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# NSC 215



**Nutrition in Health and  
Diseases**  
**Module 3**

## NSC 215 (Nutrition in Health and Diseases) Module 3

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# Module 3 Food Classification, Purchasing, Preparation, Presentation and Complementary Feeding

## Unit I Classification of Foods

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### 1.0 Introduction

Since you have learnt about food, its definition, meaning and functions, in Module 2, you are going to be introduced to classification of foods in this unit. This classification of foods will assist you use food composition tables. These tables are organised according to classification of foods into food groups, with the food items listed alphabetically within each food group. Bread, for example, tops the cereal food groups. You will be introduced to different ways of classifying foods both internationally and nationally.

### 2.0 Objectives

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

- classify foods into five different ways
- describe each classification in your own language with specific examples of locally available foodstuffs
- list at least two importance of classification of foods.

### 3.0 Main Content

#### 3.1 Classification of Foods

Foods can be classified into five different ways. These are the Basic four, the 7 food groups, Nutrients, Food Guide Pyramid and 3 Food Groups.

The Basic Four: This is an American acceptable method of classifying foods. The Basic Four Groups are Milk and milk products (milk, ice cream, and cheese); Meat group (Beef, veal, pork, lamb, poultry, fish, eggs, dry beans, peas, soybeans, melon seeds, and groundnuts as alternatives).

Vegetable and fruits Group (Citrus fruits, leafy green vegetables).

Bread and Cereals group (whole grains that include maize, millet, oats, wheat, guinea corn and rice).

The 7 Food Groups: This 7 food groups plan was introduced during the war time. These groups are:

1. green and yellow vegetables (amaranthus, water leafy, red potato leaves, red spinach).
2. Oranges, grapefruit, tomatoes or raw cabbage.
3. Potatoes, other vegetables and fruits.
4. Meat and milk products.
5. Meat, poultry, fish and eggs.
6. Bread, flour and cereal (whole grain enriched or restored).
7. Butter or fortified margarine.

Just like the Basic four, the 7 food groups were used in United States of America.

### Nutrients Classification

Food classification can also be grouped according to the major nutrient such food is made up. These nutrients are carbohydrates (yam, cassava); Protein (meat, fish, beans); Fats and oils (palm oil, corn oil, olive oil); Vitamins, Vitamins A,B, C and D (fruit and vegetables)

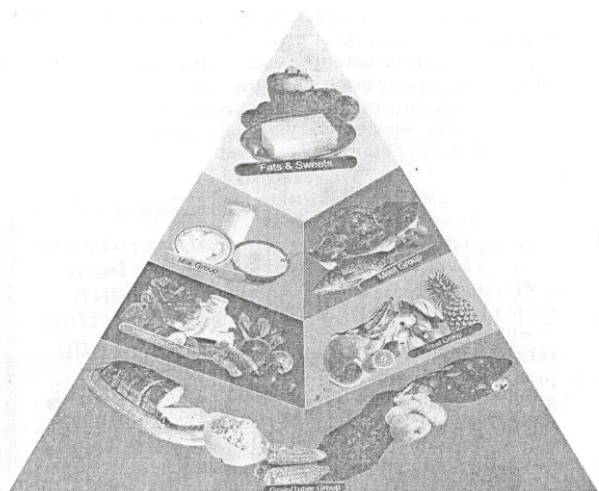
Minerals, zinc, iron, calcium (milk, nuts, fish)

1. Water (rain water, bored hole water).
2. Fibre (fruits, vegetables and beans).

### Food Guide Pyramid

The food Guide Pyramid was developed to help individuals to choose an adequate and healthful diet. The food guide Pyramid shows at the base of the pyramid bread, whole grain cereal, and at the top of pyramid are fats, oils, sweets meaning that to have an adequate diet, one should eat more of the food at the base and consume very minimal of those at the apex of the pyramid. In the middle of the pyramid fruits and vegetables are encouraged to be consumed at least 2 to 4 servings everyday. The third layer has meat and milk products and they should be consumed at least 2 servings daily.

### Food Pyramid



**Fig. 10.1: Food Pyramid**  
Courtesy of Olu Akinkugbe Foundation Child Nutrition Centre

<p><b>GRAIN GROUP</b> 1 Slice of Bread 1 milk tin of cooked/prepared rice ½ cup of cooked cereal</p> <p><b>FRUIT GROUP</b> Generous amount of any fruit in season 1 cup of fresh fruit juice</p> <p><b>MEAT GROUP</b> 2 to 3 pieces of cooked lean meat, poultry or fish. ½ milk tin of cooked dry beans or 1 egg</p>	<p><b>VEGETABLE GROUP</b> 1 serving of chopped raw or cooked vegetables 1 serving of leafy vegetables</p> <p><b>MILK GROUP</b> 1 cup of milk 1 serving of cheese</p> <p><b>FATS AND SWEETS</b> Eat less of these</p>
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Resource at [oer.nou.edu.ng](http://oer.nou.edu.ng)

### **The 3 Food Groups**

The 3 Food groups are actually the classification that is appropriate for our environment. The 3 Food groups are energy giving food group (yam, bread, cassava, beans). This group of food majorly supplies energy to the body.

The second group is Body Building food groups (fish, meat, beans, oil seeds, insects). These groups of food supply protein which the body needs for building new cells and repair worn out tissues. Remember that this is protein which is part of your Basic knowledge in nutrition in The third group is Protective food groups. These are vitamins and minerals that help the body to ward off infection and also serve as antioxidants.

## **3.2 The Importance of Food Classification**

The advantages of food grouping include the following:

- encourages consumers to eat healthily.
- shows those food items consumers should be taking in enough quantity and those that should be taken with caution.
- describes the function of each nutrient at a glance (energy giving or body building food groups).
- serves as a graphic representation of those foods to be taken minimally. (Sugar, ice cream, and other sweets, the tip of food Guide Pyramid).
- shows number of servings attached to each group (food Guide Pyramid).
- provides daily food guide.

## **4.0 Conclusion**

In this Unit, you have learnt that food can be classified in different ways. This classification of foods includes the Basic 3 Food Groups, the Basic Four Groups, The 7 Food Groups, the Nutrients classification, and the food Guide Pyramid. These five grouping of foods are discussed with specific examples. By now, you should be able to plan an adequate diet using the 3-Food groups and the Food Guide Pyramid.

## **5.0 Summary**

The unit has presented five distinct different ways of grouping foods with specific examples. The unit has also explained the usefulness of food classification.

## **6.0 Self-Assessment Exercise**

1. List three methods of classifying foods with specific locally available foodstuffs.
2. Name four groups in the Daily Food Guide Pyramid and identify at least three food items of each group.

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## Unit 2 Food Purchasing

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### 1.0 Introduction

In Unit 1, you learnt different ways of classifying foods in order to assist you in knowing types of food groups you should purchase when you go to the market. Since we have built the foundation of having an adequate nutrition, this unit shall deliberate on some of the principles that can help you to purchase foodstuffs wisely for healthy dietary intake for the family.

### 2.0 Objectives

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

- identify people who specially need protein and energy
- list, at least three determinants, of food purchasing
- describe the principle of buying in quantity
- identify factors that should be taken into consideration in food budgeting
- apportion money value to each of the 3-food group.

### 3.0 Main Content

#### 3.1 The Need for Food and its Cost

In earlier units, you have learnt the functions of food as an edible, digestible, absorbable and utilizable substance that nourishes the body for optimal growth. The need for this food varies from one group to another. Of all the nutrients that food supplies, proteins and energy stand out as crucial dependency on the physiological and physical condition of the individual.

Remember that fats, vitamins and minerals are also important to maintain, restore and promote quality health. Pregnant women, nursing mothers and young children specially need protein than the adults. In terms of energy, the need for this nutrient depends on the activity levels. A growing child, a hard working farmer, or a mechanist needs more energy than a sedentary person. Both protein and energy are derived from the foods you buy in the market and there is a price for each food item.

#### 3.2 Determinants of Food Purchasing

In shopping wisely for food items some factors should be taken into consideration. These factors include: nutrition values of foods, family income, family size and composition, house wife's level of education, family food budget, quantity of food purchased, ability to shop around, food prizes and food seasonal variations and food storage facilities.



**Nutritional Values of foods:** In shopping wisely, the house wife's educational background is very important. The educational background will certainly permit her to have some ideas about foods that will support her family's health.

Family income is definitely important in purchasing food items for the family. Low income families cannot afford to buy very expensive bodybuilding food groups such as beef, eggs, stock fish and other meat and dairy products on daily basis. But with a good knowledge in basic nutrition, the house wife can still find a substitute for the expensive meat. Beans and rice with crayfish can still meet the requirement for protein needs of the family.

**Family size and composition:** The larger the family, the more food the family needs. When the composition of the family is made up of growing children, nursing or pregnant mothers, the more food such a family requires. **Family food budget:** One of the main aims of food budgeting is to ensure that adequate diet is provided to every member of the family, regardless of the condition within the family income.

**Buying Food in quantity and shopping around for food** will certainly reduce the money spent on food purchasing. Shopping around will permit the housewife to know where certain food items are cheap. Seasonal variation in food prices also affects the amount spent on food. During raining season, there is plenty of foodstuffs but during the dry season, on the other hand, foodstuffs are scarce and costly. In the wet season, fruits and leafy green vegetables are plenty and cheap and very costly during the dry season.

Storage facility of food stuffs during the raining season when foodstuffs are plenty becomes a crucial issue in reducing cost of food during the dry season.

### 3.3 Appropriating Money for the 3-Food Groups

You will recall that you have learnt in Unit 1, that the 3-food Groups is the classification of food that applied to our environment. Of the three groups, half of the money budgeted for food should go to Body Building food group and one-quarter each goes to energy and protective food groups.

Half of the money budgeted for food has to go to body building food groups because this group is very essential for normal growth and development. It is also vital in maintaining worn out tissues in both adults and children.

## 4.0 Conclusion

In this unit you have learnt that those people that need more protein and energy are the pregnant women, nursing mothers and young children. The determinants of food purchasing have also been discussed extensively. Some of these determinants include family income, family composition, nutritional values of foods, housewife's educational level, food storage, family food budget, buying food in quantity, and distribution of money to the 3-food groups.

## 5.0 Summary

This unit has described the various factors that influence effective food purchasing in order to guarantee adequate diet for the whole family. The house wife who is the food gatekeeper is the principal actor in food purchasing.

## 6.0 Self-Assessment Exercise

1. List five determinants of food purchasing.
2. A mother of two children under five years of age and her husband have come to you for an advice on how to budget the sum of six hundred naira on food for a month. Briefly state how you will assist the family in money allocation to the different food groups and list some of the food items you will advise her to purchase.

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## Unit 3 Food Preparation

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### 1.0 Introduction

Since you have been introduced to food classification and purchasing, you should have had some ideas on how to select food from the food groups based on both the nutritive values and cost. This unit is all about methods of food preparation and their effects on the nutrients and the hygienic effects of such methods on human beings.

### 2.0 Objectives

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

- list ,at least two rationales, for cooking foods
- identify three methods of food preparation
- describe the possible effects of poor food handling during food preparation
- describe the effects of food preparation on the food nutrient.
- list two noncommunicable chronic diseases that may affect humans due to method of food preparation.

### 3.0 Main Content

#### 3.1 Rationale for Cooking Foods

You will recall that the Homo sapiens in the early century were food gatherers and they did not cook their foods until later century. All their foods were eaten raw. The agricultural and industrial revolutions had brought a lot of changes to both food processing and preparation. Most of the foods have to be cooked for the following reasons:

- Cooking of the food will destroy all pathogenic (disease causing) agents. Such as bacteria and viruses.
- Cooking the food such as meat, grains (rice, wheat, maize, guinea corn, legumes (beans, lima beans), and tubers will make these food items palatable.
- Cooking the food makes the texture soft and easily digestible and utilisable in the body system.

#### 3.2 Methods of Food Preparation

Prior to cooking the food, the food items may have to be washed, hulled or peeled, chopped, pounded, soaked, or squeezed. Smoking, baking, roasting, grilling, stewing, steaming, boiling, and frying of foods are methods of preparing food. Some of these methods have adverse effects on human beings. Smoking leaves black smoke on the food, while frying may lead to excess intake of fats in the body system. Excessive intake of fat may lead to cardiovascular disease or obesity.

Of all the methods of preparing foods, boiling, steaming and baking are acceptable because these methods help to preserve some vital nutrients in the foodstuffs.

### 3.3 The Danger of Poor Handling of Food Items during Food Preparation

Food-borne illness is one of the major adverse effects of poor handling of food during preparation. Prevention of food-borne illness can be prevented by keeping hot foods hot, cold foods cold and keeping hands, utensils, raw foodstuffs and kitchen clean. Meat and seafood must be cooked very well. Keep cold food at 40°F or less and keep frozen foods at 0°F or less. Washing of hands and all cooking utensils before cooking will definitely help to prevent food-borne diseases. Salmonellosis is a food-borne illness due to consuming raw or under-cooked eggs, meats, and dairy products. Hepatitis is also food-borne illness caused by eating undercooked or raw shell fish.

### 3.4 The Effect of Food Preparation on the Food Nutrients

Regardless of the methods used in food preparation, some nutrients are lost, especially water-soluble vitamins are lost during food preparation. The method of preparing corn pap for the children through sieving of the wet milled corn, most of all the vital nutrients such as protein, minerals and vitamins are lost. The frying of palm oil leads to the loss of beta-carotene in the palm oil.

## 4.0 Conclusion

This unit has discussed the rationale for food preparation and different methods of food preparation. The unit has also explained the adverse outcome of poor handling of food during food preparation. Specific food-borne illness due to poor food handling and effects of food preparation on the nutrients are illustrated.

## 5.0 Summary

In this unit, you have been taken through the importance of cooking food methods of preparing foods for healthful consumption. The effects of various methods of preparing these foodstuffs from nutrients loss have also been discussed.

## 6.0 Self-Assessment Exercise

1. Distinguish between two types of food preparation and their effects on the food nutrients.
2. What special precautions would you apply in preventing food-borne illness in your family?

## 7.0 References/Further Reading

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## Unit 4 Food Presentation

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### 1.0 Introduction

The three previous units have discussed food grouping, purchasing and preparation. This unit is concerned about food presentation. You will recall that in module one, we learnt that Nutrition is a science as well as an art. The art aspect of nutrition is the presentation of food after it has been prepared for consumption. Regardless the quality of a diet, if the presentation is not appealing, it is of no use. Food presentation is an important aspect of ensuring adequate diet.

### 2.0 Objectives

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

- define food presentation
- differentiate between African and Western food presentation
- list, at least three, of the primary rules of food presentation
- list, at least four, tips for plating
- identify two garnishing tips.
- Plan a food presentation that is acceptable using locally available foodstuffs.

### 3.0 Main Content

#### 3.1 Definition of Food Presentation

Food presentation is the act of presenting the foods prepared in a plate. This presentation can be appealing or not appealing. Food presentation is an important part of dining experiences, especially in Western World. Food presentation in a plate is full of different food items in small quantities, with at least three different colourful foodstuffs. A plate of food may contain a piece of sweet potatoes, carrot, leafy green vegetable, chicken or fish and rice. These food items are arranged orderly and looking at the plate, will certainly stimulate the sense of taste, after all, we eat with our eyes first.

The African food presentation is different from the western world because it does not have variety in the plate. It is either a solid tuber product (pounded yam, yam flour meal, cassava meal) or grain product (rice, corn, pap, solidified millet, wheat or guinea corn). This solid food is eaten with either vegetable, melon or okra soup). There is no variety of colour in the plate.

#### 3.2 Rules for Food Presentation

The rules for food presentation are:

- Inclusion of variety of food with different textures that will stimulate all the senses. The senses of feeling or touching should be felt.

- Visual appeal. The food presentation should be appealing to the consumers. By using different food items with different colours (carrot, sweet potatoes, garden egg, and leafy green vegetable) will certainly stimulate the other senses.
- Smelling Appeal. Food presentation should have appeal to the sense of smell. This arouses the sense of taste of the food. Flavours and types of food used will help to give appealing aroma.
- The sense of sound. A good food presentation should have the quality of sound in the form of crushing e.g. inclusion of apple or hard pawpaw.
- The sense of taste. An ideal food presentation should be tasty in the mouth.

These five senses must be fulfilled for an ideal food presentation.

### 3.3 Tips for Food Presentation Plating

The following tips on plating of food should be considered for an appealing food presentation.

- planning of the diet is very crucial. Food purchasing should be planned ahead of time for either daily or occasional meal.
- Having a bigger plate is better since this will disallow crowding of food items.
- Clouring the plate makes the food appealing. This can be achieved by using different food items of different colours.
- Finding a focus of the meal is equally important. Ideally the protein should be focal point of the meal.
- Serving of hot foods hot, on hot plates and serve cold food cold, in cold plates.

### 3.4 Tips for Food Garnishing

Garnishing is an attempt to add colour or flavour to make the dish appealing and tasty. Garnish brings the food together. Examples of garnish items are fresh herbs, chocolate, lemons, mints etc. Tips for garnishing include:

- Garnishes should be edible.
- They should be complementary to the ingredients you are using.
- The uses of fresh herbs will instantly show visual appeal, colour, flavour and fragrance to the food being presented.
- The use of chocolate, lemon, or orange to food being prepared to add flavour.

## 4.0 Conclusion

Since you have gone through this unit, you have learnt that food presentation is an important aspect of adequate dietary intake. The unit has also shown that food presentation should appeal to the five senses. Tips for food presentation plating and food garnishing are also discussed.

## 5.0 Summary

The unit has defined food presentation, its importance in taking adequate nutrition. The unit has also discussed the difference between African and western food presentation. The rules governing food presentation have been highlighted. Suggestions as to plan food presentation on plating and tips on food garnishing are also illustrated in the text.

## 6.0 Self-Assessment Exercise

1. Define food presentation in your own words.
2. Describe two of the human senses that may affect food presentation.

## 7.0 References/Further Reading

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## Unit 5 Preparation of Complementary Feeding

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### 1.0 Introduction

In developing countries, most children begin to experience childhood malnutrition from seven months upwards because breast milk can no longer meet the nutrients requirements of these growing infants. Micronutrients such as iron, Vitamin A and calcium are deficient in these growing infants after 6 months of age. In an attempt to ensure optimal growth among young children, other foods from the environment should be given to these growing infants together with breast milk. These foodstuffs being given to the infants in addition to breast milk is known as complementary feeds. The complementary feeding is to compliment breast feeding. The types of foodstuffs to be used as complementary foods depend on availability, socio-cultural and religious food taboos of the nursing mothers. In this unit you will learn the principles, properties and formulation of complementary foods.

### 2.0 Objectives

At the end of this unit, you will be able to:

- define complementary feeding
- differentiate between weaning and complementary feeding
- identify two of the reasons for complementary feeding for infants aged six months and above.
- list at least three properties of good complementary foodstuffs.
- identify two anti-nutritive inhibitors in complementary foods using locally available foodstuffs.

### 3.0 Main Content

#### 3.1 Definition of Complementary Feeds

Complementary feeding is the addition of other foods or liquid to the infants foods while the mother is still breastfeeding. This complementary feeding usually commences after the age of six months when exclusive breastfeeding has stopped. There is a difference between the term weaning and complementary weaning.

Weaning is the gradual or total withdrawal of breast milk from the infants. Complementary feeding does not displace breastfeeding rather it complements it. The term weaning connotes total stoppage of breast feeding. The term weaning has now been replaced with complementary feeding.

#### 3.2 Reasons for Complementary Feeding for Infants Six Months and above

- It is very vital to note the reasons for ensuring quality complementary feeds to infants six months and above:



- both recent and previous studies have shown infantile malnutrition begins from seven months of age.
- growth faltering. The child's growth pattern lags behind normal age group due to deficiencies in energy.
- micronutrients deficiencies. The quality of breast milk in terms of micronutrients begins to decline from 7 months of age of the infants. Essential micronutrients include zinc, iron, selenium, vitamin A.
- exposure to plethora of infections. Infants after the age of six months are exposed to plethora of infections diseases such as measles, diarrhea, and viral and upper respiratory infections.

### 3.3 Characteristics of Complementary Foodstuffs

The characteristics of complementary foodstuffs are as follows:

- it should be safe (washing hands before preparation and before feeding it to the infants. It should be kept in a clean place).
- it should be adequate in protein to support and sustain optimal growth.
- it should supply enough energy to meet the infant's daily energy requirements.
- it should be rich in micronutrients and other minerals and vitamins to meet the infant's rapid growth.
- it should be free from contamination (pathogens, toxins, or harmful chemicals).
- it should be culturally and religiously acceptable
- there should not be hot spices added to the complementary foodstuffs.
- the complementary food should be a combination of varieties of locally available and nutritious foodstuffs.

### 3.4 Anti-Nutritive Inhibitors in Commonly Used Complementary Foodstuffs

Most of the foodstuffs used for complementary feeding (maize, millet, guinea corn, maize flour) contain phytate, tannins and phytic acid. Legumes and oil seeds (cowpeas, pigeon, peas, locust bean, groundnut, soybeans, cotton) contain oxilate, trypsin and tannins. All these anti nutritive inhibitors are usually in the foodstuffs that make the minerals in the legumes and grains unavailable to the body system. Some of the ways to remove these inhibitors are by soaking, fermenting, dehulling and drying the foodstuffs before they are used.

### 3.5 Preparing Complementary Feeding

The most popular complementary food in Nigeria is corn/maize, guinea corn or millet. The protein content of this grain ranges from 7 to 10 percent, but by the time it is given to the infants, it is reduced to less than 1 percent because of sieving during preparation. Ideally, the grain should not be sieved after wet milling. Good complementary foodstuffs should be a combination of legumes and grains. Both legumes and grains complement each other. Grains

supply methionine (an essential amino acid that the body needs for proper growth) to legumes. Legume on the other hand, supplies lysine, which grains lack.

Examples of complementary food include:

- wheat pap combined with cowpea beans
- corn meal combined with black eyed beans paste.
- guinea corn with soya bean.
- corn meal combined with roasted ground nut paste
- millet with groundnut paste.

## 4.0 Conclusion

In this unit, you have learnt the meaning of complementary feeding and that it has to replace the term weaning. By now, you should be able to define the two terms in your own words. The importance of complementary feeding for infants from 6 months upwards has been discussed. The characteristics of complementary foodstuffs and the effects of anti-nutritive inhibitors have also been explained. Finally, examples of complementary foodstuffs are also illustrated.

## 5.0 Summary

This unit has described the importance of complementary feeding as complement to breast feeding. The properties and examples of complementary foodstuffs have also been discussed.

## 6.0 Self-Assessment Exercise

1. Differentiate between weaning and complementary feedings.
2. List three reasons for prescribing complementary feeding for infants aged 6 months upwards.

## 7.0 References/Further Reading

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