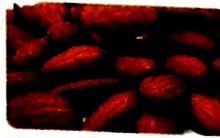


2



Components of Food

Learning Objectives

- To understand what nutrients are.
- To classify the nutrients.
- To explain the functions of these nutrients in our body.
- To identify the deficiency symptoms due to lack of various nutrients.

All living organisms need food to stay alive. Food is required for growth, strength and repair of our body tissues. It also protects us from various diseases and helps us to stay fit and healthy.

We eat a variety of food products. These foods are obtained from both plants and animals.



Get Active

Given below are some of the food items we consume regularly. Classify the products which are obtained from plants and those that are obtained from animals.



Egg



Wheat Flour



Rice



Chicken



Pulses



Milk



Ginger



Honey

Plant Products: _____

Animal Products: _____

The food we eat is made up of several components called **nutrients**.

Nutrients are the substances that are needed by our body for healthy growth and proper functioning. There are five nutrients in the food: **carbohydrates, fats, proteins, vitamins and minerals**. In addition to these nutrients, the food we eat also contains **water** and **dietary fibres** which are also essential for our body.

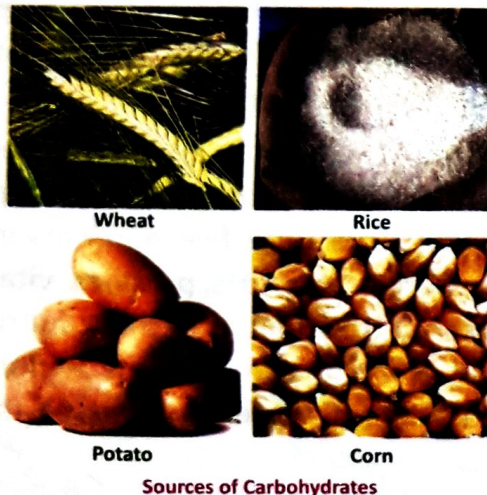
CONSTITUENTS OF FOOD

Carbohydrates

^{L1}
S1 Because
(They are the main source of energy. Although all foods provide energy in more or less quantities,) carbohydrates are the cheapest and most readily available sources of energy. The important carbohydrates found in our food are as **sugar** and **starch**.) These carbohydrates provide quick energy. (Sugars are also called **simple carbohydrates**. They are found in fruits, honey and table sugar. Table sugar is **sucrose** which is obtained from sugarcane.) Milk contains **lactose** which is another form of sugar. Fruits and some vegetables also contain sugar in the form of **fructose**.



^{L1}
(Starch is called a **complex carbohydrate** because it has to be broken down into **glucose** by our body. This glucose is then



Sources of Carbohydrates

absorbed by the blood and used to provide energy to the body. Rice, wheat, corn and maize are important sources of starch.)



Get Active

Aim: To test the presence of sugar in food products.

Materials Required: Food sample, Benedicts solution, test tube, Bunsen burner, dropper.

Procedure: Put a small amount of foodstuff in a test tube. Add a few drops of Benedicts solution to it and then heat for about a minute.

Observation: A change in colour of the solution is noticed. Depending on the amount of sugar present in the foodstuff, the solution (which is blue in colour) turns green (low sugar content) or yellow (medium sugar content) or brick red (high sugar content).



Get Active

Aim: To test the presence of starch in food products.

Materials Required: Food sample, iodine solution, test tube, dropper.

Procedure: Take a small amount of food sample in a test tube. Add a few drops of iodine solution to it.

Observation: The sample in the test tube turns blue-black in colour indicating the presence of starch.

Vegetables like potato and sweet potato also contain starch. Carbohydrates when taken in excess of body requirements are stored as **fats** in the body.

Fats

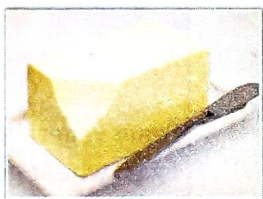
Fats too provide energy to our body. ^{V3} (Fats are stored under the skin, and around the heart and kidneys.) When the body is short of energy, it consumes these stored fats. They also help to keep the body warm. Milk, butter, cream, ghee, meat and egg yolk are animal sources of fat. Coconut oil, sesame oil, sunflower oil, soybean oil, olive oil and palm oil are plant sources of fat.

Fats may be **saturated** or **unsaturated**; saturated fats are normally solid at room temperature (ghee, butter) while unsaturated fats are liquid at room temperature (vegetable oil). Nuts such as cashew nuts, almonds and walnuts are also rich in fats.

^{V7} Due to unhealthy food habits and sedentary work profiles, fats tend to accumulate in our body leading to a condition known as **obesity** or excess body weight.)



Almonds



Butter



Oil



Cashewnuts

Sources of Fats

Quick Facts

- A handful of mixed nuts contain 21.6g fat.
- Hypertension, blocking of arteries and heart problems are obesity related diseases.



Get Active

Aim: To test the presence of fat in food products.

Materials Required: A small sheet of filter paper, food sample.

Procedure: Take the food sample and rub it on the sheet of filter paper.

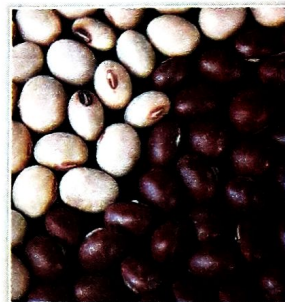
Observation: Oil stains can be seen on the filter paper indicating the presence of fat in the food sample.

Proteins

^{S2} Proteins are required by our body to make new cells and tissues and also to repair the worn out tissues. Our muscles, organs and even blood is made up of proteins.) Proteins can be obtained from both animal and plant products. Meat, fish, chicken and eggs are rich sources of animal proteins while ^{L7} pulses, gram and soybean are important sources of plant proteins.)



Pulses



Soybean



Chicken



Eggs



Fish



Gram

Sources of Proteins



Get Active

Aim: To test the presence of proteins in food products.

Materials Required: Food sample, copper sulphate solution, test tube.

Procedure: Mix the food sample in water, make a paste and put it in the test tube. Add a few drops of copper sulphate solution and shake well.

Observation: The food sample turns violet in colour indicating the presence of proteins in it.

Quick Review

• Fill in the blanks.

1. Obesity is the state of excess body weight.
2. The substances needed by our body for growth and normal functioning are called Nutrients.
3. Glucose is a simple carbohydrate and starch is a complex carbohydrate.
4. The sugar found in milk is called Lactose.
5. Fruits contain sugar called Fructose.
6. Saturated fats are solid at room temperature.
7. The important source of saturated fat is Animal.

Vitamins

↳ (Vitamins are nutrients that do not provide energy but required by our body in small quantities. They help in the normal functioning of our body and in protecting our body from various diseases. Vitamins also help in keeping our eyes, bones, teeth and gums healthy.) Some vitamins are produced by our body while most of them are obtained from fruits and vegetables. Some of these vitamins are vitamin A, D, E, K and B-complex. Our body has the ability to prepare vitamin D

in the presence of sunlight. Lack of vitamins in our body causes **deficiency diseases**.



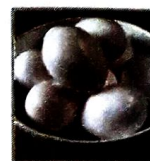
Chicken



Almonds



Butter



Eggs

Sources of Vitamins

Vitamins	Sources	Importance
A	Milk, butter, cod liver oil, tomatoes, carrots, green leafy vegetables, papaya.	Keeps eyes and skin healthy.
B	Milk, meat, whole cereals, peas, liver, egg white, nuts, green vegetables.	Growth and development.
C	Citrus fruits, water chestnut, tomatoes, green leafy vegetables, amla.	Healthy growth and strong blood vessels.
D	Sunlight, cod liver oil, milk, cheese, egg yolk.	Strong bones and teeth. Helps the body to use calcium.
E	Leafy vegetables, milk, eggs, wheat germ oil.	Helps in normal functioning of reproductive system, liver and muscles.
K	Spinach, cabbage, soybean oil.	Helps in clotting of blood.

Minerals

↳ (Minerals in food also help to keep our body healthy. They are required by our body in small quantities for proper growth and maintenance. Some important minerals like calcium, magnesium, sodium and potassium are required by the body in larger quantities. Minerals like zinc, iron, copper and iodine are required only in trace amounts.)

Minerals	Sources	Importance
✓ Calcium	Milk and milk products, green leafy vegetables	For strong bones and teeth.
Iron	Meat, liver, egg, sprouts, yeast, jaggery	Su For the formation of hemoglobin in the red blood cells.
Iodine	Iodised salt, sea food	For effective secretion of thyroid hormone.
Sodium	Common salt	Proper functioning of nervous system.
Phosphorous	Meat, fish, eggs, whole grams	For strong bones and teeth.

Water

Water forms 70% of our body weight. It is an important constituent of the cells and of blood plasma. It also enables the various life processes.

- It helps to absorb nutrients from food.
- It helps in removal of body wastes in the form of urine and sweat.
- It helps in maintaining body temperature by evaporation of sweat from the skin.

L4 (Human body needs 6–8 glasses of water every day to stay healthy. Fruits and vegetables contain large quantities of water. The body becomes dehydrated in case water intake is insufficient.

In severe dehydration, an **Oral Rehydration Solution** (ORS) is advised. It contains a combination of salts that restores the balance of electrolytes in body cells.)

Quick Facts

Water that is fit to drink is called **potable water**. We should drink only filtered and boiled water.

Roughage

L5 (Green vegetables, whole grains, fruits and vegetables contain dietary fibres which

Quick Review

- State whether the following are true or false.

1. The body is capable of synthesising vitamin E. F
2. Iron and zinc are required by the body in large quantities. F
3. ORS helps in maintaining the lost electrolyte balance. T
4. Vitamin K is required for strong bones and teeth. F
5. Lack of vitamin B affects the nervous system. T

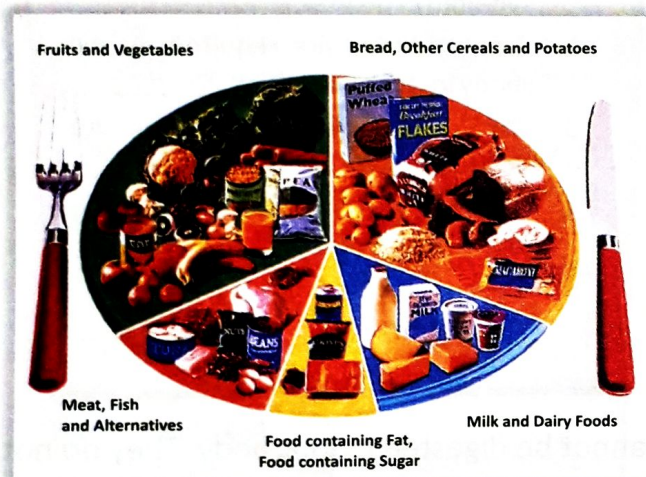
cannot be digested by our body. They do not provide any nutrients to our body but add bulk to the waste. They enhance bowel movement and prevent constipation, which is considered the mother of all ailments.)

BALANCED DIET

S3 (The term **diet** constitutes the food eaten by human beings. Our diet should contain all the nutrients which are important for proper growth and development. Such a diet that supplies all important nutrients is called a **balanced diet**.) We need to include a variety of foodstuffs in our diet to take care of our nutritional requirements.) L3

The requirement of nutrients may not be the same for every individual. Thus a balanced diet is not the same for everyone. It depends on the age, sex and occupation of the person.

- Nursing mothers and pregnant women require more proteins to supplement the needs of the growing baby.
- ^{S7} • Labourers require more carbohydrates in their diet to get the energy to do work.
- A sick person needs more proteins to repair the worn out tissues of his body.
- Growing children require a combination of carbohydrates and proteins for energy and growth.



Balanced Diet Chart

DEFICIENCY DISEASES

Inadequate intake of these nutrients can cause severe **deficiency disorders**.

Deficiency of Carbohydrates

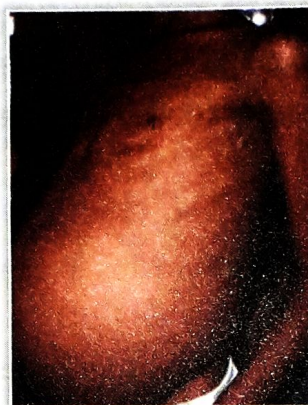
Carbohydrates are the main source of energy for our body. Lack of carbohydrates in the diet lead to lethargy and lack of stamina to work; also leading to mental stress.

Deficiency of Proteins

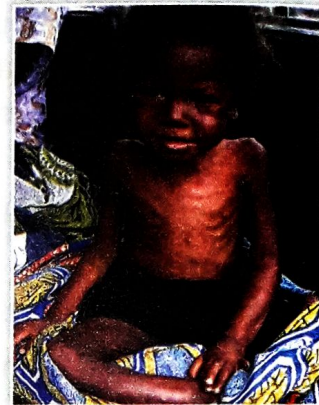
^{L6} (Protein deficiency leads to severe malnutrition especially in children. It causes a disease called **kwashiorkor**. A child suffering

from kwashiorkor will have a swollen stomach due to water retention. The legs become thin and the skin shows ugly patches. In severe cases the mental growth of the child also slows down.

The deficiency of proteins, carbohydrates and fats together leads to a disease called **marasmus**. A child suffering from marasmus becomes thin, shows lack of energy and possesses poor appetite.)



Kwashiorkor



Marasmus

Severe cases show retarded physical growth and poor muscle development.

⁵³ **Kwashiorkor** and marasmus are together termed as **Protein-Energy-Malnutrition (PEM)** or **Protein-Calorie-Malnutrition (PCM)**.

⁵⁸ (The Government of India has started various programmes such as **Mid Day Meal Scheme** and **Integrated Child Development Scheme** to prevent these diseases in children.)

Deficiency of Vitamins and Minerals

The lack of vitamins in our body also causes various diseases.

⁵⁶ (To prevent deficiency diseases caused by lack of vitamins and minerals in the diet, we need to include sufficient quantities of green leafy vegetables and fruits in the diet.) Certain vitamins like vitamin C are heat destructible. The body requirement in such cases is met by

Quick Facts

• Vitamin Deficiency

The most common signs and symptoms of vitamin deficiency include:

- Fatigue
- Shortness of breath
- Dizziness
- Paleness of skin
- Irregular heartbeat
- Weight loss
- Numbness in hands and feet.
- Muscle weakness

consumption of raw fruits and vegetables. Thus the intake of raw fruits and vegetables is also important in our daily diet.



Nutrient	Deficiency Diseases	Symptoms of Diseases
Vitamin A	Night blindness	Impaired vision.
Vitamin B	Beri - Beri	Inflammation of nerves, digestive problems.
Vitamin C	Scurvy	Bleeding gums and swelling. Slow healing of wounds.
V ₄ Vitamin D	<u>Rickets</u>	<u>Soft and deformed bones leading to bow legs and pigeon chest.</u>
V ₅ Vitamin K	<u>Hemorrhage</u>	<u>Affects clotting of blood.</u>
Iron	Anemia	Deficiency of hemoglobin in body, loss of appetite, weakness.
V ₆ Iodine	<u>Goitre</u>	<u>Swollen glands in the neck region.</u> <u>Retarded physical and mental growth.</u>

Key Words

Simple carbohydrates The carbohydrates that provide quick energy.

Lactose The sugar present in milk.

Complex carbohydrates They are broken down into glucose in the body.

Obesity The condition of excess body weight.

Deficiency diseases Diseases or symptoms caused due to the deficiency of a particular nutrient.

Balanced diet A diet that supplies all important nutrients in the right amount.

Kwashiorkor A disease caused due to the deficiency of proteins in the diet.

Marasmus A disease caused due to the deficiency of proteins, carbohydrates and fats in the diet.



Points to Remember

- Carbohydrates, fats, proteins, vitamins and minerals are important nutrients present in our food.
- Carbohydrates and fats provide energy to our body.
- Proteins help in body building and repair of worn out tissues.
- Vitamins and minerals protect our body from various diseases.
- A balanced diet contains all nutrients in adequate amounts.
- Lack of nutrients causes deficiency diseases.
- Intake of roughage is essential for effective bowel movement.

Exercises

A. Tick (✓) the correct option in each case.

1. The main source of energy for our body is _____.
a. ☒ carbohydrate b. vitamin
c. protein d. mineral
2. The presence of starch is tested by _____.
a. copper sulphate b. ☒ iodine
c. sulphuric acid d. none of these
3. Proteins are present in _____.
a. bones b. blood
c. flesh d. ☒ all of these
4. Which food item has a high percentage of fat?
a. Fish b. Rice
c. Egg d. ☒ Ghee
5. Vitamin C is obtained from _____.
a. nuts b. leafy vegetables
c. meat products d. ☒ citrus fruits
6. The deficiency of iron causes _____.
a. ☒ anemia b. scurvy
c. night blindness d. kwashiorkor



B. Fill in the blanks.

1. Carbohydrates and Fats are energy giving nutrients.
2. Proteins help in growth of the body.
3. Sugar and Starch carbohydrates provide quick energy.
4. Excess carbohydrate is stored in the form of Fats in the body.
5. Saturated fats are solid at room temperature.
6. Sunlight is required by the body for the synthesis of vitamin D.
7. ORS solution restores the balance of Electrolytes in the body cells.
8. A sick person requires protein for repair tissues and a child requires protein for growth.
9. Vitamin C is a heat destructible vitamin.

C. Name them.

1. The name given to the different components of food.
2. Form of sugar in fruits.
3. Solution required to test the presence of starch in food items.
4. Nutrient required to make new cells.
5. A vitamin which is prepared by the body.
6. A disease caused by the deficiency of vitamin C.
7. A diet containing adequate amount of all nutrients.
8. Disease condition caused due to the deficiency of vitamin K.

Nutrients
Fructose

Iodine Solution

Proteins

Vitamin D

Scurvy

Balanced Diet

Hemorrhage

D. Very short answer questions.

1. What will you include in your diet for strong bones and teeth? 21
2. What do you understand by PEM or PCM? 22
3. Where is fat stored in our body? 19
4. Name the disease caused by the deficiency of vitamin D. 23
5. Which vitamin helps in clotting of blood? 23
6. In case of which disease are you advised to take iodised salt? 23
7. What is obesity? 19



E. Short answer questions.

1. Why do we need carbohydrates in our diet? 18
2. How are proteins important for our body? 19

3. What do you understand by a balanced diet? 21
4. What is the role of iron in our body? 21
5. Name the two diseases together classified as PCM. 22
6. Why are green leafy vegetables important for us? 22
7. What type of a diet should be taken by a labourer? 22

F. Long answer questions.

1. Discuss the role of carbohydrates in our body. Name and differentiate between the two types of carbohydrates provided by our diet. 18
2. What is the importance of vitamins and minerals in our diet? List any five diseases caused by vitamin deficiency. 20 and Table page 23
3. Define a balanced diet. Why is it important for our body? 21
4. What is dehydration? How can it be treated? 21
5. Discuss the importance of roughage in our diet. 21
6. Describe the symptoms of kwashiorkor and marasmus. 22
7. If a vegetarian person does not eat meat and its products, what should he take to supply proteins to his body? 19
8. What initiatives are being taken by the Indian government to control deficiency diseases? 22

G. Solve the following crossword with the help of given clues.

Clues

Down

1. Deficiency disease caused due to lack of vitamin C.
2. Disease caused due to deficiency of vitamin K.
3. Disease caused due to deficiency of vitamin D.
4. A rich source of vitamin D.
5. The food that we eat.

Across

1. A disease of protein and calorie deficiency.
2. Disease caused due to deficiency of vitamin B.
3. Disease caused due to deficiency of iodine.
4. Disease caused due to protein energy malnutrition.

