, lamb, etc.) and meat substitutes (beans, peas, nuts, and seeds).
- (iii) **Fruit and vegetable group:** Includes fruits and vegetables.
- (iv) **Grain group:** Includes breads and cereals.



## Effect of cooking on nutrients

Selecting and eating the right kind of food is not enough. It should be cooked properly. Cooking improves the taste of food and makes it easily digestible. Cooking results in loss of certain nutrients. For example, Vitamin C gets easily destroyed by heat during cooking. It is, therefore, advised to include fruits and raw vegetables in our diet. In case of rice, it is a common practice to use excess water during cooking and then throw off the extra water. This results in loss of nutrients.



## Diseases due to imbalance in the diet


Many diseases are known to occur just because of imbalances in the diet. Imbalances in the diet may be due to following three reasons :

- (1) Inadequate quantity of food (under-nourishment or undernutrition),
- (2) Excess of food (overnutrition),
- (3) The food lacks in some essential component, i.e., nutrient.

The condition of nutrition in which the food is either in inadequate quantity or it lacks in some essential nutrient is called malnutrition. In simple terms the condition arising due to intake of inadequate or unbalanced food is called malnutrition.

### 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.



Deficiency diseases cannot be transmitted from one person to another.

**SPOT LIGHT**

If a person does not get enough proteins in his/her food for a long time, he/she is likely to have stunted growth, swelling of face, discolouration of hair, skin diseases and diarrhoea. Serious diseases like marasmus and kwashiorkor develop in the case of children if proteins are not sufficient in their diet.

If the diet is deficient in both carbohydrates and proteins for a long period of time, the growth may stop completely. Such a person becomes very lean and thin and so weak that he/she may not even be able to move.

All deficiency diseases can be prevented by taking a balanced diet.

#### Note :

It can be very harmful for us to eat too much of fat rich foods as we may end up suffering from a condition called obesity.

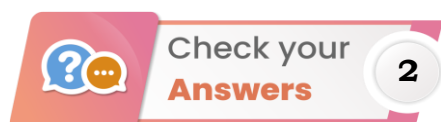


Obesity



1. Will eating too much fats make you fat?
2. Our body cannot digest plant fibres. Yet, they form an important part of our diet, why?

### 3. Why foods rich in vitamin C should be eaten raw?

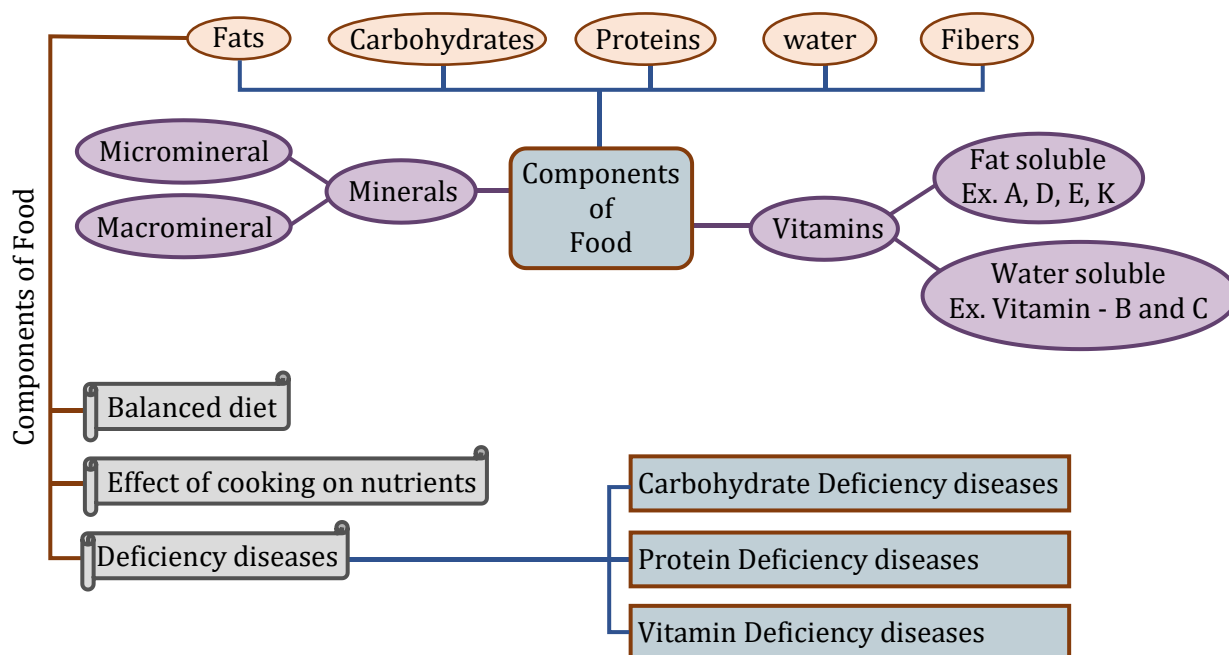


1. Fats are essential for our body but eating too much can be harmful. Excess body fat leads to a condition called obesity which is harmful to our body. Obesity may also lead to heart diseases. In order to remain fit, it is better to avoid junk foods such as burgers, candies and soft drinks. Junk foods are considered harmful due to their high fat or sugar content and poor nutritional values.
2. Our intestine uses fibres to form stools. Stool is the solid waste matter that is passed out of the body. Fibres help in making the stool soft and easy to pass. Lack of fibre in the diet causes the stools to become hard and difficult to pass. This condition is known as constipation.
3. Vitamin C is easily destroyed during cooking. Therefore, it should be eaten raw.

Vitamin/ mineral	Function	Deficiency disease	Symptoms	Sources
Vitamin A	Keep eyes, hair and skin healthy	Night blindness, Loss of vision	Dryness of eyes, Poor vision, Loss of vision in darkness(night), sometimes complete loss of vision	Green leafy vegetables and fruits, milk, butter, egg yolk, carrots and fish oil
Vitamin B <sub>1</sub>	Helps in digestion, maintains nervous system	Beriberi	Weak muscles and very little energy to work	Eggs, Whole grains, Sprouts
Vitamin C	Helps to resist infections and keeps teeth, gums, and joints healthy	Scurvy	Loosening of teeth, Spongy and bleeding gums, Slow healing of wounds	Citrus fruits such as orange, lemon, tomatoes, sprouts, amla and guava
Vitamin D	Aids in the normal growth of bones in children	Rickets	Weak & soft bones, Joint and bone deformities	Milk, fish, eggs, butter and Sunlight
Calcium	Required for making bones and teeth strong	Bone and tooth decay	Weak bones, tooth decay	Dairy products and eggs
Iodine	Controls functioning of thyroid gland	Goiter	Glands in the neck appear swollen, mental disability in children	Fish, green leafy vegetables and salt
Iron	Helps in the formation of RBC and haemoglobin	Anaemia	Weakness	Green leafy vegetables like spinach and fruits like apple and pear



## Chapter At a Glance



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**SOME BASIC TERMS**

1. **Origin** : The point from which something starts.
2. **Indispensable** : Very important.
3. **Indigestible** : Food that cannot be digested (breakdown) easily.
4. **Elimination** : Get rid of something.
5. **Essential** : Completely necessary.
6. **Peeling** : To take the skin off a fruit or vegetable.
7. **Stunted** : To stop somebody/something from growing or developing properly.
8. **Discolour** : To make something change colour.
9. **Suffering** : To experience something unpleasant (not nice).
10. **Recommended** : To say that something is good.
11. **Immediately** : Without delay (late)
12. **Dilute** : To make a liquid weaker by adding water.
13. **Deficiency** : The state of not having enough of something.
14. **Disability** : The state of being unable to use a part of your body properly.
15. **Adequate** : Sufficient.