

Introduction to Nutrition Science

Food is the basic necessity of man. Besides satisfying hunger, food is a source of various other nutritional components that have to be present in a balanced proportion. Food provides energy for various activities, besides keeping healthy. The process of development continues from conception till the end of life. Therefore, nutrition is essential for a healthy life. To understand this we must know more about health, food and nutrition. Nutrition is the ultimate core of all the processes in which the animal or human system utilizes food for providing energy for growth, development and

maintenance as per needs. A nutrient is the basic chemical component or substance that is present in the food and is needed by the body.

In this lesson, the students will be able to:

- understand the importance of food, nutrition and health.
- analyze the role of nutrition in relation to health.
- recognise the solution to overcome problems of malnutrition in the society.



Introduction to Nutrition Science

8.1 The Origin of Nutrition

The desire to probe the mysteries of nourishment is an old one and the search has continued since time immemorial. In the first century BC(BCE), it was a common belief in Egypt that the cause of many diseases is excessive eating. The Greek philosopher Hippocrates (460 – 359 BC(BCE)) observed and stated, “Growing bodies have the most innate heat, they require the most food otherwise their bodies are wasted. In old people the heat is feeble and they require little fuel”.

The science of nutrition has been developed by using the combined knowledge of the physical and biological sciences. A great number of important discoveries and developments in this field have enabled health care professionals to understand the nutrient needs of people and the means of supplying them. It is difficult to set a chronological order of events to show the development of nutrition. Many aspects developed simultaneously or overlapped each other.

Some progresses were stimulated by national emergencies. Others depended on technical development of the supporting sciences. Nutrition research in India, as Beri – Beri inquiry was started in 1918, under the guidance of Sir Mc Carrison at Coonoor in South India. It has blossomed into an important national institution, at Hyderabad called National Institute of Nutrition. It is currently engaged in carrying out basic as well as applied research work in nutrition. This national institute comes under the Indian Council of Medical Research (ICMR).

In the twentieth century a lot of knowledge has been gained about nutrition. The calorimetric studies carried out at the beginning of this century clearly established a relationship between energy and nutrition. Later experiments were able to correlate the nutritional functions of proteins and it was found that food proteins or their amino acids are the antecedents and precursors of many of the body's catalysts which are necessary for the chemical reactions involved in digestion and nutrition.

The health of the individual influenced by utilization of nutrients is called nutritional status of an individual. Medical check-up, dietary assessment and laboratory investigations can give an account on the nutritional status of a person. The purpose of nutrition is to support health by means of food that one eats.

8.2 Importance of Nutrients:

The word nutrition comes from the Latin root ‘**nutr**’, which **means** to **nurture or nourish**. Right from the moment of conception till death, the body needs to carry many vital functions such as breathing,

Definition of Nutrients

A nutrient is a component in foods that an organism uses to survive and grow. A substance in suitable amount is essential for the growth, maintenance, function and reproduction of a cell or organism is called nutrients. Nutrients consist of carbohydrates, fats, proteins, vitamins and minerals.

digestion, excretion and so on. Body needs energy to support all these diverse physiological functions.

Food is not only to be consumed, digested and absorbed but should be useful for various functioning of the body. Food and nutrition plays a prominent role in providing health. Food is essential because it contains substances which perform different important functions in our body. These essential substances derived from our food are called nutrients.

“Nutrients are small chemical components of food that are needed by the body in adequate amounts in order to grow reproduce and lead a normal healthy life.”

The human body requires 19 vitamins and 24 mineral elements for various day-to-day activities.

Definition of Nutrients

Nutrients are defined as the constituents of food which help us to maintain our body functions, to grow and to protect our organs.

Types of Nutrients:

Nutrients can be classified as macro nutrients and micro nutrients. Both are extremely important for our body as each nutrient has a specific role.

- Macro nutrients like carbohydrates, proteins and fats supply energy in large quantities to the body and building tissues.
- Micro Nutrients like vitamins and minerals are needed in small quantities but they play a crucial role to regulate and control body processes.

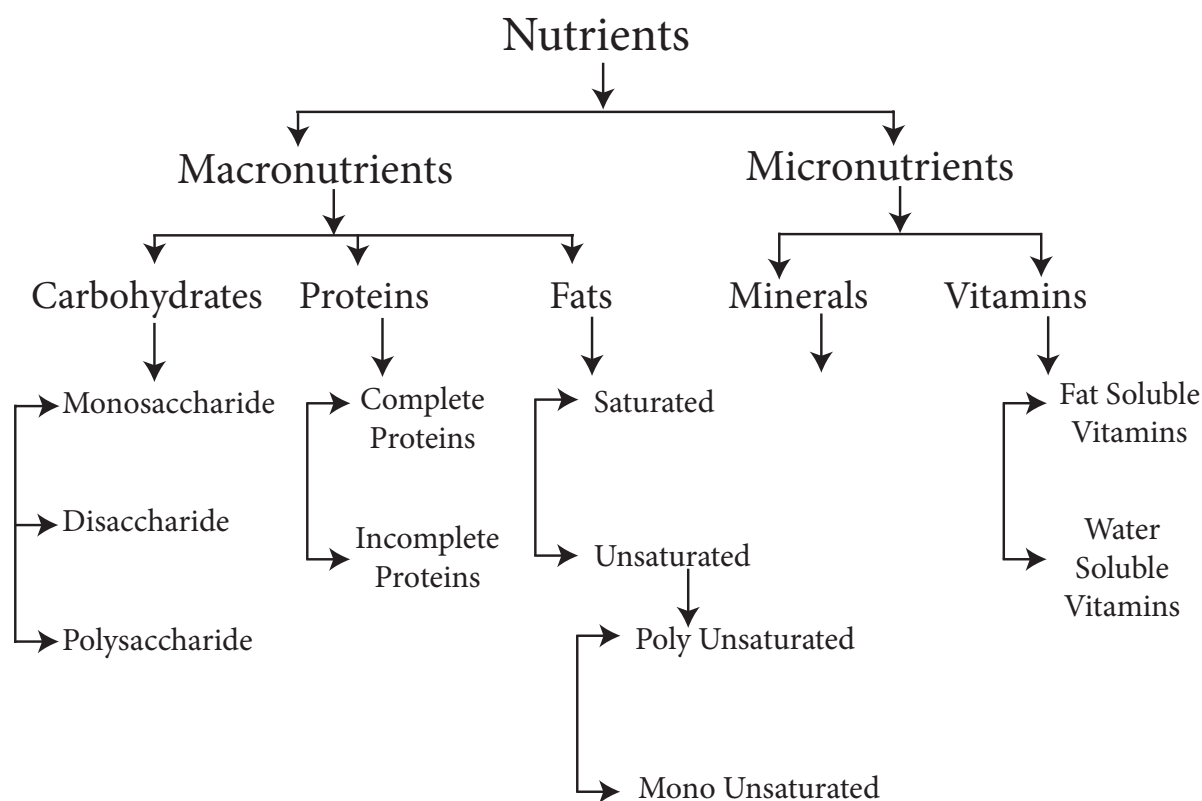


Fig 8.1: Types of Nutrients

BODY WATER

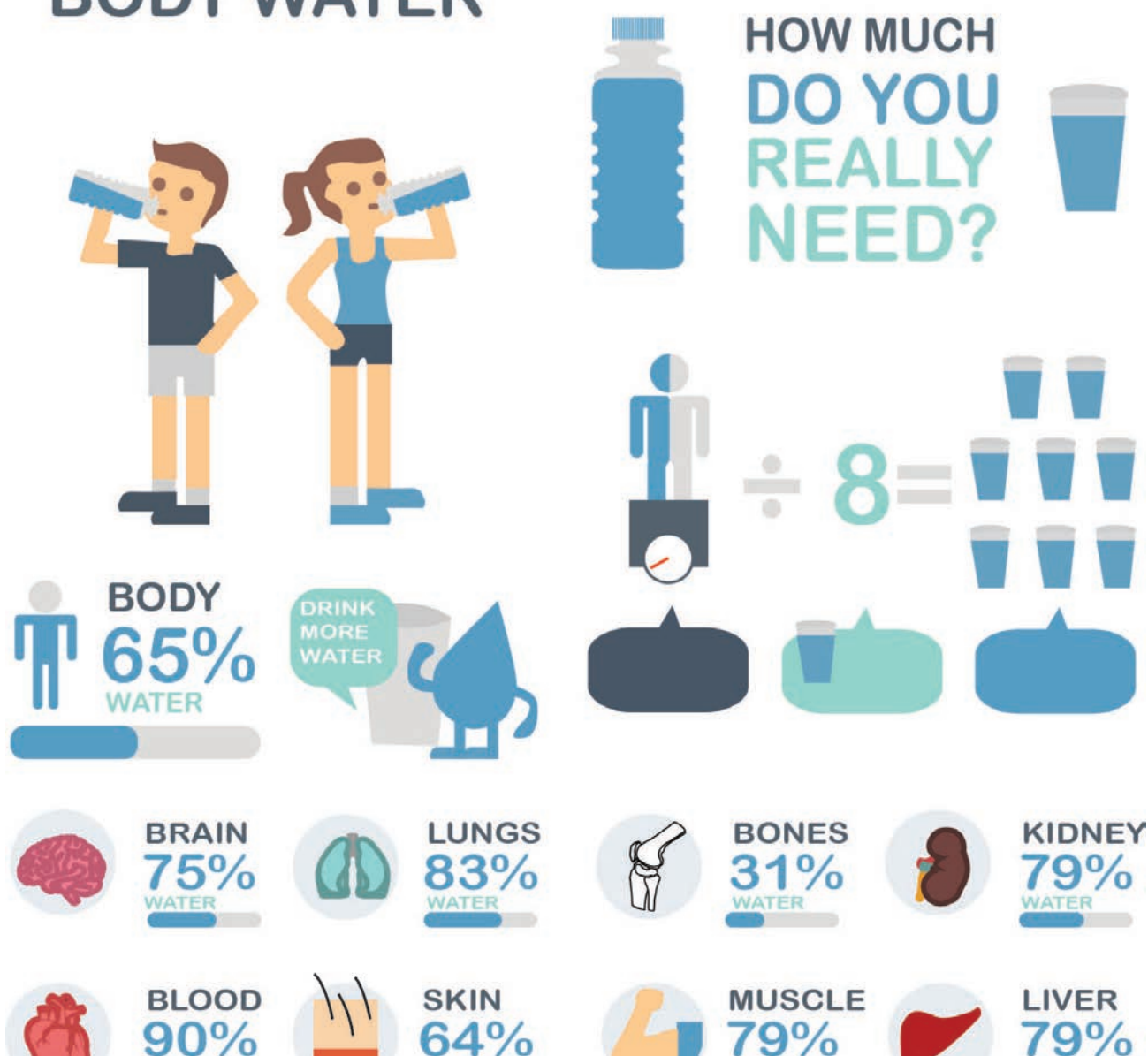


Fig 8.2: Importance of water

- Water is the overall vital nutrient that sustains all our life processes.

Nutrients provide nourishment to the body as such or after digestion. All these have a definite role and are obtained from different food products.

Nutrition is the quantitative science which deals with the accounts of nutrients contributed by different foods and action of each in the functioning of the body.

8.3 Importance of Nutrition

A living organism is the product of nutrition. A human being requires more than fifty different nutrients for its well-being. Food materials ingested by the body are digested, absorbed and metabolised. A number of foods have to be selected to get all the nutrients. The health of a person depends on the type and quantity of the foods that is chosen in his/her diet.

Definition of Nutrition

Nutrition is the process of ingestion, digestion, absorption, transportation and utilization of nutrients for the well being of the body. It is the process of providing nourishment to the body for a healthy life.

DO YOU KNOW...?

Nutrition science is the area of knowledge regarding the role of food in maintenance of health.

Optimum nutrition is required to maintain good health. There are certain signs of good nutrition. In addition, nutrition is concerned with social, economic, cultural and psychological implications of food and eating.

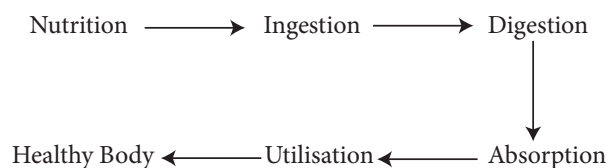


Fig 8.3: Nutrition and Health

Thus we understand that “Nutrition functionally means food at work”.

Functions of Nutrition: The two main functions of nutrition are:

1. To provide material for growth and repair of tissues that eventually maintains the basic structure of our body.
2. To support the body with the energy required to perform all metabolic activities.

Nutritional Status

Nutrients are essential elements required for the normal functioning of our body. Nutrients when taken in excess or its deficiency results in over nutrition, malnutrition and under nutrition.

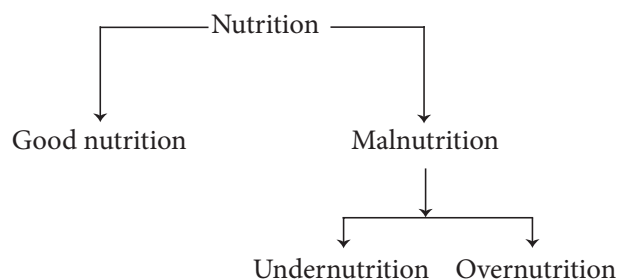


Fig 8.4: Nutritional Status

Good nutrition: “Good nutrition is the state in which a person gets all the nutrients required in correct amounts and proportion and some nutrients are stored in the body after meeting all the body requirements”. This is known as optimum or adequate nutrition and it helps to maintain good health. Thus nutrients from food sources enable one to keep fit and maintain health. These substances include energy which gives the capacity to work, proteins which form our body muscles, bones, blood, organs, skin, hair and nervous tissues. Food supplies minerals and vitamins which protect our organs and regulate their functions and other physiological processes.

Malnutrition: Malnutrition is that state of ill-health which may be caused by the deficiency or excess of one or more essential nutrients in the body. Unhealthy environment also causes malnutrition. Physical, mental and intellectual well-being of a person is affected due to malnourishment.



Fig 8.5: Malnourished child

A malnourished person is physically, mentally, socially and emotionally sick. It is of two types:

- i. Under nutrition
- ii. Over nutrition

8.4 Signs of Well Nourished Child

1. Skin is smooth and shiny with a healthy colour.
2. Bright and clear eyes and pink eye membranes.

3. Firm pink nails.
4. The hair is lustrous and firmly attached to the scalp.
5. Healthy gums and membranes of the mouth.
6. Reddish pink tongue. Not coated, pink lips.
- 7 Desirable height for age and desirable weight for height.
8. Good appetite and sound nutrition.
9. Normal body temperature, pulse rate and breathing rate.
10. Healthy children are alert.

8.5 Health

The word 'Health' refers to a particular state or condition of the body. According to this definition, a person may not suffer from any disease but still can be unhealthy, if he/she feels tired, lazy or cannot concentrate on

Table 8.1: Types of Malnutrition

Under nutrition	Over nutrition
<ol style="list-style-type: none"> 1. Under nutrition is deficiency of one or more nutrients. 2. It is that state of nutrition in which the quality and quantity of food is not sufficient for the body and is deficient in one or more nutrients. 3. When almost all nutrients are below the requirement, the condition is known as under nourishment. 4. An undernourished person manifests symptoms of deficiencies and feels unwell. Poor body weight, poor resistance to infection, weakness and general ill-health are the symptoms of under nourishment. 	<ol style="list-style-type: none"> 1. Over nutrition is excess of one or more nutrients. 2. It is that state of nutrition in which the intake of nutrients is in excess of body needs quantitatively as well as qualitatively causing adverse effect on the body. 3. When almost all nutrients are high requirement, the condition is known as over nourishment. 4. The pathological state resulting from a disproportion of essential nutrients with or without the absolute deficiency of any nutrient as determined by the requirement of a balanced diet.

his / her activities. But at other time the same person may feel fit and fine. This means the person is not absolutely healthy all the time. Still, we can call a person healthy who enjoys good health most of the time.

Definition of Health - According to World Health Organisation (WHO)
 “Health is a state of complete physical, mental, intellectual, social and spiritual well being and not merely an absence of a disease or ill-health”.

8.5.1 Dimensions of health

A person who enjoys the four dimensions of health described above is in a complete or positive health state. A healthy person is an asset to his family, society and a nation whereas an unhealthy person is a burden. A new study has concluded that being a part of many different social groups can improve mental health and help a person cope with stressful events. And it also leads to better physical health, and enables to withstand and recover faster from—physical challenges.

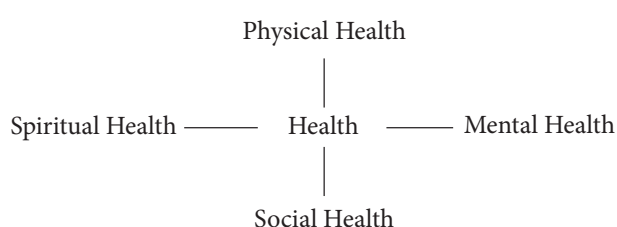


Fig 8.6: Dimensions of health

Physical health: A person who is active, alert and not suffering from any physical ailment is considered as physically healthy. Maintenance of the structural integrity and functional efficiency of body tissues is necessary for an active and productive life.

Table 8.2: Good physical health

Following are some of the features of good physical health:

- Weight and height proportionate to age.
- Strong and well developed muscles.
- Normal growth and strong bones and clean teeth.
- Smooth, shiny and good textured hair and skin.
- Bright eyes.
- Straight gait, no bulging belly.
- Sound appetite and sleep.
- Good immunity.
- Active, energetic and enthusiastic.



Fig 8.7: Physical Activity

DO YOU KNOW...?



Do you watch TV more than 30 minutes per day? _____.

How long you are using mobile phones for Calling _____ Chatting _____ and Browsing internet.

Mental health: A healthy mind lives in a healthy body. It is evident that physical and mental health is directly related to each other. Mental illness can lead to physical ailment. For example, tension and worry leads to high blood pressure and



Every kid loves watching television but if it exceeds than the allotted time, there is a need to look at it. Do you know how harmful is this? Is watching TV or Mobile from too close good for eyes?



heart problems. On the contrary, physical problems lead to mental problems. For example, polio affected individual develops inferiority complex in the society. This is a state of mental ill health.

Social health: Social well being is the ability to live in harmony with others. It is impossible to be socially healthy without enjoying good mental health.

A person who enjoys social well-being



ACTIVITY - 1

Are you feeling Lonely? Yes ____ No ____.



Table 8.3: Good mental health

Following are some of the features of good mental health:

- a) Free from tension and worry.
- b) Mentally active and alert.
- c) Sensitive towards others.
- d) Free from internal conflicts and mental ailments.
- e) Capable of adjusting with different people and in different environment.
- f) Emotionally stable.
- g) Good mental ability.
- h) Good immunity.

is one who:

For example, a tensed and worried person is incapable of helping others. Similarly, physical ailments make a person irritable, depressed and incapable of normal behaviour. This behaviour is unacceptable to

Table 8.4: Good social health

- a) Feels responsible towards others.
- b) Have tolerance and cooperate with others.
- c) Has cordial and pleasing behaviour.
- d) Get along with other people.



the society and hence they are called anti-social elements.

Spiritual health: Defining spiritual health is the most difficult task. A person who enjoys spiritual health follows moral values like:

Patience and inner peace are the hall-



Fig 8.8: Social health

marks, of spiritual health These can be inculcated by prayers, meditation etc., It should be emphasized that blindly following religious practices



Table 8.4: Spiritual health

- | |
|------------------------|
| a) Speaking the truth, |
| b) Helping others, |
| c) Dutiful, |
| d) Not hurting others, |

and customs do not necessarily make a person spiritually healthy. One dimension which is also gaining prominence is spiritual health. In this modern age, importance of spiritual aspect cannot be neglected for our complete well being.

Summary

- Food is the basic necessity of man. Besides satisfying hunger, food is a source of various other nutritional



ACTIVITY - 2

Do you feel that going to devotional places alone is called spiritual health?

components that have to be present in a balanced proportion.

- A nutrient is a component in foods that an organism uses to survive and grow.
- Macro Nutrients like carbohydrate, proteins, fats supply energy in large quantities to the body and build tissues.
- Nutrition is the process of ingestion, digestion, absorption, transportation and utilization of nutrients for the well being of the body. It is the process of providing nourishment to the body for a healthy life.
- Malnutrition is that state of ill-health which may be caused by the deficiency or excess of one or more essential nutrients in the body.
- Health is a state of complete physical, mental, intellectual, social and spiritual well being and not merely an absence of a disease or ill-health.

Glossary

Terms	Meaning
Precursors	A substance from which another is formed, especially by metabolic reaction.
Catalysts	A substance that increases the rate of a chemical reaction without itself undergoing any permanent chemical change.
Nourishment	The food necessary for growth, health, and good condition.
Metabolism	The chemical processes that occur within a living organism in order to maintain life.
Conflict	A serious disagreement or argument.

Questions

Part – A

Choose the correct Answer:

- _____ is the ultimate core of all the processes in animal or human system.
a. Nutrients
b. Nutrition
c. Health
d. Food
- _____ are small chemical components of food that are needed by the body.
a. Nutrients
b. Water
c. Fibre
d. Health
- _____ illness can lead to physical ailment.
a. Physical
b. mental
c. Social
d. Emotion



- _____ well being is the ability to live in harmony with others.
a. Physical
b. mental
c. Social
d. Emotion
- Patience and inner peace are the hall-marks of spiritual health.
a. Spiritual
b. mental
c. Social
d. Physical

Part - B

Write short Answer (2 Marks)

- Define Health.
- What is malnutrition?
- What is under nutrition?
- What is over nutrition?
- What do you mean by good nutrition?

Part - C

Answer in Brief (3 Marks)

1. Physical ill health leads to mental ill health. Give an example.
2. State any two conditions essential for good health.

Part - D

Answer in detailed (5 Marks)

1. Analyze the consequences of the excessive eating of unhealthy foods.
2. Identify the benefits of eating healthy foods and beverages.

Identify and tick major nutrients present in the following food items:

Food Items	Carbohydrates	Protein	Fat	Vitamins	Minerals	Fibre
Plant sources						
Rice						
Potatoes						
Jaggery						
Honey						
Milk						
Sugar						
Soyabean						
Peanuts						
Pulses						
Whole grain cereals						
French beans						
Green peas						
Almonds						
Flax seeds						
Cowpeas						
Butter						
Cheese						
Coconut oil						
Carrot						
Dates						
Mushroom						
Pumpkin						
Tomatoes						



Food Items	Carbohydrates	Protein	Fat	Vitamins	Minerals	Fibre
Green Leafy Vegetables						
Spinach						
Drumstick						
Nuts						
Cauliflower						
Cabbage						
Broccoli						
Sprouts						
Onion						
Garlic						
Cumin						
Cinnamon						
Apple						
Orange						
Watermelon						
Papaya						
Mango						
Lemon						
Amla						
Strawberry						
Grapes						
Egg						
Chicken						
Meat						
Liver						
Fish						
Prawn						
Crab						
Oysters						





ICT CORNER

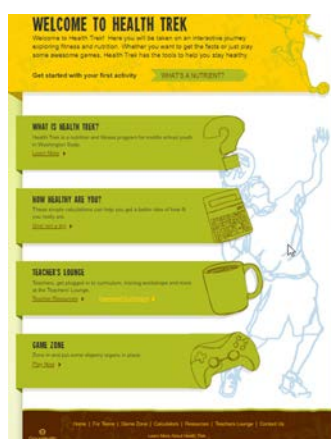
HEALTH TRACK

A healthy Diet is one that helps to maintain or improve overall Health.
This activity shows to know about the keys to health.



STEPS:

1. Type the URL link given below in the browser or Scan the QR code with your mobile to access website.
2. On the “Game Zone” tab Click Play Now. You can find three options.
3. Now Click on the “Play Health Track”
4. Start playing the game by clicking the arrow.
5. Play the quiz to strengthen your knowledge on healthy food habits.



DOWNLOADING

Click the following link or scan the **QR code** to access the website.

<http://www.healthtrek.org/>

** Images are indicatives only.



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