

**Block**

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**Activities Manual**

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## INTRODUCTION

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Dear learner,

To achieve a good understanding of the topics described in the course on “Food Science and Safety”, different activities have been identified and discussed in this block. Activities included in this block have to be performed/completed by the learners and evidence need to be submitted to the Learner Support Centre for evaluation. This will help in skill development and technical proficiency on the subject and not only improve your critical thinking & problem-solving skills but also help you in applying the knowledge. The activities are designed to engage learners actively in the learning process, fostering a deeper understanding of the subject to develop essential skills, and promoting lifelong learning. The activities performed by learners are essential for a holistic educational experience. In addition to enhancing cognitive abilities, it will also foster personal, social, and emotional development.

The activities mentioned in this block shall enable you to learn about the various requirements for food science and food safety. You may complete all these exercises by performing these activities on your own.

It is essential to complete all the activities listed in this manual and submit the same to the Learner Support Centre.

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## ACTIVITY 1      PREPARE A CHART OF THE FOOD PYRAMID

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Prepare a chart of  
the food pyramid

### Structure

- 1.1 Introduction
- 1.2 Objectives
- 1.3 Requirements
- 1.4 Procedure
- 1.5 Precautions

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### 1.1 INTRODUCTION

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In 1992, the USDA introduced the food pyramid to provide a visual representation of the recommended servings from each food group, which previous dietary guides did not clearly convey. The original food pyramid featured i) a large base comprising 6 to 11 servings of bread, cereal, rice, and pasta; followed by ii) 3 to 5 servings of vegetables; 2 to 4 servings of fruits; 2 to 3 servings of milk, yoghurt, and cheese; and iii) 2 to 3 servings of meat, poultry, fish, dry beans, eggs and nuts. At the small apex of the pyramid were iv) fats, oils, and sweets, to be used sparingly. Each group contained images of representative foods along with symbols indicating their fat and sugar content. The details may be referred to in Unit Three.

Very recently, the Indian Council of Medical Research - National Institute of Nutrition (ICMR-NIN) released new dietary guidelines for Indians in 2024, formulating a “New Food Pyramid for a Balanced Diet for 2000 kcal. The New Food Pyramid comprises the following components:

- Base of the Pyramid: 400 grams of vegetables and 100 grams of fruits;
- 2<sup>nd</sup> tier: Cereals and Nutraceuticals - 250 grams;
- 3<sup>rd</sup> tier: Milk/Curd - 300 ml and Pulses & Legumes - 85 grams (with the option to substitute 30 grams of pulses with fish or flesh foods); and
- Top of the Pyramid: Nuts & Seeds - 35 grams and Fats and Oils - 27 grams.

The link for the ICMR-NIN’s new dietary guidelines is: *(Kindly scan QR code)*

[https://main.icmr.nic.in/sites/default/files/upload\\_documents/DGI\\_07th\\_May\\_2024\\_fin.pdf](https://main.icmr.nic.in/sites/default/files/upload_documents/DGI_07th_May_2024_fin.pdf)



The food pyramid is a useful tool in our daily lives as it provides a simple, visual representation of how to allocate our daily food intake across different food groups. It encourages the consumption of a variety of foods in appropriate proportions, ensuring that we receive the necessary nutrients for maintaining good health.

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### 1.2 OBJECTIVES

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After performing this activity, you should be able to:

- explore the structure of the Food Pyramid and its nutritional guidelines; and
- create a visual representation of the pyramid.

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## 1.3 REQUIREMENTS

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- Large poster board or Chart paper
- Pencil and eraser
- Colour markers, crayons or poster colour
- Scale (Ruler)
- Glue
- Smartphone or camera (for taking pictures)
- Pictures of different foods (cut out from magazines or printed from the internet)
- Reference material on the Food Pyramid (books, articles, or online resources)

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## 1.4 PROCEDURE

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- 1) Take a Large poster board or Chart paper. Create the base of the Pyramid using a ruler, draw a large triangle on the poster board or chart paper.
- 2) Divide the triangle into sections (FOUR) based on the food groups (USDA or ICMR-NIN). Generally, the pyramid includes the base of the pyramid, followed by 2<sup>nd</sup> tier, then 3<sup>rd</sup> tier, and finally the top of the pyramid.
- 3) Label each section with the appropriate food group name. For example, if you have selected the USDA food pyramid, then label the sections (on the outside of the pyramid) as " Cereals and Grains - bread, cereal, rice, and pasta" (base of the pyramid), " Fruits and Vegetables" (2<sup>nd</sup> tier), "Proteins: Milk, yoghurt, cheese, meat, poultry, fish, dry beans, eggs and nuts" (3<sup>rd</sup> tier), and "Fats, Oils, & Sweets" (top of the pyramid).
- 4) Mention the recommended daily servings for each food group (on the side of the pyramid against each group). For example, "6-11 servings" for grains or "2-4 servings" for fruits as per the USDA food pyramid or "400 grams of vegetables" and 100 grams of fruits in harmony with NIN Guidelines.
- 5) Cut out pictures of different foods from magazines or print them from the internet. Make sure you have images representing all the food groups.
- 6) Use colour markers, crayons, or poster colour paints to colour each section of the pyramid. Make sure each food group has a distinct colour.
- 7) Arrange the images in the appropriate sections of the pyramid and glue them. Ensure the images are appropriately sized to fit within each section without overlapping.
- 8) Decorate the pyramid with additional drawings or stickers that make it visually appealing or attractive.
- 9) Review the chart to ensure all information is accurate and all sections are clearly labelled and coloured.

- 10) Write a clear, bold title at the top of the chart, e.g. “The Food Pyramid” or “Healthy Eating Guide”.

Prepare a chart of the food pyramid

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## 1.5 PRECAUTIONS

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- Keep the design simple and easy to understand.
- Avoid cluttering the chart with too much information.
- Make sure the information reflects the latest advisory.
- Clearly label each section of the pyramid and include a legend if necessary to explain symbols or colours.
- Ensure that the size of each section of the pyramid accurately represents the recommended proportion of each food group in a balanced diet.
- Use a colour scheme that is appealing and easy on the eyes but also functional in distinguishing different food groups.
- Use high-quality images and graphics to ensure clarity and professionalism.



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## ACTIVITY 2 VISIT TO A LOCAL MARKET TO IDENTIFY ANY TEN FUNCTIONAL FOODS AND THEIR NUTRITIONAL VALUE

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### Structure

- 2.1 Introduction
- 2.2 Objectives
- 2.3 Requirements
- 2.4 Procedure
- 2.5 Precautions

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### 2.1 INTRODUCTION

---

Functional foods refer to foods that provide health benefits beyond basic nutrition. These foods contain biologically active compounds that can have positive effects on health, reducing the risk of disease or promoting optimal health. The concept of functional foods bridges the gap between nutrition and medicine, emphasizing the potential health benefits of certain foods. Incorporating functional foods into the diet can play a significant role in enhancing overall health and well-being. These foods offer more than just essential nutrients; they provide bioactive compounds that support various bodily functions and help prevent chronic diseases. By making informed dietary choices that include a variety of functional foods, individuals can optimize their health and reduce the risk of illness.

The bioactive compounds in functional foods are non-nutrient substances and they possess specific health-promoting properties. Examples of bioactive compounds include antioxidants, polyphenols, phytochemicals and probiotics. These compounds can have various beneficial effects on the body, such as reducing inflammation, improving digestion, or enhancing the immune system. As an example, a checklist is given to identify functional foods.

#### A) Fruits and Vegetables

- **Citrus fruits (oranges and lemons):** Rich in vitamin C
- **Tomatoes:** Contains lycopene
- **Spinach:** High in iron and folate

#### B) Whole Grains

- **Oats:** Rich in beta-glucan fibre
- **Barley:** Contains beta-glucan fibre
- **Whole wheat products:** High in fibre and B vitamins

#### C) Dairy Products

- **Probiotic Dahi/ Yoghurt:** Contains probiotics (healthy microbes)
- **Fortified milk:** High in calcium and vitamin D

## D) Nuts and Seeds

- **Almonds:** High in vitamin E and healthy fats
- **Walnuts:** Rich in omega-3 fatty acids
- **Pumpkin seeds:** High in magnesium and zinc

It is important to check the label properly for health benefits and the amount of bioactive compound present to distinguish between legitimate health claims and marketing hype.

Visit to a local market to identify any ten functional foods and their nutritional value

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## 2.2 OBJECTIVES

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After performing this activity, you should be able to:

- recognise the importance and health benefits of functional foods;
- identify functional foods available in a local market; and
- record the nutritional value and health benefits of different functional food items.

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## 2.3 REQUIREMENTS

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- Local market or Supermarket
- Any ten functional foods
- Notebook
- Pen/Pencil
- Mobile/camera
- Glue/Gum

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## 2.4 PROCEDURE

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- 1) Before visiting the market, familiarize yourself with the concept of functional foods and their health benefits from Unit 4. Make a list of potential functional foods and a checklist for identification.
- 2) Identify and select the grocery store in the local market or supermarket, or health food store known for its variety of fresh and healthy food options.
- 3) Visit when the shop or market is not overly crowded to allow you for a more thorough exploration and easier information gathering.
- 4) Ensure that you carry your notebook or digital device, pen, and any reference materials required for the activity.
- 5) Systematically walk through different sections of the market (fruits, vegetables, dairy, meats, cereals, packaged foods, etc.). Pay attention to labels or signs that highlight the health benefits of foods. Many products label items as "high in antioxidants," "rich in omega-3," etc. Engage with vendors and ask about the nutritional benefits of their products.
- 6) Choose any 10 different functional food items from different food groups category you learnt in Units 3 and 4 (e.g., fruits, vegetables, nuts,

fish, dairy). Note down the following details for each food/product:

- a. Name of the food product
  - b. Key nutritional values (vitamins, minerals, antioxidants, etc.)
  - c. Health benefits associated with the food.
- 7) Take photos of the foods and their labels for reference and record.
  - 8) Prepare a table indicating the product details collected by you for each product. Stick the label or printout of the label of the product indicating the claim or nutritional information for easy reference.

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## 2.5 PRECAUTIONS

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- Ensure transparency in reporting the sources of information and any potential conflicts of interest.
- Use a structured format to collect and organise data systematically.
- Keep detailed citations for all sources of information to facilitate easy reference and verification.
- Use standard units of measurement (grams, milligrams, percentages) to ensure consistency.
- Cross-verify the nutritional information collected with reliable sources such as nutrition databases or health websites to ensure accuracy.



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## ACTIVITY 3      TABULATING NUTRITIONAL INFORMATION ON PACKED FOOD PRODUCTS

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Tabulating  
nutritional  
information on  
packed food products

### Structure

- 3.1 Introduction
- 3.2 Objectives
- 3.3 Requirements
- 3.4 Procedure
- 3.5 Precautions

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### 3.1 INTRODUCTION

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Food items that are processed, packaged and sold in sealed containers are called “packed food products”. The objective of packaging food is to extend shelf life of fresh foods, make them suitable for storage and transportation and offer convenience in their consumption. These products come in various forms such as canned, frozen, dried and vacuum-sealed. They are typically labelled with nutritional information, ingredients and ‘best before’ or ‘use by’ dates.

Nutrition labelling on packed food products is important to inform consumers about the nutritional content and value. According to labelling regulations, one of the essential requirements is to include detailed nutritional information per 100g or 100ml, or per single consumption pack, alongside the percentage (%) contribution to the Recommended Dietary Allowance (RDA) based on a 2000 kcal energy intake. This information includes: (a) Energy value (kcal); (b) Amounts of Protein (g), Carbohydrate (g) and Total Sugars (g), including added sugars (g); (c) Total fat (g), saturated fat (g), trans fat (if any, declared as "not more than", if applicable), cholesterol (mg) and (d) Sodium (mg). Additionally, food claimed to be enriched with nutrients such as minerals, proteins, vitamins, amino acids, or enzymes must specify the quantities of these added nutrients on the label. It is important to read the nutritional information given on the label of packed products carefully. Please refer to the “Food Safety and Standards (Labelling and Display) Regulations, 2020” and the “Food Safety and Standards (Advertising and Claims) Regulation, 2018” by the Food Safety and Standards Authority of India (FSSAI) for detailed and updated information. The QR codes (links of regulations) are given on the side of this page (for the latest information, kindly visit the FSSAI website).



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### 3.2 OBJECTIVES

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After performing this activity, you should be able to:

- identify packed food products available in a local market;
- tabulate the nutritional value and health benefits of packed food products; and
- Compare the nutritional information with recommended daily values.

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### 3.3 REQUIREMENTS

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- Local market or supermarket
  - Any five packed food products
  - Notebook
  - Pen/Pencil
  - Mobile/camera
  - Glue/Gum
- 

### 3.4 PROCEDURE

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- 1) Before visiting the market, familiarize yourself with the concept of packed food products and their health benefits from the study materials. Make a list of potential packed food products you are looking for.
- 2) Identify and select the grocery store in the local market or supermarket or store known for its variety of packed food products.
- 3) Visit when the market is not overly crowded to allow you for a more thorough exploration and easier information gathering.
- 4) Ensure that you carry your notebook or digital device, pen, and any reference materials required for the activity.
- 5) Systematically walk through different sections of the market (snacks, beverages, dairy products, bakery, canned products, meats, etc.). Pay attention to labels in the packed food products for the ingredients and nutritional information.
- 6) Choose five different packed food products from a variety of categories (e.g., snacks, beverages, dairy products, bakery, canned products, meat, fish). Note down the following details for each food product:
  - a. Name of the food product
  - b. Ingredients used and nutritional information (carbohydrates/energy, fat, proteins, vitamins, minerals, etc.)
  - c. Health benefits, if any, associated with food.
- 7) Take photos of the foods and their labels for reference. Take printouts of the labels.
- 8) Check and ensure that the information provided meets the requirements specified under the FSSAI regulations.
- 9) Prepare a table indicating the product details collected by you for each product. Stick the label or print out of the label of the product indicating the nutritional information for easy reference.
- 10) Compare the nutritional information with recommended daily values.

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### 3.5 PRECAUTIONS

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- Ensure transparency in reporting the sources of information and any potential conflicts of interest.
- Use a structured format to collect and organise data systematically.
- Keep detailed citations for all sources of information to facilitate easy reference and verification.
- Use standard units of measurement (grams, milligrams, percentages) to ensure consistency.
- Cross verifies the nutritional information with reliable sources such as nutrition databases or health websites to ensure accuracy.

Tabulating  
nutritional  
information on  
packed food products



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## ACTIVITY 4 ASSESSMENT OF YOUR OWN DIETARY PATTERN AND COMPARISON WITH A REFERENCE BALANCED DIET

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### Structure

- 4.1 Introduction
- 4.2 Objectives
- 4.3 Requirements
- 4.4 Procedure
- 4.5 Precautions

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### 4.1 INTRODUCTION

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A well-balanced dietary pattern for a single day ensures that all necessary nutrients are included in the meals spaced throughout the day to maintain energy levels and support overall health. This dietary pattern provides a balanced mix of proteins, carbohydrates, fats, vitamins and minerals. It's important to adjust portions and specific food items based on individual dietary requirements, tastes and any medical conditions.

The Indian Council of Medical Research - National Institute of Nutrition (ICMR-NIN) has recently notified new dietary guidelines for Indians. The dietary guidelines recommend consuming whole grains, pulses, fruits, vegetables and moderate amounts of animal-based foods while using healthy fats and oils in moderation. They also stress the importance of regular physical activity, portion control and minimizing the intake of high-fat, sugar, and salt (HFSS) foods. By assessing your dietary intake and comparing it with the reference balanced diet, you can identify gaps and areas for improvement. Ensuring a balanced intake of nutrients supports overall health, energy levels, weight management, digestive health and prevention of chronic diseases. The link for the new dietary guidelines is (Kindly scan QR code):

[https://main.icmr.nic.in/sites/default/files/upload\\_documents/DGI\\_07th\\_May\\_2024\\_fin.pdf](https://main.icmr.nic.in/sites/default/files/upload_documents/DGI_07th_May_2024_fin.pdf)

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### 4.2 OBJECTIVES

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After performing this activity, you should be able to:

- plan a balanced diet based on your health/physiological condition;
- record and assess your single-day dietary pattern;
- identify gaps or areas for improvement in your diet; and
- realign your dietary pattern with a balanced diet for optimal health.

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### 4.3 REQUIREMENTS

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- Diary or a notebook
- Pen or pencil
- A reference guide to a balanced diet
- Optional: Nutrition tracking app

Assessment of your own dietary pattern and comparison with a reference balanced diet

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### 4.4 PROCEDURE

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- 1) Record all your dietary intake throughout the day i.e. during breakfast, mid-morning snacks, lunch, afternoon snacks, evening snacks and dinner. Record what you ate and drank during the whole day. Note down the portion sizes and any additional ingredients or toppings.
- 2) Break down your recorded foods into different categories viz proteins, carbohydrates, fats, fruits, vegetables, and beverages to analyse your dietary intake.
- 3) If possible, estimate or collect information (reliable source) about the nutritional content (calories, macronutrients, vitamins, and minerals) of your meals and snacks. You can use online tools or apps for the estimation of nutritional content in your diet.
- 4) Compare with a balanced diet (Use the reference balanced diet: reliable source like NIN, ICMR etc.).
- 5) Note down the positives and negatives (identify gaps and excesses) of your diet based on food groups classification. Identify areas where you may be consuming too less (e.g. fruits, vegetables) or too much of a certain type of food/nutrient (e.g. sugars, unhealthy fats).
- 6) Based on your comparison, make specific changes in your diet/dietary plan to meet the dietary requirements as per your physiological condition (like inclusion of more fruits and vegetables; reduction of intake of processed foods and added sugars, etc.).

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### 4.5 PRECAUTIONS

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- Be honest in assessing/recording your dietary intake and pattern.
- Measure or estimate portion sizes as accurately as possible.
- For homemade meals, estimate the nutritional content based on the ingredients used and their quantities based on information from reliable sources.
- Ensure your assessment considers the variety and balance of foods consumed.
- Record all beverages, including water, coffee, tea, and sugary drinks.
- Use a reference balanced diet based on dietary guidelines from reputable sources such as the ICMR, NIN, WHO, USDA MyPlate, the Dietary Guidelines for Americans, or guidelines from your country's health authority.
- Compare your nutrient intake (calories, macronutrients, vitamins, and minerals) with the recommended daily requirements for your age, sex, activity level and physiological condition.

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## ACTIVITY 5 PREPARE A PICTORIAL CHART OF THE DISORDERS CAUSED BY THE EXCESS OR DEFICIENCY OF ONE MACRONUTRIENT AND ONE MICRONUTRIENT

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### Structure

- 5.1 Introduction
- 5.2 Objectives
- 5.3 Requirements
- 5.4 Procedure
- 5.5 Precautions

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### 5.1 INTRODUCTION

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Nutritional imbalances can lead to various health disorders, depending on whether there is an excess or deficiency of a specific nutrient. For example, excess carbohydrates or fat intake can lead to obesity and associated health risks such as cardiovascular diseases and type 2 diabetes. Conversely, inadequate protein intake may result in conditions like kwashiorkor, characterized by oedema, muscle wasting and impaired growth.

Micronutrient imbalances are equally important. Excess intake of iron can lead to hemochromatosis, a condition causing organ damage and systemic symptoms such as fatigue and joint pain. On the other hand, deficiency in vitamin D can lead to rickets in children, marked by weakened and deformed bones, and osteomalacia in adults, contributing to an increased risk of fractures and bone pain. Hence, balancing nutrient intake is essential for maintaining optimal health and preventing nutrient-related disorders.

Preparing a pictorial chart will help you to understand the significance and consequences of nutrient imbalances in the diet.

---

### 5.2 OBJECTIVES

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After performing this activity, you should be able to:

- state the impact of nutritional imbalances on health;
- identify specific disorders caused by the excess or deficiency of macronutrients and micronutrients; and
- suggest ways to prevent and address these nutritional imbalances.

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### 5.3 REQUIREMENTS

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- Internet or reference books.
- Pen and paper or a digital note-taking device.
- Chart paper.
- Pen, pencil, poster colours, etc.

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## 5.4 PROCEDURE

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- 1) Before creating a pictorial chart to illustrate the disorders caused by the excess or deficiency of one macronutrient and one micronutrient, go through Units 7 and 8 to recollect the major nutritional disorders affecting human beings.
- 2) Select any one macronutrient and one micronutrient.
- 3) Identify disorders associated with the excess and deficiency of these nutrients and prepare the information about their causes, signs/symptoms, treatment and prevention and control measures.
- 4) Search for appropriate pictures that represent each disorder from medical textbooks, reputable health websites, or licensed stock photo services etc.
- 5) Prepare a Table indicating the information collected in step 3 and paste the pictures (step 4) in the chart.
- 6) Add the chart title at the top. Create headings for each column: "Nutrient," "Disorder," "Deficiency," and "Excess."

Prepare a pictorial chart of the disorders caused by the excess or deficiency of one macronutrient and one micronutrient

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## 5.5 PRECAUTIONS

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- Keep the design simple and easy to understand.
- Avoid cluttering the chart with too much information.
- Ensure images are clear and appropriately sized.
- Clearly label each section and include a legend if necessary to explain symbols or colours.
- Ensure that the size of each section is appropriate.
- Use a colour scheme that is appealing and easy on the eyes.
- Use high-quality images and pictures to ensure clarity and professionalism.



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## **ACTIVITY 6      PREPARE A CHART SHOWING THE PROCESS OF DIGESTION OF FOOD, ABSORPTION AND TRANSPORTATION OF NUTRIENTS**

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### **Structure**

- 6.1 Introduction
- 6.2 Objectives
- 6.3 Requirements
- 6.4 Procedure
- 6.5 Precautions

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### **6.1 INTRODUCTION**

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The human body operates a highly efficient system to break down food into usable nutrients, absorb these nutrients into the bloodstream and transport them to cells where they are needed. This involves the digestion of food, absorption and transportation of nutrients as explained in Unit 5. During digestion, the food is broken down into smaller molecules. After digestion, the nutrients (such as carbohydrates, proteins, fats, vitamins and minerals) are absorbed through the walls of the small intestine into the bloodstream. The absorbed nutrients travel through the bloodstream to various cells and tissues where they are used for energy, growth, repair and maintenance of body functions. Understanding these processes is important to appreciate their role in transformation of food to meet our nutritional needs for our overall health. Creating a chart that shows the digestion of food, absorption and transportation of nutrients makes it easier to simplify these complex body functions. Each step is essential to ensure that nutrients are efficiently extracted from food and made available for the body's needs.

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### **6.2 OBJECTIVES**

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After performing this activity, you should be able to:

- comprehend the digestive process,
- illustrate the step-by-step process of food digestion and assimilation,
- state the process of absorption and transportation of nutrients, and
- depict a visual representation of the digestion process that aids in understanding complex biological processes.

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### **6.3 REQUIREMENTS**

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- Library and internet resources.
- Pen and paper or a digital note-taking device.



- Chart paper.
- Pencil, colours etc.

Prepare a chart showing the process of digestion of food, absorption and transportation of nutrients

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## 6.4 PROCEDURE

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- 1) Before preparing the chart, go through Unit 5 to get clarity on the digestive system and digestion of food, nutrient assimilation and transportation process.
- 2) Take a chart and divide the chart into three sections to depict the digestion and assimilation process (digestion, absorption, and transportation) of any one major nutrient (carbohydrate/protein/fat).
- 3) Draw/Illustrate each stage of the digestive process, including the role of enzymes and digestive juices.
- 4) Label each organ and process clearly.
- 5) Organize the information and pictures in the chart.
- 6) Add the chart title at the top.

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## 6.5 PRECAUTIONS

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- Ensure that all information is sourced from reputable and accurate scientific references such as textbooks, peer-reviewed journals, or reputable health websites.
- Use clear, legible fonts and appropriate font sizes so that text is easily readable from a distance.
- Use consistent labelling and terminology throughout the chart to avoid confusion.
- Use high-quality images and diagrams that clearly and accurately depict the anatomical structures and processes.
- Ensure that all parts of the diagrams are correctly labelled with accurate anatomical names and functions.
- Organize the chart in a logical sequence following the process of digestion from ingestion to nutrient transportation.
- Use adequate spacing in different sections and elements to avoid clutter.
- Use a consistent colour scheme to differentiate between various processes and organs (e.g., blue for the digestive tract, red for blood vessels). Include legends to explain colour coding, symbols, abbreviations used in the chart.
- Maintain appropriate scale and proportion in diagrams to give a realistic view of the digestive organs and structures.
- Give proper credit to all sources of information and images used in the chart.

---

## ACTIVITY 7 VISIT A FOOD RETAIL STORE OR MARKET TO GATHER INFORMATION ON ORGANIC AND TRADITIONAL FOOD PRODUCTS

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### Structure

- 7.1 Introduction
- 7.2 Objectives
- 7.3 Requirements
- 7.4 Procedure
- 7.5 Precautions

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### 7.1 INTRODUCTION

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Organic food products are produced using environmentally friendly farming and ethical food production practices that endorse sustainability, and animal wellbeing and offer health benefits leading to movement towards more sustainable practices. However, organic products can be more costly, and their availability is less compared to conventionally produced foods. Understanding organic certifications and labels can help consumers make informed choices about the food they eat. As per the FSSAI “Organic foods are products of holistic agricultural practices focusing on biodiversity, soil health, chemical free inputs etc. with an environmentally and socially responsible approach that have been produced in accordance with organic production standards”. A logo has been created with the tagline “Jaivik Bharat” to distinguish organic products from non-organic ones. The details are available on a special created portal and the link is <https://jaivikbharat.fssai.gov.in/>.



Traditional food products refer to foods that are made using conventional or heritage methods, often passed down through generations. These food products are deeply rooted in the cultural, historical and culinary traditions of a particular region or community. Traditional foods normally use locally sourced ingredients and traditional methods of preparation, cooking and preservation. Traditional food products play a dynamic role in preserving the culinary heritage, cultural identity and historical practices of various communities.

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### 7.2 OBJECTIVES

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After performing this activity, you should be able to:

- describe a range of organic and traditional food products;
- identify organic and traditional food products available in a local market;

- state the nutritional importance of organic and traditional food products available in the market; and
- record the nutritional value and health benefits of different organic and traditional food products.

Visit a food retail store or market to gather information on organic and traditional food products

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### 7.3 REQUIREMENTS

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- Market or supermarket near your locality
- Any five organic food products and any five traditional food products
- Notebook
- Pen/Pencil
- Mobile/camera

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### 7.4 PROCEDURE

---

- 1) Before starting this activity, familiarise yourself with the concept of organic and traditional foods and their health benefits from Unit 4. The FSSAI regulation on Organic Foods may also be referred and links are: [https://fssai.gov.in/upload/uploadfiles/files/Gazette\\_Notification\\_Organic\\_Food\\_04\\_01\\_2017.pdf](https://fssai.gov.in/upload/uploadfiles/files/Gazette_Notification_Organic_Food_04_01_2017.pdf) and <https://jaivikbharat.fssai.gov.in/>. (scan QR code).
- 2) Make a list of potentially available food products of different categories you are looking for.
- 3) Identify and select the grocery store in the local market or supermarket, or health food store known for variety of organic and traditional food products.
- 4) Visit when the shop or market is not overly crowded to allow you for a more thorough exploration and easier information gathering.
- 5) Ensure that you carry your notebook or digital device, pen, and any reference materials required for the activity.
- 6) Systematically walk through different sections of the market or store where the organic and traditional food products are kept. Pay attention to labels or signs that highlight the health benefits of foods. Engage with vendors and ask about the health benefits of organic and traditional food products.
- 7) Choose any five different organic and five traditional foods for a variety of categories (e.g., fruits, vegetables, bakery, dairy, meat etc.). Write the following details for each food:
  - a. Name of the food Product
  - b. Ingredients and nutritional values
  - c. Health benefits associated with food.
- 8) Check whether the organic food products have organic certification and logo.



- 9) Take photos of the foods and their labels for reference and record.
- 10) Prepare a table indicating the product details collected by you for each product. Stick the label or printout of the label of the product indicating the claim or nutritional information for easy reference.

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## 7.5 PRECAUTIONS

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- Ensure transparency in reporting the sources of information and any potential conflicts of interest.
- Use a structured format to collect and organise data systematically.
- Keep detailed citations for all sources of information to facilitate easy reference and verification.
- Use standard units of measurement (grams, milligrams, percentages) to ensure consistency.



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## ACTIVITY 8 CALCULATE THE BODY MASS INDEX (BMI) AND COMPARE WITH THE WHO STANDARDS

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Calculate the Body Mass Index (BMI) and compare with the WHO standards

### Structure

- 8.1 Introduction
- 8.2 Objectives
- 8.3 Requirements
- 8.4 Procedure
- 8.5 Observations and Calculations
- 8.6 Recommendations
- 8.7 Precautions

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### 8.1 INTRODUCTION

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The full form of BMI is Body Mass Index. It is an important measurement for assessing an individual's weight status. Calculation of the BMI is significant for several reasons. It helps in the early detection of potential health issues related to weight, such as underweight, overweight and obesity. Early identification allows for timely interventions to prevent associated health problems. For children and adolescents, monitoring BMI can help track growth patterns and ensure they are healthy.

Calculating BMI is a practical and widely used method for assessing weight status and its associated health risks. It helps in identifying individuals at risk, monitoring changes over time, guiding clinical and nutritional interventions, educating the public, motivating healthy behaviours and supporting research and public health initiatives. By understanding and utilising BMI, healthcare providers and individuals can work together to improve health outcomes and promote a healthier population. Calculating and comparing BMI with World Health Organization (WHO) standards enables a better understanding of weight-related health risks and the importance of maintaining a healthy weight.

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### 8.2 OBJECTIVES

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After performing this activity, you should be able to:

- measure Body Mass Index (BMI);
- evaluate the risk of developing weight-related health conditions; and
- educate individuals about the importance of maintaining a healthy weight and the health risks associated with being underweight or overweight.

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### 8.3 REQUIREMENTS

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- A weighing balance/Weighing scale (to measure weight)
- A measuring tape or a stadiometer (to measure height)
- A calculator or online BMI calculator

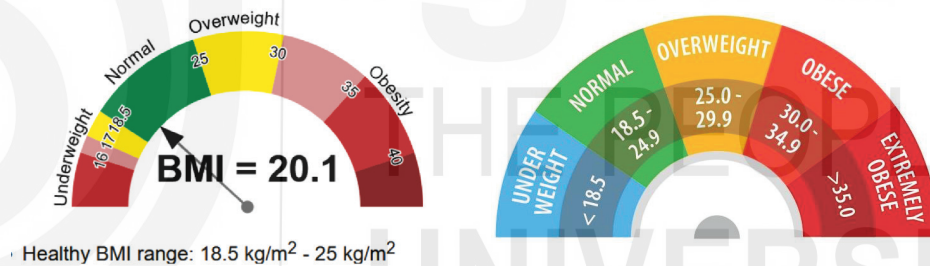


- Notebook
- Pen and pencil

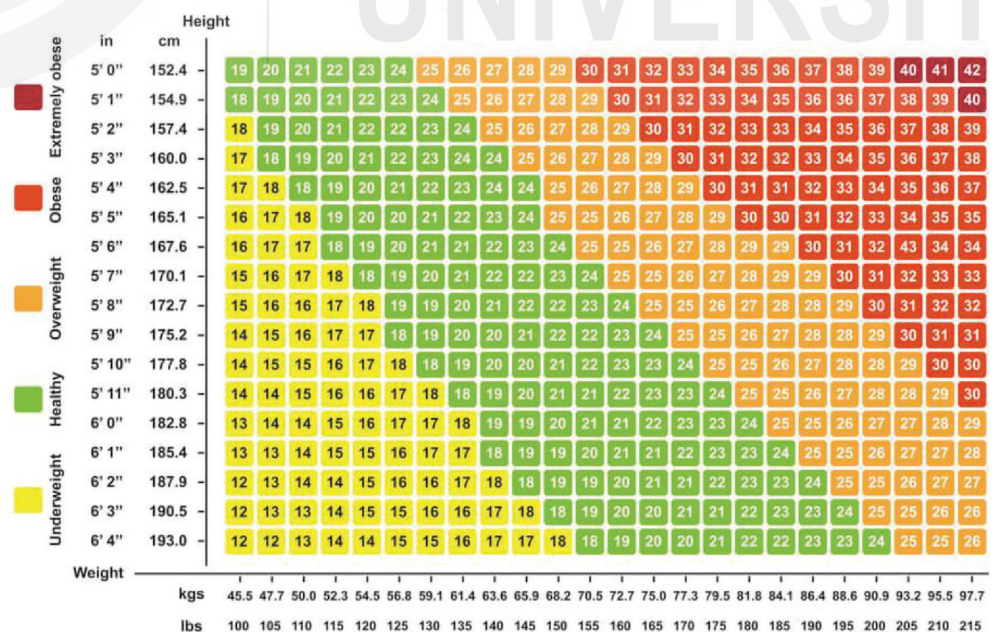
## 8.4 PROCEDURE

- 1) Before starting this activity, ensure that you have a reliable scale for weight measurement and a stadiometer or a measuring tape for measuring height along with a calculator or access to an online BMI calculator.
- 2) In the notebook, prepare a table indicating Sl. No., name of the family member, Height (in m), Weight (in kg), BMI and measures/strategies.
- 3) Ask each member of your family to stand on the weighing balance/scale. Measure the weight of each family member. Record and note down the weight in kilograms (kg) for each member (including yourself) in the table.
- 4) Ask each member of the family to stand straight against the stadiometer or wall with his/her heels together and look straight in front. Measure the height of each family member in meters (m). If using centimetres (cm) or inches, convert to meters.
- 5) Use the following BMI formula for the calculation of BMI:  

$$\text{BMI} = \text{Weight in kg} / (\text{height in meters})^2$$
- 6) Reference guide/chart is depicted below:



• Healthy BMI range: 18.5 kg/m<sup>2</sup> - 25 kg/m<sup>2</sup>



### BMI categories based on the World Health Organization (WHO)

- Underweight: BMI < 18.5
  - Normal weight: BMI 18.5–24.9
  - Overweight: BMI 25–29.9
  - Obesity: BMI ≥ 30
- 7) Compare the BMI of each family member and suggest/recommend the measures/strategies (dietary plan) to bring the BMI to the optimum range (Healthy). Indicate the same in the table.

Calculate the Body Mass Index (BMI) and compare with the WHO standards

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## 8.5 OBSERVATIONS AND CALCULATIONS

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Record the weight and height of each family member, calculate the BMI for each family member based on the data recorded using the following formula and note down the data in the following table:

$$\text{Body Mass Index (BMI)} = \text{Weight in kg} / (\text{height in meters})^2$$

Family Member	Weight (kg)	Height (m)	BMI
Yourself			
Member 2			
Member 3			
Member 4			

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## 8.6 RECOMMENDATIONS

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Based on the BMI calculated for each family member (including you), give your recommendations in the table given below:

Family Member	BMI	Category	Measures/strategies
Yourself			
Member 2			
Member 3			
Member 4			

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## 8.7 PRECAUTIONS

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- Use a calibrated scale for weight and a stadiometer for height measurement and ensure that height and weight are measured accurately.
- Use a reliable BMI calculator or apply the correct formula.
- For children and adolescents, use age- and gender-specific BMI percentiles to interpret the results accurately.
- Avoid using BMI to assess weight status during pregnancy, as it does not account for pregnancy-related weight gain.
- Ensure privacy when measuring and discussing BMI to respect the individual's confidentiality.

## Feedback Questionnaire

Dear learner,

While studying the units of this block, you might have enjoyed learning most portions of the content. On the other hand, you might have faced difficulty in understanding/comprehending some portions of the text. We wish to hear from you about the strengths and weaknesses of this course/study materials. Hence it is requested to give your valuable suggestions and opinions which will help us to improve the course in future. Therefore, kindly fill in and send the following questionnaire which pertains to this block. If you find the space provided is insufficient, kindly use a separate sheet.

### Questionnaire

Enrolment No.: 

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Course Code: **BPVC-101** Block No.: **5**

1) **How many hours did you take to learn the units in this block?**

Activity No.	1	2	3	4	5	6	7	8
Number of hours required								

2) **Please give your opinions/suggestions (✓) on the following items based on your experience:**

Criteria	Excellent	Very Good	Good	Poor	Give specific examples, if poor/excellent
Presentation					
Language					
Illustrations used (diagrams, table etc.)					
Conceptual Clarity					
Check Your Progress					
Any other: _____					

3) **Any other comments:** \_\_\_\_\_

**You can send the filled-in feedback form to the below mentioned address:**

<b>By Post (Hard Copy):</b> Prof. Vijayakumar and Prof. Mukesh Kumar The Programme Coordinator (BSCFFSQM), School of Agriculture, G-Block, Zakir Hussain Bhawan, Indira Gandhi National Open University (IGNOU), Maidan Garhi, New Delhi – 110068.	<b>By Email:</b> pvkumar@ignou.ac.in mkumar@ignou.ac.in
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# BPVC-101

## Food Science and Food Safety

### **BLOCK 1 FOOD FUNDAMENTALS**

UNIT 1 Food and Human Health

UNIT 2 Food Constituents and Properties

UNIT 3 Common Food Groups

UNIT 4 Other Foods

### **BLOCK 2 FOOD ASSIMILATION AND DISORDERS**

UNIT 5 Food Digestion and Assimilation

UNIT 6 Anti-nutritional Factors, Toxins and Chemical Contaminants

UNIT 7 Protein and Energy Disorders

UNIT 8 Mineral, Vitamin and Metabolic Disorders

### **BLOCK 3 FOOD NUTRITION AND QUALITY**

UNIT 9 Food Attributes

UNIT 10 Changes in Food during Handling and Processing

### **BLOCK 4 FUNDAMENTALS OF FOOD SAFETY AND QUALITY**

UNIT 11 Introduction to Food Safety and Quality

UNIT 12 Food Hazards

UNIT 13 Food Spoilage

UNIT 14 Role of Organizations

### **BLOCK 5 ACTIVITIES MANUAL**

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