

17

Nutrients in Food

17.1 Food and nutrients

Air, water as well as food are the most essential for the existence of life. The Table 17.1 shows the diet taken by a student of grade seven for during 3 days.

Table 17.1 ▼ Types of food taken for main diet

Date	Diet		
	Breakfast	Lunch	Dinner
Wednesday	A glass of milk, String hoppers, Dhal, Coconut sambol	Rice, Green gram seeds, Fried dry fish, A fruit	Rottie with "Lunumiris", Papaw
Thursday	A glass of milk, Bread, "Kiri hodhi"	Rice, Dhal, Fried potato, "Pala malluma"	Noodles, Potato curry, Egg, Mango
Friday	Rice, Fish, Coconut sambol, "Kiri hodhi"	Rice, Winged bean, Pumpkin, Egg	Rice, Fish, Vegetable salad, Luffa, Banana

There are different types of food mentioned in the above table. Those foods contain five main nutrients in different amounts.

There are five main nutrients required by our body and should be present in the food we eat.

1. Carbohydrates
2. Proteins
3. Lipids
4. Vitamins
5. Minerals

In addition to above mentioned nutrients, certain amount of water and fibre should be present in the diet. Let us consider about type of nutrients and food which they contain.

Carbohydrates

The carbohydrates we take are in the form of sugar and starch. They give energy for our body. Identify the food rich in carbohydrates.

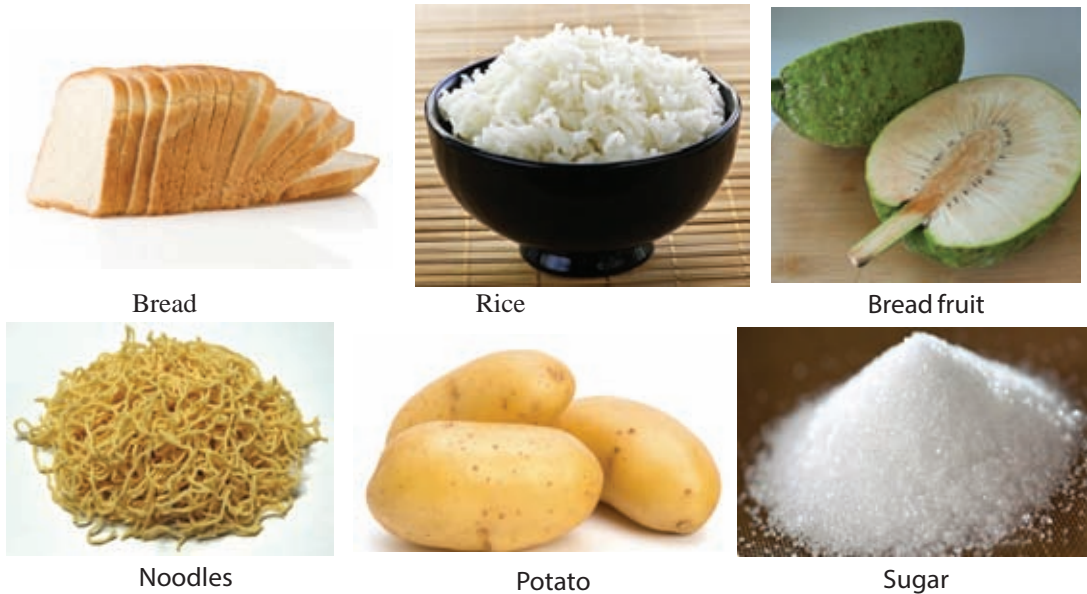


Figure 17.1 ▲ Several food rich in carbohydrates

Other food rich in carbohydrates - Hoppers, String hoppers, Jak, Types of yams, Types of grains

Proteins

Animal food (meat, fish, milk, eggs) as well as plant foods contain proteins. They are used mainly for growth and repair.



For extra knowledge

The growth of 80% of the human brain takes place from the conception of the child in the womb upto 2 years from birth. Therefore, a diet of pregnant woman should contain adequate amount of protein.

Figure 17.2 shows some food items which are rich in proteins.



Eggs



Soya seeds



Fish



Dry fish



Meat

Figure 17.2 ▲ Several food items which rich in proteins

Other food rich in proteins - Winged beans, Gram, Milk, Dhal, Mushroom



For extra knowledge

The table given below shows amount of protein recommended daily for different types of age limits.

The minimum amount of protein essential per day

Age (year)	Protein grams per one kilogram of body mass
2	1.2
4	0.9
8	0.7
16	0.77
18	0.45
21	0.35

Lipids

Nutrients which supply high amount of energy for body is lipids. Lipids include fats and oils.

Oils which are liquid in nature are mostly found in plants. Fats which are solid in nature are highly abundant in animals. The main function of the lipid is supplying energy for body.



Assignment 17.1

Inquire about the advantages of having storage of large amount of body lipids, in animals like Camel and Polar bear.

Some food items rich in lipids are shown in Figure 17.3.



Figure 17.3 ▲ Different types of food rich in lipids

Vitamins and minerals

Vitamin and minerals are required in small amounts but they are essential nutrients for our body. This group of food protects us from diseases. Therefore, they do protective function and are important in maintaining good health.

Vitamins and their sources are listed in Table 17.2.

Table 17.2 ▼ Vitamins and sources of them

Vitamin	Sources
A	Cod liver oil, Liver, Milk, Butter, Carrot, Yellow coloured fruits
B	Cereals, Liver, Red-rice, Green leaves, Meat, Fish, Milk, Eggs, Green vegetables
C	Lime, Orange, 'Naran', 'Nelli', Guava, Papaw, Tomato, Vegetables
D	Butter, Cod liver oil, Eggs, Milk, Fish
E	Wheat, Green leaves, Dark green vegetables, Cereals
K	Cabbage, Cauli flower, Spinach, Tomato



For extra knowledge

Vitamins and functions of them

Vitamin	Functions
A	Improve the vision, Maintain healthy skin and hair
B	Development of memory power, Reduce lethargy
C	Maintain healthy gum, Strengthen the immunity
D	Development of bones, Prevent decaying of teeth
E	Maintain cell division
K	Involve in blood clotting mechanism

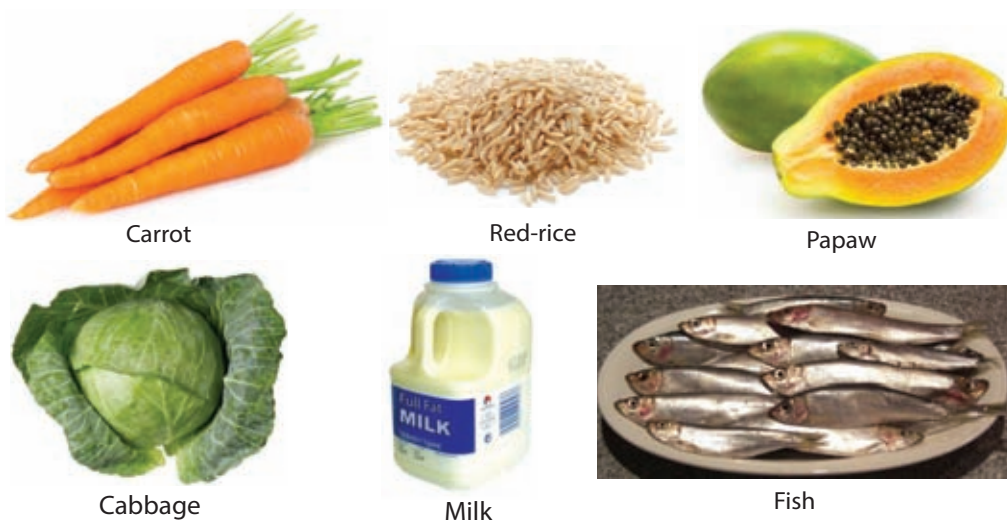


Figure 17.4 ▲ Food rich in vitamins

Table 17.3 shows different minerals, their sources and functions of them.

Table 17.3 ▼ different minerals and their sources

Mineral	Sources
Calcium	Milk, Green leaves, Small fish (sprat)
Phosphorus	Milk, Eggs, Cheese, Meat, Garlic, Small fish, Cowpea, Carrot
Iron	Gingerly, Liver, Meat, Dhal, Spinach, 'Sarana', 'Gotukola'
Sodium	Salt used for cooking, Meat, Milk, Eggs
Iodine	Iodized salt, Sea food



For extra knowledge

Different minerals and their functions

Mineral	Functions
Calcium	Maintain healthy teeth and bones, Blood clotting during injuries
Phosphorus	Maintain healthy teeth and bones, Maintain strong muscles
Iron	Formation of haemoglobin which is needed for transportation of oxygen in blood
Sodium	Transmission of nerve impulse
Iodine	Development of intelligence and memory power, Synthesis of the hormone thyroxine

Some food items contain minerals and salt are given in Figure 17.5.



Garlic



Dhal



Milk



Spinach



Sprats



'Gotukola'

Figure 17.5 ▲ Food rich in minerals



Assignment 17.2

Prepare an article on discovery of vitamin B and C by collecting related historical information.



Activity 17.1

Study Table 17.1. Design and display graphs or tables based on food items and nutrients contain in them. Get the guidance of following chart for your creations.

Figure 17.6 shows the daily food requirements for an individual.

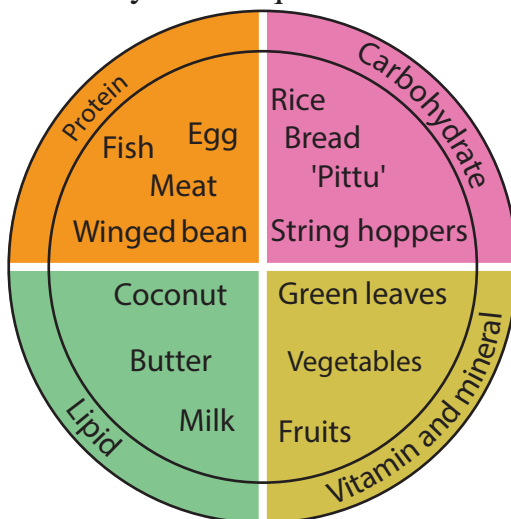


Figure 17.6 ▲ An example showing nutrients contain in a daily meal



Activity 17.2

Observe labels on different types of food containers. Study the types of nutrients contain in them and tabulate.

Most of food items rich in different nutrients.

e.g. :- Dhal contains carbohydrates, proteins and minerals.

Egg contains Proteins, lipids, vitamins and minerals.

Importance of fibre

The fibrous nature of the food is called fibre. Some fibre present in food can be observed by your naked eye. But some are microscopic.

Food rich in fibre

1. Unpolished food
2. Fruits (Ambaralla, Mango, Guava, Banana, Papaw)
3. Vegetables (Carrot, 'Kohila', Cabbage, Potato, drumstics, Bean, Radish, Luffa)
4. Cereal/Grains ('Kurakkan')

Advantages of having food rich in fibre

1. Reduce the absorption of fat in the diet to the body
2. Decrease the absorption of sugar (Glucose) in the diet to the body
3. Prevent the constipation and reduce the risk of causing disease like piles.

Importance of water

We get water with our meals to a certain extent. But, we should drink enough amount of water to maintain good health. Water is mainly used in to cool the body surface, supply medium for cellular reactions, remove excretory products efficiently from the body and prevent the constipation.

17.2 Tests to identify food

Let us do Activity 17.3 to identify main nutrients in food.

Glucose (simple sugar) test



Activity 17.3

You will need :- A test tube, Glucose solution, Benedicts solution, water bath

Method :-

- Add 2 ml of glucose solution to the test tube.
- Add 2 ml of benedict's solution and boil it in the water bath.
- Observe the colour change.

You can observe the colour change in following way.

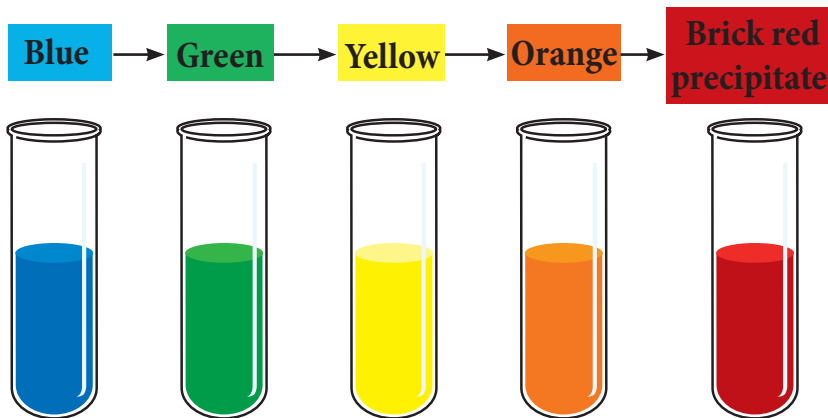


Figure 17.7 ▲ Colour change in the presence of simple sugars

Glucose can be identified by getting brick red precipitate

Starch test



Activity 17.4

You will need :- Mixture made dissolving a small amount of boiled flour

Method :-

- Boil some flour in water and prepare a solution.
- Add drops of iodine solution to the flour solution.

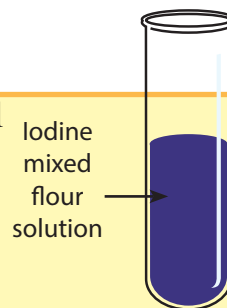


Figure 17.8 ▲

Starch can be identify by getting the colour of purple-blue

Protein test (Biurette test)



Activity 17.5

You will need :- Egg white, water, a test tube

Method :-

- Make a mixture by dissolving egg white in water.
- Put 2 ml of it, to a test tube
- Add 2 ml of sodium hydroxide solution first and then add a few drops of copper sulphate solution to the test tube.

The solution will turn to purple colour which proves proteins occur in mixture.



Figure 17.9 ▲ Biurette test and its observations

Lipid test



Activity 17.6

You will need :- A food contains lipid, white paper

Method :-

Rub some lipid of food on a piece of paper and remove.

If lipids are present, a translucent oily patch can be observed on the paper.



Activity 17.7

Collect different types of food items and test for each nutrients. Tabulate your observation.

The balanced diet

The following descriptions are about food patterns of three children as the description.

Student A

I always eat food which are shown on T.V. They are very tasty. My mother prepares them for me always. Because they are easy to be cooked. I hate taking foods like "Kola kadha" and different types of leaves "Pala". We have our dinner from outside probably 2 or 3 days per week. My father brings food for us from outside. I feel sleepy after having those food.

Student B

My mother prepare a glass of fresh milk for me early morning and all my food are home made foods. Mostly my diet contains of rice, fish, vegetables and fruits. Some days I take cereals like cowpea, gram or green gram. "Kolamalluma" or salad is a frequent essential item in my diet. "Kola kadha" is compulsory on holidays. I rarely take instant foods. I am clever both in study as well as extra curricular activities.

Student C

I normally don't eat anything after breakfast until the interval. During the interval I eat from my friends and drink cool drinks out of money given to me from home. I feel sleepy when eating rice. Therefore, I eat bread or buns, for my lunch. I feel very tired after returning home. I eat a little bit of rice as my mother forces me to eat. I feel sleepy.



Activity 17.8

Form groups and present your ideas regarding diet patterns of above three children.

Compare your findings with following analysis.

A = Use more sugar, starch and fat, artificial flavours, colourings and preservatives are highly collected in the body.

Results:- Can be victims of non infectious diseases like obesity, diabetes, hypertension (high blood pressure), cancer, paralysis and heart attacks in future.

B = Do not consume high amount of sugar, starch and fat, artificial flavours, colourings and preservatives are not collected in the body.

Results:- Healthy. Protect from infectious and non infectious diseases.

C = Poor immunity due to lack of enough vitamins and minerals in the diet. Further, poor growth due to lack of adequate proteins from the diet.

Results:- Can be easily caused infectious as well as non infectious diseases. Growth is not up to the age.

Student "B" has the correct pattern of diet among above three children. Because he gets a balanced diet.

What is a balanced diet?

The balanced diet contains the essential nutrients and fibre in correct proportions.

Diagrams given below illustrate three balanced diets prepared for a day.

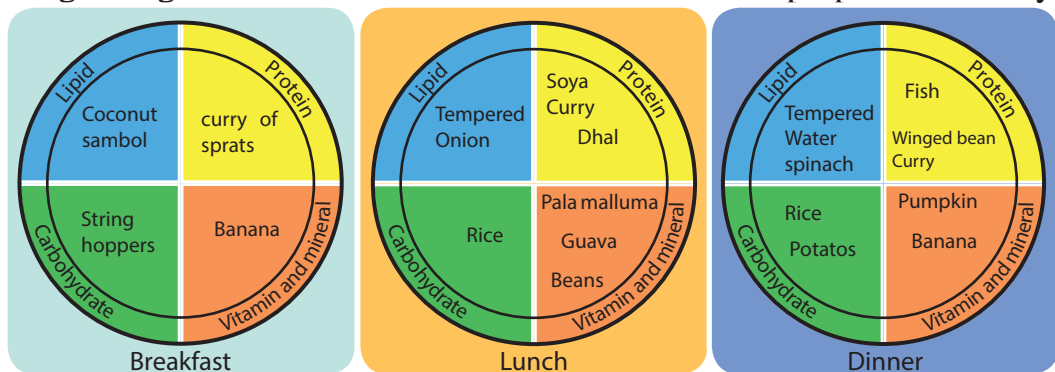


Figure 17.10 ▲ Examples for three balanced diet



Assignment 17.3

Prepare a balanced diet for breakfast, lunch and dinner for your family per day.

Unfavourable conditions due to lack of balanced diet

1. The body does not show adequate growth (poor growth) or show over growth.
2. Infectious diseases and non infectious diseases are easily caused.
3. Become weak and lethargic.
4. Suffering from deficiency diseases.



Rickets due to lack of vitamin D



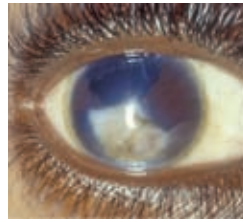
Pellagra due to lack of vitamin B



Scurvy (bleeding gums) due to lack of vitamin C



Goitre due to lack of iodine



Bitot's spot due to lack of vitamin A

Figure 17.11 ▲ Bad conditions due to lack of having balanced diet



Assignment 17.4

Prepare a booklet on nutrient deficiency diseases.



Summary

- Carbohydrates, proteins, lipids, vitamins and minerals act as main nutrients.
- Carbohydrates and lipids supply energy for body.
- Proteins involve in maintain tissues and development of body.
- Vitamin and minerals protect body from diseases.
- Fibre in food play many functions in the body.
- A diet that contains the essential nutrients and fibre in the correct proportion is called a balanced diet.
- Main nutrients can be identified by food tests.

Exercise

(01) Fill in the blanks with suitable words.

- (i) Soya bean is rich in
 - (ii) is the nutrient which supports the growth of the body.
 - (iii) and are involved in protecting body from diseases.
 - (iv) in food, prevent the constipation.
- (02) Match with the suitable answer.

Nutrient

Vitamin A
Vitamin D
Vitamin B
Vitamin C
Iodine

Most abundant foods

Yellow coloured fruits
Red-rice
Small fish
Sea food
Lime

(03) Discuss the advantages of having a balanced diet

Technical Terms

Nutrients	- ஷேர்ஷக	- ஷோசனனக்஑ூறுகள்
Carbohydrates	- ஑ாவெர்஑சிவிரேர்	- ஑ாஷோவைதரேற்று
Proteins	- ஷ்ரேர்ஷீன்	- ஷுரதம்
Lipids	- ஑ிசிவ	- இலிஷ்ஷிட்டு
Vitamins	- விர்ஷீன்	- விற்றுமின்கள்
Minerals	- ஑ிசிர் ஑லிஷ	- ஑னியுஷ்ஷுக்கள்
Fibre	- ஑ன்ஷு	- ஑ார்ப்ஷொருள்஑ள்
Balanced diet	- ஑ுலிஷ ஑ா஑ார்ச	- சமநிலை ஑ணவு