

SECTION

# 3

## THE CONCEPT OF FOOD AND NUTRITION



# FOOD AND NUTRITION

## Food for Healthy Living

### INTRODUCTION

Welcome to Food and Nutrition as the third strand of the Home Economics course. It has been divided into two sub-strands namely, Food for Healthy Living and Food Production Technology. The section begins with Food for Healthy Living, which seeks to equip you with knowledge, understanding and skills related to nutrition, diet and overall well-being of the individual, family and society at large.

Recognising the crucial role of a balanced diet in the physical and mental development of individuals, this section endeavours to promote lifelong habits that contribute to a healthy and fulfilling life.

The basic competencies required of you include the classification of food commodities under the various food groups, food habits/lifestyle and their implications on the nutritional status of individuals, families and societies, the concept of food spoilage and storage, causes of food spoilage and demonstration on storage of food commodities.

Do you remember the lesson on Food and Nutrition you learnt in JHS? We are going to learn more on Food and Nutrition. You will learn about what food commodities are and their classification, food habits and factors that influence these habits. You will also discuss food spoilage and storage in this section. This will enable you select the right food commodities to prepare well-balanced and healthy meals.

#### At the end of this section, you should be able to:

- Explain basic concepts in food and nutrition.
- Classify food commodities under the various food groups.
- Discuss food habits/lifestyle and their implications on the nutritional status of individuals, families, and societies.
- Analyse factors that influence food habits/ lifestyles.
- Explain the concept food spoilage and food storage.
- Discuss the causes of food spoilage.
- Demonstrate how to store various Food Commodities

#### Key Ideas

- The basic concepts of [food and nutrition include food, nutrients, nutrition and digestion](#).
- Food commodities are the basic agricultural products or raw materials used as essential ingredients in the production of food and beverages.

- The foods we consume are broadly grouped into six and each of these groups contributes a key nutrient to help our bodies function properly.
- Food habits and lifestyle have both negative and positive implications on the nutritional status of individual, families and societies.
- The positive ones are good health, long life, healthy socialisation, reduced financial burden and improved interpersonal relations.
- The negative implications are health issues such as diabetes, heart attack, overweight/obesity and financial burdens.
- The factors that influence people's food habits/lifestyles include geographical location, culture/ethnicity, technology, religion, education, income and health status.
- Food spoilage is the state in which food has gone bad and is usually dangerous to eat. Foods that deteriorate and develop unpleasant odours, taste and texture are said to be spoiled.
- Food storage is the process of keeping raw or finished products in safe containers with controlled conditions such as dry conditions, refrigeration and freezing.
- Proper food storage can help prevent spoilage and contamination of foods that can lead to potentially fatal food poisoning.
- Storing food commodities properly is crucial to maintaining their quality, safety, and shelf life.
- Storage has to do with the ways and manner we keep our foodstuffs to prevent them from going bad and becoming unsafe for consumption.

## The Concepts in Food and Nutrition

The basic concepts in Food and Nutrition include, food, nutrients, nutrition, digestion.

Basic Concepts in Food and Nutrition	Meaning
Food	Anything solid or liquid, raw or cooked, which when taken into the body promotes growth, provides heat and energy and regulates body processes.
Nutrients	The chemical substance that provides nourishment essential for the maintenance of life and growth.
Nutrition	The study of food, nutrients and how food intake affects the body processes such as growth development and metabolism.
Digestion	It is the process of breaking down food into substances the body can use for energy, tissue growth and repair.

**Table 3.1:** Basic concepts in Food and Nutrition

## Application of the basic concepts in food and nutrition in your daily activities.

Understanding the food and nutrition concepts will help you understand what food is. It will also help you to know that, when food is eaten, it is digested and certain substances known as nutrients will be absorbed and affect the body processes such as growth, development and metabolism.

### Activity 3.1

Research using the internet and other sources such as books on the basic concepts of food and nutrition, record your thoughts on the subject and share your understanding of the basic concepts with your friends.

## Food Commodities and Their Classification

Food commodities are raw or processed agricultural products that are intended for human consumption. Food commodities can also be referred to basic agricultural products or raw materials used as essential ingredients in the production of food and beverages.

Food Group	Examples
Animal and Animal Product	Meat, fish, milk and eggs
Beans, Nuts and Oily Seeds	Beans, groundnut and neri
Cereals and Grains	Maize, millet and rice
Starchy Roots and Plantain	Cassava, plantain and yam
Fats and Oils	Shea-butter, palm oil, coconut oil
Fruits and Vegetable	Cocoyam leaves, pumpkin leaves and tomatoes

**Table 3.2:** The six Ghanaian food groups with examples



Fig 3.1: Food groups

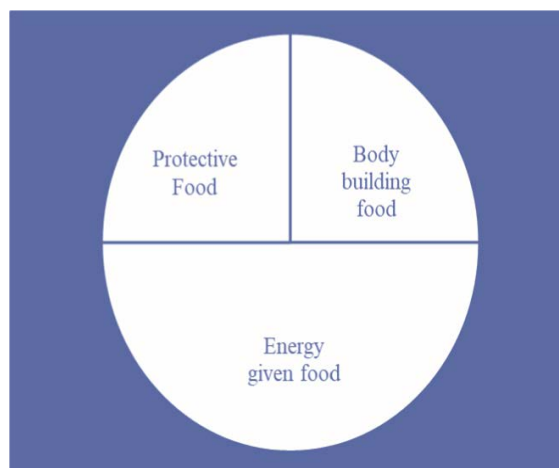


Fig 3.2: Functional Food Groups

Food commodities	Uses	Nutritive value	Effects of heat	Importance
Animal and Animal Product e.g. fish	They are used for stews, sauces, soups and gravies.	Protein Minerals Fats Vitamins	Overheating causes some protein to coagulate and shrink.  Continued heating will denature the protein and reduce the food value.  When the right amount of heat is applied, the food is made more digestible.	It helps to repair worn out tissues and hence promote growth and development.
Beans, Nuts and Oily Seeds	They are used for stews and soups, snacks like groundnut brittles “nkate” cake, roasted ground nuts, roasted almonds, groundnut balls, groundnut sticks (“kurikuri”)	Proteins (Second class) Oils Vitamins Minerals	When dry heat is applied it dextrinizes.  When wet heat is applied it swells and becomes soft and bursts and gelatinizes.	It helps to repair worn out tissues and hence promote growth and development.  They support healthy weight management and offer essential nutrients and antioxidant.

Food commodities	Uses	Nutritive value	Effects of heat	Importance
Cereals and Grains	<p>Cereals are normally prepared into breakfast cereals like “egukgumi”, “oblayo”, porridge, oats, Hausa Koko and bread.</p> <p>Cereals are also cooked into dishes like “banku”, “kenkey”, rice balls, “akple”, “ayiple”, “kpoikpoi”, and pasta-based dishes</p>	<p>Carbohydrates</p> <p>Vitamins</p> <p>Fat</p>	<p>When dry heat is applied it dextrinizes.</p> <p>When wet is applied it swells and becomes soft and bursts and gelatinizes</p>	It provides the body with heat and energy.
Starchy Roots and Plantain	They are use for ‘Ampesi’(Boiled roots and plantain) fufu, flour	<p>Carbohydrates</p> <p>Vitamins</p>	<p>When dry heat is applied it dextrinizes.</p> <p>When wet heat is applied it swells and becomes soft and bursts and gelatinizes</p>	It provides the body with heat and energy.
Fats and Oils	Fats and oils are used for cakes, frying food, salad dressing, ice cream and greasing of baking sheet	Fats and oil vitamins	<p>When heat is applied to fat it melts and changes to oil.</p> <p>Further heating of oil will lead to a sizzling sound. further heating will develop a blue haze or smoke Continued heating leads to decomposition.</p>	<p>Supply calories and essential fat and help the body absorbs fat soluble vitamins.</p> <p>They insulate and protect the body vital organs.eg. the heart.</p> <p>It helps give the body energy, supports cell growth and helps the body absorb vital nutrients</p>

Food commodities	Uses	Nutritive value	Effects of heat	Importance
Fruits and Vegetable	They are used for salads, stews, soups, drinks.	Vitamins Minerals	Heat breaks down the fibres and softens them.  High temperatures destroy the nutrients (Vitamins)	They help to fight infections, heal wounds making bones strong and regulating hormones.

**Table 3.3:** Food commodities, use, nutritive value, effects of heat on nutrients and importance

## Convenience Foods

These are foods which have been fully or partly prepared so that further cooking may or may not be needed before use. They are foods that have been processed to make them easier to prepare. They have been partly or fully cooked and therefore require little or no cooking. Examples of convenience foods: bread, biscuits, cornflakes, ice cream, gari, shito, milk, canned palm pulp, fish powder, shrimp powder, pepper powder, groundnut paste, cake mixes, custard powder and dressed poultry.

There are two major types of convenience foods, **ready-to-serve** and **ready-to-use foods**.

### Ready-to-eat or serve foods

Ready-to-serve foods require little time and effort. They can be eaten as they are or added to other foods, without further cooking. Examples of these include tinned fish, cornflakes, ice cream, bread, gari, shito, milk, sardine. Some convenience foods can be both ready to use and ready to serve because they can be cooked or eaten as they are. Examples are roasted corn flour (Tom brown), groundnut paste and gari.

### Ready-to use food

Ready-to-use or semi-prepared foods are convenience foods that are partly cooked or processed. You only need to cook them for a very short period for them to be ready to eat. Examples are canned palm pulp, fish powder, shrimp powder, pepper powder, groundnut paste, cake mixes, custard powder, dressed poultry, etc.



**Fig 3.3:** Convenience food

Now try these activities and review questions.

### Activity 3.2

Research five food commodities and write a report explaining the following:

- a. Their use
- b. Their nutritive value
- c. The effects of heat on nutrients
- d. The importance of the selected food commodities

### Activity 3.3

Produce a labelled chart/diagram of the Six Food Groups and present in class for peer review during gallery walk.

### Activity 3.4

Research convenience foods and share your findings with your friends in class. Your research should include the following:

- a. The different types
- b. Their nutritional value
- c. Their use

### Activity 3.5

Visit the local market/supermarket in your community list **ten** food commodities including convenience foods found in the market and group them according to the following:

- a. Type of food commodity
- b. Uses of the food commodity
- c. Nutritive value of the food commodity
- d. Importance of the food commodity to the body
- e. Effects of heat on the nutrients during cooking

**Self-Assessment:** How will your knowledge of the six food groups help you plan a balanced meal? Select the food you eat after going through this lesson.

## Extended Reading

Below are some recommended reading materials and links that you can visit or consult for more information.



## Implications of Food Habits/Lifestyles

We learnt in the previous lesson that, food habits/lifestyle is a typical way of life of an individual, group or culture, which reflects their attitudes and values. In this lesson, we will learn about the positive and negative implications of food habits/lifestyles on individuals, families and societies. We will also learn about the factors that influence food habits/lifestyle. This lesson will help you improve your food habits and lifestyle to prevent diet-related diseases and live a healthy life.

### Food Habits/Lifestyles

Food habits may be negative or positive. Negative food habits are harmful to the body. On the other hand, positive food habits promote the health of the body.

#### 1. Negative Food Habits/Lifestyles: Negative food habits include

- a. Snacking or eating between meals
- b. Skipping meals
- c. Drinking alcohol
- d. Eating too many fats, sugar, salt, red meat, and processed foods
- e. Eating late in the night

#### 2. Positive Food Habits/Lifestyles: Positive food habits include

- a. Eating on time
- b. Do not skip meals
- c. Eating a balanced diet
- d. Discipline and self-control

## Implications of Food Habits/Lifestyles

We have both positive and negative implications for food habits and lifestyle on individuals, families, and societies. When it comes to our health, the food we eat can have a significant effect on our bodies.

1. Positive food habits/lifestyles such as eating balanced diets, fruits, and vegetables with regular exercise can significantly improve our health. They can lead to good health, long life, healthy socialisation, reduced financial burden, and improved interpersonal relations.
2. Negative food habits/lifestyles such as eating too many sweets, fatty foods, and salty foods as well as regular intake of high carbohydrate foods can affect our health badly. This will result in health issues such as diabetes, heart attack, overweight/obesity, financial burdens and increase certain risk factors for stroke heart disease and cancer.

## Interventions to Correct Negative Food Habits/Lifestyles

The following interventions can help promote good health.

1. Eat food in moderation
2. Eat balanced diets
3. Eat a variety of fruits and vegetables
4. Reduce the intake of salt and sugar, fats and oils
5. Drink enough water daily
6. Regular exercise and relaxation
7. Avoid alcohol intake

### Activity 3.6

Interview people of different cultural backgrounds to find out their food habits/lifestyles and produce a report to highlight interventions to support the following groups:

1. Diabetes
2. Heart attack
3. Overweight/obesity

#### Interview Tips

- Plan the questions in advance.
- Make and maintain eye contact.
- Ask open-ended questions so the interviewee can expand on their answers.
- Listen carefully to their responses.
- Take notes.
- If you do not understand something, ask them to explain.

You could use a template to record your questions and the respondent's answers:

<b>Instructions:</b> You must think of questions about the food habits/lifestyles that you will put to the respondent's during the interview.
Question: Answer:
Question: Answer:
Question: Answer:

Question:

Answer:

Question:

Answer:

### How to analyse data

- It involves extracting (taking out) important facts and patterns from the data gathered.
- Draw conclusions.
- Make informed decisions based on the results.

### Prompt sheet for report writing

- Informative and fact-based.
- Formally structured.
- Usually written with a specific purpose and reader in mind.
- Written in style appropriate to each section.
- Include section headings.
- Often use bullet points.
- Often includes tables or graphs.
- Offer recommendations for action.
- Uses a clear structure.
- Based on evidence (data, other reports, experiment results).
- Has a clear introduction and conclusion.

## Factors that Influence Food Habits/Lifestyles

We have discussed food habits/lifestyles, its implications on the individual and some interventions to address the negative implications. In this lesson, we will discuss the factors that influence people's food habits/lifestyle. These factors include:

1. Geographical location
2. Culture/ethnicity
3. Technology
4. Religion
5. Education
6. Income/economic status
7. Health status

**Geographical location:** The availability of food in a particular environment/location influences an individual's choice of food. For example, in the north – cereals, grains and

legumes (maize, rice, millet, beans) are the predominant food items that are used for foods. In the forest zone – roots, tubers and plantains are also used by the people in that area.

**Culture/ethnicity:** Culture and food are intertwined, and food can influence various aspects of culture. Cultures and food traditions can influence how you eat, what you eat, when you eat, where you get the food and how you prepare the food. For example, northerners eat Tuo Zaafi, Akans eat fufu, and Ewes eat akple. No matter where one is, one would still want to eat their traditional foods.

**Religion:** The foods that people eat have influence on their beliefs. For example, Catholics do not eat meat on Good Fridays; Muslims are not allowed to eat pork and Seventh Day Adventist do not eat fish without scales.

**Technology:** The advancement of technology has brought about a variety of foods which can be found all year round and everywhere. This influences the individual's choice of food and influences food habits/lifestyle. For example, frozen chicken and apples can be found everywhere.

**Education:** The knowledge gained about food and how food affects the body influences what to eat, what not to eat and how to eat it. People with knowledge in foods tend to select and eat balanced diets for good health.

**Income/economic status:** The amount of money one has will influence the choice of food. The selection and consumption of food is based on the individual's money available. For example, the amount of money one has determines the quality and quantity of food one eats.

**Health status:** The health condition influences what one eats. For example, a diabetic patient does not eat foods with much sugar and an overweight person should reduce carbohydrates, fat, oils intake, and take in more fruits and vegetables.

### Activity 3.7

Investigate and report how the following factors influence people's food habits/lifestyles

- a. Geographical location
- b. Culture/ethnicity
- c. Technology
- d. Religion
- e. Education
- f. Income
- g. Health status

Note:

- Investigate using the internet and other sources such as books and people in the community.
- Use different forms of presentation to report for whole class discussion.

## Extended Reading

Below are some recommended reading materials and links that you can visit or consult for more information.

Adigbo, E. C. & Maddah, C. K. (2011). *A complete course in Food and Nutrition*. Kwadwoan publishing: Accra. Pg.30-31.

[Factors That Affect Dietary Habits & Nutritional Status - Lesson | Study.com](#) (Video on food habits and lifestyle).

## Concept of Food Spoilage and Food Storage

You are welcome to another interesting lesson on how food spoils and how best to store it to prevent spoilage. Have you ever seen spoiled food? How did it look? Most food commodities we buy and bring home are raw foods. These foods are perishable and can easily spoil. If food items are kept for a long period and not stored properly, they get spoiled and such food items are bad for health. Once the food is spoiled, it cannot be eaten and must be thrown away. Food spoilage is the state in which food has gone bad and is usually dangerous to eat. These foods need to be properly stored to prevent spoilage. Proper food storage is just as important as all the other food preparation and handling aspects. If you want your food to last longer, you must store it well. In that way, you are keeping all its nutrients intact, and you are also keeping it safe from bacteria and other harmful microorganisms. You are also saving money if you store your food properly.

You will learn in this lesson what food spoilage and food storage are. You will also learn what causes food spoilage. This knowledge will help you keep your food longer to get the best out of your food and save money.

### Food Spoilage

When food is harvested until it is consumed, it will spoil and decay if not properly stored. What is food spoilage?

Food spoilage is the state in which food has gone bad and is usually dangerous to eat. Foods that deteriorate and develop unpleasant odours, taste and texture are spoiled. Spoilage of food can be described as a loss of its qualitative properties with regards to colour, flavour, texture, odour, or shape.



**Fig 3.4:** Spoiled tomatoes



**Fig 3.5:** Rotten food stock

## Food Storage

Food storage is the act of keeping food at appropriate temperatures, conditions, and places to avoid spoilage and prolong its shelf life until it is ready for consumption. It is important to store food correctly to prolong its life span, ensure food security, preserve quality and nutritional value to save money and prevent foodborne illness.

Non-perishable and perishable food products should be stored in different ways.

Non-Perishable foods	Storage
Dry beans	In sack
Flour	In tight-fitting containers
Maize	In sacks or containers
Rice	In sacks or containers
Onion	In basket

**Table 3.4:** Storage of non-perishable foods

Perishable foods	Storage
Meat	Fridge/freezer
Fish	Fridge/freezer
Vegetables	Fridge
Yam	Bury in soil, barns
Cassava	On airy racks and barns

**Table 3.5:** Storage of perishable foods

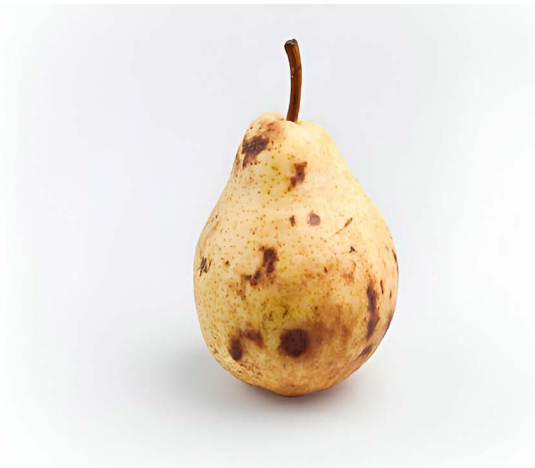
## Causes of Food Spoilage

We often see that food that has been kept out for too long, smells foul and looks rotten. But what causes this? What will happen if we eat this food? Is it edible? In this lesson, you will learn about the causes of food spoilage.

The main types and causes of food spoilage include mechanical, physical, microbial and chemical.

**Mechanical Spoilage:** This refers to bruises, cuts and falls: Bruising occurs during harvest and postharvest operations like sorting, grading, and packing. Bruising is the most common mechanical damage which fruits suffer. Bruising damage is initially not

visible but can spoil the appearance and several physiochemical factors to downgrade quality and weight, leading to considerable economic losses. They cause changes in texture of the food. For example, some vegetables like potato, yam and carrot undergo too much softening leading to rotting. Some of the changes are due to mechanical damage such as eggs with broken shells, bruises and cuts on fruits and vegetables during transportation also constitute food spoilage, the fruits crush and soften.



**Fig 3.6:** Bruised fruit



**Fig 3.7:** Yam showing cuts and bruises

**Physical Spoilage:** Refers to dust, oxidation and pest damage. It is the changes in the structure of foodstuffs. The damage increases the chance of chemical or microbial spoilage and contamination because the protective outer layer of the food is bruised or broken, and microorganisms can enter the foodstuff more easily. For example, you may have noticed that when an apple skin is damaged, the apple rots more quickly.

**Dust:** Microorganisms are found everywhere in our environment. Many types can be found in air and dust and can contaminate food at any time during food preparation or when food is left uncovered.



**Fig 3.8 :** Spoilt Kontomire

**Oxygen:** Oxygen can cause food to spoil in several ways: Oxygen encourages the growth of microorganisms, resulting in mould and yeast growth. Oxidising enzymes speed up chemical reactions in food, resulting in browning and foul odours.

**Pests:** Foods can be damaged and contaminated by pests. Many stored grains are lost through the damage done by pests, including termites, beetles, locusts, cockroaches, flies and rodents such as rats and mice. Pests can damage and contaminate foods in various ways, such as boring into and feeding on the insides of grains or tunnelling into stems and roots of food plants. Pests also damage the protective skin of foods allowing microorganisms to get inside the food and causing it to rot more quickly. Pests can pollute food with their excreta, and with bodies and body fragments when they die. Flies and cockroaches readily move between wastes and foods, transporting microorganisms with them as they go.



**Fig 3.9:** Insects can leave dirt, excreta and possibly pathogenic microorganisms if they are allowed to crawl on food. (Photo: Basiro Davey).

**Microbial Spoilage:** This is caused by microorganisms like fungi (moulds, yeasts) and bacteria. They spoil food by growing in it and producing substances that change the colour, texture and odour of the food. Eventually the food will be unfit for human consumption. Microbial spoilage by moulds and yeasts includes souring of milk, growth of mould on bread and rotting of fruit and vegetables. Comparatively, bacterial contamination is often more dangerous because the food does not always look bad, even if it is severely infected.



**Fig 3.10:** Bread infested by mould/ fungus



**Fig 3.11:** Microbial-infected meat

### **Chemical Spoilage**

**Enzyme Action:** Chemical reactions in food are responsible for changes in the colour and flavour of foods during processing and storage. Foods are of best quality when they are fresh, but after fruits and vegetables are harvested, or animals are slaughtered, chemical changes begin automatically within the foods and lead to deterioration in quality. Naturally occurring enzymes promote major chemical changes in foods as they age.



**Enzymic spoilage:** Every living organism uses specialised proteins called **enzymes** to drive the chemical reactions in its cells. After death, enzymes play a role in the decomposition of once-living tissue, in a process called **autolysis** (self-destruction) or **enzymic spoilage**. For example, some enzymes in a tomato help it to ripen, but further enzymatic action causes it to decay. Once enzymic spoilage is underway, it produces damage to the tomato skin, so moulds can begin to attack it as well as speed the process of decay.

**Enzymic browning:** When the cells of fruits and vegetables such as apples, potatoes, yam, bananas and avocados are cut and exposed to the air, enzymes present in the cells bring about a chemical reaction in which colourless compounds are converted into brown-coloured compounds. This is called **enzymic browning**. If the food is cooked very soon after cutting, the enzymes are destroyed by heat and the browning does not occur. For example, apples are prone to discolouration if cut open when raw, but when cooked they do not go brown.

### Activity 3.8:

#### Project Work

Investigate local and modern ways people store food commodities in the community. Use your observations and conduct interviews with local people about the food storage techniques that they utilise and their reasons for doing so. Produce a report with photographic evidence of different food storage techniques for appraisal. Use a range of presentation techniques (pictures, drawings and PowerPoint) to present your report.

You will need the following to help you gather your information

1. A questionnaire or interview guide
2. Camera to take pictures.

#### Interview Tips

- Plan the questions in advance.
- Make and maintain eye contact.
- Ask open-ended questions so the interviewee can expand on their answers.
- Listen carefully to their responses.
- Take notes.
- If you do not understand something, ask them to explain.

You could use a template to record your questions and the respondent's answers:

**Instructions:** You must think of questions about the food spoilage and storage that you will put to the respondent during the interview.

Question:

Answer:

Question:

Answer:

Question:

Answer:

Question:

Answer:

Question:

Answer:

### How to analyse data

- It involves extracting (taking out) important facts and patterns from the data gathered.
- Draw conclusions.
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### Prompt sheet for report writing

- Informative and fact-based.
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- Often use bullet points.
- Often includes tables or graphs.
- Offer recommendations for action.
- Uses a clear structure.
- Based on evidence (data, other reports, experiment results.)
- Has a clear introduction and conclusion.

Now that you have completed this lesson, you can assess how well you have achieved its Learning Outcomes by answering **review questions 3.3**.

## Extended Reading:

Below are some recommended links that you can visit or consult for more information

<https://www.toppr.com/guides/evs/mangoes-round-the-year/food-spoilage/>

<https://felixinstruments.com/blog/bruising-impact-on-fruit-quality>

## Demonstration How To Store Food Commodities

In this lesson, you will learn the practical ways of storing food commodities in the home and other places where the need arises. You will also learn about the general guidelines for storing dry foods, canned foods, perishables and frozen items. The knowledge and skills acquired will help you store food in the home to ensure the availability and accessibility of food. It will also help you to save money by reducing spoilage leading to unnecessary purchase of foodstuff and preventing contamination and spoilage-related illnesses.

### Demonstrate how to Store Food Commodities

Look at some steps and guidelines that will help you store food to stay fresh and safe for consumption:

#### Guidelines for storing food

- i. **Inspect and Sort:** Before storing, check for damaged packaging, signs of pests, or expiration dates. Discard any food showing any sign of spoilage.
- ii. Sort items by type and date of purchase to facilitate easy access and use.
- iii. **Choose the right storage area:** Select a cool, dry, and well-ventilated storage area away from direct sunlight, heat sources, and humidity.
- iv. Consider using a pantry, cupboard, basement, or dedicated storage room.
- v. **Use Appropriate Containers:** Transfer dry goods like grains, flour, and sugar into airtight containers to prevent moisture, pests, and contamination.
- vi. Use clear containers for easy visibility and label them with the contents and date of storage.
- vii. **Follow the First-In, First-Out (FIFO) Rule:** Arrange items in a way that allows you to use the oldest items first. This prevents items from expiring before they are used.
- viii. **Maintain Proper Temperature:** Keep perishable foods like fruits, vegetables, dairy, and meat in the refrigerator at temperatures below 40°F (4°C) to slow bacterial growth. Freezers should be set to 0°F (-18°C) or lower for storing frozen foods.
- ix. **Prevent Cross-Contamination:** Store raw meat, poultry, and seafood on lower shelves or in separate containers to prevent drips and contamination of other foods.

## Ways of storing food commodities at home



**Fig 3.12:** Fresh fish in a freezer



**Fig 3.13:** Onion stored in a basket



**Fig 3.14:** Cereals in airtight containers



**Fig 3.15:** Maize in a sack

What are some of the ways you store food commodities at home?

In storing foods, you may encounter some challenges. What do you think are some of the challenges of storing food commodities in the home?

### Some challenges of storing food commodities in the home include

- a. Limited space and storage capacity.
- b. Inadequate ventilation and temperature control.
- c. Moisture and humidity issues.
- d. Pests and rodent infestation.
- e. Contamination and cross-contamination.
- f. Disorganisation and difficulty in tracking inventory.
- g. Inadequate packaging and labelling.
- h. Limited access to proper storage equipment (e.g., shelving, bins).
- i. Power outages and equipment failure (for refrigerated or frozen items).
- j. Physical constraints (e.g., heavy or bulky items).

- k. Difficulty in maintaining proper sanitation and hygiene.
- l. Inadequate security measures (e.g., locking systems).
- m. Potential for foodborne illnesses due to improper storage.

### To overcome these challenges, it is essential to:

- a. Assess storage needs and capacity.
- b. Implement proper storage techniques and protocols.
- c. Utilise suitable storage equipment and materials.
- d. Monitor and maintain storage conditions.
- e. Rotate and track inventory regularly.
- f. Ensure proper sanitation, hygiene, and pest control measures.

#### Activity 3.9

Investigate from books, the internet and people in the community some of the storage devices or equipment used to store food commodities and share with friends.

#### Activity 3.10

Demonstrate appropriate ways of storing the following food commodities:

- 1. Pepper
- 2. Okro
- 3. Kontomire leaves
- 4. Cocoyam
- 5. Beans

### Extended Reading:

Below are some recommended links that you can visit or consult for more information.

<https://www.ksre.k-state.edu/humannutrition/foodstorage-documents/Homestorageof%20foodsNewJersey2012fs340.pdf>

<https://www.ethicalteapartnership.org/wp-content/uploads/Food-Safety-Module-3-1.pdf>

<https://extension.oregonstate.edu/sites/default/files/documents/pnw612.pdf>

# Review Questions 3.1

1. Explain the following basic concepts in food and nutrition:
  - a. Food
  - b. Nutrients
  - c. Nutrition
  - d. Digestion
  - e. Malnutrition
2. Explain the concept of food commodities to your friend.
3. List at least two groups of food you like and justify the reasons for your choice.
4. Describe at least one of the following functional food groups with specific examples.
  - a. Protective food.
  - b. Energy giving food.
  - c. Body-building food.
5. Classify at least five food commodities under each of the six Ghanaian food groups using concept maps, charts, tables

# Answers to Review Questions 3.1

1.
  - a. Food is anything solid or liquid, raw or cooked, which when taken into the body promotes growth, provides heat and energy and regulates body processes.
  - b. Nutrients are chemical substances that provides nourishment essential for the maintenance of life and growth.
  - c. Nutrition is the study of food, nutrients and how food intake affects the body processes such as growth development and metabolism.
  - d. Digestion is the process of breaking down food into substances the body can use for energy tissue growth and repair.
  - e. Malnutrition results from excess, inadequate or imbalance intake of nutrients in the diet.
2. Food commodities can also be referred to basic agricultural products or raw materials used as essential ingredients in the production of food and beverages.
3. No right or wrong answer. Learners should be able to give convincing answers that justify their choices
4.
  - a. Protective food: They are foods that protect us against diseases. Examples: pineapple, mango, banana, kontomire, Alefo, and bokoboko.
  - b. Energy giving food: They are foods that provide the body with heat and energy. Examples: corn, rice, millet, yam, cassava, oats, potatoes and wheat.
  - c. Body-building food: They are foods that help in growth and development. Examples: eggs, meat, fish, crab, snail, and beans of all kinds.

5.

Food Commodities	The Six Ghanaian Food Groups
Snail, crab, meat, fish, milk and eggs	Animal and Animal Product
Beans, groundnuts and neri	Beans, Nuts and Oily Seeds
Maize, millet, wheat and rice	Cereals and Grains
Cocoyam, cassava, plantain, yam and potatoes	Starchy Roots and Plantain
Groundnut oil, shea-butter, palm oil and coconut oil	Fats and Oils
Orange, pawpaw, watermelon, apple, cocoyam leaves, pumpkin leaves and tomatoes	Fruits and Vegetable

## Review Questions 3.2

1. Discuss at least three food habits/lifestyles and their implications on the nutritional status of one of the following,
  - a. Individual
  - b. Families
  - c. Societies
2. Explain with specific examples, how any one of the following factors influences food habits/lifestyle:
  - a. Geographical location
  - b. Culture/ethnicity
  - c. Technology
  - d. Religion
  - e. Education



## Answers to Review Questions 3.2

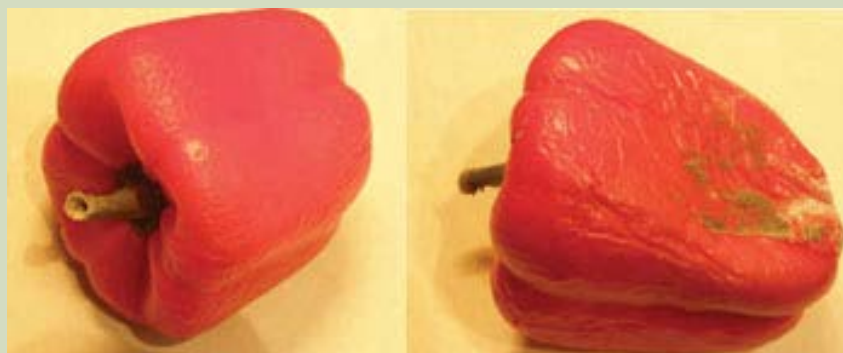
1.
  - a. Individual: What individual eats is central to his or her health. If you eat too many fats, oils, and carbohydrates, you will become overweight or obese. Too much consumption of carbohydrates and sweets, such as candies, sugar, carbonated drinks can lead to diabetes but when a balanced diet is taken at the right time, it will improve one's health.
  - b. Families: Poor food habits/lifestyle can lead to the following diseases in the family. Diseases such as malnutrition, cardiovascular diseases such as heart attack, and obesity. Poor food habits/lifestyle brings about high financial burden on the family because they will spend more money on medication. Good food habits/lifestyle can lead to good health of family members, and this will reduce the financial burden on the family.
  - c. Societies: Unhealthy food habits can have far-reaching negative implications on the society such as: widespread health issues like obesity, diabetes, and heart diseases. It will have serious economic burden such as high health care cost and loss of productivity in the society.
2.
  - a. Geographical location: The availability of food in a particular environment/location influences an individual's choice of food. For example, in the north – cereals, grains and legumes (maize, rice, millet, beans) are the predominant food items that are used for foods. In the forest zone – roots, tubers and plantain are also used by the people in that area.
  - b. Culture/ethnicity: Culture and food are intertwined, and food can influence various aspects of culture. Cultures and food traditions can influence how you eat, what you eat, when you eat, where you get the food and how you prepare the food. For example, northerners eat Tuo Zaafi, Akans eat fufu, and Ewes eat akple. No matter where one is, one would still want to eat their traditional foods.
  - c. Technology: The advancement of technology has brought about variety of foods which can be found all year round and everywhere. This influences the individual's choice of food and hence leading to food habits/lifestyle. For example, frozen chicken and apples can be found everywhere.
  - d. Religion: The foods that people eat have influence on their beliefs. For example, Catholics do not eat meat on Good Fridays; Muslims are not allowed to eat pork and Seventh Day Adventist do not eat fish without scales.
  - e. Education: The knowledge gained about food and how food affects the body influences what to eat, what not to eat and how to eat it. People with knowledge of foods tend to select and eat balanced diets for good health.

## Review questions 3.3

1. Match each term with the correct definition.

Terms	Definitions
Oxidizing enzymes	The state in which food has gone bad and is usually dangerous to eat.
Food Storage	The act of keeping food at appropriate temperatures, conditions, and places to avoid spoilage and prolong its shelf life until it is ready for consumption.
Enzymic browning	The speeding up of chemical reactions in food, resulting in browning and foul odours.
Food spoilage	When the cells of fruits and vegetables such as apples, potatoes, bananas and avocado are cut and exposed to the air, enzymes present in the cells bring about a chemical reaction in which colourless compounds are converted into brown-coloured compounds.
Enzyme action	The chemical reactions in food are responsible for changes in the colour and flavour of foods during processing and storage.
Oxidizing enzymes	The state in which food has gone bad and is usually dangerous to eat.

2. What is the difference between food spoilage and food storage?
3. Your mother brought home some fresh tomatoes, fresh pepper, onions, corn, rice, and flour.
- Categorise them into perishable and non-perishable foodstuff.
  - Describe how you will store the perishable and non-perishable foods.
4. State examples of two causes of food spoilage and explain how to prevent them.
5. Study the figure below and explain why the two peppers look different.



## Answers to review questions 3.3

1. Oxidizing enzymes (c)

Food storage (b)

Enzymic browning (d)

Food spoilage (a)

Enzyme action (e)

2. Food spoilage is the state in which food has gone bad and is usually dangerous to eat while food storage is the act of keeping food at appropriate temperatures, conditions, and places to avoid spoilage and prolong its shelf life.

3.

a.

Perishable Foods	Non-perishable foods
Fresh tomatoes, fresh pepper, onions	corn, rice, and flour

b.

Perishable foods	Storage	Non-perishable food	Storage
fresh tomatoes	Freezer or fridge	corn	In sacks or containers
fresh pepper	Freezer or fridge	rice	In sacks or containers
onions	In basket	flour	In tight-fitting containers

4. State examples of two causes of food spoilage and explain how to prevent them.

Causes of food spoilage	Prevention
Mechanical Spoilage: This spoilage is due to bruises, and cuts on fruits and vegetables. The damage increases the chance of chemical or microbial spoilage and contamination because the protective outer layer of the food is bruised or broken, and microorganisms can enter the foodstuff more easily.	Handle food with care to avoid bruises and cuts. Food should also be properly packaged to protect the food.
Chemical spoilage: This is due to enzyme action. Enzymes are proteins or chemical substances in living organisms i.e. plants and animals and they help speed up metabolism, or the chemical reaction in them. They cause fruits to ripen and further reaction cause fruits to rot.	Store food in fridges and freezers to stop enzyme action.

<p><b>Microbial Spoilage:</b> This is caused by microorganisms like fungi (mould, yeast) and bacteria. They spoil food by growing in it and producing substances that change the colour, texture and odour of the food. Eventually the food will be unfit for human consumption.</p>	<p>Store food in fridges and freezers to stop microbial activities.</p>
<p><b>Physical Spoilage:</b> This is spoilage caused by dust, oxidation and pest damage.</p> <p><b>Dust</b> Dust carries microorganisms which when settled on food will enable the microorganism to work on the food.</p>	<p>Package food well so that dust does not settle on food.</p>
<p><b>Oxygen:</b> Encourages the growth of microorganisms, resulting in mould and yeast growth. Oxidizing enzymes speed up chemical reactions in food, resulting in browning and foul odours.</p>	<p>Do not expose food surfaces to oxygen.</p>
<p><b>Pests:</b> Can damage and contaminate foods in various ways, such as boring into and feeding on the insides of grains, or tunnelling into stems and roots of food plants. For example, weevils cause large losses of stored grains, especially in warm and humid conditions. Pests also damage the protective skin of foods allowing microorganisms to get inside the food and causing it to rot more quickly.</p>	<p>Properly store food in airtight containers and in dry places to prevent pests from getting into the food.</p>

5. The two peppers look different because one has been spoiled by enzyme reactions, which have also allowed moulds to grow on the fruit.

## Review Questions 3.4

1. How will you store the following food commodities to prolong their life span in the home?
  - a. Tomatoes
  - b. Dry Maize
  - c. Eggs
  - d. Meat
  - e. Dry Millet
2. Your friend complains to you that their mother's food stays too long in the freezer, and she usually throws it away due to spoilage. What advice will you give to your friend?
3. How will you prevent cross-contamination during food storage in the freezer?

## Answers to Review Questions 3.4

1.
  - a. Tomatoes: Store at normal room temperature in baskets, paper bags or breathable bags for a short period. To store for longer periods use freezing or canning. Keep tomatoes away from strong-smelling foods because they can absorb odours.
  - b. Dry Maize: Store in jute sacks at normal room temperature or in airtight containers with tight-fitting lids to protect from moisture and pests.
  - c. Eggs: Store in a refrigerator at a consistent temperature below 4°C or 40°F with the pointed end facing downwards in a carton to keep the yolk centred and reduce the risk of breakage. Store eggs away from foods with strong aromas, such as onions or garlic, because they can absorb these smells.
  - d. Meat: Refrigerate meat at 4°C or 40°F for 5 days, to store meat for more than 5 days freeze at -18°C or 0°F or lower to prevent bacteria growth.
  - e. Dry Millet: This can be stored in jute sacks at normal room temperature or in airtight containers with tight-fitting lids to protect from moisture and pests.
2. I will advise my friend's mother to employ First-In, First-Out (FIFO) guidelines in storage. This means she should rotate and manage the inventory to ensure the oldest items are used first. This means storing new items behind or below existing ones to ensure older items are accessed first. Regularly rotate stock to ensure that older items are moved to the front or top, making them more accessible. Group similar items together, making it easier to access and manage stock and reduce the risk of misplaced or forgotten stock. Also, consider a "Use by" List: create a list of items nearing expiration or with a limited shelf life, ensuring they are used before they expire.
3. Store raw meat, poultry, and seafood on lower shelves or in separate containers to prevent drips and contamination of other foods.

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### <Glo>Glossary

**Bruises:** Damage caused by crushing or pounding food which can change the texture and appearance of the food.

**Enzymes:** proteins that help speed up chemical reactions in our bodies

**Microbial:** means relating to or caused by microbes.

**Microorganisms:** organisms that are so small they can only be viewed under a microscope (not with the naked eye). Microorganisms include bacteria, protozoa, algae, and fungi.

**Perishable foods:** Perishable foods are those likely to spoil, decay or become unsafe to consume if not kept refrigerated at 40 °F or below, or frozen at 0 °F or below. Examples of foods that must be kept refrigerated for safety include meat, poultry, fish, dairy products, and all cooked leftovers.

**Non-perishable foods** – They are edible foods that can last for an extended period without spoiling. Examples are rice, maize, beans and flour. Note: They are all dried foods.

**Contamination** - The state of making food or being made **impure** by **polluting** or **poisoning** it.

**Cross-contamination** - Cross-contamination is the transfer of microorganisms (bacteria) or other chemical substances from one food to another.

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Ghana Education Service (GES)



## List of Contributors

Name	Institution
Nyarko Lily-Versta	Mancell Girls' SHTS, Kumasi
Karim Ankrah Mohammed	Gbewaa College of Education, Pusiga
Akompi Dorcas Abena	Asesewa SHS
Judith Sakara	