

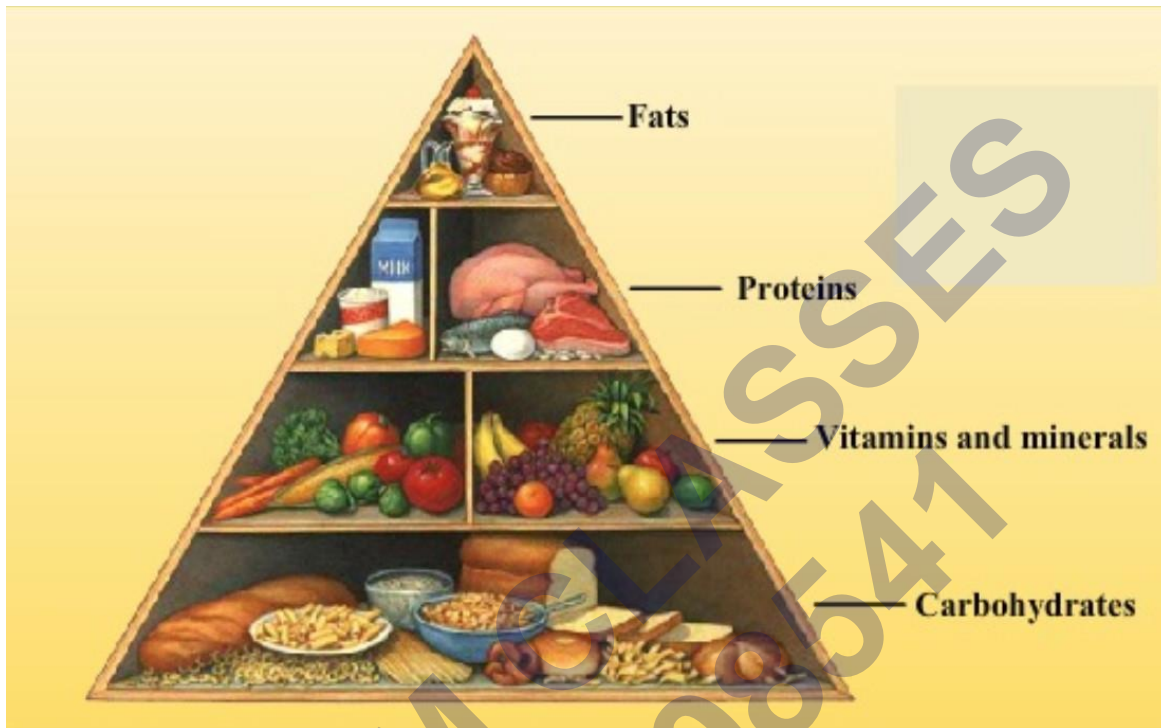
# SCIENCE

## Chapter 2: Components of Food



## Components of Food

- The components of food provide nutrition and hence, are also termed as nutrients.
- Different nutrients present in food



- Simple tests help us to detect the presence of a particular nutrient or a raw ingredient in cooked food.

### Carbohydrates

- Provides energy to our body.
- There are two types of carbohydrates: SUGAR and STARCH
- SUGAR: it is called SIMPLE carbohydrates. Source: fruits, honey, and table sugar
- STARCH: it is called COMPLEX carbohydrate. Plants store energy in the form of starch. Source: Rice, wheat, corn, potato, and bread.
- If after adding iodine to the food, the food turns into blue-black colour, then it indicates that it contains starch.
- In our digestive system sugar and starch are broken down into glucose by various enzymes (substance produced by a living organism which helps to bring about a specific biochemical reaction)

- GLUCOSE is the SIMPLEST form of Carbohydrates
- It is then absorbed into the blood and provides us energy.



## Fats

- Provides energy to our body.
- Fats are the slowest source of energy but the most energy-efficient form of food.
- Each gram of fat supplies the body with calories, more than twice that supplied by equal amount of proteins or carbohydrates.
- Food containing both carbohydrates and fat are called 'ENERGY GIVING FOODS'
- There are of two types of FAT: SATURATED and UNSATURATED.
- SATURATED: Normally Solid at room temperature. E.g. butter and ghee.
- UNSATURATED: Normally Liquid at room temperature. E.g., vegetable oil
- There are generally two types of source of fat: Plant & Animal
- Plant source: ground nut oil, Mustard oil, Sunflower oil, Coconut oil, Cashew, Soyabean
- Animal source: Butter, ghee, milk, cheese, egg yolk, Meat, fish.

- Excess body fat leads to a condition called Obesity. Obesity may lead to heart diseases.



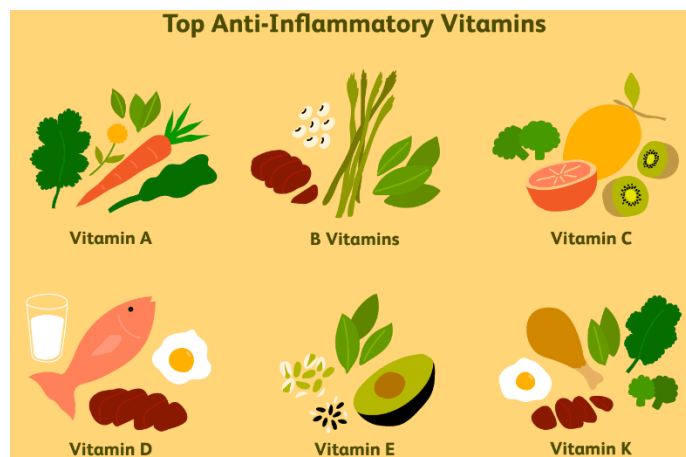
## Proteins

- Protein is needed for growth and repair of our body.
- Food containing proteins are called 'BODY BUILDING FOODS'
- Children require more protein because of the rapid growth of their body.
- Our Muscles, organs even bloods are made up of mostly proteins.
- There are generally two types of source of Protein: Plant & Animal
- Plant source: peas, soyabean, groundnut,
- Animal source: Milk, cheese, fish, meat, chicken, eggs
- Protein rich food → put it in test tube and add some water → heat the test tube for 1 min → let it cool, then add two drops of COPPER SULPHATE sol<sup>n</sup> and SODIUM HYDROXIDE → turn PURPLE / VIOLET to confirm presence of Protein.



## Vitamins

- For proper functioning of our body we need vitamins in our diet.
- Vitamins keep us healthy.
- There are about 20 vitamins
- Vitamins are of two types: FAT-SOLUBLE and WATER – SOLUBLE.
  1. FAT- SOLUBLE: A,D,E,K Stored in fat tissues of our body.  
Our body prepares vitamin D in the presence of sunlight.
  2. WATER – SOLUBLE: B1,B2,B3,B6,B12, FOLIC ACID & VITAMIN C Not stored in body, so regular intake is necessary .



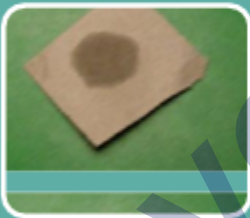
## Minerals

- Minerals are nutrients that contain certain elements.
- They are required in small quantities in our diet.
- Their deficiency also leads to efficiency diseases.
- Minerals are of two types: MACRO-MINERALS & TRACE MINERALS
  1. MACRO: Required more in amount by our body e.g., Calcium, magnesium, Sodium, Potassium
  2. TRACE: Required in very small amount  
e.g., Iron, Zinc, Copper, Iodine.



### To detect the presence of starch:

The presence of **starch** in food can be tested with **dilute iodine**. Iodine produces a **black, blue colour** on combination with starch.

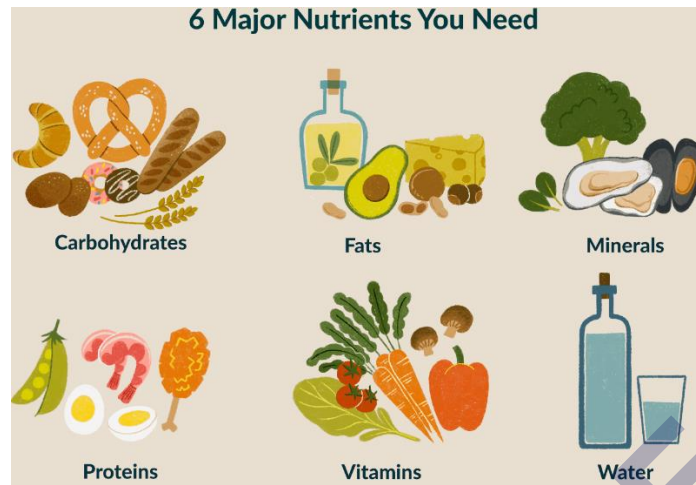


The presence of **fats** can be tested on the basis of the fact that fats **produce a greasy patch** when rubbed on a clean sheet of paper. The greasy patch allows some light to pass through it when held against a source of light and hence, appears to be **bright** as compared to the rest of the paper.



The presence of proteins is detected by the fact that proteins give a **violet colour** with alkaline solution of **copper sulphate**.

## Importance of Nutrients



- Food containing carbohydrates and fats are called energy-giving foods.

Nutrients	Sources	Functions	
<b>1. Carbohydrates</b>	Cereals, maize potatoes, sugar, honey, banana, melon, papaya	<ul style="list-style-type: none"> <li>• Provide energy.</li> </ul>	
<b>2. Fats</b>	Butter, ghee, milk, cheese, oil, egg yolk, meat	<ul style="list-style-type: none"> <li>• Provide twice as much energy as compared to carbohydrates.</li> </ul>	
<b>3. Proteins</b>	Milk, pulses, peas, beans, chicken, fish, eggs, cheese	<ul style="list-style-type: none"> <li>• Necessary for the growth and repair of the body.</li> <li>• Protein rich foods are known as bodybuilding food items.</li> </ul>	
<b>Vitamins</b>	<b>Vitamin A</b>	Carrot, milk, green leafy vegetables	<ul style="list-style-type: none"> <li>• Good eyesight</li> <li>• Healthy skin</li> <li>• Hair</li> </ul>
	<b>Vitamin B1</b>	Wholegrain cereals, potatoes, green vegetables	<ul style="list-style-type: none"> <li>• Growth and proper functioning of the digestive system, heart, nerves and muscles.</li> </ul>
	<b>Vitamin C</b>	Citrus fruits, <i>amla</i> , tomato, guava	<ul style="list-style-type: none"> <li>• Healthy teeth, gums</li> <li>• Healthy joints</li> <li>• Increases the resistance of the body to infections and helps in fighting diseases.</li> </ul>

	<b>Vitamin D</b>	Milk, fish, egg, butter. Some Vitamin D is also made in our body when the skin is exposed to early morning sunlight.	<ul style="list-style-type: none"> <li>• Normal growth of bones and teeth.</li> <li>• It helps to absorb calcium from food.</li> </ul>
<b>Minerals</b>		Milk, pulses, green leafy vegetables, seafood, salt (iodine), fruits, etc.	<ul style="list-style-type: none"> <li>• Proper functioning of the body.</li> <li>• Formation of blood</li> <li>• Coagulation of blood</li> <li>• Functioning of muscles</li> <li>• Functioning of nerves, thyroid gland, etc.</li> </ul>
<b>Dietary fibres</b>		Plant products, whole grains, pulses, fresh fruits and vegetables	<ul style="list-style-type: none"> <li>• They are also known as roughage.</li> <li>• Help to eliminate undigested food.</li> </ul>
<b>Water</b>		Besides liquid water, many food items contain water, such as tomatoes, melons, cabbage and lettuce.	<ul style="list-style-type: none"> <li>• Absorbs nutrients from food.</li> <li>• Helps in transportation and regulation within the body.</li> </ul>

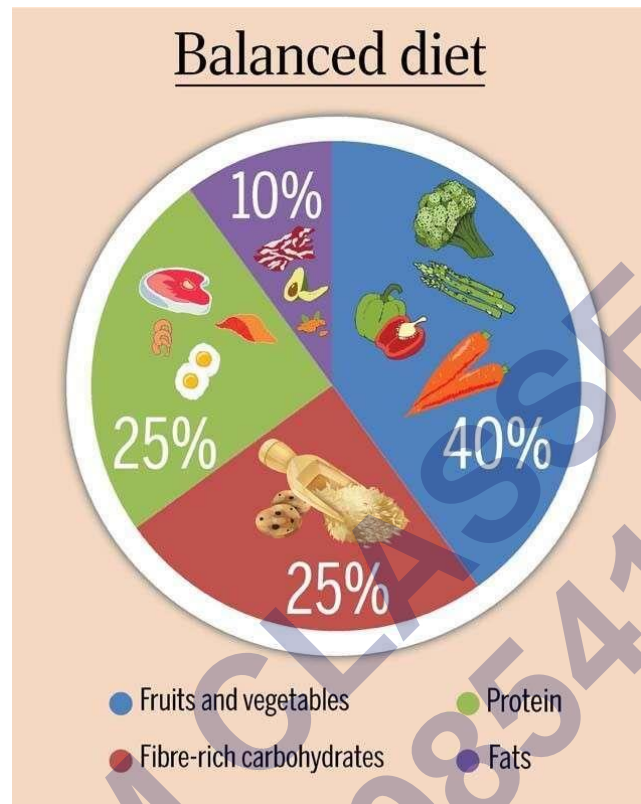
## Balanced Diet

- A balanced diet contains all the classes of food in adequate proportions which supply the required energy for the body and maintain proper growth and functioning of the body.
- The requirement of energy varies from person to person depending on age, gender, height, weight, type of occupation, lifestyle and climate.
- Food such as pulses, groundnut, sprouted seeds, fermented foods, spinach and a combination of flours are highly nutritious.
- Junk food refers to any food which is high in salt, fat, sugar or calories and low in nutrient content.
- Few examples of junk food are fried snacks, aerated drinks, gum, sugar candy, most sweets and desserts.
- Prolonged consumption of such foods can deprive the body of a balanced diet which may



lead to problems such as diabetes, heart diseases and obesity.

- Obesity is a condition where excess fat accumulates in the body.



## Preventing Loss of Nutrients

- It is important that food is cooked right so that its nutrients are not lost.
- Vegetables and fruits must be washed before cutting. This will prevent loss of nutrients.
- If vegetables have to be peeled, then the peels must be as thin as possible to prevent the loss of nutrients.
- Repeated washing of rice and pulses may remove water-soluble vitamins.
- Many nutrients and minerals are lost when excess water used for cooking is thrown away. Overcooking of food must be avoided.

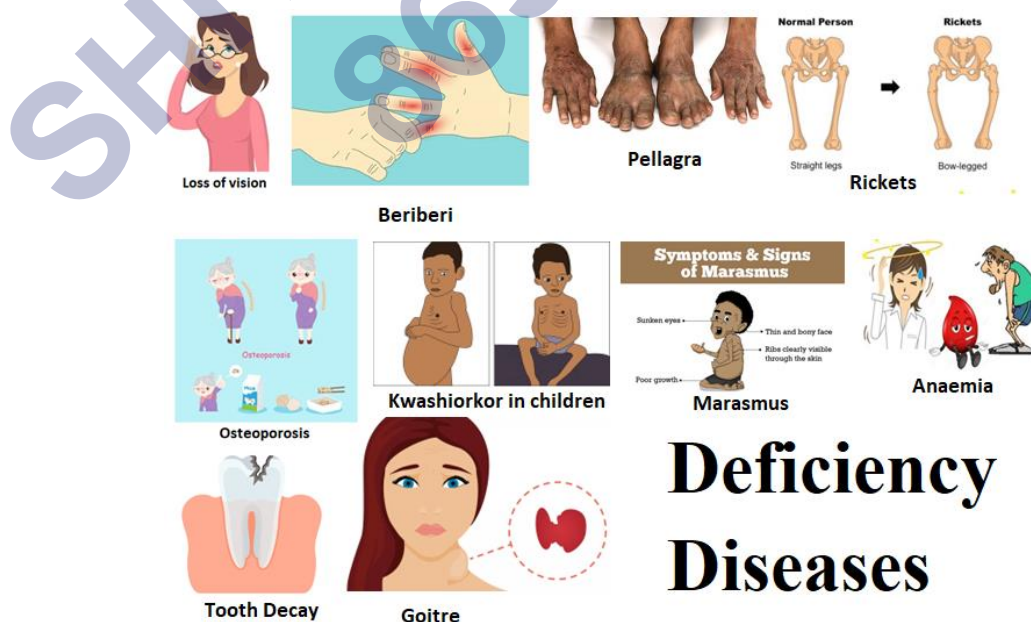


## Deficiency Disease

Deficiency of one or more nutrients can cause imbalance or disorders in the body.

Diseases which occur due to lack of nutrients over a long period are called deficiency diseases.

Nutrient	Diseases caused by its deficiency	Symptoms
Vitamin A	Loss of vision	Poor vision, loss of vision in darkness or sometimes complete loss of vision
Vitamin B1	Beriberi, pellagra, etc.	Weak muscles and very little energy to work
Vitamin C	Scurvy	Bleeding gums and wounds which take time to heal
Vitamin D	Rickets	Bones become soft and bent
Calcium	Osteoporosis, tooth decay	Weak bones and tooth decay
Iodine	Goitre	Glands in the neck appear swollen
Iron	Anaemia	Weakness
Proteins	Kwashiorkor in children	The stomach swells and bulges with swelling of feet. The child has stunted growth and reduced immunity.
Carbohydrates and Proteins	Marasmus	The child becomes thin. Bones can be seen through the skin; ribs can be clearly seen.



## Deficiency Diseases

## Different Type of Food

<b>Energy-giving food</b>	Carbohydrates and Fats. Carbohydrates provide us instant energy. Fats are stored energy resources
<b>Body-building food</b>	Proteins are body-building food as they help in body growth and repair of damaged parts of the body.
<b>Protective food</b>	Vitamins and minerals are protective food as they protect us from many diseases. They give us resistance against disease causing germ



## Roughage or dietary fibers.

- Roughage is the fibrous matter in food which can't be digested.
- Mainly made of an indigestible carbohydrate called 'cellulose' which is present in plant cell walls.

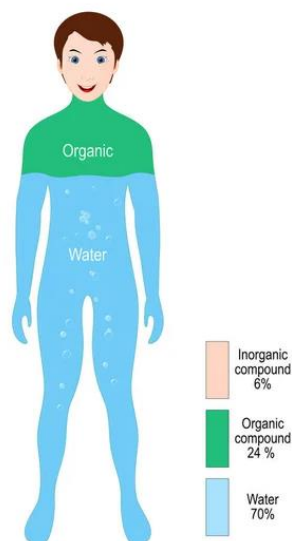
- It does not provide any nutrient to our body.
- It has no FOOD VALUE but its presence is essential in our food.
- Lack of fibers in our diet causes the stool to become hard & difficult to pass. This condition is called constipation.



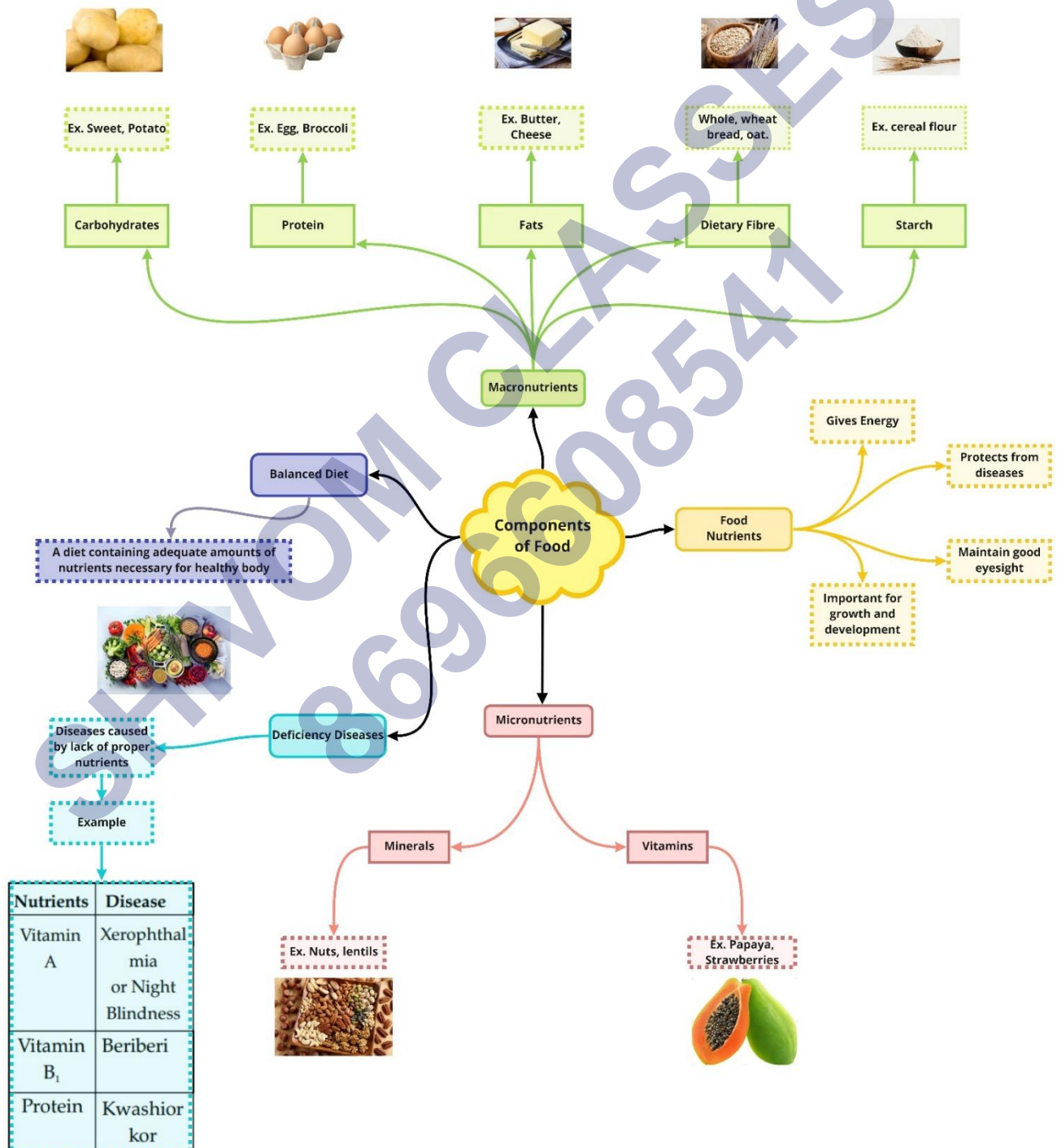
## Water

- Water makes up almost 70 per cent of our body weight.
- It helps to transport substances inside our body.
- It helps our body to absorb nutrients from food.
- It helps to regulate our body temperature.
- It is needed for various chemical reactions that take place inside our body during digestion, excretion, etc.
- We get water not only from the liquids we drink but also from the food we eat. Milk, fruits, vegetables, and juices are good sources of water.

### Water and the human body



Class : 6th Science  
Chapter- 2: Components of Food



## Important Questions

### Multiple Choice Questions:

- Diseases that occur due to lack of nutrients over a long period are called disease.
  - scurvy
  - deficiency
  - Beri-Beri
  - None of these
- Repeated washing of rice and pulses may remove some and present in them.
  - vitamins
  - minerals
  - both and (b)
  - none of these
- Get lost in the process of cooking and preparations.
  - Nutrients
  - Oil
  - Taste
  - Spices
- What happen if excess water is used during cooking and is then thrown away?
  - tastes is lost
  - Oil is lost
  - Many useful proteins and considerable amount of minerals are lost
  - None of these
- How do we get most of the water that our body needs?
  - The liquid we drink-such as water, milk, tea
  - We add water to most cooked food
  - Many food materials that we eat themselves contain water
  - All of these
- How many meals does a child take everyday?
  - 7
  - 4

- C. 3
- D. none of these
7. What food items we eat in our lunch?
- A. Curd, Roti, Dal
- B. Biscuit, milk
- C. Only fruit
- D. All of these
8. How many groups can be classified of nutrients required by our body?
- A. 7
- B. 4
- C. 3
- D. 8
9. \_\_\_\_\_ are made up of carbon, hydrogen and oxygen.
- A. Vitamins
- B. Calcium
- C. Proteins
- D. Carbohydrates
10. The excess carbohydrates are mainly stored in the body as:
- A. Calcium
- B. Proteins
- C. Fats
- D. Roughage
11. Carbohydrates are present in the form of:
- A. Sugar
- B. Starch
- C. both and (b)
- D. none of these
12. The human body is made up of amino acids and constitute all proteins of the body.
- A. 10
- B. 20
- C. 30

- D. 15
13. \_\_\_\_\_ are body building foods.
- A. Fats
  - B. Calcium
  - C. Vitamins
  - D. Proteins
14. What is the similarities of carbohydrates and fats ?
- A. both have sugar
  - B. both have starch
  - C. both have oxygen, carbon and hydrogen
  - D. all of these
15. What is the main difference between carbohydrates and fats?
- A. the amount of oxygen is less in fats as compared to carbohydrates
  - B. the amount of oxygen is more in fats as compared to carbohydrates
  - C. the amount of oxygen is same in fats as compared to carbohydrates
  - D. none of these

### Very Short Question:

1. Do all meals consist of the same food items?
2. Why should a meal have different food items?
3. Do all foods contain all the required nutrients?
4. Name two main types of carbohydrates found in our food.
5. What are carbohydrates?
6. What happens when two or more drops of iodine solution fall on starch substance?
7. If any food item gives blue-black colour with iodine then which nutrient is present in the food?
8. Name two substances which provide carbohydrates.
9. Name the food nutrient indicated by an oily patch on paper.
10. Name two energy-providing nutrients.

### Short Questions:

1. What are nutrients? Name major nutrients.



2. What are the functions of carbohydrates?
3. Write test for detecting the presence of starch.
4. What are the functions of proteins?
5. How can you test presence of proteins in a given food item?
6. What are fats? Name some fat-containing substances.
7. Write test for detecting, presence of fat.
8. What are vitamins? Write various kinds of vitamins.

### Long Questions:

1. List various types of nutrients and write the functions of each.
2. What is a balanced diet? Write the components of balanced diet.
3. Prepare a chart to show various vitamins and minerals and the disorders caused by their deficiency.

### Answer Key-

### Multiple Choice Answers:

1. deficiency

**Explanation:** Diseases that occur due to lack of nutrients over a long period are called deficiency diseases.

2. both (a) and (b)

**Explanation:** Repeated washing of rice and pulses may remove vitamins and minerals present in them.

3. Nutrients

**Explanation:** Nutrients get lost in the process of cooking and preparations.

4. Many useful proteins and considerable amount of minerals are lost

**Explanation:** Many useful proteins and considerable amount of minerals are lost if excess water is used.

5. All of these

**Explanation:** Through all of these given statements we get most of water, that our body needs.

6. 3

**Explanation:** A child takes 3 meals everyday.

7. Curd, Roti, Dal

**Explanation:** We eat curd, roti, dal in our breakfast.

8. 7

**Explanation:** 7 groups can be classified as nutrients required by our body.

9. Carbohydrates

**Explanation:** Carbohydrates are made up of carbon, hydrogen and oxygen.

10. Fats

**Explanation:** The excess carbohydrates are mainly stored in the body as fats.

11. both (a) and (b)

**Explanation:** Carbohydrates are present in the form of sugar and starch.

12. 20

**Explanation:** The human body is made up of 20 amino acids.

13. Proteins

**Explanation:** Proteins are body building foods.

14. both have oxygen, carbon and hydrogen

**Explanation:** Both have oxygen, carbon and hydrogen.

15. the amount of oxygen is less in fats as compared to carbohydrates

**Explanation:** The amount of oxygen is less in fats as compared to carbohydrates.

### Very Short Answer:

1. **Answer:** No, all meals do not have the same food items.
2. **Answer:** A meal should have different food items because our body needs different kinds of nutrients for proper functioning.
3. **Answer:** No, all foods do not contain all the nutrients required by our body.
4. **Answer:** (i) Starch (ii) Sugar
5. **Answer:** The compounds of carbon, hydrogen and oxygen which provide energy for our body are called carbohydrates.
6. **Answer:** The colour of the substance becomes blue-black.
7. **Answer:** Starch.
8. **Answer:** (i) Potato (ii) Rice/ wheat/ maize/ sugar
9. **Answer:** An oily patch on paper shows the presence of fat.
10. **Answer:** (i) Carbohydrates (ii) Fats

### Short Answer:

- Answer:** The components of food which are needed by our body for growth and development are called nutrients.

**The major nutrients are:**

(i) Carbohydrates (ii) Fats (iii) Proteins (iv) Vitamins (v) Minerals

- Answer:** They complete the energy requirements of the body so they are called energy providing food.
- Answer:** Take a piece of the food item. Put 2-3 drops of dilute iodine solution on it. If the colour of the food item becomes blue-black, then it indicates the presence of starch in the food item.
  - Food + Iodine - Blue-black colour (starch present)
  - Food + Iodine - No blue-black colour (no starch present)
- Answer:** Proteins are the most important nutrient. They are called body-building food. They help in the growth and repair of damaged cells and tissues of the body. They also help our body to fight against infections. Proteins make our nails, hair and muscles.
- Answer:** Take a small quantity of the food item. If the sample is solid, grind it. Put some part of this in a clean test tube, add 10 drops of water to it and shake the test tube. Now, with the help of a dropper, add two drops of solution of copper sulphate and 10 drops of solution of caustic soda to the test tube. Shake well and place the test tube in test tube stand for a few minutes.  
Observe colour of the contents of test tube. If colour of the contents turns violet, the food item contains protein.  
**Note:** Copper sulphate and caustic soda solutions are harmful. Handle them with care.  
Food + water + copper sulphate + caustic soda → violet colour → protein is present.
- Answer:** The energy rich sources of food are called fats. They provide energy to the body. All types of nuts, mustard seeds, milk and butter are the major sources of fat. Like carbohydrates, fats also contain carbon, hydrogen and oxygen but fats contain less oxygen than carbohydrates.
- Answer:** Take small quantity of the food item. Rub it on a piece of white paper. Observe carefully, you will find that the piece of white paper shows an oily patch on it which indicates that the food item contains fat.
- Answer:** They are protective compounds with no energy value. They help in proper body- functioning and are required by the body in very small quantities. Various kinds of vitamins are - Vitamin A, Vitamin B-complex, Vitamin C, Vitamin D, Vitamin E and Vitamin K.

## Long Answer:

1. **Answer:** The various types of nutrients are:
  - i. **Carbohydrates:** They are mainly energy-providing nutrients.
  - ii. **Fats:** They provide energy for the body. They give much more energy than carbohydrates if consumed in same amount.
  - iii. **Proteins:** They are called body-building foods. Proteins help in the formation and repairing of body parts. Skin, hair, muscles, enzymes are made up of proteins.
  - iv. **Vitamins:** Vitamins help in protecting our body against disease. They also protect eyes, bones, teeth and gums.
  - v. **Minerals:** Minerals are essential for proper growth of body and to maintain good health.
  
2. **Answer:** A diet which provides the right proportion of all the nutrients that our body needs along with roughage and water is called balanced diet. The various components of balanced diet are carbohydrates, fats, proteins, vitamins, minerals, roughage and water.

3. **Answer:**

Types of Vitamins	Deficiency Diseases
A (Retinol)	Night blindness
B1 (Thiamine)	Beri-beri
B2 (Riboflavin)	Retarded growth, bad skin
B12 (Cyanocobalamin)	Anaemia
C (Ascorbic acid)	Scurvy
D (Calciferol)	Rickets
K (Phylloquinone)	Excessive bleeding due to injury
Types of Minerals	Deficiency Diseases
Calcium	Brittle bones, excessive bleeding

Phosphorus	Bad teeth and bones
Iron	Anaemia
Iodine	Goitre, enlarged thyroid gland
Copper	Low appetite, retarded growth

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