GOVERNMENT OF TAMIL NADU

HOME SCIENCE

HIGHER SECONDARY SECOND YEAR

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How To Use The Book

Introduction

Motivate the students interest into the content.

Learning Objective

This gives an overview of the chapter.

Case study

Deeper understanding and knowledge application is enhanced.

Do you know?

To give the learner additional information related to that particular topic.

Activity

Activities are given to illicit critical and creative thinking and develop independent learning skills.

QR Code

Enhances the visual knowledge, memory and presents the content in a interesting manner.

ICT Corner

References to the relevant website for further information on topics covered in that chapter.

Summary

Brief outline of the entire chapter is given in a nutshell.

Glossary

Gives detailed meaning of new technical terms.

Reference

All basic materials used for the development of contents.

CAREER GUIDANCE

Professional Courses

- M.B.B.S
- B.D.S
- Pharm D
- B.Pharm
- B.A.M.S
- B.V.Sc
- B.Sc Agriculture

UG Degree Courses

- B.Sc Nutrition Food Service Management and Dietetics
- B.Sc Clinical Nutrition and Dietetics
- B.Sc Nutrition and Dietetics
- B.Sc Food Science and Nutrition
- B.Sc Home Science
- B.Sc Textiles and Fashion Design
- B.Sc Interior Design & Resource Management
- B.Sc. Human Development

PG Degree Courses

- M.Sc Food Science and Nutrition
- M.Sc Foods and Nutrition
- M.Sc Food Service Management and Dietetics
- M.Sc Textile and Fashion Apparel
- M.Sc Interior Design and Resource Management
- M.Sc Human Development
- M.Sc Extension and Communication
- M.Sc Bio-Textiles
- M.Sc Apparel and Fashion Design
- M.Sc Exercise Physiology and Nutrition

Higher Studies(M.Phil&Ph.D)

- Food Science and Nutrition
- Foods and Nutrition
- Food Service Management and Dietetics
- Textiles and Fashion Apparel
- Human Development
- Extension and Communication
- Resource Management
- Bio –Textiles
- Exercise Physiology and Nutrition

Diploma Courses

- Diploma in Food and Nutrition
- Diploma in Dietetics in Public Health Nutrition
- Diploma in Early child hood care and Education
- P.G. Diploma in Dietetics
- Diploma in Dyeing and Printing

Diploma Paramedical Courses

- Diploma in Physiotherapy
- Diploma in Occupational Therapy
- DOTT (Diploma in Operation Theatre Technology)
- Diploma in Dialysis Technology
- DMLT (Diploma in Medical Lab Technology)
- Diploma in X-Ray Technology
- Diploma in Radiography
- Diploma in Medical Imaging Technology
- Diploma in Medical Record Technology
- Diploma in Nursing Care Assistant
- ANM
- GNM
- Diploma in Ophthalmic Technology
- DHLS (Diploma in Hearing Language and Speech)
- Diploma in Anaesthesia Technology
- Diploma in Dental Hygienist
- Diploma in Rural Health Care
- Diploma in Community Health Care

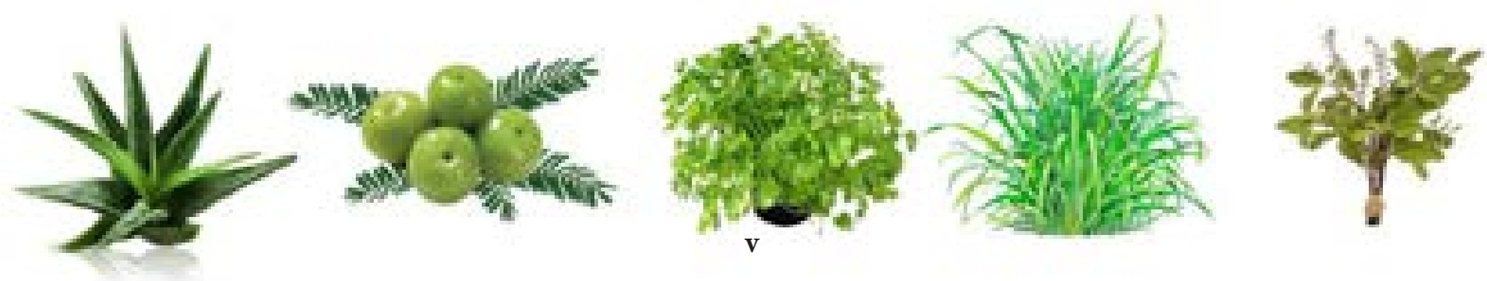
Certificate Courses

- Certificate in X-Ray Technician
- Certificate in Lab Assistant/Technician
- Certificate in Dental Assistant
- Certificate in Operation Theatre Assistant
- Certificate in Nursing Care Assistant
- Certificate in ECG and CT Scan Technician
- Certificate in Dialysis Technician
- Certificate in Home Based Health Care
- Certificate in Rural Health Care
- Certificate in HIV and Family Education
- Certificate in Nutrition and Childcare

Content

HOME SCIENCE

E-book **Assessment**



UNIT 1

Therapeutic Diets

LEARNING OBJECTIVES

- To provide a detailed view of the relationship between diet, nutrition and disease.
- To study the pathophysiology and dietary treatment of various diseases.
- To study the management of specific diseases and conditions such as gastrointestinal disorders, liver diseases, obesity, cardiovascular disease, diabetes and kidney disease in depth.
- To learn to plan therapeutic diets and to maintain or restore good nutrition in the patient.

1.1 Introduction

Good nutrition along with food selection is the corner stone of personal health and for maintaining good health during and after diseases. The term "diet therapy" refers to the usage of food and nutrition in controlling symptoms and managing the progress of disease.

A therapeutic diet is a modified meal plan. The modification include increasing or decreasing intake of nutrients and change in texture.

1.1.1 Objectives of Diet Therapy

1. To maintain good nutritional status.
2. To correct nutrient deficiencies which may have occurred due to the disease.
3. To afford rest to the whole body or to the specific organ affected by the disease.
4. To adjust the food intake to the body's ability to metabolize the nutrients during the disease.
5. To bring about changes in body weight whenever necessary.

1.1.2 Principles of Therapeutic diet

A well planned diet provides all the specific nutrients to the body that are needed to achieve nutritional homeostasis in a normal healthy individual. However, in disease conditions, body tissues either do not receive proper nutrients in sufficient amount or cannot utilize the available nutrients owing to faulty digestion, absorption or transportation. Therefore, normal diet is modified to meet the requirements of the sick individual.

The normal diet may be modified to:

1. Provide change in consistency, as in fluid and soft diets.
2. Increase or decrease the energy values.
3. Include greater or lesser amounts of one or more nutrients.
4. Increase or decrease bulk- high and low fibre diets.
5. Include or exclude specific foods as in allergic conditions
6. To modify the intervals of feeding.

Factors to be considered in planning therapeutic diets

1. The underlying diseased condition which requires a change in the diet.
2. The possible duration of the disease.
3. The diet which must be altered to overcome these conditions.
4. The patients' tolerance for food by mouth.

In addition to economic status, the food preferences, occupation and time of meals should be considered.

The four attributes of a therapeutic diet are: Adequacy, Accuracy, Economy and Palatability.

1.1.3 Routine Hospital Diets

The routine hospital diets include Liquid diet, soft diet, mechanically altered, fibre restricted diet and regular diet.

i Liquid Diet

Liquid diet consists of food that will pour or liquid at normal room temperature. In this diet, nutritive value is

low and is used only for limited periods of time. The liquid diet is used

i) to keep fecal matter in the colon at a minimum

ii) after surgery

iii) to replace fluids lost from vomiting or diarrhoea.

Fluid Diet

Liquid diets may be clear- liquid or full liquid diet.

Clear Fluid Diet: This diet is made up of clear fluids that leave no residue, and it is non gas forming, non irritating and non stimulating to peristaltic action. This diet can meet the requirement of fluids and some minerals and can be given in 1 to 2 hour intervals and its use is typically limited to 24 to 36 hours. This diet is given during acute infection, following operations of colon or rectum, diarrhoea and vomiting. The foods which can be included are barley water, dhal water, whey water, tea and coffee without milk.

Full Fluid Diet: This diet bridges the gap between the clear fluid and soft diet. In this diet, foods which are liquid or which readily become liquid on reaching the stomach are given. It is used following operations, in acute gastritis, acute infections and in diarrhoea. This diet is given at 2 - 4 hours interval. The foods included are kanji, milk shakes, lassi and soups.

ii Soft Diet

It is used in acute infections, following surgery, and for patients who are unable to chew. The soft diet is made up of simple, easily digested food and contains no harsh fibre and no rich seasoned food. In this diet, three meals with intermediate feedings should be given; Patients with dental problems are given mechanically soft diet. The foods include cooked dhals, double cooked cereals, custard, and steamed bananas, purees.

Soft Diet

iii Mechanically Altered Diet

It differs from normal diet in texture and seasonings, depending on the needs of the patient. Mechanically altered diet is limited to soft food for those who have difficulty chewing food because of missing teeth or poorly fitting dentures. Eg. Puffed rice, gruels, purees, minced meat and desserts like custard.

Mechanically Altered Diet

iv Fibre Restricted Diet

Fibre restricted diet have reduced fibre content and are soft in consistency. It serves as a transition to a normal diet in fevers, and in gastrointestinal disturbances.

v. Regular Diet

The regular diet is the most frequently used in hospitals. It should meet the RDA and include all food groups (refer to XI Home Science Text book).

1.2 Diet in Fever

Fever may be defined as an elevation of body temperature above normal (98.4°F). It may occur in response to infection and inflammation.

Causes of Fever

Endogenous factors: Antigen-antibody reaction.

Exogenous factors: Infection due to Bacteria or Fungi.

Classification of Fever

- **Short duration:** as in acute fevers of colds, pneumonia, influenza, measles, chickenpox, scarlet and typhoid fevers. All these diseases manifest fever as the first symptom.
- **Long duration:** as in chronic fevers or infections which may continue for months and stretch to years. Tuberculosis is an outstanding example.
- **Intermittent:** Fever in which increased body temperature last for few hours alternate with periods in which the temperature is normal. e.g., Malaria.

Metabolic Changes in Fever

1. The metabolic rate is increased. The increase in metabolic rate is proportionate to body temperature and the duration of fever. An increase of 7 percent in the metabolic rate for each degree rise in Fahrenheit (13 percent for every degree Celsius rise in body temperature).
2. Glycogen stores are decreased.
3. Increased catabolism of proteins.
4. Nitrogen waste is increased and it exerts an additional burden on the kidneys.
5. Water metabolism is also affected. Excessive perspiration and excretion of body waste increases the loss of body water.
6. Increased excretion of electrolytes like sodium and potassium.

1.2.1 Typhoid

Typhoid is an infectious disease with an acute fever of short duration. *Salmonella typhi* causes typhoid. The duration may be as short as three days or as long as three weeks.

Causes of Typhoid

Contaminated drinking water, milk and food by intestinal contents of a patient or handling of food by carriers or by flies, are the source of infection.

Symptoms of Typhoid

The disease is characterized by a continued, high inflammation of the intestine, formation of intestinal ulcers, haemorrhage and enlargement of spleen. The patient suffers from:

- Diarrhoea or constipation
- Severe stomach ache.
- Headache and anorexia.

Principles of Diet

A high calorie, high protein, high carbohydrate, low fat, high fluid, low fibre and soft bland diet.

Dietary Management

- **Energy**: Energy utilization is high in fevers due to the high metabolic activities. The calorie requirement is increased about 50 percent. High carbohydrate drinks and cereal gruels can be included in frequent small feedings to meet high energy demand.
- **Proteins:** In prolonged fever 100g of good quality proteins have to be included. High protein beverages and soups can be included.
- **Carbohydrate:** Glucose can be used for sweetening beverages. Starchy gruels also supply carbohydrates.
- **Electrolytes**: Sodium chloride, has to be supplemented. Soups can meet this demand. Fruit juices and milk beverages can be given in considerable quantities.
- **Vitamin:** The requirement increases during fever. Vitamin A and ascorbic acid have to be supplemented; B complex vitamin intake has to be adjusted with calorie intake.
- **Fluid:** Intake must be liberal so as to meet the additional loss during fever. At least 3-5 litre of fluid intake is essential.

Dietary Guidelines

First clear fluid diet is given, followed by full fluid and soft diet. Bland, easily digestible foods must be used. Instead of a four-meal pattern, frequent small feedings are recommended.

Foods to be included	Foods to be avoided
Cereals, gruels. barley water, Thin dal, milk, curds, cottage cheese, milk shakes, custards, Poached Eggs, baked fish, double cooked minced meat, vegetable puree, Steamed vegetable, Fruit juices	Butter, ghee, vegetable oil, fibres, chilies and other spices, rich pastries, fried foods, puddings and cream soups

1.2.2 Tuberculosis

Tuberculosis is an infectious disease caused by the *bacillus Mycobacterium tuberculosis*. It affects the lungs, kidneys, alimentary tract, lymph nodes of the neck, liver, spleen, bones and joints of children.

Causes of Tuberculosis

It is an air borne infection. Congested dwelling and unhygienic living conditions are the main causes of this infection.

Symptoms of Tuberculosis

- Wasting of tissues
- Exhaustion
- Persistent cough
- Low-grade fever
- Loss of weight
- Pain in the chest
- Poor appetite
- Fatigue
- Sputum coughed up by the patient may become streaked with blood.

Principles of Diet

A high calorie, high protein, high vitamin, minerals, and high fluid diet is given.

Dietary Management

Energy: High calorie diet is prescribed. Satisfactory weight can be maintained with 2500 to 3000 calories. 45-50 kcal/ kg body weight for adults and 90 kcal/kg body weight for children are suggested.

Protein: The daily protein intake of 80 to 120g or 1.5 - 2 g/kg body weight for adults is suggested.

Minerals: Calcium should be provided liberally since it is also essential for healing tuberculosis lesions. At least one litre of milk should be taken daily. The iron needs may also be increased if there has been hemorrhage.

Vitamins: The metabolism of vitamin A is adversely affected in tuberculosis. The diet should provide vitamin A. The weekly inclusion of vitamin A rich food and dietary supplementation with vitamin A is essential. Ascorbic acid intake should be increased. Large amounts of citrus fruits or supplementation of ascorbic acid is essential. Include plenty of antioxidants in the diet.

Dietary Guidelines

Easily digestible and good quality diet reduces strain on the body. During the acute stage a high-calorie diet is prescribed. One litre of milk and 3 to 4 eggs per day are given. Two or three servings of different type of fruits are suggested to meet micronutrient and antioxidant requirement.

1.3 Diet in Diseases of the Gastrointestinal Tract

Introduction

The **gastrointestinal tract** starts from the oral cavity, where food enters the mouth, continuing through the pharynx, oesophagus, stomach and intestines to the rectum and anus, where food is expelled. A**ccessory organs** such as liver and pancreas, salivary glands and the biliary tract secrete enzymes and bile to help break down food into is component nutrients.

Basic Structure

The gastrointestinal tract is a muscular tube lined by a special layer of cells, called epithelium.

i. Oral cavity

In the oral cavity or mouth the food is mechanical broken down by chewing and chopping actions of the teeth. The tongue plays an important role in chewing, swallowing, and helps the food bolus to come in contact with the teeth. It is also the sensing organ of the mouth for touch, temperature and taste using papillae.

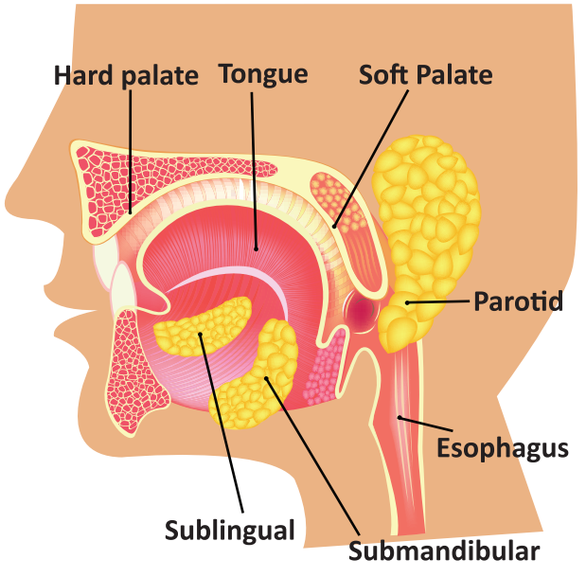
ii. Salivary glands

Salivary glands secrete saliva that lubricate and protect both the soft and hard tissues of the oral cavity. Three pairs of salivary glands include Parotids, Submandibular and Sublingual.

Functions of Saliva

- It keeps the mouth moist and helps in speech.
- It helps in the process of mastication of the food stuff and in preparing it into a bolus suitable for digestion.

- Saliva contains **two enzymes. Ptyalin** and **Maltase** which converts starchy foods into sugars.
- Saliva helps in the sensation of taste.
- It helps in the excretion of certain substances. Ex: mercury, lead.



iii. Oesophagus

The esophagus is a muscular tube which conveys food from oral cavity to stomach.

iv Stomach

The stomach is a J shaped expanded bag, located left side of the midline between the oesophagus and small intestine.

The stomach is divided into three regions: the fundus, the body and the pylorus.

The functions of the stomach include:

- The short-term storage of ingested food.
- Mechanical breakdown of food by churning and mixing motions.
- Temporary storage allowing time for the digestive enzymes like pepsin to act.
- Limited absorption of water, alcohol and some fat soluble drugs.
- Preparation of iron for absorption further along the tract.

v. Small intestine

The small intestine is composed of the duodenum, jejunum, and ileum. It averages approximately 6m in length. The lining of the small intestine is made up of numerous permanent folds, numerous villi and microvilli.

Functions of Small Intestine

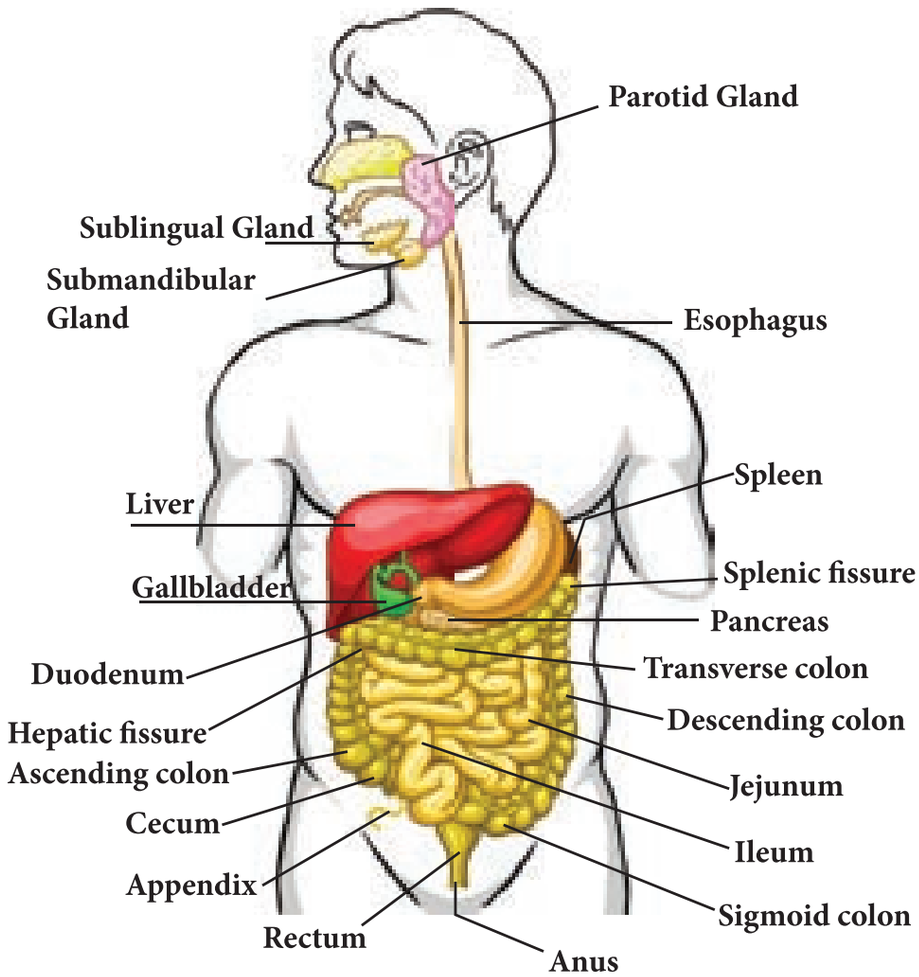
- Secretion of intestinal juice and hormones.
- Completion of chemical digestion of carbohydrates, protein and fats.
- Provide protection from infection by microbes.
- Digestion and absorption of nutrients .

v. Large intestine

The large intestine is horse-shoe shaped and extends around the small intestine like a frame.

Functions of Large Intestine

- Absorption of water, by osmosis, continuous until the semi solid consistency of stools is achieved.
- Mineral salts, vitamins and some drugs are also absorbed.
- It has certain types of bacteria which synthesize Vitamin K and folic acid.
- It helps in mass movement of fecal mass.



Gastrointestinal Tract

1.3.1 Peptic Ulcer

Peptic ulcer is a localized erosion on the mucosal lining of those portions of the alimentary tract that comes in contact with gastric juice. It can occur in any area of the stomach. The disintegration of tissues can also result in necrosis.

Types of Ulcer

Gastric Ulcer: Gastric ulcer occur in the stomach, mostly along the lesser curvature of the stomach.

Duodenal Ulcer : Most duodenal ulcers occur in the duodenal bulb, in an area immediately below the pylorus.

Stress Ulcer: Stress ulcer may occur as a complication of severe burns, trauma, surgery or radiation therapy.

Necrosis is the death of most or all cells in an organ or tissue due to disease, injury or failure of blood supply.

Causes of Ulcer

1) **Bacterial infection:** Infection by Helicobacter pylori is the chief cause of ulcer. It colonizes the stomach. Infection is typically contracted in early childhood and remains for the rest of life. Helicobacter pylori is cleared by antibiotic treatment especially with amoxicillin.

2 **Genetic factors:** It is common in persons with blood group 'O'.

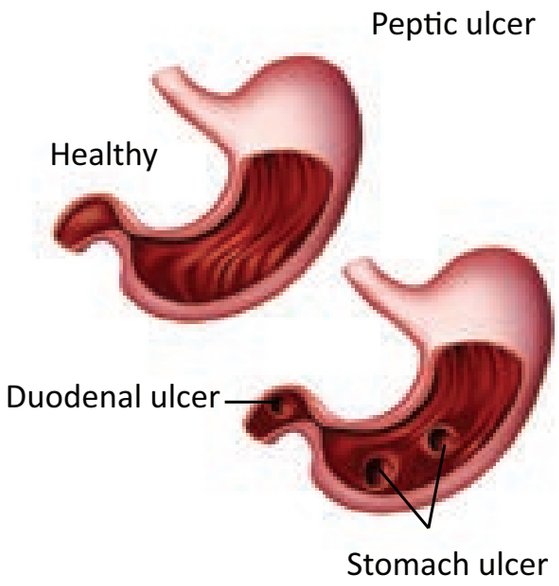
3) **Gender:** Men are affected 2-3 times more frequently than woman.

4) **Age:** The incidence is high between 20 and 40 years

5) **Stress:** People who are highly nervous and emotional are more susceptible.

6) **Potential irritant substance:** Caffeine, chillies, pepper, ginger, meat soup and strong tea or coffee and protein rich foods increase the secretion of hydrochloric acid

7) **Emergency injuries :**Stress ulcers occur in conjunction with emergency injuries such as burns.



Symptoms of Ulcer

- Epigastric pain in the upper abdomen.
- Hemorrhage-an escape of blood from a ruptured blood vessel.
- Hypermotility- excessive motility of the gastrointestinal tract.
- Painful hunger contractions.
- Flatulence.
- Weight loss
- Iron deficiency.

Principles of diet

High energy, high protein, moderate fat and low fibre

Regular balanced diet should be given to support the primary medical management of

1) tissue healing and

2) maintenance of structural and functional integrity of tissues.

Dietary Management

Energy: Increased energy intake is necessary. If the patient is at bed rest, energy is not required for activity but needed to make-up the extra demands.

Protein: A high protein diet promotes healing. Milk and milk products should be included as a source of nutrient factor for healing process. Eggs and other high protein foods can be included.

Fat: Moderate amounts of fat to help to suppress gastric secretions and motility.

Carbohydrates: They are used to meet the energy needs. Foods containing high fibre and vegetables which are high in insoluble fibre are restricted.

Fibre: Soluble fibre can be given. Certain raw fruits and vegetables high in fibre are restricted.

Gastritis is the inflammation and corrosion of the inner lining of the stomach called mucosa as a result of an immune response to infection or external injury.

Dietary Guidelines

Foods to be included	Foods to be avoided
Rice flakes, puffed rice, well-cooked cereals, Cooked pulses, dairy products like milk, cream, boiled eggs, steamed fish, Well cooked vegetables Desserts such as custard	Raw vegetables, raw unripe fruits, Beverages - strong tea, coffee, cola, processed foods- pickles, spices, pastries, sweets, all fried foods, Spices -Pepper, chillies

1.3.2 Diarrhoea

Diarrhoea is often a symptom of a systemic disease caused by viral and bacterial organisms. It is defined as frequent passage of loose, watery stools which may contain blood or mucous.

Causes of Diarrhoea

Diarrhoea results from changes in the mucosa of the small and large intestines. Diarrhoea may be due to many causes. The more common causes are:

- **Viral Infection :** e.g. 'intestinal' flu, a common term for infection of the bowels by the influenza virus and rota virus.
- **Bacterial Infection :** 50 percent of the cases are due to bacterial infections of the gut. Bacteria produce toxin in the gut e.g. Vibrio cholerae, Shigella.
- **Food poisoning :** Poor food hygiene and improperly handled food as a result of food being prepared with unwashed hands, food exposed to flies or cockroaches, or left at room temperature for a long time.

Symptoms of Diarrhoea

Diarrhoea means passing loose or watery stools several times a day. It is usually a symptom of an inflamed intestine or bowels. The inflammation results in food hurrying through the bowels. This leaves too little time for water to be absorbed from the bowel contents back into the body. Diarrhoea can be uncomfortable especially when accompanied by abdominal pain, nausea, vomiting or fever. Diarrhoea can lead to dehydration.

Principles of Diet

A high calorie, high protein, moderate fat, low fibre, high fluid and low residue diet is recommended. Initially liquid diet followed by soft bland diet.

Dietary Management

After recovery the following diet is given.

Energy: Energy intake is increased by 10-20% due to increase in BMR.

Carbohydrate: Carbohydrate intake is increased. to meet the increased energy requirement,

Protein: The protein requirement is increased.

Fats: Only moderate amount of fat should be given.

Minerals: The requirement of calcium and iron is increased during diarrhoea.

Vitamins: Sufficient amount of fat soluble vitamin A is required.

Dietary fibre: Low fibre diets in recommended in diarrhoea in order to avoid stress in GI tract. Foods rich in fibre have high residue, so it should be avoided. It is recommended to give low residue food.

Fluid: Plenty of fluid, 3 to 4 litres of water, ORS, tender coconut water, barley water and strained soup.

Treatment

Oral Rehydration Therapy: It is a type of fluid replacement used to prevent and treat dehydration, especially that caused due to diarrhoea. The World Health Organization approved Oral Rehydration Solution (ORS) is given in table below:

Oral Rehydration Solution	
Components	**Amount g /l**
Glucose	**20**
Sodium chloride	**3.5**
Trisodium citrate	**2.9**
Sodium carbonate	**2.5**
Potassium chloride	**1.5**

Home made ORS

For one glass boiled cooled water, one pinch of salt and one teaspoon of sugar can be added, to prepare ORS at home.

Foods to be included	Foods to be avoided
Refined Cereals (Rice, Maida, Vermicelli), Idli, Idiyappam	Whole Cereals- Dalia, Whole Wheat Flour.
Washed/Dehusked Pulses (Moong, Lentil).	Whole Pulses- Rajmah, Chole, Soyabean, Peas,
Milk products - Curd, Buttermilk.	Milk and Milk based Desserts like Milk Shakes
Boiled Vegetables and Fruits - Papaya, Banana, Stewed Apple (without peel), strained Juice, Soups,	Muttons, Chicken and Fish, Fried foods
Beverages and Light Desserts like Custard	Nuts and Oilseeds

DO YOU KNOW?

ORS Day is celebrated every year on 29th July.

1.3.3 Constipation

Constipation is a common disorder of motor activity of the bowel and characterized by the infrequent and difficult passage of small amounts of hard stool. It is the passage of hard stool at infrequent and long intervals with difficulty to expel. In constipation there may be less than 3 motion per week or painful defecation.

Causes of Constipation

I Systematic / metabolic causes:

- Lack of exercise,
- Ignoring urge to defecate,
- Diet low in fibre,
- Pregnancy,
- Side effect of medication,
- Metabolic and endocrine abnormalities (uremia, hypocalcaemia, hypo-thyroidism).

II Gastro Intestinal cause:

- Cancer in stomach and colon
- Upper GI tract diseases,
- Irritable bowel syndrome,
- Anal fissures and hemorrhoids,
- Laxative abuse.

Symptoms of Constipation

The symptoms are as follows:

- Head ache
- Coated tongue
- Foul breath
- Lack of appetite

- Abdominal swelling
- Abdominal bloating
- Nausea
- Feeling sluggish

Principles of Diet

Normal energy, protein and fat requirements are followed. Adequate fat may be given as it increases gastric motility by causing lubrication of mucous in the GI tract. High fibre and plenty of fluid is recommended.

Dietary Management

Fibre: Primary diet consideration is consumption of both soluble and insoluble fibre because it remains in the digestive tract for long duration and contribute to the bulk of diet.

What is the role of Fibre in Constipation?

Dietary fibre refers to edible plant material not digested by the enzymes in the upper digestive tract of humans. It consists of cellulose, hemicelluloses, pectin, starchy materials, and oligosaccharide that are partially resistant to digestive enzymes. Cellulose is considered insoluble; it helps move waste through your digestive tract, which prevents constipation. Residue refers to the end result of digestive, secretary, absorptive, and fermentative processes. High residue (high bulk, high fibre, high roughage) diet is given during constipation. Increasing dietary fibre may result in increased fecal output.

Guava has a high fibre content.

Sources:

Whole cereals - whole wheat flour, broken wheat, millets, oats.

Legumes - green gram, Bengal gram, Rajma

Roots- carrots, radish

Fruits-guava, orange, apricot, dates, raisins, banana

Green leafy vegetables- amaranth, fenugreek, drumstick leaves

Vegetables – beans, brinjal, drumstick, gourds

Fluid: 2-3 litres of fluids including warm water with lemon juice is advised to get relief from constipation. Unstrained soups (spinach, tomato, chicken and corn) can be given.

Potassium: Acutely ill patients who are bedridden, may be given vegetable soup and fruit juices which are high in potassium.

1.4 Diet in Diseases of Liver

The liver is the largest glandular organ of the body situated in the right upper side of the abdomen. It is divided into four lobes. Blood is supplied by 2 sources, the Hepatic artery and Portal vein. About 1500ml of blood gets circulated in the liver.

Functions of Liver

Liver has metabolic functions related to all major nutrients.

i. Carbohydrate metabolism

The liver is the chief storehouse of carbohydrates in the body especially glycogen, which is formed from glucose (glycogenesis). When glucose is needed

by the body, glycogen is converted to glucose (glycogenolysis) and returned to the blood stream to maintain blood levels of glucose.

ii. Protein metabolism

Metabolism of protein through conversion of amino acid into other non-essential amino acid occurs in liver.

iii. Fat metabolism

The liver synthesizes lipoproteins, phospholipids, cholesterol and formation of bile.

iv. Mineral metabolism

The greatest portion of the body's iron is stored in the liver in the form of ferritin. Copper is also stored and is necessary for the production of hemoglobin.

v. Vitamin metabolism

All fat-soluble vitamins are present in the liver. Vitamin-A, D, E and K are stored in the liver. It also stores considerable amount of Vitamin C and the B vitamins.

vi. Detoxification

The liver detoxifies substances which are toxins produced because of bacterial action, parasitic infection, mineral poisons or drugs.

Vii. Other Functions

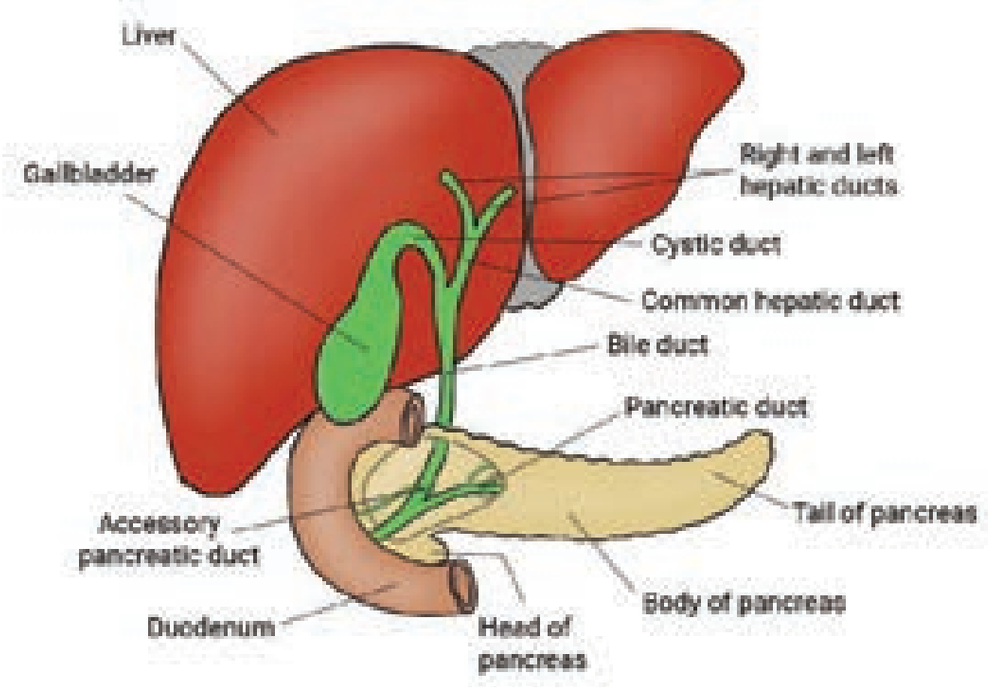
It helps in the formation of blood coagulation factors.

Jaundice is the symptom common to many diseases of the liver and disease of the biliary tract rather.

It is a condition in which yellow discoloration of the skin and mucous membranes occurs due to the presence of excessive amounts of the bile pigments in the blood.

1.4.1 Hepatitis

Hepatitis refers to an inflammation and degenerative changes of the liver. The most common are hepatitis viruses A, B, C, D, E virus.



Causes of Hepatitis

- Acute inflammation of the liver due to infection
- Inflammation of the bile duct
- Obstruction of the bile duct
- Hemolytic anemia

Symptoms of Hepatitis

- nausea and vomiting
- high fever
- dark colored urine
- loss of appetite
- pale colored stool
- abdominal pain (especially in the liver region) weakness and fatigue
- weight loss
- ascites

Principles of the Diet

A high protein, high carbohydrate and moderate fat diet is recommended. Small, attractive meals at regular intervals are better tolerated. Over feeding should be avoided.

Dietary Management

Energy: Increased energy intake. A liberal intake of carbohydrates and fat as tolerated is required to reduce protein catabolism. Initially liquid, soft bland diet should be given.

Proteins: For the liver cells to regenerate, an adequate supply of proteins is needed. Protein requirements vary according to the severity of the disease. With severe hepatitis, 40g, while in mild hepatitis 60- 80g of protein is permitted.

Fats: Fats make the food more palatable and increase caloric intake. In severe cases 20g and in moderate cases 20-30g of fat is recommended.

Carbohydrates: High carbohydrate content in the diet is essential to supply enough calories

Vitamins: They are essential to regenerate liver cells. Vitamin C, vitamin K and B complex are essential to meet the daily needs.

Minerals: Oral feeds of fruit juice, vegetables and meat soup with added salt are given orally to maintain the electrolyte balance.

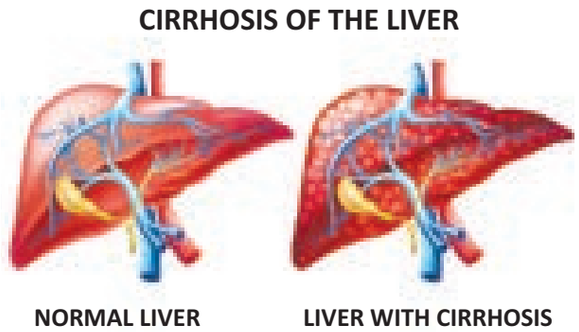
Sodium: If oedema or ascites is present then restrict sodium to 500 mg to 1000 mg. Fluid intake may be limited.

Dietary Guidelines

Foods to be included	Foods to be avoided
Cereal porridge, double cooked rice, soups, Milk, butter milk, Roots and tubers -boiled tapioca, potato and sweet potato, Fruit juices and light custard	Meat, fish, egg, Whole milk and cream, Processed foods -papads, chutneys, pickles, Sweet preparations, bakery products, Dried fruits and nuts, Condiments and spices

1.4.2 Cirrhosis

Cirrhosis is characterized by loss of functional cells and nodular regeneration of the liver cells.



Causes of Cirrhosis

- The causes include infectious hepatitis, chronic alcoholism in association with malnutrition.
- Non-alcoholic fatty liver disease has a number of causes, including being verweight, diabetes, high blood fats, and high blood pressure.

Symptoms of Cirrhosis

Gastrointestinal disturbances such as anorexia, vomiting, ascites, pain and swelling.

ASCITES

Ascites is the accumulation of abnormal amounts of fluid in the abdomen.

Principles of Diet therapy

A high calorie, high protein, high carbohydrate, moderate or restricted fat, high vitamin diet helps in the regeneration of liver and helps to prevent ascites. Vitamin supplementation is given. Sodium is restricted only when there is ascites.

Dietary Management

Energy: A 2000 -2500 kcals per day is needed. Most patients find it difficult to consume adequate calories because of anorexia and nausea. Several small meals are preferable to three large meals daily.

Carbohydrates: The carbohydrates content of the diet will be high 300 to 400g per day, in order to provide sufficient calories so that protein is not used for energy.

DO YOU KNOW?

Coconut oil is rich in Medium Chain Triglyceride.

Protein: A high protein diet is helpful for regeneration of the liver.

Fats: In cirrhosis, 20 g of fat is given. Medium chain triglycerides can be given.

Vitamins and Minerals: Vitamins and mineral supplementation is needed in all patients.

Sodium: Sodium restriction is prescribed if edema and ascites are present.

Fluids: Fluids may not be severely restricted if sodium restriction is effective in correcting edema and ascites.

Foods to be Avoided - Papad, pickles, preserved foods such as jams, jellies, sauces.

1.5 Overweight and Obesity

Obesity can be defined as the generalized accumulation of excess adipose tissue in the body resulting in an increase of more than 20 percent of the desirable weight or ideal weight. Overweight refers to person with body weight in excess of the weight-height standard but below the 20% excess designated as obesity.

1.5.1 Obesity

Types of Obesity

Android Obesity-: The android or the male pattern is characterized by fat distributed predominantly in the upper body above waist. This pattern may lead to an "apple-shaped" body.

Gynoid Obesity: Gynoid or female pattern shows fat predominantly in the lower body that is lower abdomen, buttocks, hips and thigh. Gynoid obese looks pear shaped.

Causes of Obesity

Genetic Factor

Age and Sex: The critical periods for the development of obesity is early childhood and early stages of puberty because of reduced physical activity and no adjustment of kilocalorie intake and no change in food habits.

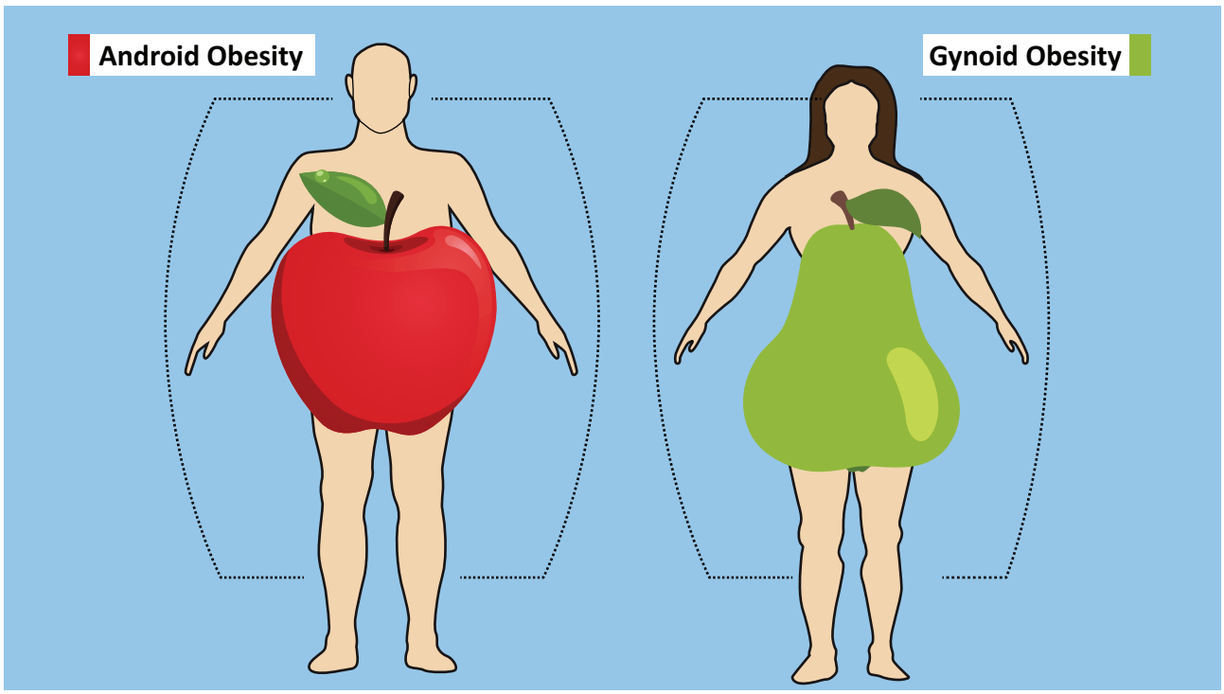
Eating Habits

1. Nibbling between meals,
2. Some may eat faster taking less time for chewing,
3. People who eat outside home more frequently are prone to obesity,
4. Non inclusion of fruits and vegetables,
5. People who eat processed, concentrated and high fat food are susceptible to obesity,
6. Frequent consumption of fast food which are rich in fat and low in fibre,
7. Consumption of sugar added beverages may contribute to weight gain.

Physical Activity

Obesity is found in persons who lead a sedentary life with less physical activity. Obesity is seen among school children who do not participate in school games and who use vehicles for commuting to school.

ADIPOSE TISSUE DISTRIBUTION IN MEN AND WOMEN



Endocrine Factor

Obesity is found in hypothyroidism.

Prosperity and Civilization

Obesity is common among people from higher socioeconomic status of developing countries since they have the purchasing power and availability of surplus food.

How do you assess the Body Composition?

Body Weight

An adult weighing 10% more than the standard weight is overweight and 20% more is obese.

Ideal Body Weight

The formula for ideal body weight is

Height (cm) – 100 = Ideal weight (kg)

Body Mass Index: Obesity is expressed in terms of BMI. It is also called QUETELET INDEX. It is represented as

BMI = weight (kg) / height^2 (m)

The following WHO classification scheme gives the grading of obesity based on BMI.

Table 3 BMI Classification

Classification	BMI (Kilograms/ m^2)
Underweight	<18.5
Normal weight	18.5-24.9
Overweight	25-29.9
Obesity Class 1	30-34.9
Obesity Class 2	35-39.9
Obesity Class 3	>40

Strategies For Weight Loss And Weight Maintenance Are

1. Diet Therapy
2. Physical Exercise

DO YOU KNOW?

Golden rate of obesity No fasting No feasting.

Principles of Diet Therapy

Low calorie, normal protein, vitamin and mineral (except sodium), restricted carbohydrates, restricted fat and liberal fluid, high fibre diet.

Energy: To lose weight, energy output must exceed energy input. About 20 kcal per kg ideal body weight is prescribed for a sedantary worker and 25 kcal per kg ideal body weight for moderately active worker.

Protein: About 0.8-1 g of protein/ kg body weight is prescribed for tissue repair.

Carbohydrates: Include more of complex carbohydrates. High carbohydrate content food like potatoes and rice are restricted. Sugar which gives empty calories should be totally avoided. Fruit rich in carbohydrate like banana should be avoided.

Fat: Low fat diet should be given to reduce energy value of food. Foods rich in fat substances like nuts and oil seeds should be restricted or avoided. Skim milk should be the choice.

Vitamins: Fat soluble vitamins A and D which may be supplemented.

Minerals: Restriction of sodium as common salt is helpful in weight reducing diet as excess sodium leads to retention of fluid.

Fluid: Fluid can be taken liberally. Also a glass of water before meal helps to cut down food intake.

High Fibre: High fibre low calorie foods like green leafy vegetables, fruits, vegetables salads, whole grain cereals and pulses can be included in the diet.

Advantages of High Fibre Food

1. Low in calorie density
2. Foods like greens provide many vitamins and minerals (which are difficult to meet with restricted foods)
3. Give satiety
4. Help in regulating bowel movements
5. Reduce blood cholesterol
6. Promote chewing and decrease rate of ingestion.

A paleo diet typically includes lean meats, fish, fruits, vegetables, nuts and seeds.

The colour Orange is named after the Orange fruit, but before that, it was called geoluread (yellow-red)

Physical Exercise

A low calorie diet accompanied by moderate exercise will be effective in causing weight loss.

- Aerobic exercise directly increases the daily energy expenditure.
- Exercise will also preserve lean body mass
- It helps to regulate appetite and increases the basal metabolic rate
- Reduce stress related eating.

Complications of Obesity

- ***Physical disability***: Feet have to carry extra load complications like flat feet, osteo-arthritis of knee, hip and lumbar spine.
- ***Metabolic disorder***- (a) Diabetes. (b) Plasma cholesterol level. (c) Atherosclerosis. (d) Gout.
- ***Cardiovascular disorders***-: High blood pressure and varicose veins.
- ***Sleep apnea***.
- ***Prone to accidents***-: Falling down on slippery floor and crossing streets.
- ***Gastrointestinal disturbance***: Hiatal hernias and gall bladder disease.
- ***Osteoarthritis***.
- ***Cancer***: Cancers (colon, rectum and prostrate in men, uterus, biliary tract, breast and ovary in women), digestive tract diseases (gallstones, reflux, esophagitis) and skin disorders.

1.5.2 Underweight

According to the WHO classification of Body Mass Index (BMI) people whose BMI is less than 18.5 are considered as underweight.

Causes of Underweight

Starvation: This occurs due to famine conditions or an inadequate diet lacking in proteins or an attempt at reducing weight.

Wasting diseases: Underweight also results from debilitating disease like tuberculosis, diabetes, malabsorption syndrome or cancer. Infections are common among them.

Poor food Intake: Diminished intake of food resulting due to 1) Psychological factors that cause a person to refuse to eat 2) loss of appetite or imbalance of the brain's hunger, satiety centers or 3) personal poverty and limited food supply.

Malabsorption syndrome: Poor nutrient absorption results from 1) prolonged diarrhoea 2) gastrointestinal disease 3) abuse of laxatives.

Anti obesity day is celebrated on 26th November.

Hormonal imbalance: Hyper-thyroidism increase the caloric needs of the body.

Energy Imbalance: Greatly increased physical activity without a corresponding increase in food brings an energy balance deficit.

Poor living status: An unhealthy home environment or no home at all results in irregular and inadequate meals.

Principles of Diet Therapy

A high calorie, high protein, high carbohydrate, moderate fat diet with good sources of vitamins and minerals.

Dietary Management

Energy: The calorie requirements vary depending upon the activities. The total calorie intake should be in excess of the energy requirement.

Proteins: Instead of 1 g of protein 1.2 g per kg/day is recommended.

Fat: Fat is added to increase the calories but it should not exceed the tolerance limits.

Carbohydrate: High carbohydrate is to provide primary energy source and should be provided in an easily digested form. The number of meals should be increased.

Vitamins and minerals: Liberal amount through proper diet should be given.

Fluids: Fluid should be taken after meal and not before or during meals.

Dietary Guidelines

- Good food of wide variety, well prepared, helps to revive lagging appetite and increase desire to eat.
- Energy dense food is preferred.
- Frequent small nourishing meals should be given.
- Concentrated food supplements can be given.
- Foods can be seasoned with ghee, butter, sauces and dressings.

1.6 Diet for Cardiovascular disease

Cardiovascular disease (CVD) generally refers to the disease of the heart and blood vessels, is a major cause of disability and premature death throughout the world and contributes to the escalating cost of health care in India. Compared to the western countries, CVD affects Indians atleast a decade earlier and in their most productive years.

Structure of the heart

It is a muscular organ made up of smooth muscles (myocardium) which is enclosed in a sac known as the pericardium (outside layer). Shaped like an egg, is about the size of a person's clenched fist and weighs around 300 g in a man and 250 g in a woman.

The heart has four chambers, two atria (upper) and two ventricles (lower). Valves connect the upper and lower chambers and allows blood to flow only in one direction. The right and left sides of the heart are totally separated by a muscular wall and there is no communication between them.

The right side of the heart (Right atrium and Right ventricle) receives deoxygenated (impure) blood collected from different parts of the body through small and big veins (superior vena cava and inferior vena cava) which enters the lungs through the pulmonary artery.

In the lungs, blood is oxygenated and carbon dioxide and metabolic waste are removed. The left side of the heart (Left atrium and Left ventricle) gets oxygenated (pure) blood from the lungs through the pulmonary vein and supplies it to the entire body through the major blood vessel aorta and its innumerable branches (arteries and capillaries).

The left ventricle generates considerably greater pressure than the right ventricle, to enable the blood to be pumped throughout the body.

The heart muscles are supplied with oxygenated blood by two major coronary arteries and their branches which are distributed all over the surface of the heart.

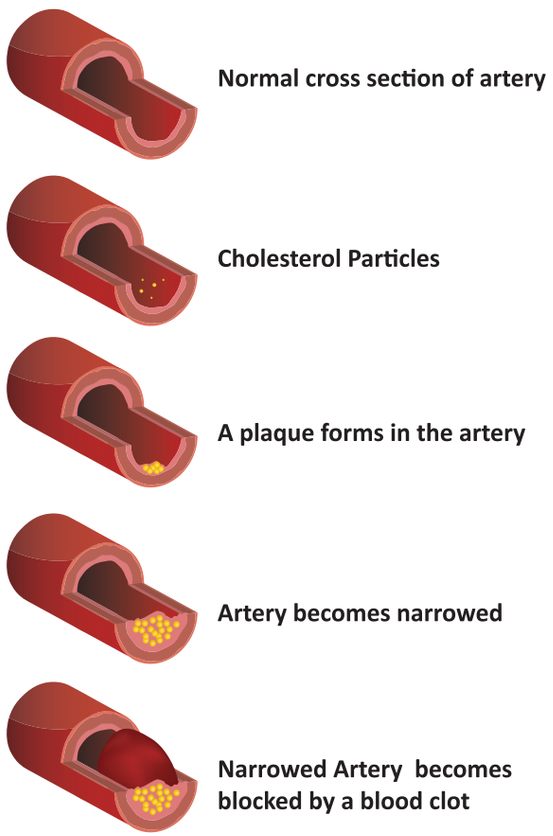
The coronary blood flow in a normal adult averages 200-250 ml/minutes. In a healthy adult at rest, the heart pumps approximately 5 litres of blood every minute. For efficient pumping, it is necessary for the heart to beat at a reasonable rate of 60-90 beats/minute which is achieved through controlled electrical impulses.

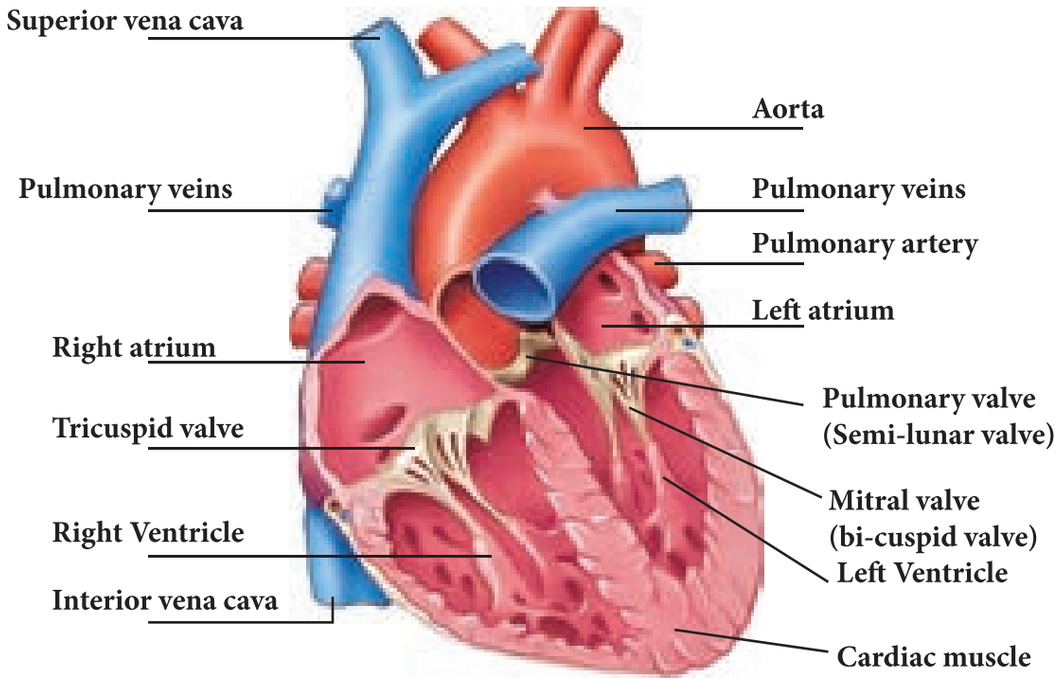
The heart and the blood vessels together constitute the cardiovascular system.

1.6.1 Cardiovascular diseases

The most common forms of cardiovascular disease are:

1. **Atherosclerosis** is a process by which arteries are narrowed due to the accumulation of cholesterol and other blood lipids along the walls obstructing the blood flow.



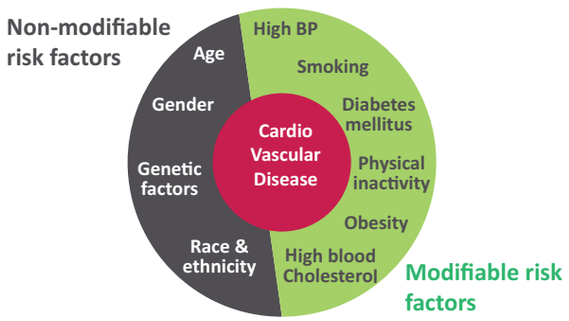


The fatty fibrous mass thickens over time narrowing the interior of the artery and forms blood clots, which may cut off blood flow causing tissue death called an **infarct**. When there is no supply of blood nutrients and oxygen to the myocardium (heart muscle) due to block in one of the coronary arteries, the event is called an acute **myocardial infarction** (MI) or heart attack.

2. **Stroke** / brain attack results when there is a block in the major artery supplying blood to the brain.

Risk factors for CVD

Multiple risk factors are involved such as:



Non-modifiable factors - the individual has no control over them.

1. **Age** - Onset increases with advancing age: usually between 50-55 years occurs at an earlier age in individual with a position family history.
2. **Sex** - Occurs more in men than women: but after menopause the risk increases in a woman due to lack of ovarian hormone estrogen.
3. **Hereditary/ family history** - A history of premature death (before 55 years in a parent/grandparent) increases the risk for CVD.

Modifiable factors - can be controlled to prevent or delay the onset of CVD.

4. **Blood lipids** - Elevated levels of blood lipids (Cholesterol, LDL & triglycerides) is the major risk factor which is worsened by lack of physical activity, obesity, smoking, stress and excess food intake.
5. **Dietary fat**- High intake of saturated fat and cholesterol in the diet increases the blood cholesterol levels.

6. **Obesity** - Excess body fat is associated with increased risk of developing hypertension, high cholesterol and diabetes.
7. **Hypertension / high blood pressure**- It is an independent risk factor for heart attack, stroke, diabetes and renal failure.
8. **Diabetes mellitus** - The risk for heart diseases doubles in individuals with diabetes.
9. **Smoking** - It is a major risk factor that damages the heart and blood vessels muscles directly by making the heart work faster and harder. It also increases the blood cholesterol and blood pressure.
10. **Physical inactivity** - Sedentary lifestyle leads to excess body fat, elevated cholesterol and high blood pressure resulting in 2 times increase in CVD.
11. **Stress**- Anxiety, depression and lack of social support not only increases the blood pressure but also damages the muscles of the heart.

DO YOU KNOW?

Heart disease occurs in person with diabetes at 2/4 times more than rate of the general population.

Blood lipids and CVD

Lipid is the class name for all fats and fat related components. Elevated blood lipids are associated with cardiovascular disease. Lipids substances involved in the disease process are cholesterol, triglycerides and lipoproteins- LDL (low density lipoproteins) and HDL (high density lipoproteins).

Cholesterol and triglycerides are the main forms of lipids in the blood. These come partly from the food and partly from the body's own production in the liver. Excess cholesterol above that needed by the body is deposited in the arteries and contributes to atherosclerosis.

Lipoproteins carry fat and cholesterol to the tissue for metabolism and back to the liver for excretion as needed.

"GOOD" Cholesterol - HDL

The HDL Cholesterol scarapes away necessary LDL from artery walls, preventing the formation of plaques. That's why HDL cholesterol is commonly called "GOOD".

"BAD" Cholesterol - LDL

LDL, on the contrary, deposits excess cholesterol on the artery walls, thus promoting plaque formation. For this reason, the LDL cholestrol is defined as "BAD"

Because LDL constantly sends cholesterol to the tissues and promotes the deposition in the arteries, it is called the " bad cholesterol". HDL called the "good cholesterol" transports cholesterol from the tissues to the liver for elimination from the body. It is not found in food but produced in the body.

High level of total LDL is a concern in the development and progression of heart diseases while an optimal level of HDL confers protection against heart diseases.

ACTIVITY 1

Assess for the presence of risk factors for heart disease in your respective family and discuss the same among your friends and family members.

ATP III classification of blood lipids

Cholesterol reading	Classification
Total cholesterol (mg/dl)	
<200	**Desirable**
200-239	**Borderline high risk**
≥ 240	**High risk**
LDL cholesterol (mg/dl)	
<100	**Optimal**
100-129	**Near optimal**
130-159	**Borderline high risk**
160-189	**High risk**
≥ 190	**Very high risk**
HDL cholesterol (mg/dl)	
≥ 60	**Optimal**
40-59	**Desirable**
<40	**High risk**
Triglycerides (mg/dl)	
<150	**Optimal**
150-199	**Borderline high risk**
≥ 200	**High risk**

Principles of diet

Low to moderate calorie, moderate fat (less saturated fat, cholesterol and high in unsaturated fats such as monounsaturated fat and poly-unsaturated fatty acids) low carbohydrate, normal protein and high fibre is recommended.

Dietary management

Energy

The total energy intake should match the energy expenditure to achieve a desirable body weight. Reducing the calorie intake and increasing the physical activity helps to reduce excess body weight and blood lipids.

Fat

Dietary fat has been shown to affect blood lipid levels. Total fat intake should not exceed 25% of total calories.

- **Saturated fat** to be restricted to 7% of total calories as it promotes an increase in blood cholesterol which in turn can lead to heart disease.

  Saturated fat is mostly present in animals foods like meat, poultry, milk and milk products. Processed foods like cakes, biscuits and pastries also contain these fats.

- **Monounsaturated fat** An intake of 20% of monounsaturated fat (MUFA) reduces the cholesterol and maintains the HDL levels. These are found in groundnut oil, soyabean oil, olive oil as well as nuts like almonds and walnuts.

- **Polyunsaturated fatty acids** (PUFA) It is found as n-3 fatty acids and n-6 fatty acids to be not more than 10% of total calorie intake. Fish oils, flax seeds, nuts like walnuts are good sources of n-3 fatty acids while n-6 are present in vegetable oils like sunflower, safflower oils. n-3 fatty acids can help reduce the triglycerides levels in the blood. A good balance between n-6, n-3 PUFA is essential for a healthy heart which is possible by appropriate combination of oils. eg, use of mustard oil or soya bean oil with other oils will help to achieve this balance.

DO YOU KNOW?

Consuming 100-200 gm of fish at least twice a week benefits heart health.

- **Dietary cholesterol** Limiting the dietary cholesterol to less than 200 mg/ day is associated with reduced levels of total cholesterol and LDL cholesterol. Egg yolk and organ meats like brain, kidney and liver are rich in cholesterol.
- **Trans-fats** are fats that are found in baked foods, fast foods and fried foods have the ability to raise LDL cholesterol. It is advisable to restrict the intake to not more than 1% of calories (approximately 1-3gm/day).

DO YOU KNOW?

Heart cancer is very rare because heart cells stop dividing early in life.

ACTIVITY 2

List the usage of different oils used in your home. Justify the level of usage.

Carbohydrate

Carbohydrate intake should contribute to not more than 55% of the total energy requirement. Complex carbohydrates in the form of whole grain cereals are preferred to simple carbohydrates that raise the blood triglycerides levels.

Protein

Normal intake of 50-60g/day is recommended. Usage of animal proteins which are also rich in saturated fats and

cholesterol can be limited or replaced with vegetable like pulses and nuts proteins.

Sodium

Sodium is restricted when hypertension is present.

DO YOU KNOW?

Grapes have to be consumed with the seeds and skin as they contain resveratol - a powerful antioxidant that protects the heart.

Other dietary factors

In general a nutritionally balanced diet helps reduce the risk of CVD. Additionally specific dietary strategies also help to protect against heart diseases.

Dark chocolate – Moderate intake of dark chocolate (high in cocoa content) has antioxidant potential to lower LDL cholesterol.

DO YOU KNOW?

Approximately ⅓ rd the requirement of fibre (6-10g out of 30g/day) and antioxidants for adults can be easily met by taking 5-6 servings of fruit and vegetables per day (1 serving = 75-100g)

Dietary factor	Protection against CHD
Soluble fibre (apples and other fruits, oats, soy, barley, legumes).	• Lowers blood cholesterol • Lower risk of heart attack • Improves LDL to HDL ratio
Antioxidants like beta carotene, lycopene, vitamin E and vitamin C present in fruits and vegetables	• Slows progression of Atherosclerosis • Lowers risk of heart attack in people with CHD • Decreases LDL cholesterol
Soya (protein and isoflavones)	• Lowers blood cholesterol • Raises HDL cholesterol • Improves LDL to HDL ratio
Nuts (in small amounts) walnut, almond and groundnut	• Lowers blood cholesterol

Other lifestyle modifications

Physical activity – Regular aerobic exercise like brisk walking can help to strengthen the heart muscle, promote weight loss or help maintain weight, raise HDL cholesterol, improve blood glucose levels and reduce blood pressure.

Smoking and stress – Refraining from smoking and appropriate strategies for coping with stress would help to prevent heart disease.

Case study

Kumar is a 60 year old executive who is obese. He smokes and occasionally consumes alcohol. He is very ambitious and does not like to do exercise. He has a strong family history for heart disease.

1. What are his risk factors?
2. What lifestyle modification will you advice him?

1.6.2 Hypertension

Hypertension is the number one killer disease in India, with a higher prevalence among the urban adult population.

The normal pressure of blood against the walls of the arteries is called blood pressure or hypertension. The normal blood pressure, when the heart contracts, is called systolic pressure (SBP) and is between 100-140 mm of mercury. When the heart relaxes, the pressure is known as diastolic pressure (DBP) with values of 70-90 mm of mercury.

Hypertension in adults aged 18 years and older is defined as systolic blood pressure of 140 mm Hg or greater and/or diastolic blood pressure of 90 mm Hg or greater.

It is also called "the silent killer" because it does not exhibit any signs or symptoms to indicate its presence. When undetected, untreated or uncontrolled can lead to serious consequences like stroke.

Hypertension may be classified as

- **Primary or essential hypertension** - It refers to the condition where the specific cause is unknown. It involves a complex interaction between poor lifestyle choices and genes. The lifestyle factors include a poor diet – high sodium, low fruit and vegetable intake, obesity, smoking, lack of exercise and stress.
- **Secondary hypertension** - This has a known cause and may arise as a result of another disease. E.g. Individuals with kidney disease have secondary hypertension.

Classification of blood pressure

Category	Systolic (mmHg)	Diastolic (mmHg)
Optimal	<120	And <80
Normal	<130	<85
High normal	130-139	85-89
Hypertension		
Stage 1	140-159	90-99
Stage 2	160-179	100-109
Stage 3	≥180	≥110

Source: Indian Guidelines for management of Hypertension II, 2013

Stage 1 Hypertension. Focus is on dietary modification (without drugs) to reduce excess weight and restrict sodium.

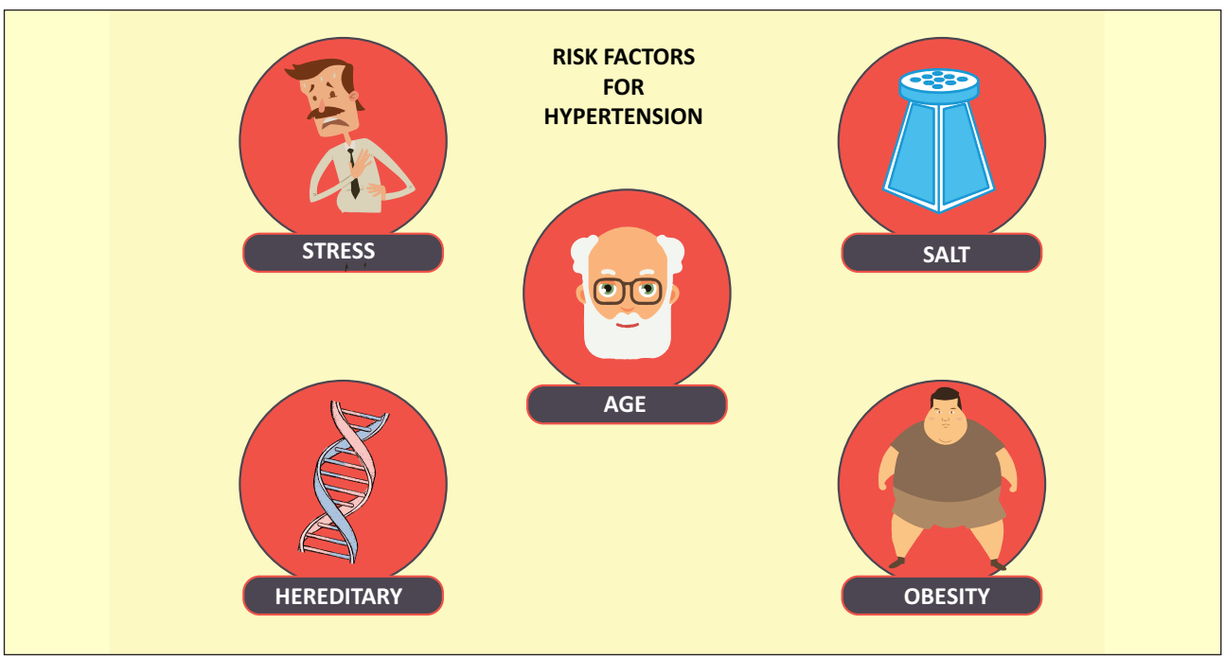
Stage 2 Hypertension. In addition to the diet therapy for stage 1, drugs are used according to need and usually include a diuretic agent. Continious use of some, diuretic drugs cause loss of potassium along with the increased loss of water from the body. Potassium replacement becomes necessary to avoid irregular heart beat.

Stage 3 Hypertension. Vigorous drug therapy becomes necessary along with dietary changes in stage 2. Nutritional support is important for all types of hypertension, along with other nondrug therapies of physical exercise and stress reduction.

Risk factors for hypertension

Major risk factors are:

- **Smoking.** Smoking increases the heart's workload, raising blood pressure as nicotine in cigarette constricts the small blood vessels.
- **High blood lipids**. High blood lipids contribute to both atherosclerosis and hypertension.
- **Poor diet**. Diets rich in saturated fat and cholesterol with low intake of fruit and vegetable raises blood pressure.
- **Diabetes**. People with diabetes often have high blood pressure.
- **Gender**. Risk of blood pressure is higher in men than in-women and the risk is higher in post menopausal women.
- **Age**. Onset increases with advancing age (>60 years) as old age is associated with loss of elasticity of the arteries.
- **Heredity**. A family history of hypertension in women under 65 and in men under 55 significantly raises the risk of developing hypertension.
- **Obesity**. Excess body fat, especially abdominal fat, is closely associated with hypertension.
- **Lack of exercise**. Less active people are twice likely to develop hypertension than their active counterparts.



- **Chronic stress**.
- **Certain drugs**. Birth control pills may increase blood pressure.
- **Caffeine**. Some people, who are sensitive to caffeine may experience an increase in blood pressure.

Principles of diet

Low calorie, low fat, low sodium diet with normal protein is prescribed.

Energy

Calorie restriction to aid weight loss is recommended for overweight and obese individuals, which significantly reduces the blood pressure and LDL cholesterol levels. Weight loss along with drug therapy decreases the dose or number of drugs necessary to control blood pressure.

Protein: Adequate intake of 50- 60 g protein is necessary to maintain optimal nutrition.

Fats: Fat intake with emphasis on low saturated and high PUFA & MUFA is recommended to facilitate weight control and decrease the risk of CVD.

Carbohydrate: Complex carbohydrate as whole grain helps to manage high blood pressure.

Sodium: In sodium sensitive people, restricting sodium to 2-g is sufficient.

In severe cases of hypertension, a moderate 1-g sodium level may be indicated.

How to cut salt intake

Strategies to cut salt intake include:

- Select fresh, unprocessed foods.
- Cook with little or no added salt avoid pickles and salted fried.
- Prepare foods with sodium-free spices such as basil, bay leaves, curry leaves, garlic, ginger, mint, pepper, lemon juice, vinegar in place of some or all of the salt to add flavour .
- Read labels for sodium to select low-salt or salt-free products when available.
- Avoid preservatives like monosodium glutamate, soya sauce, ketchups, Cheese, and salted butter.
- Canned and instant soups.
- Gelatin, cakes, biscuit and candies.

DO YOU KNOW?

2.4g of sodium is approximately equivalent to 6 g sodium chloride or table salt.

Other minerals

Minerals like calcium and magnesium are found to be beneficial in controlling blood pressure, e.g. Low fat dairy products, green leafy vegetables and nuts. Increasing the potassium to replace the loss with diuretics. Most of the fruits and vegetables are rich in potassium.

Exercise

Moderate physical activity (30-45 minutes of brisk walking) is recommended as weight loss is associated with reduced blood pressure values.

1.7 Diet in Diabetes Mellitus

Diabetes mellitus is a group of metabolic diseases characterised by high blood glucose resulting from defects in insulin secretion, insulin action or both.

Diabetes = to pass through ; mellitus = honey (sugar in urine)

Insulin is a hormone produced by the beta cells of the pancreas which helps to transport glucose into the cells and utilize them for energy production in the body.

It also helps to convert glucose to glycogen to be stored in the liver and muscles. Alongside it helps to convert glucose to fat that is stored as body fat and promotes the uptake of amino acids by muscles.

Individuals with diabetes either do not produce insulin or cannot use the insulin produced. As a result glucose does not enter the body cells and builds up in the blood causing an increase in blood glucose levels. As the disease progresses, glucose starts to appear in the urine.

Classification of Diabetes Mellitus

Type 1 Diabetes Mellitus

Type 1 diabetes mellitus accounts for 5% to 10 % of all cases of diabetes. Previously called insulin dependent diabetes is caused by the destruction of the beta cells in the pancreas.

The onset of type 1 diabetes occurs rapidly in children and adolescence. Individuals with type 1 diabetes mellitus require insulin injections for their survival.

Type 2 Diabetes Mellitus

The most common form with approximately 90% to 95% of the individuals belonging to this category. When the body is not producing enough insulin or the insulin it produces cannot be used (insulin resistance) leads to type 2 diabetes mellitus.

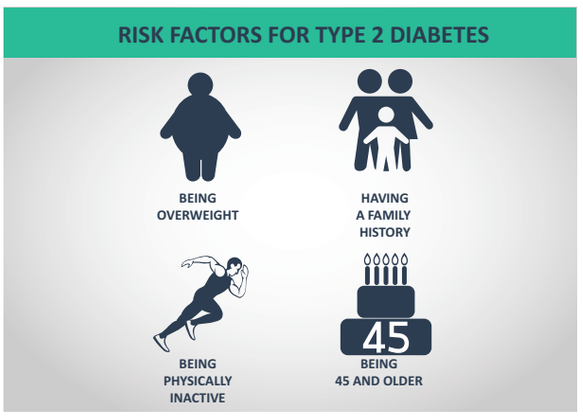
This form has a strong genetic link and is more prevalent in older, obese, inactive individuals. The onset occurs in adults above age 40, but is now also being diagnosed in children and young adults. These individuals do not need insulin for survival, but rather rely on diet, exercise, and (usually) oral medications for disease management.

Gestational Diabetes Mellitus

Gestational diabetes mellitus (GDM) is a temporary form of diabetes developed during pregnancy in woman who do not have diabetes. The blood glucose level become normalized after delivery.

Impaired Glucose Tolerance / Pre-diabetes

Individuals whose fasting blood glucose is above normal (≥ 110 mg/dL), but is not high enough to be diagnosed as diabetes (< 126 mg/dL) fall under this category. It is also referred to as pre-diabetes.



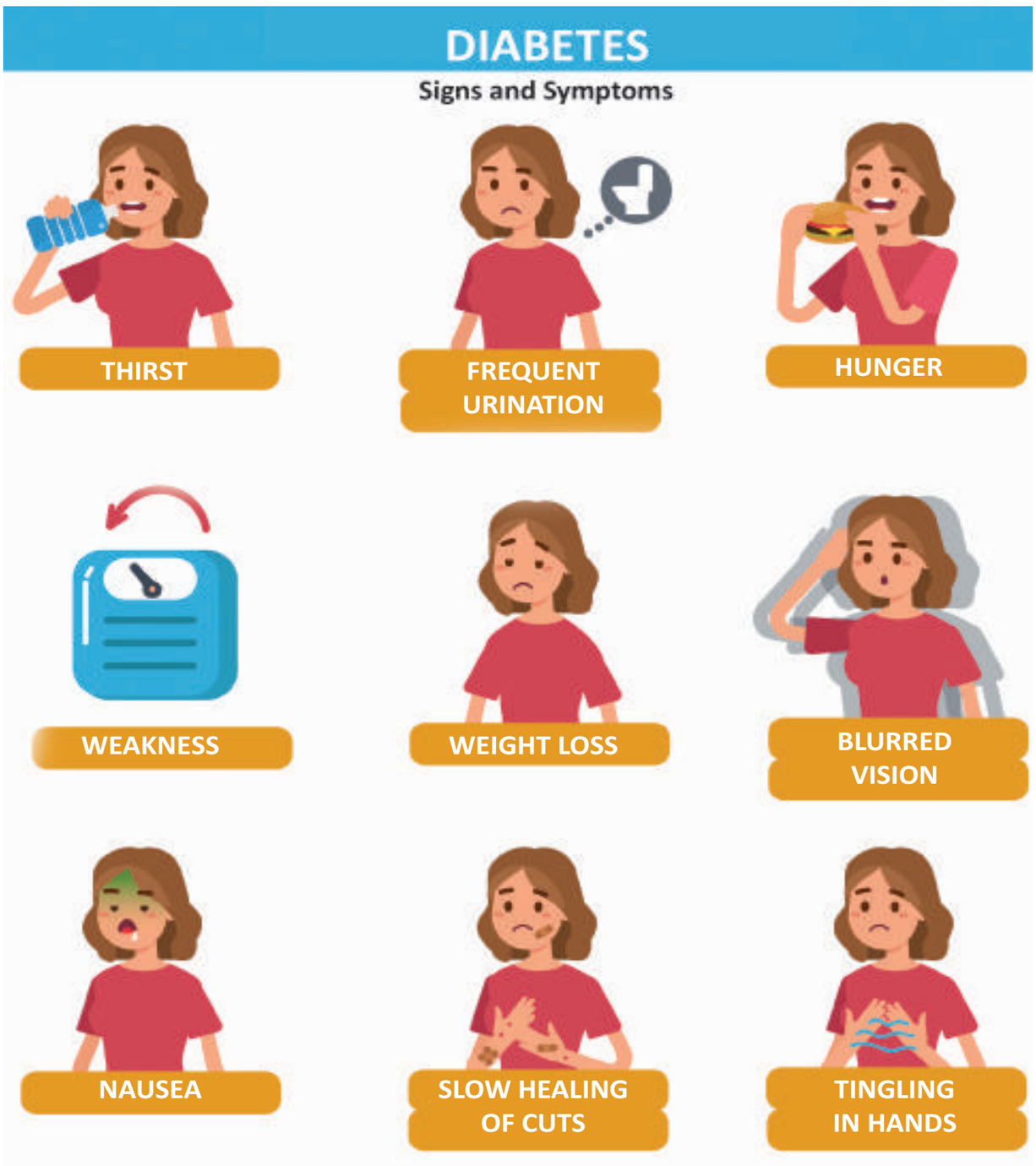
Risk Factors for Type 2 Diabetes Mellitus

- Family history of diabetes.
- Age - 45 years or older.
- Obesity (BMI ≥23 kg/m^2).
- Physical inactivity.

- Race/ethnicity- Asians have 2-4 times risk than Europeans.
- History of gestational diabetes.
- Woman who has delivered an infant weighing more than 4kg.
- History of heart diseases – high cholesterol, low HDL, hypertension.

DO YOU KNOW?

Diabetes emerged as India's seventh biggest cause of early death in 2016, from eleventh in 2005. In India, about 50.9 million people suffer from diabetes, and this figure is likely to go up to 80 million by 2025, making it the 'Diabetes Capital' of the world.



Symptoms of Diabetes Mellitus

- Increased thirst (polydipsia)
- Increased urination (polyuria)
- Increased hunger (polyphagia)
- Unintentional weight loss in type 1, or weight gain with type 2
- Blurred vision
- Skin irritation or infection
- General weakness and loss of strength.

Complications

Uncontrolled diabetes can lead to

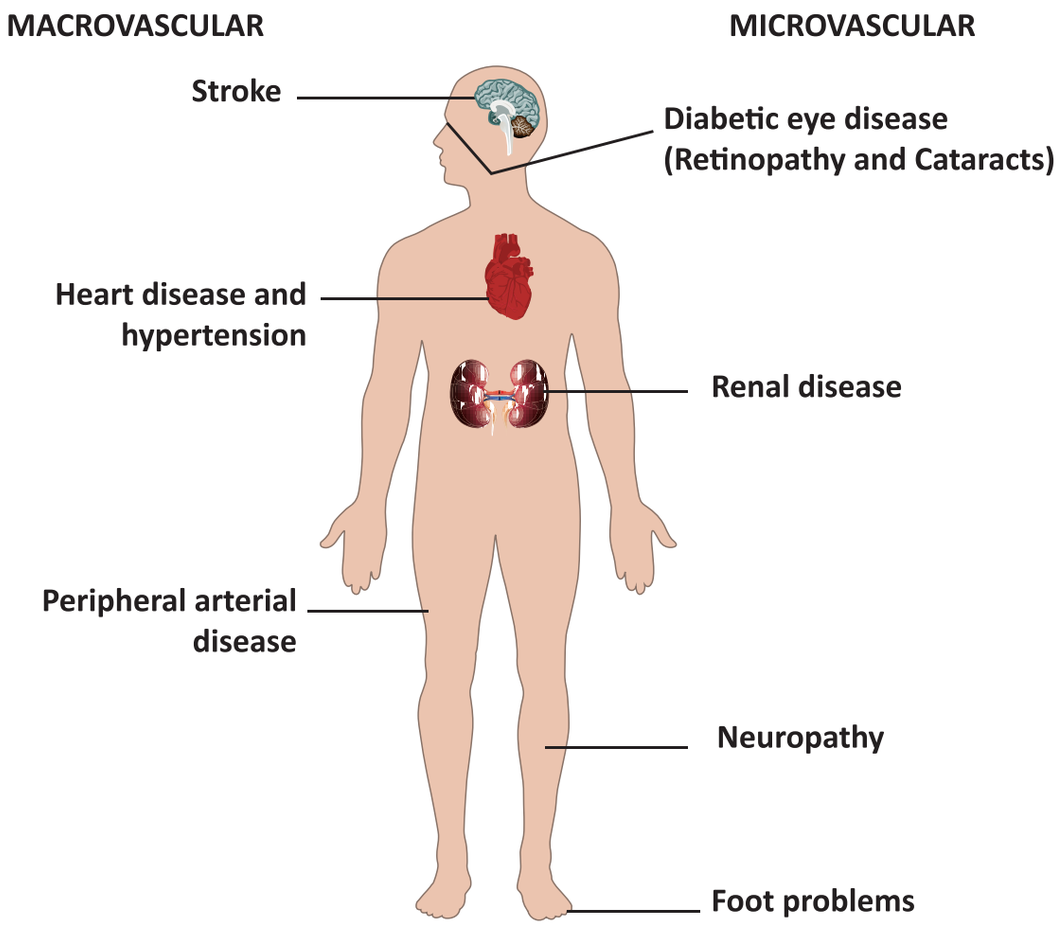
- Blindness
- Kidney disease
- Nerve disorders
- Limb amputations, foot ulcers
- Heart diseases - Atherosclerosis (increase in triglyceride and decrease in HDL cholesterol)
- Hypertension
- Stroke

Glycosylated haemoglobin (HbA1C)

Increase in blood glucose level, causes the glucose to attach to haemoglobin (a pigment in the red blood cells) to form glycosylated haemoglobin.

Glycosylated haemoglobin (HbA1C) levels reflect the blood glucose control over the previous 2-3 months. In people with diabetes, HbA1C is >6.5% of the total haemoglobin.

DIABETIC COMPLICATIONS



Management of diabetes

Lifestyle modifications play an important role in the prevention and treatment of diabetes than in any other disease. Balancing diet, exercise and drug along with appropriate stress coping skills will ensure better diabetic management.

The main modes of treatment are:

- Diet
- Exercise
- Drugs
- Education

A. Dietary Management

A balanced diet rich in complex carbohydrates and fibre, low in simple sugars and saturated fat with moderate protein facilitates good glucose control. Regular use of fresh foods like fruits and vegetables with limited use of processed foods is recommended.

Energy

The total energy intake should be sufficient to meet individual needs for normal growth and development, physical activity and exercise and maintenance of a desirable body weight.

Even amounts of food should be eaten at regular intervals throughout the day, to prevent fluctuations in the blood glucose level, especially hypoglycaemic (low blood glucose level). Snacks between meals may be needed to prevent fluctuation in the blood glucose level.

Carbohydrate

An intake of 55-60% of total calories is recommended to improve glycemic control. Complex carbohydrates found in whole grains, pulses, vegetable and fruits are preferred. Root vegetables can be taken in moderation while simple sugars like sugar, honey, jaggery and processed refined cereals should be restricted.

DO YOU KNOW?

Glycemic index

The extent of rise in blood glucose levels in response to a food in comparison with the response to an equal amount of glucose is known as glycemic index. Generally, complex carbohydrates are considered to have a low or moderate glycemic index, while simple sugars have high glycemic index.

Fibre

An intake of 25-50g of dietary fibre is considered optimal. Fibre present in vegetables, fruits, legumes and fenugreek seed is soluble in nature and more effective in controlling blood glucose and lipid levels (reduce total cholesterol and triglycerides) than the insoluble fibre present in cereals. High fibre diets also promote weight loss.

Protein

Consuming protein at levels of 20 % of total calories is recommended. Protein along with carbohydrate will lower blood glucose level.

Fat

No more than 25% of the total calories should come from fat as high fat diet increases the risk of heart diseases. Polyunsaturated fatty acids and Mono unsaturated fatty acids present in vegetable oils are preferred to saturated fatty acids that are found in meat and egg.

Salt

A moderate to low salt is recommended to lower high blood pressure.

DO YOU KNOW?

Medicinal plants for diabetes

Fenugreek seeds at levels of 15g per day lowers blood glucose level. Bittergourd and Jamun (Naval) exhibit hypoglycemic effect.

Food Exchange System

The food exchange system is a familiar tool to distribute the food in a balanced pattern. In this system, foods providing the same amount of calories, carbohydrate, proteins and fats are grouped together. The exchange list helps to interchange foods from the different food groups according to one's personal choice and preferences. e.g In a cereal exchange.

Idli - 1½ nos / Dosa -1 no / Chappathi - 1 no / Upma - ½ katori

Provide approximately 100 kilocalories. Similarly vegetable , fruit, pulse exchange are available.

Artificial sweeteners

People with diabetes can use artificial sweeteners instead of sugar but limiting their usage in beverages is considered safe.

Case Study

Raman is a 45 year old busy executive. He is obese, chronic smoker and physically inactive. His blood sugar levels are fluctuating.

What advice you would give him to maintain the blood glucose levels?

B. Exercise

Regular, moderate intensity exercise like brisk walking helps to control blood sugar and reduce the risk of cardio vascular diseases.

Benefits:

- Aids weight loss/ maintenance
- Improves blood lipid levels
- Increase blood pressure
- Improves blood glucose control

C. Drugs

Drugs to treat diabetes include insulin and oral hypoglycemic drugs.

People with type 1 diabetes need to take daily insulin injections.

Type 2 diabetes may respond to treatment with exercise, diet, and medicines orally. Some people with type 2 diabetes may no longer need medication. Individuals with type 2 diabetes also may require insulin under certain circumstances.

D. Education

Education plays a vital role in the control and management of diabetes. Individuals with diabetes should be educated on the nature of the disease, importance of diet, drug and exercise, self monitoring of glucose, recognition and treatment signs of hypoglycaemia and the possibility of complications if blood sugar is not kept under control.

E. Other lifestyle modifications

Alcohol

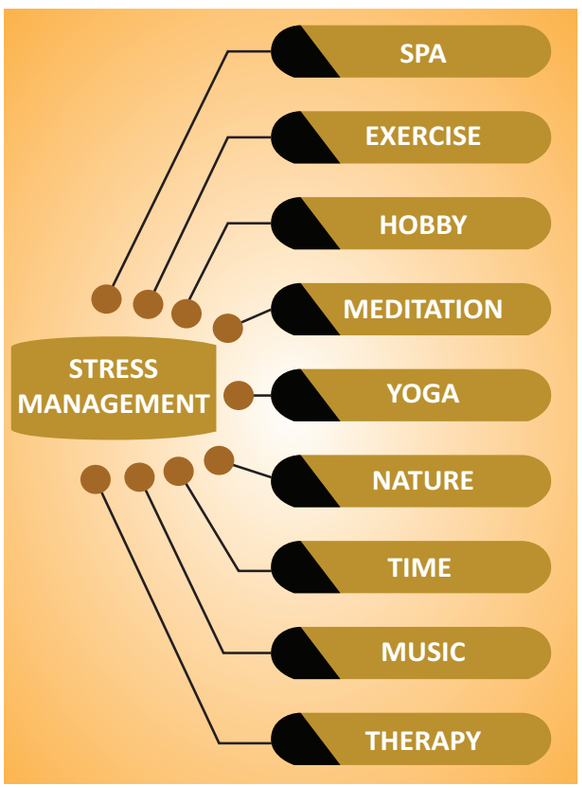
Excessive amounts of alcohol on a consistent basis can increase the blood sugar levels and raise the blood pressure. It is advisable to stop or limit the alcoholic consumption.

Smoking

Individuals with diabetes would benefit from quitting smoking inorder to have a better blood glucose control and reduce the complication of diabetes.

Stress

Stress can affect diabetic control, by reducing the insulin action. Learning useful stress reduction exercises will ensure better control.



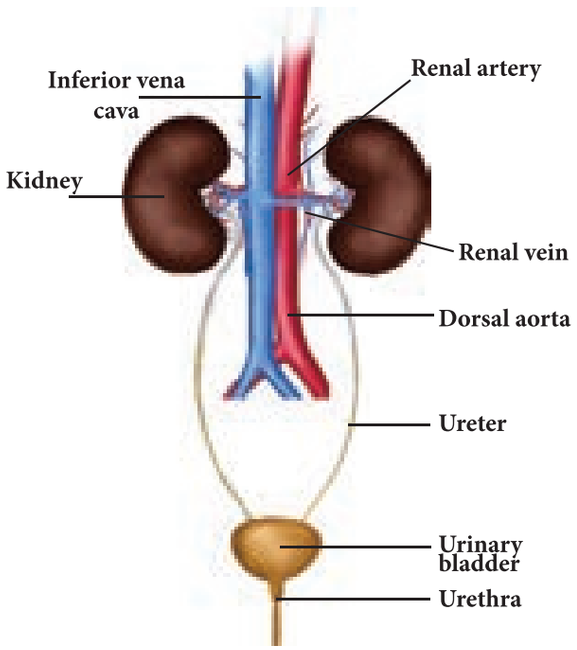
ACTIVITY 3

Create awareness by preparing a brochure/hand out to educate the public on the prevention and management of diabetes in the walker's park

1.8 Diet for Kidney Diseases

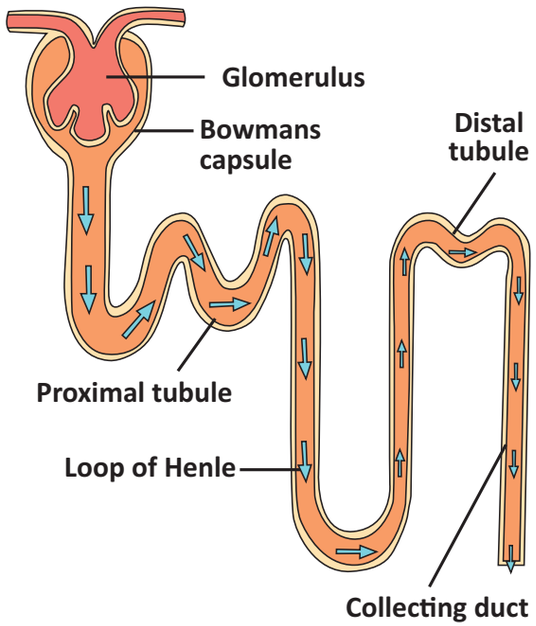
The kidney is the principal excretory organ of our body. The kidney is a bean shaped paired structure and is located in the upper abdominal region. A thin transparent membrane called capsule covers the kidney. The outer portion of the kidney is the renal cortex and the inner portion is the renal medulla. Blood enters the kidneys through the renal arteries and leaves through the renal veins. Each kidney has about 1.0 millions of functional units called nephrons which remove wastes and extra fluids from the blood in the form of urine. The urine passes through the ureter to the bladder for excretion.

Urinary system



Structure of nephron

The basic functional unit of the kidney is the nephron. The nephron consists of a glomerulus connected to a series of tubules.



Tubules consist of different segments: the proximal convoluted tubule, loop of Henle, distal tubule and collecting duct. Each nephron functions independently and contributes to the final urine.

The glomerulus is a spherical mass of capillaries surrounded by a membrane, Bowman's capsule. The hydrostatic pressure within the glomerular capillaries results in the filtration of fluid into Bowman's capsule. The filtrate formed in the glomerulus passes first into the proximal convoluted tubule and from there, through the loop of Henle and distal convoluted tubule to the collecting ducts.

The processes of selective reabsorption and tubular secretion of the filtrate results in the production of 1.5 litres of urine that is excreted each day.

DO YOU KNOW?

The glomerular filtration rate (GFR) is used to monitor kidney function. Normal GFR is 100-125 ml/minute/1.73m^2. Chronic Kidney Disease occurs when GFR is < 60 ml/minute/1.73m^2 for 3 or more months.

Functions of the Kidney

The kidneys perform the following functions :

1. **Urine formation**-Make urine through which they excrete most of the waste products of metabolism like urea, creatinine, toxins and drugs.
2. **Maintain fluid and electrolyte balance**- Controls the concentration of the constituents of the blood like sodium, potassium, chloride etc.
3. Kidneys are an **exclusive site for the production** of

a) 1,25 dihydroxy cholecalciferol, the active from of vitamin D which is important for bone health.

b) Erythropoietin which is essential for the synthesis of red blood cells.

c) Renin, an enzyme that helps to regulate blood pressure.

4. **Hormone degradation** - Parathyroid hormone, calcitonin, insulin and gastrin are degraded by the kidneys.

Risk factors for kidney disease

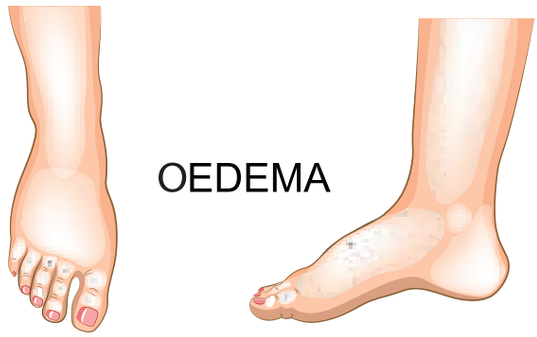
- Old age
- Exposure to hot climate
- Diabetes
- Hypertension
- Urinary tract infections
- Urinary stones
- Family history of chronic kidney failure
- Exposure to certain nephrotoxic drugs
- Low birth weight

1.8.1 Glomerulonephritis

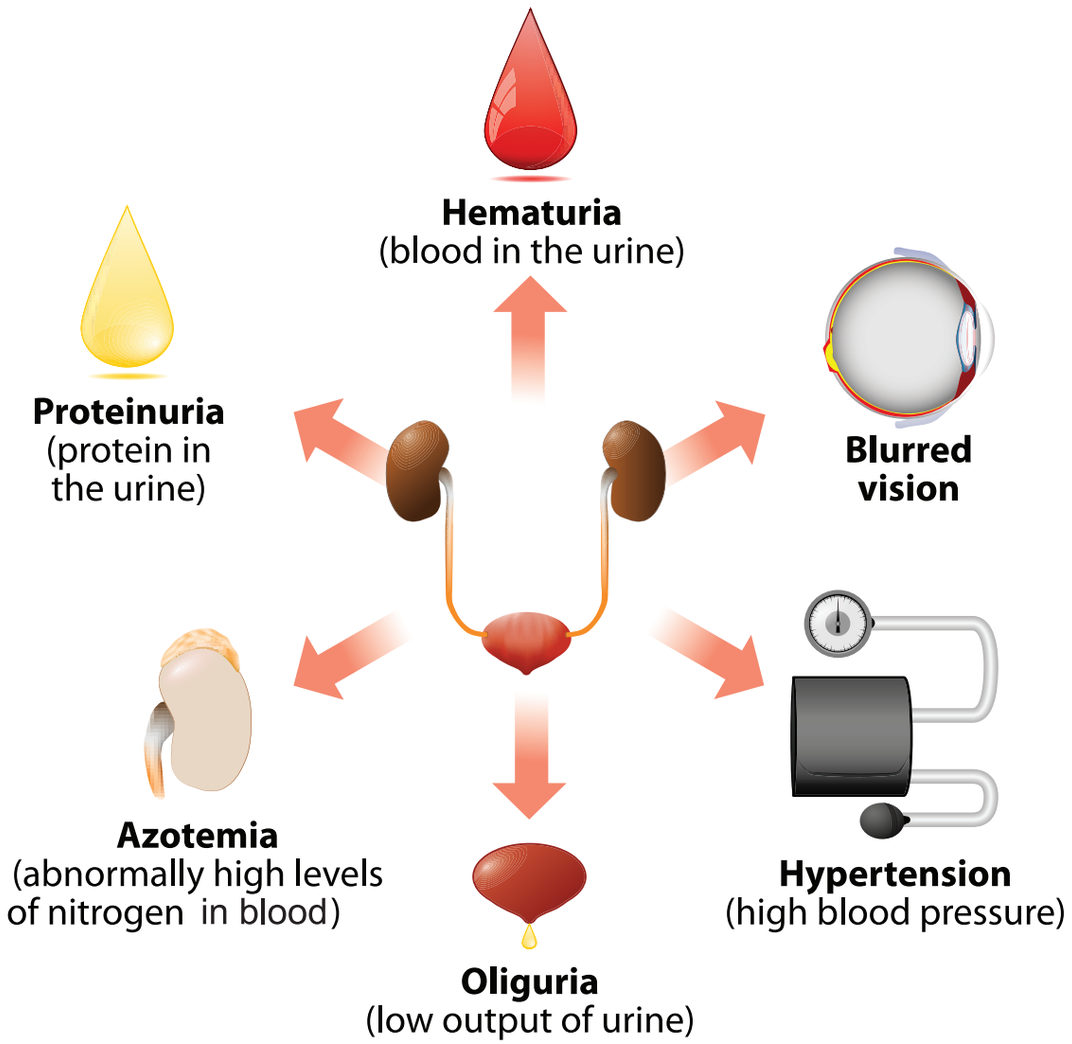
Glomerulonephritis is the inflammation of the capillary loops of the glomerulus. It is sudden onset and may lead to nephrotic disease or proceed to recovery. Glomerulonephritis occurs mostly in young children between 3-10 years of age, although it may occur in adults.

A. Clinical symptoms

- Hematuria- the abnormal presence of blood in the urine.
- Proteinuria- abnormal excess of serum proteins (e.g albumin) in the urine.



- Oedema- excess accumulation of fluid in the body tissues
- Hypertension
- Poor appetite
- Oliguria (secretion of small amounts of urine) and



- Anuria (absence of urine production) develops as the disease progresses.

Dietary Management

- Bed rest and antibiotic drug therapy along with optimum nutritional support are emphasized.
- Salt usually is not restricted unless oedema, hypertension, oliguria is present. Fluid intake is adjusted to output.

Energy

Carbohydrates should be given liberally to provide sufficient energy and prevent tissue protein breakdown.

Protein

Improper functioning of the nephrons leads to the inability to filter urea nitrogen, a product of protein breakdown which is usually expressed as **blood urea nitrogen (BUN).** If the blood urea nitrogen is elevated and urine output is decreased, dietary protein is restricted. High quality animal proteins such as meat, eggs are preferred to vegetable proteins to ensure maximum utilization.

Intake between 0.5-1.5 g/kg body weight is recommended for children. An protein intake may be held at 0.75 to 1 g/kg body weight when BUN levels are normal.

Fluid

Fluid intake is restricted according to urine output. If restriction is not indicated fluids can be consumed as desired.

Sodium

Sodium is restricted to 500-1000mg/day if oedema or hypertension is present, but may be increased to 2-3g/day as the function resumes.

Potassium

As kidneys lose their ability to clear potassium, a build up results in the body. This can cause irregular heart beats, hence potassium intake is restricted. Most of the fruit and vegetables contain potassium which can be reduced by double leaching (cooking them in excess water and discarding the water twice).

Case Study

Ramesh is 60 year old man having oedema. He is an hypertensive who complains of poor appetite and low urine output.

1. What is the diagnosis?
2. What is the sodium requirement?
3. What advice would you give him on the protein intake?

1.9.2 Nephrosis

Nephrosis results from the damage to the tissues of the nephron both the glomerulus and tubule. This disrupts both the filtration and reabsorption functions which result in large amounts of protein to pass into the tubules causing damage to it. Nephrosis is caused by progressive glomerulonephritis, diabetes, drugs, heavy metals or toxic insect venoms.

Clinical symptoms

- Oedema
- Ascites (accumulation of fluid in the abdominal cavity)
- Proteinuria
- Distended abdomen due to fluid accumulation.
- Albuminuria (increased loss of urinary albumin)
- Malnourishment due to large protein loss that leads to tissues protein breakdown.

Principles of diet

High energy, moderate protein, salt and fluid restricted diet is advised.

Dietary management

Energy

A high intake of 30-40 g/kg ideal body weight is provided for tissue rebuilding. Food to be made more appetizing and soft in consistency to improve acceptability.

Protein

A protein intake of 0.8- 1.0 g/kg body weight/day given to meet the nutritional needs and prevent tissue protein breakdown. High quality proteins present in animal foods are preferred.

Sodium

Sodium is reduced to approximately 1 g/day to prevent oedema and increased to 3 g/day as oedema subsides.

Other minerals and vitamins

Iron and vitamin supplement may be helpful, while potassium restriction is not necessary. Potassium supplements are useful to replace losses with diuretic usage.

DO YOU KNOW?

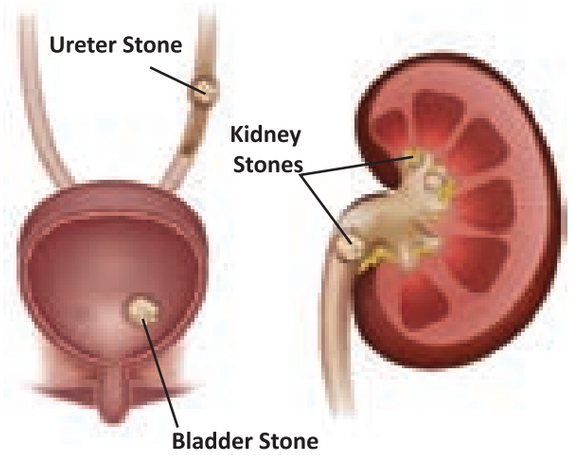
Kidney transplantation is needed when the kidney function reduces to less than 10%. Donor kidneys are taken from either brain dead organ donors or family member of the recipients.

DO YOU KNOW?

Human Organ Transplantation Act (1994) in India allows only live transplants from close relative/voluntary donors (exceptional) to avoid organ trafficking.

1.8.3 Kidney Stones / Urinary Calculi

Kidney stones, also called urinary calculi /nephrolithiasis may be found in the kidney, ureter, bladder or urethra.



The basic cause of kidney stones is unknown, but many factors relating to the nature of the urine itself or conditions of the urinary tract environment contribute to their formation.

Risk factors for the development of kidney stones

- **Gender** – men are 2.5 times more likely to develop stones than women and have high recurrence rates
- **Age**- most common between 30 to 50 years of age
- **Family history**- risk doubles with strong family history
- **Climate**- exposure to hot climate and sweating in large amounts can concentrate the urine and reduce the volume of urine, which favours stone formation
- **Diet**- high intake of animal protein and reduced consumption of fibre and fluids
- **Weight**- overweight or severely underweight increases risk
- **Life style**- high levels of stress
- **Medical conditions**- hypertension, gout and diabetes
- **Medications** for AIDS, thyroid hormones, chemotherapy and long term antacid use.

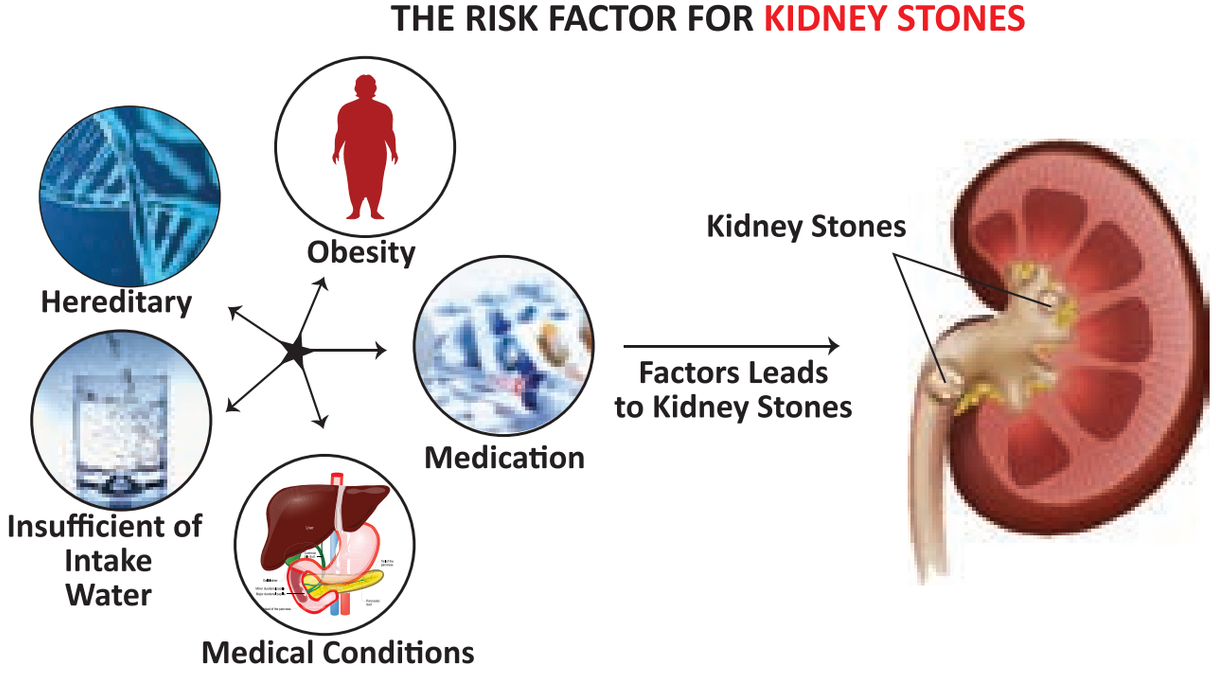
Types of kidney stones

The common forms of kidney stones belong to calcium, uric acid, struvite and cystine types.

Calcium stones

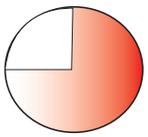
In India, calcium oxalate stones are very common. The causes are:

- Family history
- Excess calcium in the blood (hypercalcemia)
- Excess calcium in the urine (hypercalciuria)
- Excess oxalate in the urine (hyperoxaluria)
- Low level of citrate in the urine (hypocitraturia)
- Infection



Calcium Oxalate Stones

The most preventable cause is dehydration and low urine output, where as other factors in a person's diet can cause these stones including high sodium intake, high oxalate intake,
and high protein intake.



60-80%
of all kidney stones

Uric acid stones

- Gout (conditions resulting from excess uric acid in the urine)
- Wasting disease

Struvite stones

- Struvite stones are called infection stones because they are caused by urinary tract infections and not associated with any specific nutrient.
- Thus no specific diet therapy is involved but removed surgically.

Cystine stones

- Cystine is the rarest kidney stones. Cystine stones are caused by a genetic history.

Clinical symptoms of kidney stones

- Severe pain
- General weakness
- Fever (sometimes)

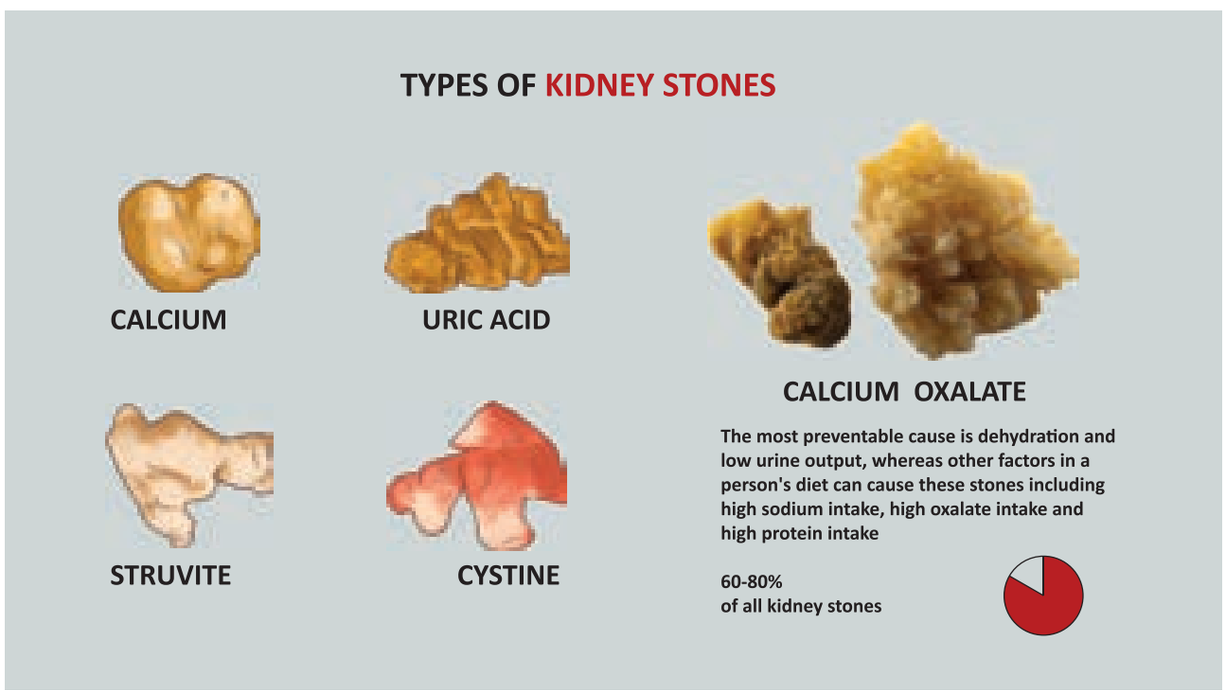
Treatment

Fluid intake

A large fluid intake is a primary therapy that helps to produce more dilute urine and prevent accumulation of materials that form stones.

Urine pH and diet

- Dietary intake can influence the acidity or alkalinity of the urine.
- High intakes of protein foods like meat, fish, egg, pulses can acidify the urine while fruits, vegetables and milk can alkalize the urine.



- It is important that acid producing foods need to be balanced with alkali producing foods to reduce the risk of urine stone formation.

- When stones are composed of calcium phosphate or oxalate the urine is alkaline and hence acid ash diet is used to balance it.

Foods included: cereals, meats, fish, eggs, nuts, pulpy and pulses.

Foods avoided: milk, fruit and vegetables.

- As uric acid and cystine stones are formed by an acidic urinary environment the condition is treated with an alkali ash diet to neutralize the acidic urine.

Foods included: milk, fruit and vegetables.

Foods avoided: cereals, organ meats, fish, eggs, nuts, pulpy and pulses.

Dietary management

The diet is modified to reduce the intake of nutrients that lead to the formation of a particular type of stone.

1. Calcium stones

- A low calcium diet of approximately 400 mg/day is recommended for people who are not at risk for bone loss.

- The lower level mainly is achieved by restricting dairy products, which are the main dietary sources of calcium.

- If a stone is calcium phosphate, additional sources of phosphorous (e.g., meat, legumes and nuts) should be controlled.

- If a stone is calcium oxalate, foods high in oxalate like spinach, tomatoes, sweet potato, strawberry, chocolate, wheat products, nuts and tea should be avoided.

Other dietary factors

Other dietary factors to consider in the case of calcium stones are sodium fluid and fibre intake.

- High intake of salt increases the amount of calcium excretion in the urine, thus causing hypercalciuria.

- Diluting the urine by drinking plenty of fluids is beneficial in preventing all types of kidney stones.

- Foods high in phytates like whole wheat, soya help prevent the formation of calcium oxalate salts.

2. Uric acid stones

- A low purine diet is recommended to reduce uric acid.

- Foods to be avoided: organ meat, chicken, legumes,alcoholic beverages, spinach and cauliflower.

3. Cystine stones

- Cystine is derived from the essential amino acid methionine, so a low protein diet is preffered.

Dietary principles in kidney stones

Stone Chemistry	Nutrient modification	Dietary Ash (Urinary pH)
Calcium	Low calcium (400 mg)	Acid ash
Phosphate	Low phosphorus (1000-1200 mg)	Acid ash
Oxalate	Low oxalate	Acid ash
Struvite	Low phosphorus (1000-1200 mg: associated with urinary infections)	Acid ash
Uric acid	Low purine	Alkaline ash
Cystine	Low methionine	Alkaline ash

SUMMARY

- Nutrition and health are interrelated and good nutrition is a prerequisite for good health. Nutritional support and diet therapy are fundamental in the treatment of acute illness or chronic diseases. Nutritional strategies should be planned to reduce chronic diseases and to minimize its severity and duration. Diet therapy deals with modification of normal diet, as the metabolism of the individual changes in different disease with respect to one or more nutrients. Individual adaptations of the diet to meet the individual needs are imperative for successful therapy. This can be achieved through proper planning of diets and proper nutrition. Thus proper nutrition can enhance the productivity of individuals and contribute to development of a nation as a whole.
- Cardiovascular disease is the major cause of disability and death in India. Atherosclerosis and stroke are the major modifications of cardiovascular disease.
- Elevated amount of blood lipids are associated with cardiovascular disease. Elevated blood cholesterol is a primary risk factor for development of atherosclerosis.
- Persons with heart disease benefit from a low fat-balanced diet, weight management and exercise along with other lifestyle modifications.
- Weight control, exercise and sodium restriction are the strategies to manage hypertension.
- Diabetes mellitus is a metabolic disorder involving three energy nutrients – carbohydrate, fat and protein. The major controlling hormone involved is insulin and persons with diabetes have either a lack of insulin secretion or its action or both.
- A consistent sound diet balancing food intake, exercise and insulin/oral drug is essential for successful diabetic management.
- Education is the keystone in the care and control of diabetes. Good self care skills enable a person with diabetes to reduce the risk for complications.

- Nephron the functional unit of kidney maintains life sustaining blood levels of materials required for life and health. Toxins, drugs, infections, stress and various diseases can interface with the effective functioning of the nephrons causing serious renal diseases.
- Nutritional management focuses on reducing the load on the kidneys while preventing nutrient losses.
- Proteins and calories are modified to prevent malnourishment while sodium and fluid are modified to correct water and electrolyte imbalance.

A-Z GLOSSARY

- Gruel - a thin liquid food or other meal boiled in water or milk
- Epigastric pain-discomfort right below the ribs in the area of your upper abdomen
- Hemorrhage-an escape of blood from a ruptured blood vessel.
- Hypermotility- excessive motility of all or part of the gastrointestinal tract
- Flattulence-the accumulation of gas in the alimentary canal.
- Necrosis- cell death caused by progressive enzyme breakdown
- Zollinger-Elison syndrome – a typical peptic ulcer disease, characterized by enzyme gastric hyperacidity
- Pyrosis- heartburn
- Dyspepsia– indigestion
- Atherosclerosis - Thickening of the walls of blood vessels by deposits of fatty materials.
- Antioxidants - A group of substances that prevent the damage by free radicals.
- Blood clot - A semi-solid mass consisting of a mesh of a protein, in which various blood cells are trapped.
- Calorie - Unit used to indicate the energy value of foods. ie., kilocalories(kcals)
- Diuresis - Increased secretion of urine.
- Essential fatty acids (EFA) - Fatty acids which are not made in the human body and must be supplied through the diet. They are linoleic acid, n-6 and alpha linolenic acid, n-3.
- Glomerular filtration rate - the test to measure level of kidney function and determine the stage of kidney diseases.
- Ischemia - lack of blood supply to a tissue resulting in reduced oxygen supply.
- Inflammation - The reaction of the tissues to injury, characterized clinically by heat, swelling, redness and pain.
- Isoflavones - A phytochemical found in (especially) soyabeans that may have cancer-preventing properties.
- Junk food - It is food containing high levels of calories from sugar or fat with little fibre, protein, vitamins or minerals.
- Risk factors - Characteristics or conditions whose presence is associated with the future of developing a disease.
- Stroke - a sudden condition that results from blocking or bleeding of blood vessels in the brain, resulting in paralysis.

EVALUATION

I. Choose the correct answer

Find out the correct one from the following

1. High calorie diet is given during
   a. Fever
   b. Constipation
   c. Underweight
   d. Obesity

   Options
   1. a and b is correct
   2. b and c is correct
   3. a and c is correct
   4. c and d is correct.

2. When a person suffers from fever a high calorie diet is prescribed, the reason for increase in calorie is because the Basal Metabolic Rate increases by _____ for every degree Celsius rise in body temperature.

   Options
   1. a. 13 %
   2. b.7%
   3. c. 10%
   4. d. 1%

3. **Payer's Patches is seen in**
   a) Tuberculosis
   b) Peptic ulcer
   c) Typhoid
   d) Jaundice

4. **The principles of dietary treatment followed in Obesity is**
   a) Low calorie diet
   b) High fat diet
   c) High fibre diet
   d) Low protein diet

   Options
   1. a is correct and b is correct
   2. b is correct and c is wrong
   3. d is wrong and b is correct
   4. a is correct and c is correct

5. **Cellulose is**
   a) A complete protein
   b) An indigestible carbohydrate
   c) A saturated fat
   d) An essential mineral

6. ***Correctly pair the given match***

a) Anti Obesity Day	i) 14th November
b) Oral Rehydration Salt Day	ii) 26th November
c) World Heart Day	iii) 29th July
d) World Diabetes Day	iv) 30th September

   Options
   1. a and ii
   2. b and iii
   3. c and iv
   4. d and i

7. **Which of the following groups of food would be allowed on a clear liquid diet?**
   a) Strained soup, coffee without milk and whey water
   b) Tomato juice, sherbet and strained cooked cereal
   c) Beef stock, apple juice and icecream
   d) Tea, coffee and milk

8. **Which of the food should not be included in a soft diet?**
   a) Idly
   b) Chapatti
   c) Puttu
   d) Idiappam

9. Pick out the wrong statement
   a). High fibre diet is given to patients who are obese
   b). High calorie diet is prescribed for underweight individuals
   c). Fibre restricted diet is given in acute infection and fevers
   d Normal diet is given to replace fluids lost from vomiting or diarrhoea.

10. A person complains to the doctor of sudden onset and passage of watery stool which has lasted for 48 hours. What treatment strategy should be followed immediately.
   a) Give him Oral Rehydration therapy
   b) Give him soft bland food.
   c) Give him only juices and water
   d) Give him a normal diet

11. The main function of liver is carbohydrate metabolism which is through glucogenesis. Glucogenesis from the statement given below is
   a) Conversion of glucose to glycogen
   b) Conversion of glycogen to glucose
   c) Conversion of amino acid into other non-essential amino acid
   d) Conversion of carotene into vitamin

12. Soluble fibre is present in _____
   a. Greens
   b. Cereals
   c. Pulses
   d. Oats

13. Oxygenated blood for the lungs reach the heart through _____
   a. Pulmonary vein
   b. Pulmonary artery
   c. Aorta
   d. Superior vena cava

14. Myocardial infarction is otherwise known as _____
   a. Stroke
   b. Atherosclerosis
   c. Hypertension
   d. Heart attack

15. _____ is a confirmatory test for diabetes.
   a. Urine sugar
   b. Fasting blood sugar
   c. Random blood glucose
   d. GTT

16. Women who deliver baby greater than _____ kg are prone to get diabetes.
   a. 3
   b. 4
   c. 5
   d. 2.5

17. The caloric value of the diet for a person with diabetes should be ------
   a. Increased above normal requirements to meet the increased metabolic demand.
   b. Decreased below normal requirements to prevent glucose formation
   c. Sufficient to maintain the person's appropriate weight
   d. Contributed mainly by fat to spare the carbohydrate for energy needs

18. The most effect strategy to lower blood pressure is ----------
   a. Lose weight
   b. Restrict salt
   c. Monitor glucose
   d. Supplement protein

19. _____ hormone is secreted by the kidney is response to low blood pressure.
    a. Adrenalin
    b. Vasopressin
    c. Rennin
    d. Calcitonin

20. _____ is the abnormal presence of blood in the urine.
    a. Oliguria
    b. Proteinuria
    c. Hematuria
    d. Anuria

21. _____ is the single most important risk factor for kidney stones.
    a. Low urine volume
    b. High stress
    c. Over weight
    d. Hypertension

II. Write Very Short Answers 2 marks)

1. What is the cause for typhoid fever?
2. List any two exogenous agents that cause fever.
3. Define soft diet
4. List any two high fibre foods
5. Expand ORS
6. Name the organism that causes peptic ulcer
7. Give any two condition where low fat is prescribed
8. **Reason / Assertion**
   All fats are not bad.
   R- Some fats reduce blood cholesterol while others raise them.
   (i) Both A & R are true and R explain A
   (ii) Both A & R are true and R does not explain A
   (iii) Only A is true but R is false
   (iv) A is false but R is true
9. **Match**
   1. Trans fat - good cholesterol
   2. Insulin - brain
   3. Low urine volume - fast foods
   4. Stroke - fast oliguria
   5. HDL - type 1 diabetes
   6. LDL - bad cholesterol

III. Write Short Answers (3 marks)

1. Define Fever.
2. When and why is clear fluid diet recommended?
3. Seetha complains of epigastric pain and flatulence. She is diagnosed with peptic ulcer. What are the causes?
4. The protein requirement is increased during fever. What foods would you recommend to increase the protein intake?
5. List the signs and symptoms of cirrhosis
6. Define Jaundice
7. What principles of diet would you prescribe for your friend suffering from constipation?
8. If a family member is suffering from severe diarrhoea what home remedy would you prescribe?
9. Classify the following diets based on the condition

Clear fluid diet, Mechanical soft diet, soft bland diet- peptic ulcer, dentures, fever

Diet	Condition

10. Define
    a. Atherosclerosis
    b. Stroke
    c. Glycemic index
    d. Metabolic syndrome
    e. Trans fats
    f. Oedema
    g. Anuria
    h. Glomerulonephritis
    i. Ascites
    j. Nephrosis
11. What is the role of antioxidant in heart disease?
12. How does fibre confer protection against heart disease?
13. Uma consumes snacks made of vanaspathi (dalda). Suggest ways to make a healthy snack.
14. Describe the major characteristics of the two main types of diabetes mellitus.
15. List the symptom of diabetes.
16. What are the complications of diabetes?
17. A woman has diabetes during her pregnancy. What is the condition called as? What advice you would give her?
18. What is pre diabetes? Can it be reversed? If yes, how?
19. Raman has an HbA1C value of 8.5%. He is not able to understand its significance in diabetes. How will you explain?
20 What are the risk factors for kidney disease?
21. List any three risk factors for kidney stones?
22. Expand GFR?
23. List four sources of oxalate.
24. What is the golden rule of obesity?
25. What are the clinical signs of glomerulonephritis?
26. List any four sources of oxalate.
27. Anitha is worried about the recurrence of kidney stones. Suggest any three ways to prevent stone formation?
28. Define Diabetes mellitus.

IV. Write in detail (5 marks)

1. Explain to Neela what food she has to give her mother who is suffering from typhoid.
2. Ashok is a chronic alcoholic. He has fatty liver. What is the condition he is suffering from? What dietary advice would you give to him?
3. Fibre plays a very important role in certain conditions. Name the diseases and the role of fibre in treating the diseases.

4. Prepare a chart describing the principles and objectives of diet therapy.
5. In current practice, what are the basic principles of diet planning for patients with peptic ulcer disease?
6. A friend comes to you with high fever and says she is suspecting tuberculosis. As a dietician what symptom would you look for and what dietary treatment would you suggest?
7. Kavitha is Obese. She only plays games on the internet and she travels to school by her own vehicle. What treatment strategy would you advise her?
8. Ram is underweight due to hyperthyroidism. He is a carpenter by profession. Give him a suitable dietary regimen and suggest two recipes for snacks.
9. Mrs Janaki is admitted to the hospital and was diagnosed for Jaundice. She has fever and also ascites. She has been advised a liberal intake of carbohydrates, 60- 80g of protein is permitted and 20-30g of fat. Answer the following questions:
   a. Why was the extra calorie advised?
   b. What is the role of extra protein?
   c. What foods should be included and avoided?
   d. Since, she has ascites what additional restrictions should be placed on her diet?
   e. List any other disease that requires low fibre and high carbohydrate
10. Uma's blood pressure read as 140/80. What is the condition referred to as? What is the focus of treatment?
11. Draw and explain the structure of the heart.
12. Write on the risk factors for CVD.
13. What is the role of dietary fat in CVD.
14. What is acid ash diets? When is it indicated? What foods are to be included?
15. Describe the principle of diet for a person with diabetes mellitus.
16. Draw and explain the structure of a nephron.
17. List the functions of the kidney.
18. Indicate the dietary modification for glomerulonephritis.
19. How will you manage calcium stones.
20. Give the classification of diabetes mellitus.
21. Give the dietary modification for atherosclerosis.
22. Link the figures in the given picture:

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ICT Corner

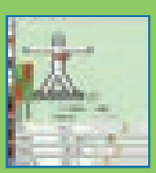
Therapeutic Diet

This activity enables the students to enrich themselves with the type of food they have to eat and the type of exercises they have to do to keep the body fit.

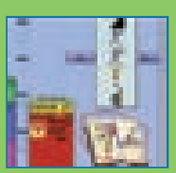
Steps:

- Type the URL link given below in the browser or scan the QR code. A page opens like shown above with manu adjustments in the same page.
- In the left side a image with boxes to select the language and gender is there. Select accordingly. Below that height, weight and age columns are there. Fill them all.
- In the right side top left food items are given below that a plate by selecting the 'MORE' button you can fill the plate by dragging the food items.
- Right top exercises are given you have to drag the exercise pictures and fill the exercise log book. Here also you can select the exercises by pressing the 'MORE' button.
- The final part is according to your selection the human body at the left side will become more fattier or thinner. Now you will have a whole understanding on exercises and food. By adjusting your weight and diet you can change the body thinner or thicker.


Step 1


Step 2


Step 3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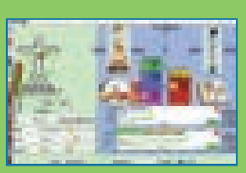

Step 5


Step 6

URL:

https://phet.colorado.edu/en/simulation/eating-and-exercise

UNIT 2

Consumer- Protection and Education

The Greater Marketer

A customer is the most important visitor on our premises.

He is not dependent on us.

We are dependent on him.

He is not interruption in our work.

He is the purpose of it.

He is not an outsider in our business.

He is part of it.

We are not doing him a favour by serving him.

He is doing us a favour by giving us an opportunity to do so.

LEARNING OBJECTIVES

This chapter will help the students to

- Understand the meaning of consumer and consumer education.
- Gain insight into problems faced by consumer.
- Learn about various consumer aids.
- To understand about packaging and labelling
- Provide in depth understanding on consumer rights and responsibilities.
- Be aware of consumer redressal forums and consumer protection act.

2.1 Introduction

The concept of protection of rights of the consumers has been present from various centuries. Even Old Testament and Code of Hammurabi refers about consumer protection. The Holy Quran mentions the problems faced by consumers and it condemns the use of unjust weights and measures. The first consumer organizations were formed in Denmark in 1947 and Great Britain in 1955 where the Government

created the consumer council in order to enable consumers to express themselves on issues reserved to producers and traders. Further it became a single European Act which was economic and social committee to safeguard the consumers.

In India, the ancient Vedas and various other ancient codes also contained provisions to protect the interests of the consumers and provided punishment in case of violations. During British rule in India, the rights and interest of consumers were mainly regulated and protected by the common law of Tort or Law of Contracts.

In India first formal consumer movement was started in 1949 in Madras (chennai). Later a consumer protection council was established in Madras under the patronage of Shri C. Rajagopalachari. The work of Council was confined only to the people of Tamil Nadu. In 1956, nine housewives and social workers combined together to form the Consumer Guidance Society of India (CGSI) in Bombay. The Consumer Guidance Society of India (CGSI) is a Non-Profit consumer organization CGSI was the first consumer organization to demand special Consumer Court for redressal of consumers' complaints. CGSI's constant follow-up was instrumental in enacting the Consumer Protection Act, 1986 (CPA) amended in 2000.

2.2 Consumer

A consumer is a person who buys goods and services and makes use of public utilities as well as natural resources like water. It refers to those who use goods and services for their personal wants and excludes buyers who purchase for manufacturing purposes or for resale.

It does not include a person who obtains such goods for sale or any commercial purpose.

2.3 Consumer Problems

Consumers face a wide range of problems in their day today dealings. These problems may be the result of scarcity, varying incomes, product development, environmental changes or social structure. The consumers face problems even in markets, banks, government and private offices, hospitals, schools, public distribution agencies and other services.

Problems faced by consumer can be categorized as:

i. Problems related to products.

ii. Problems related to services.

DO YOU KNOW?

Goods: Goods are those products which we buy to fulfill our needs. It includes items of daily consumptions like milk, pencils, vegetable etc.

Services: Services are those facilities which are provided by government or non-government agencies free of cost or on payment. For example- electricity, water, health, education etc

2.3.1 Problems Related to Products

The consumer faces a number of serious problems with prices, quality and weights or volumes of products available in the market. Profit motive in any business is not a crime while, making profit through illegal trading like black marketing, adulteration etc., and objectionable malpractices such as deceptive packaging, short-weighing etc., are considered as unfair business practices. The Monopolistic and Restrictive Trade Practice (MRTP) Act 1969 offers legal protections to consumers against list of unfair trade practices such as

i) Lack of safety and absence of quality control regulations
ii) Adulteration
iii) Imitation manufacture
iv) Unfair warranties
v) Sales gimmicks
vi) Substandard quality
vii) Incorrect weights and measures
viii) Deceptive goods
ix) Misleading advertisements
x) Incorrect and incomplete labels
xi) Deceptive packaging
xii) Dishonest vending

These practices pose a problem to consumers. Unless these practices are restricted they are likely to continue to exploit the consumers.

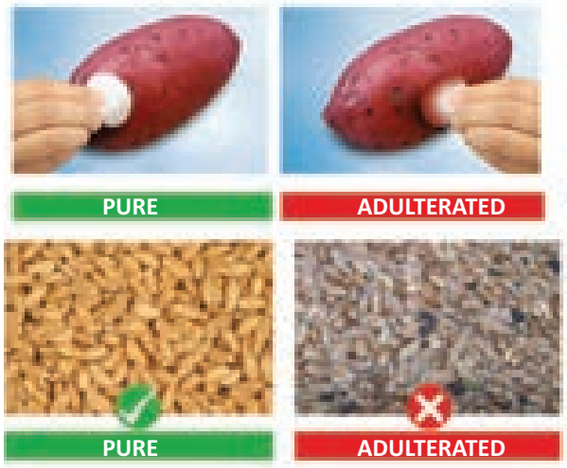
i) Lack of Safety and Quality Control Regulations

Any defective functioning of equipment can affect the safety of the consumers. People can sustain injuries through shock, fire while using defective appliances or due to absence of adequate information on safe handling of defective equipment. e.g., household appliances and equipments, electrical and mechanical devices.

ii) Adulteration

Adulteration implies that some substances are either added or removed from a product as a result of which its composition, nature or quality gets altered. And when product is prepared without changing its composition, but kept under insanitary conditions and later gets sold in

a contaminated state, the product is said to be adulterated.



The products in the market which are subject to adulteration are food, building materials, textiles, stationery etc. The products which harm consumers the most are those which are ingested.

iii) Imitation manufacture

Markets are flooded with all kinds of spurious and substandard goods, some of them often carrying popular brand names or similar sounding brand names of popular manufacturers. Imitating these names is a deliberate malpractice and amounts to cheating of the consumers. Such products are generally of cheap quality and unsafe to use , but are sold as genuine, safe and expensive products. Such practices are commonly prevalent with the consumer goods such as shoes, soaps, tooth pastes, medicines, cosmetics, etc.

iv) Unfair warranties

Consumers are neither familiar with nor understand the full implications of terms like guarantee and warranty. Even some of the terms of the warranty are confusing, ambiguous and are favorable to the manufacturers. There are no regulations to govern these warranties.

Guarantee- repairing of defective goods or/and change the defective parts free of cost for a fixed period.

Warranty- provides free spare parts but service charges are collected from the customer.

v) Sales Gimmicks:

Sales gimmicks are tricks used on consumers intended to attract attention, publicity or trade.

Many manufacturers spend a lot of money on sales promotion through large scale advertising, free gifts, discount sales etc. Though these are projected as extra benefits to the consumers, generally the cost is hidden. It is passed on to the consumers without them becoming aware

of it. The unsuspecting consumer assumes that he gets additional benefit in terms of free gifts, discounted price as introductory offer. But the product is sold at the usual price. Sometimes the consumer is forced to take certain goods as free gifts whether he needs them or not.

vi) Substandard Quality

A wide range of products of different sizes and qualities are available in markets. The consumer finds it difficult to choose with confidence, in a market where spurious spare parts of equipment, and adulterated foods are easily available.

In addition to cheating the consumers, the products of substandard quality also create a safety problem for them. Imitations are so cleverly manufactured that there is no way to tell that they are spurious. Such fake copies of originals can lead to serious hazards besides being expensive in terms of replacement costs and fuel use.

ACTIVITY 1

Collect any two advertisement which offers free gift and record your comment regarding the offer.

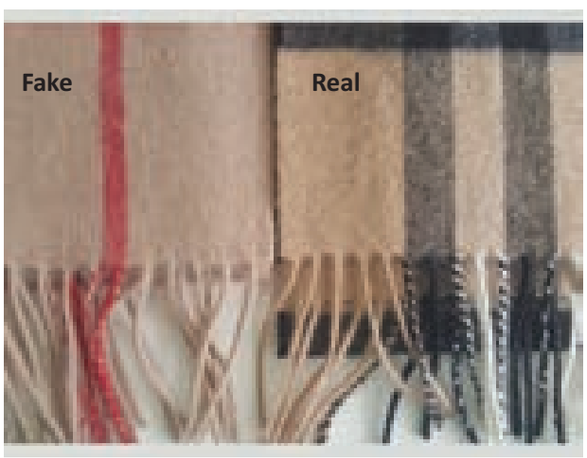
vii) Incorrect Weights and Measures

Receiving less than what a consumer pays for, has been an age old problem. This type of problems usually occurs in case of food ingredients liquids such as oils and milk and dry items like rice, pulses. The measuring of fabrics is also affected. Very often the cloth to be measured is stretched while measuring, resulting in higher costs for the consumer in addition to having less cloth for stitching a garment.

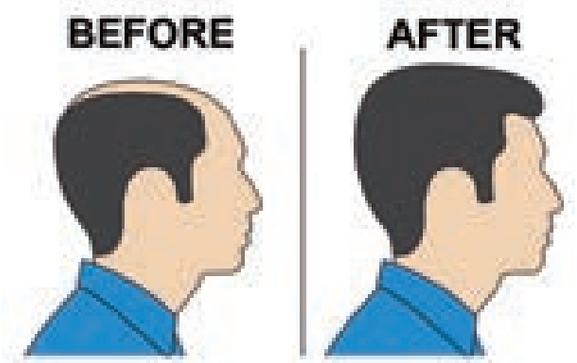
As a result of the government's efforts of standardising weighing and measuring equipment and stepping up inspection of the weights and measures used in the market, the problem of under weighing or measuring is significantly less than what it was a few decades ago.

viii) Deceptive goods

Due to technological advancement, every year many new commodities are available in the market. Each year the new varieties that reach consumers also increase. Many fake items which imitate popular brands are also available. In some case cheaper fibers are mixed or replaced in place of costlier fibers and sold in market . For example varying proportions of cotton is mixed with linen or woolen goods, while rayon and polyester fabrics mixed with silk.



ix) Misleading advertisements



Advertisements are mainly focused on goods and services that are made available in the market. But the consumer however, does not find any one advertisement which will give him all the information about a product. Most of the statements in the advertisements are usually too general to be helpful to give essential information on materials used.

x) Incorrect and incomplete labels

Labels are generally attached to a product for informing the consumers about the product. The information which a label conveys varies considerably. Sometimes it shows nothing more than the name of the product and of the manufacturer, whose address may or may not be mentioned for future correspondence or complaints.

xi) Deceptive Packaging

Packaging is a means to protect the contents of a package or a product from any kind of damage such as contamination, breakage, evaporation, pilferage etc. Packaging sometimes identifies the maker as well as his product, his brand and trade mark. In this way, he forces a consumer to make impulsive buying with his attractive package.

In most cases, when the package is not transparent, the consumer is unable to examine the product. He is unable to judge the product in terms of its size, shape, contents etc. The problem of a consumer increases when the weight of the packaging material or the container is also added to the weight of the product or contents. This means that the consumer pays more for less content.

xii) Dishonest Vending

While improvements have been made in the area of legislation and standards for sale of goods and services, sometimes consumers feel that vendors have cheated them. There is no way a consumer can know what to pay for a product.

2.3.2 Problems Related to Services

A number of factors also influence the provision of services rendered to customer.

i) Financial Institutions

Almost all financial institutions including banks render a host of financial services to the consumers. Wrong entries, mis-spelt names and absences of entries of deposits are common with these institutions.

ii) Transportation Authorities and Travel Agencies

These authorities and agencies are expected to render services to customers so that their journeys are made easy and comfortable. The customers are charged extra for these facilities. Sometimes the tickets are issued by private transportation authorities and agents without confirmation or proper reservations. Sometimes, consumers are not properly informed about cancellation or delay or re-schedule.

iii) Education

With the demand for schooling and higher education is on raise many private schools and colleges have started demanding large amounts of money from parents at the time of children's admission or regularly along with tuition fees.

The problems faced by students vary from shortage of space to that of staff shortages, lack of laboratories and equipments, environmental and classroom hygiene, lack of proper toilet and washroom facilities, poor canteen services etc. Students are afraid to complain about these problems due to fear of expulsion or ill-treatment by the management.

2.4 Consumer Aids

Consumer aids are tools which consumers can use not only in the selection but also to protect themselves against exploitative and fraudulent practices of sellers in the market place.

This information can be obtained from a number of sources such as:

i. Labels on Products
ii. Advertisements
iii. Internet
iv. Standardization marks

2.4.1 Label On Products

A label is a piece of paper or plastic that is attached to an object in order to give information about it. Manufacturer use labeling to their products to bring identification. This kind of labeling helps a viewer to differentiate the product from the rest in the shelves of the market. It is also done to impart knowledge of the ingredients of the food items. This helps to spread awareness among the customers about the item they are consuming and labeling also helps to mention ingredients. There are two types of labels:

i) Removable labels to adhere to the product only until they need to be removed

ii) Non removable labels/permanent labels the bonding is permanent and the label is difficult to remove.

Classification of Labels

There are various classes of labeling used in market. They are informative labels, care labels and nutrition labeling.

i) **Informative labels**- It gives details like the composition of the product, its manufacturing details the other uses of a product.

ii) **Care labels**- These are usually seen on textile and clothing items. Care labels give the information on the care required like, when the item is in use or while washing. These instructions are given either in a written form or in the form of standard symbols. Instructions like store in a cool and dry place, keep away from heat/ sunlight, keep beyond the reach of the children, do not stretch, use of bleach/soap /detergent powder, whether machine wash or hand wash etc. are all intended for the purpose of providing care labels.

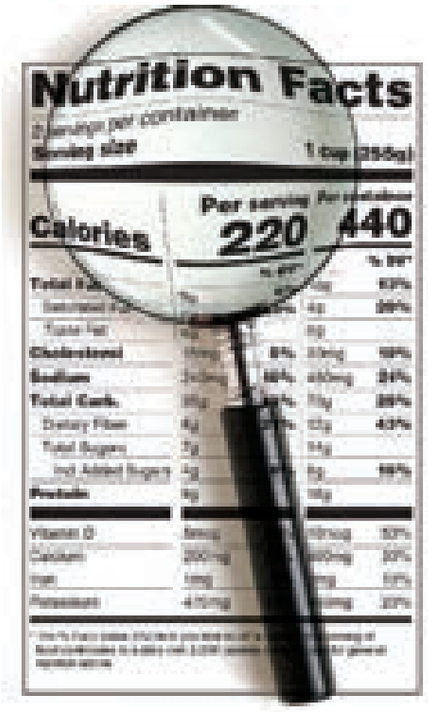
iii) **Nutrition Labeling-**

The food industry contributes to nutrition education by offering products that correspond to the current needs of consumers and by informing them of product ingredients and nutritional characteristics including energy value, content of protein, fat, carbohydrates, vitamins and minerals.

a. **Nutrient content claims:** This is a nutrition claim that describes the level of a nutrient contained in a food. Example: low in fat, gluten free, iron rich or low sodium.

b. **Comparative claim:** It is a claim that compares the nutrient levels or energy value of two or more foods. The foods being compared should be different versions of the same food or similar food. The difference in nutrient content and energy value should be given.

c. **Nutrient function claim:** This is a claim that describes the physiological role of a nutrient in the growth, development and normal function of the body e.g., contains calcium for stronger teeth.



ACTIVITY 2

Draw a food label with all specifications for a pickle you have prepared

DO YOU KNOW?

Government had made it mandatory with effect from July 1999 that all packed food items should necessarily display "Best before date".

It has been made mandatory that every container of milk substitute or infant food should have an important notice. "Mother's milk is best for babies" in capitals.

2.4.2 Advertisements

Advertisement is a source of information to consumers.

The purpose of advertising is to inform the consumers about their product and availability of a company's services or and to hold existing customers. Advertising is communicated through various mass media, including traditional media such as newspapers, magazines, television, radio, outdoor advertising or direct mail; and new media such as search results, blogs, social media, websites or text messages.

2.4.3 Internet

The internet is quickly becoming one of the primary sources for people to receive information and also to attract customers. In Internet based market the transactions are electronic, on screen interactions instead of face to face interactions. Online shoppers can seek virtually any product at any time and from any location. Internet provides consumers with an extraordinary search power, where a large number of Websites can be visited in a number of minutes, which is virtually impossible for traditional shoppers. Negative aspect associated with internet buying are the products takes time to reach consumer and sometimes products in the illustration does not match the products which consumer gets.

The web can be used as a powerful marketing tool in a number of ways to promote business and reach people across the globe. They are easy and effective. Internet business is done through E-mail networking social media marketing etc.

2.4.4 Standardization Marks

Standardization mark is a mark or symbol given to a product, which meets certain standards with respect to the quality in terms of material used, methods of manufacturing, labeling, packaging and performance. There are a number of certification marks in use for different products.

DO YOU KNOW?

The department of consumer affairs has launched this portal for registering online complaints for grievances against misleading advertisements. **www.gama.gov.in**

Grievance against Misleading Advertisements (GAMA)

i) Agmark

AGMARK is a certification mark employed on agricultural products in India, assuring that they conform to a set of standards approved by the Directorate of Marketing and Inspection, an agency of the Government of India.

The 'Agmark' is a trademark of quality control set up by the government. It establishes the norms relating to the acceptable physical and chemical characteristics in both natural and processed products. The 'Agmark' standard covers 222 agricultural, horticultural, forest and livestock products. This certification on any product assures the consumer of correct selling practices like quality and purity of the product, correct weights and other relevant chemical and physical characteristics of the product and protect the consumers from the hazards of adulteration and contamination.

The testing done across these laboratories include chemical analysis, microbiological analysis, pesticide residue and aflatoxin analysis.

DO YOU KNOW?

Important Products with Agmark -Whole and ground spices, butter, ghee, vegetable oils honey, jaggery, food grains, gram flour, oil cake, animal casings, meat and other food products

(www.agmarknet.nic.in).

ii) FSSAI

FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA

Inspiring Trust, Assuring Safe & Nutritious Food

Ministry of Health and Family Welfare, Government of India

Food Safety and Standards Authority of India (FSSAI) is an autonomous body established under the Ministry of Health & Family Welfare, Government of India. The FSSAI has been established under the Food Safety and Standards Act, 2006 which is a consolidating statute related to food safety and regulation in India.

FSSAI is the supreme authority which is responsible for regulating and supervising the food safety. It is mandatory for all the Food Business Operators (FBOs) in order to obtain an FSSAI license or Food Licenses

iii) FPO Certification

The FPO *mark is a certification mark mandatory* for all processed fruit products sold in India such as packaged fruit beverages, fruit jams, crushes and squashes, pickles, dehydrated fruit products, and fruit extracts. The fruit products order also specifies the conditions of hygiene and sanitation required to be maintained by the manufacturers. This mark guarantees that the product was manufactured in a hygienic food safe environment, thus ensuring that the product is fit for consumption.

iv) ISI Mark

Indian Standards Institution (ISI) is a certification mark of the Bureau of Indian Standards (BIS). The BIS has published over 15,000 standards covering product specifications, methods of test, codes of practice and others. About 400 standards of various products are approved every year, and each standard is reviewed for amendments every five years. The ISI mark is mandatory for certain products to be sold in India, like many of the electrical appliances like switches, electric motors, wiring cables, heaters, kitchen appliances etc., Indian standards also cover food items such as vegetables, fruits and meat products, spices and condiments, processed foods, cereal, soya products, soaps, candies, beverages, detergents, paints, paper etc. and other products like Portland cement, LPG valves and cylinders, automotive tyres etc.

v) ISO Mark

International Organisation for Standardization (ISO) prescribes quality standards for products, services and authorizes national standard setting bodies (Bureau of Indian Standards) to

issue certificates. The objective of ISO is to make common standards of products and services at international level, which ultimately facilitate foreign trade. The areas where ISO standards can be applicable are manufacturing, processing, printing, electronics, steel, banking, telecommunication, hospital, insurance, etc. The BIS in India has prescribed standards of 9000 and 14000 series for exportable products which confirm to the quality standards adopted in western developed countries.

vi) Silkmark

Silk Mark is a certification mark in India for silk textiles. It is a registered trade mark. It is a quality assurance label for the assurance of pure silk and in addition serves as a brand for generic promotion of pure silk. It can be used in all silk product like dress materials, garments, carpets, sarees, etc.

vii) Ecomark

To keep the environment 'pollution free', BIS has prescribed standards for eco-friendly products. An earthern pot is used as a logo for eco-friendly product. Products that conform to the standards set by BIS for environmental protection are permitted eco-labeling of their products. This mark indicates that the product is environment friendly and less potential for pollution as regards production, use and disposal. Hence ecofriendly product should be made from recyclable, reusable and biodegradable materials. The various products in which you may find this eco mark are Soaps and detergents, plastics, paper, textiles, preservatives, food additives, cosmetics, paints, lubricating oils, packaging materials, wood substitutes , food items (edible oils, tea and coffee beverages, infant foods, processed foods) etc.

ECOMARK

ECOMARK is a certification mark issued by the Bureau of Indian Standards to products conforming to a set of standards aimed at the least impact on the ecosystem.

viii) Holomark

Hologram is a small square size plastic sticker generally of silver colour pasted on the package of some products or on the cover page of some book. It gives three dimensional images of different colours when held under light. It also changes appearance when you change the viewing angle. By observing it minutely you can also find some text written on it. The text may be the name or its logo of the company. The purpose of sticking it on the package of the product is to establish the genuineness of the products.

ix) Hallmark

Purity of gold cannot be measured by normal eyes. Thus to protect customers, Bureau of Indian standards has a special symbol on jewellery known as "hallmark". Hall mark indicates the Caratage or ensures the purity of gold jewellery number indicating gold content on a scale of 1000. Hallmarking is a foolproof method to accurately determine and record the exact gold content in jewellery.

x) Vegetarian and Non Vegetarian Mark

The small green or red circle inside a square on the package of some products like bread, honey, milk powder, spices etc are used to indicate the presence of vegetarian and non vegetarian ingredients in processed food items. The red circle indicates that the food item contains non vegetarian ingredients and the green circle indicates vegetarian ingredients. This helps the consumer to identify the food of their choice. The Government of India has made it mandatory for all packages of processed food items to bear the vegetarian or non-vegetarian mark. This is an identification mark adopted by Government of India from Codex Alimentarius, which is an international organisation that prescribes food safety norms.

xi) Barcode

It is a set of black vertical small lines printed on the label of some products. It consists of a particular numbers of bars of different width along with a number. If you observe it carefully you may find that the width of lines and the numbers written are different from product to product. These lines and numbers indicate the types and price of the product which, only a computer can read.

2.5 Branding

A brand is a name, term, design, symbol, or other feature that distinguishes an organization or product from its rivals in the eyes of the customer. Brands are used in business, marketing, and advertising. Name brands are sometimes distinguished from generic or store brands.

2.5.1 Elements of Branding

Brand includes various elements like - brand names, trade names, brand marks, trademarks and trade characters. The combination of these elements forms a firm's corporate symbol or name.

i) **Brand Name** - It is also called product brand. It can be a word, a group of words, letters, or numbers to represent a product or service.

ii) **Trade Name** - It is also called corporate brand. It identifies and promotes a company or a division of a particular corporation.

iii) **Brand Mark** - It is a unique symbol, colouring, lettering, or other design element. It is visually recognisable, not necessary to be pronounced.

iv) **Trade Mark** - It is a word, name, symbol, or combination of these elements. Trade mark is legally protected by government. No other organisation can use these symbols.

v) **Trade Characters** - Animal, people, animated characters, objects, and the like that are used to advertise a product or service, that come to be associated with that product or service.

2.5.2 The Types of Brand

The types of brands include individual products, product ranges, services, organizations, individual persons, groups, events, geographic places, private label brands, media and e-brands.

i) Individual Brands

The most common type of brand is a tangible, individual product, such as a car or product. Brands can also be associated with a range of offerings such as varieties of toothpaste.

ii) Group Brands

Group branding happens when there is a small group of branded entities that have overlapping, interconnected brand equity

iii) Service Brands

A service brand develops as companies move from manufacturing products to delivering complete solutions and intangible services. Service brands are characterized by the need to maintain a consistently high level of service delivery. This category includes the following:

a. Classic service brands (such as airlines, hotels, car rentals, and banks)

b. Pure service providers (such as member associations)

c. Professional service brands (such as advisers of all kinds—accountancy, management consultancy)

d. Agents (such as travel agents and estate agents)

e. Retail brands (such as supermarkets, fashion stores, and restaurants)

iv) Organization Brands

Organization brands are companies and other entities that deliver products and services. Example: Maruthi Suzuki and TVS each possess strong organization brands, and each has associated qualities that make up their brand.

v) Event Brands

Events can become brands when they strive to deliver a consistent experience that attracts consumer loyalty. Example: sporting events like the Olympics. The strength of these brands depends on the experience of people attending the event.

vi) Geographic Place Brands

Many places or areas of the world seek to brand themselves to build awareness of the essential qualities they offer. Geographic branding is used frequently to attract commerce and economic investment, tourism, new residents. Example Kanchi silk sarees, Tirunelveli halwa.

vii) Media Brands

Media brands include newspapers, magazines, and television channels.

viii) E-Brands

E-brands exist only in the virtual world. Many e-brands, such as Amazon. com, have a central focus on providing an online front end for delivering physical products or services.

2.6 Packaging

Packaging is the science, art and technology of enclosing or protecting products for distribution, storage, sale and use. Proper packaging ensures that product has to reach consumer in the same condition with original characteristic.

Packaging serves 2 major functions – protection and preservation. Protection of the product can be from climatic damage like atmospheric moisture, oxygen, light, heat, cold, microbial attack and mechanical damage.

Through product preservation a product could be preserved in a packaging system maintaining the quality till it is consumed. The better the packaging maintains qualities of the product, prevents tampering and prevents spurious cheap imitations.

2.6.1 Classification of Packaging

i) **Unit pack:** It is also called primary pack or consumer pack. The size and number of units going into each pack depends on the nature of the product and the merchandising method.

ii) **Intermediate pack:** Also called secondary pack, the purpose of the intermediate pack can be utilization of couple of unit packs, distribution, requirement, display value etc.

iii) **Bulk pack:** Master pack, distribution pack, transport pack all refer to bulk pack only. This pack is used for distribution of unit packs or intermediate packs. In general the bulk pack has to take care of protection against mechanical hazards.

2.6.2 Types of Packaging Materials

A variety of packaging materials are used by the processed food industry. Few are enlisted below:

i) **Glass containers:** Glass containers are heavy and fragile but glass is still predominantly used as a packaging medium for a number of processed food items like carbonated beverages, syrups, squashes, jams, jellies, pickles, malted-milk foods, instant coffee, sauces, ketchup etc. Glass is preferred as it is inert and resistant product visibility. It offers additional benefits of impermeability, reusability and recyclability.

ii) **Metal containers:** Tinplate containers are available in wide range of capacities. Inner lacquer coating is essential for tin plate containers which should be compatible with the food product. Metal drums and used for bulk packaging. Because of the superior strength and excellent protection tin plate containers are used for a variety of processed food items like cheese, baby foods and milk powder, biscuits, processed fruits and vegetables, jams, meat and fish preparations, edible oils etc.

iii) **Composite containers:** In composite containers, generally, the body is made up of paperboard tubes and the ends are made up of metal. The body of the container is lined internally with plastic films or aluminum foil. Food products like spices, custard powder, and corn flour are packed in composite containers.

iv) **Wooden crates or boxes:** Wooden crates are used extensively for weight above 100 kg.

v) **Plastic:** Polystyrene is principally made into tubs for ice-creams, small packages for butter, jam and cheese. Recycled plastic is not to be used for storing food grains. Biscuits stay crackling fresh mouths on end and cakes retain their softness even after weeks due to tough cellophane packages.

vi) **Modified atmosphere packaging/ Gas flushing:** These are packaging methods for extending the life of food products by changing the atmosphere surrounding the food inside the package.

a. In modified atmosphere packaging, the gas mix (carbon dioxide, nitrogen, oxygen) inside the package, suppresses / aggravates naturally occurring reactions of food. This method is employed for highly perishable food like meat, meat products.

b. In gas flushed packages, the package is flushed with an inert gas and oxygen is eliminated and used packing for high fat foods to prevent oxidation and rancidity. Item like nuts, potato chips etc., are found in gas flushed packages.

vii) **Edible Food Wraps:** Sandwiches and meat are wrapped in edible substances and preserved. Usually the wraps are made up of fruit or vegetable like broccoli, tomato or fruit wraps like mango, peach, pear, apple or papaya.

Edible vegetable and fruit wraps keep lunches fresh much longer and are biodegradable. Wheat protein in the form of purified wheat gluten, commercial wheat gluten and corn protein as corn zein have been tried as edible films. This wrap is not water resistant and dissolves in the mouth. The advantages of using edible films are:

a. the film can be consumed with the packaged product and there is no packaging to dispose off,

b. can add nutritional value to foods.

c. flavours can be incorporated in these films.

www.youtube.com/watch?v=hosmVt62x2U

2.7 Consumer Education

Every one of us is a consumer and has a right to consumer education. The right education that would enable us to act as informed consumers throughout our life. Therefore, the purpose of consumer education is to teach people how to be better consumers.

Consumer education is

- a process by which an individual can gain understanding of changes in the economy, clarify personal goals, values and attitudes, identify alternatives, and make decisions that will result in maximum satisfaction and benefits.
- To provide consumer information that increases consumer awareness, and helps in making the appropriate decisions.
- a process of making consumer aware of their fundamental rights as consumers and to motivate them to utilize their rights.

2.7.1 Role of Consumer education

Consumer education is important because it helps a consumer to be a better and wise buyer. The role of consumer education is:

1. It helps a person in making proper purchase. It enables the consumer in making right selection.
2. It familiarizes the consumer with the problems that he faces while making purchases. This education inculcates the logical viewpoint in him.
3. It provides the consumer complete information about products, for example this information enables him in and helps taking right decision regarding purchasing, sources of purchasing a particular commodity, from where to get best goods etc.
4. Consumer education familiarizes the consumer with various standards of standardization and their markings, and the various acts enacted by the government from time to time.
5. Consumer education helps the consumer in getting maximum satisfaction by proper utilisation of his money and leads a better living standard.

2.7.2 Rights of a consumer

The definition of consumer right is the right to have information about the quality, quantity, purity, price and standard of goods or services but mainly is to protect the consumer from any unfair practices of trade. They are:

i) Right to safety

Consumers have a right to be protected against marketing of goods which are injurious to health and life. As a consumer if you are conscious of this right, you can take precautions to prevent the injury or if injury is caused in spite of precaution, you have a right to complain against the dealer and even claim compensation. For example if you buy any product from the shop selling it can be held responsible if the product is fake and causes harm.

ii) Right to Information

The right to obtain any information or facts about the product helps the consumer to make an informed choice and to be protected against dishonest or misleading advertising and labeling. Information to consumers such as product specification, place of production, safety warnings, price, mode of payment, date of quality assurance, description of after sale services, warranty, ingredient, nutritional facts, etc should be given.

iii) Right to Choose

Every buyer has the right to select according to his needs and wants from various qualities, prices, sizes and designs available. The consumer satisfaction varies based on individual's sense of beauty, sense of satisfaction, sense of reasoning, etc. This is the theoretical framework on which right to choose is built, and this right is fundamental to consumer satisfaction.

iv) Right to be Heard

This right has three interpretations. This right means that consumers have a right to be consulted by Government and public bodies when decisions and policies are made affecting consumer interests. The consumers have a right to be heard by manufacturers, dealers and advertisers about their opinion on production and marketing decisions.

The consumers have the right to be heard in legal proceedings in law courts dealing with consumer complaints.

v) Right to Seek Redressal

When any consumer has a complaint or grievance due to unfair trade practices like charging higher price, selling of poor quality or unsafe products, lack of regularity in supplying of services etc. or if he has suffered loss or injury due to defective or adulterated products, he has the right to seek remedies. He has a right to get the defective goods replaced or money refunded by the seller or dealer. He also has the right to seek legal remedies in the appropriate courts of law. This right also provides for due compensation to consumers if they have suffered a loss or are put to inconvenience due to the fault of the supplier or manufacturer.

vi) Right to Consumer Education

To prevent market malpractices and exploitation of consumers, consumer awareness and education are essentially required. For this purpose, consumer associations, educational institutions and government policy makers can provide information to consumers about

a) The relevant laws which are aimed at preventing malpractice and promoting fair practice

b) The ways in which dishonest traders and producers may try to manipulate market practices to deceive consumers

c) How consumers can protect their own interest

d) The procedure to be adopted by consumers while making complaints.

vii) Right to Live in a Healthy Environment

It is the brith right of every individual in a society to have a clean physical environment that will enhance the quality of life. The right calls for the need to protect and improve the environment for the present and future generations. It is needless to say that the hazard to clean and safe environment is increasing day by day. This right of the consumers to be ensured of clean and safe environment casts a duty on the state to prevent any danger to environment.

viii) Right to Basic Needs

The right to basic needs is the primary right of a consumer as a human being. The very survival of an individual will be jeopardized if his basic needs are not met. Right to basic needs does not merely imply a simple right to survival but also to lead a normal life of an individual.

2.7.3 Consumer Protection Act 1986 (COPRA)

It makes provision for the establishment of consumer councils and other authorities for the settlement of consumer's disputes.

In India, it is regarded as the most important law in the field of consumer protection. It led to the establishment of a widespread network of consumer forums and appellate courts all over India.

Its provisions are very comprehensive and safeguard the economic rights of consumers very effectively. This law is based on the principle of 'self-help' to protect against all kinds of exploitative and unfair dealings, such as overpricing, defective goods and

cheating. The law redefines the legal relation between consumers of goods and services and their sellers or manufacturers.

This act has two important implications for the consumer:

- Firstly, it gives him the right to complain to an authority when aggrieved and seek redressal speedily without much haste.
- Secondly, the consumer can claim compensation for any loss or injury suffered on account of the negligence of the manufacturer.

The act applies to all goods and services except those rendered free of charge or under a personal service contract. Any complaint of deficiency in the service rendered to a consumer, or loss caused due to an unfair trade practice, can form the subject for proceedings under the act.

Features of Consumer Protection Act:

i) Group of Consumer's Rights:

This act provides many rights to consumers. These rights are related to safety, information, choice, representation, redressal, education etc.

ii) Effective Safeguards:

This Act provides safety to consumers regarding defective products, dis satisfactory services and unfair trade practices. So under the purview of this Act there is a provision to ban all those activities which can cause a risk for consumer.

iii) Three-tier Grievances Redressal Machinery:

Consumer courts have been established so that the consumers can enjoy their rights. This Act presents Three- tier Grievances Redressal Machinery:

a. At District Level-District Forum
b. At State Level -State Commission
c. At National Level – National Commission.

iv) Time Bound Redressal:

A main feature of the Act is that under this, the judgment for the cases are decided in a limited time of period.

v) Consumer Protection Council:

To favour consumer protection and to encourage consumer awareness, there is a provision in this act to establish consumer protection councils. It ensures consumer's right to seek redressal if any grievance arise.

2.7.4 Consumer Redressal Forum

The judiciary bodies are set up by the government to protect the consumer rights. Its main function is to maintain the fair practices by the sellers towards consumers. Consumers can file a case against a seller if they are harassed or exploited by sellers. The court will only give a verdict in favour of the consumers if they have proof of exploitation, i.e., bills or other documents.

i) Who Can File a Complaint?

The following categories of persons can file a complaint

- aggrieved consumer
- any voluntary consumer organisation, registered under the Societies Registration Act, 1860, or the Companies Act, 1956,
- the Central Government
- the State Governments or Union Territory Administrations

ii) When to File Compliant?

All complaints should be filed within 2 Years from date of purchase.

iii) What Constitutes a Compliant?

The complaint can be filed against the trader, manufacturer and the supplier of the services. A complaint can be filed if there is a defect in the goods or a shortage in the service rendered or when a trader charges more maximum retail price for the goods and also when a consumer suffers any loss or damage due to unfair trade practices.

iv) Where to File a Complaint?

The consumer can move the district forum, the State Commission or the National Commission on the following grounds.

i) **District Consumer Disputes Redressal Forum (DCDRF):** it works at the district level with cases where the compensation claimed is up to 20 lakhs. The prescribed fee is Rs 100 to 500 only.

ii) **State Consumer Disputes Redressal Commission (SCDRC):** it works at the state level with cases where compensation claimed is above 20 lakhs but up to one crore. The prescribed fee is Rs2000 to 4000. The State Commission also has Appellate jurisdiction over the District Forum.

iii) **National Consumer Disputes Redressal Commission (NCDRC):** A national level court works for the whole country and deals compensation claimed exceeds rupees one crore. The prescribed fee for the national commission is 5000 and it is the apex body of consumer courts. It is also the highest appellate court in the hierarchy.

v) How to File a Complaint?

The procedure laid down for filing complaints for seeking redressal is simple. The complainant or his authorised agent can also present the complaint in person or send it by post to the appropriate forum. The complaint should be signed and verified by the complainant or his authorised agent.

They should file three copies of the complaint to the concerned authorities. A complaint should contain the following information:

i) the name, description and the address of the complainant,

ii) the name, description and the address of the opposite party or parties,

iii) the facts relating to complaint and when and where it arose,

iv) documents, if any, in support of the allegations contained in the complaint,

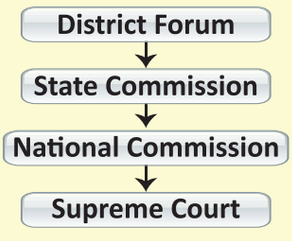
v) the relief which the complainant is seeking.

The redressal forums will give orders for removal of defects from the goods or refund of the price paid or award of compensation for the loss suffered or injury sustained.

vi) Procedure for Filing the Appeal against Decision:

There is no fee for filing appeal before the State commission or the national commission. Procedure for filing an appeal is the same as that of a complaint, except that the application should be accompanied by the orders of the district forum or state commission as the case may be and reasons for filing the appeal should be specified.

An appeal against the decision of a district forum can be filed before the state commission within a period of thirty days. Appeal against the decision of a state commission can be filed before the national commission within thirty days. Appeal against the orders of the national commission, can be filed before the Supreme Court within a period of thirty days. The structure of the redressal machinery is shown in figure below.



Levels of Forums for Redressal of Complaints

ACTIVITY 3

Selvi bought a washing machine for 25000 rupees and it was found to be defective machine. What is the procedure for filling a complaint and enlist what details and documents should provided while filling complaint? Where should she file the complaint?

National Consumers Helpline
(Sponsored by Department of Consumer Affairs, Govt. of India)
Toll Free No. 1800-11-4000
SMS No. 8130009809(24 Hrs.)
www.consumerhelpline.gov.in

SUMMARY

- A consumer is a person who buys goods and services. Every one of us is a consumer and has a right to consumer education. The purpose of consumer education is to teach people how to be better consumers.
- It also includes the problems faced by consumer are related to products or related to services used by them. They are lack of safety and absence of quality control regulations, adulteration, imitation manufacture, unfair warranties, sales gimmics, substandard quality, incorrect weights and measures, deceptive goods, misleading advertisements, incorrect and incomplete labels, deceptive packaging and dishonest vending.
- Importance of consumer education is emphasized because it makes a consumer to be a better and wise buyer. Knowledge about consumer aids are tools which

consumers can use not only in the selection but also to protect themselves. This information can be obtained from labels on products, advertisements, internet and standardization marks.

- Components of consumer education include right to safety, information, choose, heard, seek redressal, consumer education, live in a healthy environment and basic needs.
- Consumer Protection Act (1986) "COPRA" protect the interests of consumers. It defines the procedure, three tier redressal system in which who can, when to, what constitutes, where to file, how to file a complaint? It also provides procedure for filing the appeal against decision.
- Information's pertaining on various types of brands, classification of packaging and variety of packaging materials are used by the processed food industry and classification of labels are essential for consumer to buy wisely.

A-Z GLOSSARY

- Consumer- (நுகர்வோர்)- is a person who buys goods and services or use of public utilities or natural resources
- Commercial- (வணிக) Buying and selling
- Appropriate - (சரியான) Suitable or right for a particular situation or occasion
- Fundamental- (அடிப்படை) forming the base from which everything else develops
- Scarcity- (பற்றாக்குறை) shortage in supply
- Public distribution agencies- (பொது விநியோக நிறுவனம்) It is a government chain of shops distributing basic food and non-food commodities to the needy sections of the society at very cheap prices.
- Illegal- (சட்டத்திற்கு புறம்பான) not according to or authorized by law
- Black marketing- (கள்ள சந்தை) illicit trade in goods or commodities in violation of official regulations
- Malpractice- (முறைகேடு) an injurious, negligent or improper practice
- Adulteration- (கலப்படம்) when some substances are either added or removed from a product which changes its composition, nature or quality.
- Imitation- (போலி) copying or resembling something of better quality
- Sale gimmicks- (விற்பனை வித்தை) It is a creative way to attract attention to business, product or service and to increase urge to purchase in the mind of customers.
- Deceptive- (ஏமாற்றக்கூடிய) misleading believe about something which is not true
- Misleading- (தவறான) giving the wrong idea or impression.
- Dishonest- (நேர்மையற்ற) behaving in an untrustworthy, deceitful or insincere way, willful perversion of truth in order to deceive, cheat or defraud.
- Commodity- (பொருட்கள்) a substance or product that can be traded, bought, or sold
- Standardization- (தரப்படுத்தல்) the process of making something conform to a standard.
- Redressal- (குறைநிவர்த்தி) Act of correcting an error or a fault and a sum of money paid in compensation for loss or injury.

EVALUATION

I. Choose the correct answer

1. _____ on a product which is packed in a box or bottle gives all information about the products to consumer
   a) Label
   b) Bill
   c) Holomark
   d) Trade mark
2. Replacement of defective products or their parts is assured by the manufacturer in _____ card.
   a) Bill
   b) Warranty
   c) Standard
   d) Service
3. A small red circle inside a square mark on the package indicates the presence of _____ ingredients in a product.
   a) Non vegetarian
   b) Vegetarian
   c) Artificial colours
   d) Artificial flavours
4. _____ are facilities provided by government or non-government agencies free of cost or on payment
   a) Goods
   b) Services
   c) Trade
   d) Business
5. _____ ensure legal protections to consumers against unfair trade practices
   a) ISO mark
   b) MRTP act
   c) Vegetarian mark
   d) Barcode
6. Hologram is a symbol which is used to establish _____ of a product.
   a) Genuineness
   b) Rate
   c) Eco friendliness
   d) Quantity
7. _____provides free spare parts but service charges are collected from the customer.
   a) Warranty
   b) Guarantee
   c) ISO
   d) ISI
8. The department of consumer affairs has launched online service portal for registering complaints for grievances against misleading advertisements _____
   a) Misleading advertisement prevention agency
   b) Grievance against Misleading Advertisements (GAMA)
   c) Food Safety and Standards Authority of India (FSSAI),
   d) Ministry of AYUSH

9. _____include chemical analysis, microbiological analysis, pesticide residue and aflatoxin analysis.
   a) ISO Mark
   b) Silk mark
   c) Agmark standard
   d) Ecomark
10. _____ mark is by prescribed Bureau of Indian standards for eco-friendly products
   a) ISO Mark
   b) Silk mark
   c) Agmark standard
   d) Ecomark

II. Write Very Short Answers (2 marks)

1. Define consumer.
2. What is meant by goods?
3. Give two examples for service.
4. Ramu is adding water to milk for profit – identify the type of adulteration.
5. Brief about deceptive goods.
6. What is silkmark?
7. Brief about National consumer disputes redressal commission.
8. Define brand.
9. What is geographic place brands?
10. What are removable labels?

III. Write Short Answers (3 marks)

1. Describe on the purpose of consumer education.
2. Enlist the problems faced by consumers related to products.
3. Selvam bought a pair of expensive branded shoes but on using he found it was not genuine and safe. It was a duplicate of expensive brand- Comment on type of unfair trade practice involved in this case.
4. When the consumer is forced to take certain goods as free gifts as introductory offer but the cost is hidden and is paid by the consumer - identify unfair trade practice involved and comment.
5. Differentiate Vegetarian and Non Vegetarian mark.
6. Write about important information which are needed to be found in a label.
7. Who can file a complaint in consumer redressal forum?
8. Describe the elements of branding
9. Why do we pack food? Mention any one function of packaging.
10. Enumerate on classification of packaging.

IV. Write in detail (5 marks)

1. Elaborate on the problems faced by consumer.
2. How does advertisement affect buying decisions? Give two examples.
3. What information will you gather before buying any product? State with examples.
4. Explain the purpose of standardization mark of the products.
5. With an example explain the information which are needed to be found in a label.

6. Mohan went to the market to buy bread. He bought a packet and when he opened it at home he found the bread to be stale and rotten. Who is to be blamed? What are the information you will look when you buy a bread packet?
7. Write in detail about the image given below.

8. Explain in detail about the rights of consumer.
9. Describe about the Three-tier Grievances Redressal Machinery of Consumer Protection Act.
10. Baskar bought a car for 10lakhs but the performance was not as it was advertised .Where should he file his complaint? Discuss about the procedure involved and prescribed fee for filing his complaint.
11. Enlist and explain any two types of brand.
12. Explain the types of packaging materials used in India.
13. Write briefly on classification of labels.

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UNIT 3

Food Safety

LEARNING OBJECTIVES

This chapter helps the students to get a bird's eye view of:

- The process of Food Selection and the factors governing the selection to ensure food safety.
- Methods to be adopted for food storage and the containers to be used for a safe food storage.
- Adulteration and its impact with the key adulterants in foods and simple tests to identify them.
- Causes of food contamination and food borne infections which prove hazardous to health.
- Method to prevent Food- Borne Illness.

3.1 Introduction

Food has been a basic part of our existence. The edible parts of plants and animals termed as "food" are consumed by people to satisfy their physiological, psychological and social needs. It is universally accepted that the nutritional value of food alone does not persuade people to eat but also its colour, flavour, texture, temperature and presentation which are the other contributory factors towards food consumption patterns of the people which ensure the wholesomeness of the food in terms of quality and quantity. Thus the consumer can get a food item without compromising on the deteriorative aspects like food contamination, food borne illnesses and infections.

Food safety is an assurance that food will not cause any harm to the consumer when it is prepared and eaten according to its use. The said assurance is determined by

- Whether the harmful substances present in the food have been eliminated or reduced to acceptable level.
- Whether food that has been prepared, handled or stored under controlled and sanitary conditions in conformation with practices prescribed by government regulations.

3.2 Selection of Food

Food selection is an important step in ensuring good nutrition for the family. The daily food guide helps in deciding the kinds and amount of foods to be purchased. Selection of foods from the available variety is an important aspect of marketing. Intelligent selection of foods is based on the knowledge of attributes of high quality foods.

The types of food selection depend on:

- Availability of funds/ money
- Nutritional needs
- Effect of advertisements
- Likes and Dislikes

Availability of funds / Money

Money enhances the purchasing power and increases purchasing choices. People who have a lot of money can afford a variety of meals and can eat away from home. However, people with small incomes have a limited choice and it becomes a hard task to buy enough food to meet family needs.

Nutritional needs

Food choice will also depend on nutritional needs. Without food one becomes weak and ill. The nutritional needs of the people may vary based on age, activity, health condition, gender and specific needs during specific stage of growth and development. eg. Pregnancy, lactation.

Effects of Advertisements

Another great influence on food choice is advertisement. Advertisements have a way of persuading people to make choices. Food manufacturers and shops advertise their products through television, radio, magazines, newspapers, posters and leaflets. People tend to taste new food products that are endorsed by famous personalities.

Likes and dislikes

The choice of foods is often based on the likes and dislikes of the family members. Several factors contribute to our likes and dislikes such as colour, flavour, appearance and texture of the food.

In addition food selection also depends on the safety and hygiene aspects and it should be free from insecticides, chemical toxins, physical hazards and microbial contamination.

3.3 Storage of Foods

Foods can be classified as perishable, semi- perishable and nonperishable and these factors determine the methods of storage. Most food materials need to be stored for different lengths of time and at different temperatures, to preserve their wholesomeness till required for preparation and service. For effective storage of food items two types of storages are used :the dry storage rooms meant for non-perishable commodities like cereals and their products, pulses, legumes, sugar and spices, canned foods, fats and oils, etc., and the low temperature storages for semi-perishable and perishable foods.

Dry storage

It is a place for storage of dry ingredients and it should be cool, well ventilated and free from infestation. The average temperature of a dry store varies between 20°C – 25°C. It is suitable for non-perishable and semi perishable commodities.

Low Temperature Storage

The main aim of low temperature storages is to maintain the temperatures at levels which will inhibit the growth of microorganisms thereby preserving the food. Three distinct types of low temperature storage include

a) Refrigerated Storage

b) Cold Storage

c) Freezer Storage for the storage of semi perishable and perishable foods.

Refrigerated Storage: It is storage space planned and maintained at a temperature between 0°C - 10°C. They are necessary to maintain the quality of perishable foods for 3-5 days only. Foods should be kept covered in refrigerated storage to prevent drying and odours been taken up by other foods.

Cold Storage: Here the temperature is maintained between 0°C and -5°C thereby reducing the enzyme activity to the minimum. Such storages are called "chill rooms" and can hold perishables for over a week and in the case of vegetables and fruits even up to a month.

Freezer Storage: The temperature ranges between -20°C to 0°C. For successful freezing the foods should be blanched, cooled quickly to freezing temperature and packed in airtight containers or bags.

ACTIVITY - 1

Try storing greens, brinjal, onion and egg at different temperatures in the refrigerator and see the effect

General Procedure for storage

i. Arrange food according to the type of commodity.

ii. Place stock item in alphabetical order of food.

iii. Stamp the date of delivery on every stock received before shelving to ensure that the old stocks are used up first.

iv. Place items on shelves according to date stamped, with earlier ones in the front of a row, and later ones at the back. Stamping also helps to cost the stocks more accurately according to the prices paid on the bill for the particular lot.

v. Arrange products to give an organized appearance. Efforts should be made to ensure that commodities do not lie around on the floor at any time.

vi. Heavy bins or drums should also be placed on wheels or on slatted platform, for free circulation of air around the food packs.

vii. All items delivered in bulk bags of jute or poly bags like sugar, flour, cereals, pulses, etc., should be cross stacked.

viii. Any opened bags should be immediately emptied into metal or plastic bins, polyethylene drums or cans with tight fitting lids.

ix. Cross stacking helps free air circulation. Polythene bags of milk powder should preferably be refrigerated.

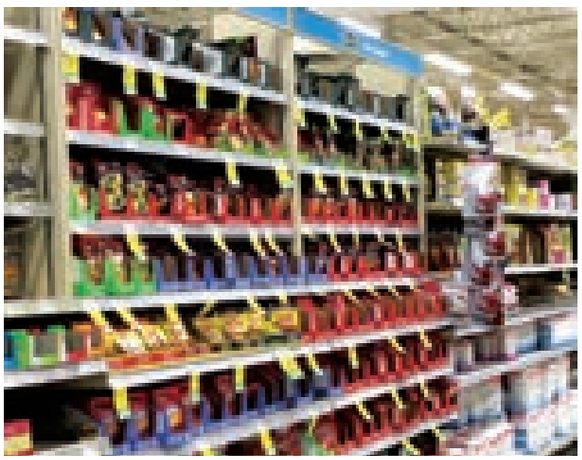
x. Cartons of canned foods, biscuits, etc., should be stacked with their labels visible for identification.

xi. Tins or small cardboard packs are generally used for dried fruits, preserves, mixes, jellies, etc., and may be lined up one in front of the other, each row having packs of the same item.

xii. As a rule, vegetables and fruits require to be stored in areas separate from the main dry stores, especially root vegetables.

xiii. Oils and fats need special attention in storage because they tend to get rancid in the presence of light. So fats and oils should be stored in a place where it can be protected from sunlight.

If foods are not stored properly they can become contaminated leading to several health hazards.



3.4 Food Adulteration

Adulteration of food stuffs is commonly practised in India by the traders. When the price of food production is higher than the price which the consumer is prepared to pay, the seller is compelled to supply a food product of inferior quality. Thus, adulteration occurs.

Definition: Adulteration is defined as the process by which the quality or the nature of a given substance is reduced through i) addition of a foreign or an inferior substance and the ii) removal of a vital element.

Adulterants can be of two types

1) **Intentional Adulterants:** Some manufacturers mix adulterants like brick powder, chalk powder, dried seeds, stones, marble, addition of harmful colors to food items like spices, pulses (metanil yellow in Turmeric or Carmoisine in Chili powder) with intention to make more profit.
2) **Incidental Adulterants** is the contamination due to carelessness and lack of proper hygiene during overall processing of food. It includes contamination due to defective packaging and storage and may result in bacterial or fungal attack.

As adulteration is rampant everywhere, consumer should be aware of adulterators and one should take steps to safeguard themselves against those food items. It is as shown in the table 3.4.1.

3.4.1 Common Adulterants in food and their Harmful effects

Sl. No.	Name of the food article	Adulterant	Simple method to detect the adulterant	Harmful Effects
1.	Ghee or butter	Vanaspathi	Take one teaspoonful of ghee or butter with equal quantity of concentrated hydrochloric acid in atest tube and add a pinch of cane sugar to it . Shake well for one minute and test it after 5 minutes. Appearance of crimson color shows the presence of vanaspathi	____
2.	Milk	Water	Lactometer reading should not be less than 1.026	Stomach disorder
			Drop of pure milk flows slowly leaving a white trail behind whereas adulterated milk with water will flow immediately.	___
3.	Khoa	Starch	Add tincture of iodine. Blue color shows the presence of starch.	Less - nutritive value
4.	Dhals	Kesari dhal	Add 50 ml of dilute hydrochloric acid to the dhal and simmer it for 15 minutes. Pink color shows the presence of kesari dhal.	Stomach pain, ulcer
5.	Hing	Soap stone or other earthy matter	Shake with water , soap stone or earthy matter will settle down.	Dysentry
6.	Tea leaves	Exhausted tea or black or Bengal gram dhal husk with color	Tea leaves sprinkled on wet filter paper would immediately release added color.	Liver Disorder
7.	Sugar	Chalk Powder	Dissolve in a glass of water, chalk will settle down at the bottom	Stomach – Disorder
8.	Chilli powder	Stones Brick Powder, Sawdust	Any grittiness present may be felt by tapping. The sediment at the bottom of glass confirms the presence of brick powder or sand.	Stomach problems

Sl. No.	Name of the food article	Adulterant	Simple method to detect the adulterant	Harmful Effects
9.	Rawa	Iron filings	By moving a magnet through it iron filings may be separated.	___
10.	Mustard seeds	Argemone seeds	Argemone seeds which are grainy with a rough surface can be separated from mustard seeds which have a smooth surface by close examination.	Epidemic dropsy & Glaucoma
11.	Honey	Molasses	A cotton wick dipped in pure honey when lighted with a match stick burns. If adulterated the presence of water will not allow the honey to burn.	Stomach disorder
12.	Cinnamon	Cassia Bark	Cinnamon barks are very thin and cassia barks are thick and stiff.	___
13.	Coffee	Chicory	When coffee powder is sprinkled on the water surface in a glass coffee floats but chicory sinks down.	Diarrhoea
14.	Black Pepper	Papaya seeds	Papaya seeds give a repulsive flavour distinct from the bite of black pepper	Stomach, liver problems
15.	Rice	Marble or other stones	Place a small quantity of rice on the palm of the hand and immerse the same in water. Stone chips will sink.	___

ACTIVITY - 2

Collect the samples of black pepper, cinnamon, chilli powder and milk and assess their quality.

DO YOU KNOW?

The Prevention of **Food Adulteration Act**, **1954** aims at making provisions for the prevention of **adulteration** of **food**. The **Act** extends to the whole of India and came into force on 1st June 1955.

3.5 Food Hygiene

Food Hygiene is the action taken to ensure that food is handled, stored, prepared and served in such a way, and under such conditions, as to prevent – as far as possible – the contamination of food. Good food hygiene is essential to ensure that the food prepared/ sold by businesses is safe. Food safety and hygiene are important both to safeguard consumer health and the reputation of food businesses.

3.5.1 Contamination of Food

Food contamination occurs by substances (contaminants) not intentionally added to food. Contaminants are the factors responsible for unhygienic food. They compromise food safety and cause harm to the health of a consumer. Such substances may be chemical, physical or biological.

Chemical

(For example, chemical poisons like insecticide) Chemical poisons such as insecticides get into food, and toxic metals may enter food during processing. Poisonous plants (and fungi) like some types of mushrooms and seafood produce chemicals or toxins which can cause illnesses if consumed incorrectly.

Physical

(For example, undesirable substances in food) Reports of 'foreign bodies' such as dead rats, insects and pieces of glass in food get wide publicity although they are rare events. Physical contaminants such as these are usually detected by the consumer and the food is not consumed. However, substances like glass or staple pins used for packing can be dangerous. These incidents rarely cause food poisoning but are, of course, highly undesirable.

Biological

(For example, bacteria, their toxins and viruses) Biological contaminants include microorganisms/microbes which are small organisms that can only be seen through a microscope. The most common types of microorganisms are bacteria and viruses.

3.6 Food borne Diseases

Food-borne diseases, including food-borne intoxications and food-borne infections, are terms applied to illnesses acquired through consumption of contaminated food, and are also frequently referred to as food poisoning.

While many food-borne diseases may be selflimiting, some can be very serious and can lead to death particularly in children, pregnant women and older persons.

3.6.1 Classification of food-borne illnesses

- **Food-borne infections** – caused by consuming foods or liquids contaminated with bacteria, viruses, or parasites. These pathogens cause infection by:
  - Invading and multiplying in the lining of the intestines and/or other tissues
  - Invading and multiplying in the intestinal tract and releasing a toxin (bacteria only).
- **Food-borne intoxications** – caused by consuming foods or beverages already contaminated with a toxin. Sources of toxins are as follows:
  - Certain bacteria (pre-formed toxins)
  - Poisonous chemicals
  - Natural toxins found in animals, plants, and fungi.

Salmonella food Poisoning:

Causative agents: Salmonella group are the main group of bacterial agents

causing food poisoning. S. enteritids, S. typhimurium, S. Thompson are the most frequent but other types have also been isolated in outbreaks of food poisoning. Salmonella food poisoning causes gastro enteritis since only the alimentary tract is involved and there is no general invasion of the body.

Signs and symptoms: The condition is characterized by nausea, vomiting, abdominal discomfort, headache and later diarrhoea. The symptoms appear 12-26 hours after the ingestion of the contaminated food. In most cases these symptoms subside in a few days and the patients recover completely in 6-8 days. Mortality rate is very low.

Foods involved: The common foods that give rise to this type of food poisoning are meat, milk, fish or eggs, the contamination being from the animal itself or from external sources. Eggs from infected ducks have been the cause of several outbreaks, many types of Salmonella have been isolated from dried egg powder and egg albumen.

Staphylococcus Food Poisoning:

Causative agents: It is due to Staphylococcus aureus and strains of this organism produce an exotoxin which is responsible for a number of outbreaks of food poisoning characterized by vomiting and diarrhea. The sources include human or animal origin. The nasal passages of many persons contain a large number of these organisms, boils and infected wounds may also be sources of contaminating food.

Signs and Symptoms: The duration of the condition caused by staphylococcus food poisoning is only for a day or two. Mortality is extremely low.

FOOD POISONING SYMPTOMS

Foods Involved: The common foods involved are custard, cream and poultry.

Botulism:

Causative Agent: The organism responsible for this is a spore bearing anaerobic bacillus Clostridium botulinum which produces an exotoxin in the food. Hence poisoning is due to the ingestion of the preformed exotoxin in the food.

Signs and symptoms: It is a toxemia and the symptoms are protrusion of the eyeballs, loss of accommodation and dilated pupils. It is most fatal and death occurs due to respiratory or cardiac failure occurs due to 4 to 8 days after the symptoms appear.

Foods Involved: It is a comparatively rare kind of food poisoning which follows the ingestion of contaminated food such as sausages, meat, fish vegetables and other canned foods.

Some ways in which Bacteria are introduced into food by food handlers

3.7 HACCP – Method to prevent Food- Borne Illness

One of the major tools for achieving a high degree of reliability and safety is called the Hazard Analysis and Critical Control Point (HACCP) system. HACCP principles apply to microbiological, chemical and physical hazards associated with foods but are mostly applied to microbiological hazards because they are the leading cause of food borne disease.

Definition: HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product.

Case Study

Mary had an egg omelette yesterday and from today morning she is having nausea, vomiting and stomach ache. She consulted a doctor who said that she is suffering from food poisoning Can you identify the causative organism?

Principles of Hazard Analysis and Critical Control Point (HACCP)

The seven steps of HACCP Process include the following:

1. **Analyse hazards** - Potential hazards associated with a food and measures to control those hazards (biological, e.g. a microbe; chemical, e.g. a toxin;

or physical, e.g. ground glass or metal fragments) are identified.

2. **Identify critical control points** - These are points in a food's production - from its raw state through processing and shipping to consumption by the consumer - at which the potential hazard can be controlled or eliminated. Examples are cooking, cooling, packaging, and metal detection.

3. **Establish preventive measures with critical limits for each control point** - For a cooked food, for example, this might include setting the minimum cooking temperature and time required to ensure the elimination of any harmful microbes.

4. **Establish procedures to monitor the critical control points** - Such procedures include determining how and who should monitor the cooking time and temperature.

5. **Establish corrective actions when monitoring shows that a critical limit has not been met** - For example, reprocessing or disposing of food if the minimum cooking temperature is not met.

6. **Establish procedures to verify that the system is working properly** - For example, testing time and-temperature recording devices to verify that a cooking unit is working properly.

7. **Establish effective record keeping for documentation** - This would include records of hazards and their control methods, monitoring of safety requirements and action taken to correct potential problems.

Five Keys to Safer Food*

1. Keep Clean

- Wash your hands before handling food and often during food preparation.
- Wash your hands after going to the toilet.
- Wash and sanitize all surfaces and equipment used for food preparation.
- Protect kitchen areas and food from insects, pests and other animals.

2. Separate raw and cooked food

- Separate raw meat, poultry and seafood from other foods.
- Use separate utensils such as knives and cutting boards for handling raw foods.
- Store food in containers to avoid contact between raw and prepared foods.

3. Cook thoroughly

- Cook food thoroughly, especially meat, poultry, eggs and seafood.
- Bring foods like soups and stews to boiling to make sure that they have reached 70°C.
- Reheat cooked food thoroughly.

4. Keep food at safe temperatures

- Do not leave cooked food at room temperature for more than 2 hours.
- Refrigerate promptly all cooked and perishable food (preferably below 5°C).
- Keep cooked food piping hot (more than 60°C) prior to serving.
- Do not store food too long even in the refrigerator.
- Do not thaw frozen food at room temperature

5. Use safe water and raw materials

- Use safe water or treat it to make it safe.
- Select fresh and wholesome foods.
- Choose foods processed for safety, such as pasteurized milk.
- Wash fruits and vegetables, especially if eaten raw.
- Do not use food beyond its expiry date.

SUMMARY

- Food safety is an important issue that needs advancements in methods of maintaining the food as early as possible.
- People nowadays demand and wish to eat more hygienic, clean and healthy food. Health is always crucial to everyone.
- Offering a wholesome food in terms of quality and quantity to everyone is the first basic thing for everyone in the world.
- Preventing people from food borne disease is the most important thing that needs to be done at the earliest.
- Hence quality control of food will help people to protect them from illnesses resulting from food contamination, food infection and food poisoning.

A-Z GLOSSARY

- Food safety (உணவு பாதுகாப்பு): A scientific discipline describing handling, preparation, and storage of food in ways that prevent food-borne illness.
- Food contamination (உணவு மாசுபாடு): presence of harmful chemicals and micro-organisms in food, which can cause illness.
- Food poisoning (விசமுற்ற உணவு): The illness resulting from eating food or drinking water containing bacteria, viruses, pesticides, or toxins.
- Adulteration (கலப்படம்) Refers to mixing of an inferior and sometimes harmful quality substances with food or drink intended to be sold.
- Food Storage (உணவு சேமிப்பு); Food storage allows food to be eaten for some time after harvest rather immediately.

EVALUATION

I. Choose the correct answer

Section A - Objective Type Questions **(1 mark)**

1. Pick the odd one out
   Clean, separate, cook, purchase, chill

2. Which is matched correctly
   a. Television - Equipment store
   b. Spare parts – Incidental adulteration
   c. Defective - Advertisement packaging
   d. Rava- Iron fillings

3. Cross stacking during storage helps in
   a) Water flow
   b) Air circulation
   c) Easy identification
   d) Good ventilation

4. Selection of food depends on
   a) Likes and dislikes
   b) Availability of money
   c) Nutritional requirements
   d) All of the above

5. Refrigerated storage is a type of
   a) Dry storage
   b) Low temperature storage
   c) Miscellaneous storage
   d) Trash storage

6. Biological contamination is caused by
   a) Band- Aid
   b) Pesticides
   c) Plastic
   d) Micro organisms

7. Kesari dhal is commonly adulterated with
   a) Chilli powder
   b) Asafoetida
   c) Bengal gram
   d) Coffee powder

8. Botulism is caused by the ingestion of contaminated
   a) Custard
   b) Cream
   c) Egg powder
   d) Meat

9. HACCP principles are applied to
   a) Microbiological hazard
   b) Biological Hazard
   c) Pollution Hazard
   d) None of the above

10. Starch adulteration in milk products can be identified with
    a) Iron
    b) Iodine
    c) Calcium
    d) Phosphorus

11. Blanching of food enhances
    a) Freezer storage
    b) Refrigerated storage
    c) Cold storage
    d) Chill storage

12. Food borne infections can cause
    a) Cholera
    b) Typhoid
    c) Dysentery
    d) All of the above

II. Write Very Short Answers **(2 marks)**

1. What is food adulteration?
2. Define food contamination.

3. Give the harmful effects of coffee powder with excess chicory.
4. What are the signs and symptoms of staphylococcus food poisoning?
5. What is a cold storage?

III. Write Short Answers (3 marks)

1. What is meant by food safety?
2. Explain refrigerated storage?
3. What are the causes of physical contaminants?
4. What are the common adulterants in asofoetida and termeric?
5. How do advertisement influence food selection?

IV. Write in detail (5 marks)

1. Explain the general procedure for storage?
2. List the steps of HACCP.
3. What is Salmonella food poisoning?
4. What are the simple ways to detect adulteration in
   a) Mustard Seeds b) Honey.
5. Describe the categories of storage.

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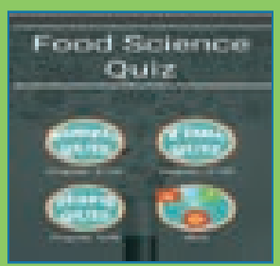
ICT Corner

Food Safety

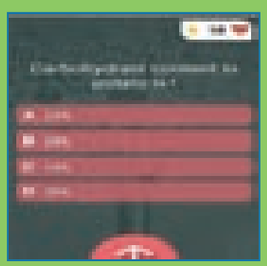
This activity enables the students to enrich themselves with the food factors. It acts as a reinforcement or recollection of what they heave learnt on food. It's self parameter

Steps:

- Type the **URL** link given below in the browser or scan the **QR code**.
- A page opens with quiz and it's options. You select your own quiz.
- Then start your quiz. Start to select the right options.
- If the answer is right it gives you a green tick. If not the tick will be red. And the score will be shown at the top right corner.
- When we press the next button it goes to the next quiz.
- The special feature of this quiz or game is till we give the right answer it will be in the same place.



Step 1



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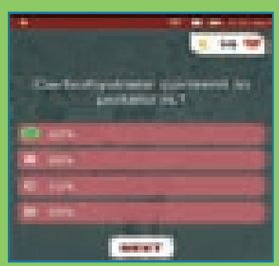

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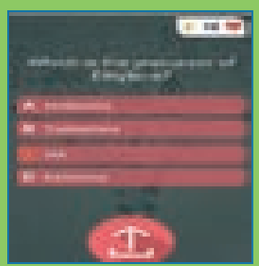


Step 4

URL:

https://play.google.com/store/apps/details?id=food.science.master.quiz

FGSQ1

UNIT 4

Fundamentals of textiles

LEARNING OBJECTIVES

- To know the different kinds of fibres and their uses.
- To identify and differentiate fibres using simple tests.
- To learn about yarn making and weaving.
- To understand about fabric finishes.
- To gain knowledge about different temporary and permanent stitches in daily life.
- To learn about stain removal.

4.1 Introduction

Textiles play a vital role in our daily life. From the primitive age textiles are used for covering, warmth, personal adornment and even to display personal wealth. Today, textiles are used for various purpose and everyone is an ultimate consumer. Though we aren't the direct purchaser, we use textiles in some form. In the beginning textiles were used for packing food then it was used as mats in shelter and later on it was used as clothing. Home makers, dressmakers, interior decorators and retail-store customers demand textiles. This chapter deals with the various types of fibres, their properties, finished products of textiles, care of fibres and uses.

4.1.1 Definition and Classification

Textile is defined as a type of material composed of natural and synthetic fibres.

The word textile comes from Latin textilis, means "woven", which in turn comes from the Latin verb textere, "to weave". In textile science, however, a textile is finely defined as any product made from fibres. Types of textiles include animal-based material such as wool and silk, plant-based such as linen and cotton and synthetic material such as polyester and rayon. Textiles are often associated with the production of clothing.

Textile fibre is very long in relation to its thickness. The fibre consists of cells arranged in its longitudinal direction. The strength and elasticity of the fibre is dependent on the forces between these cells.

4.2 Manufacturing Of Fibres

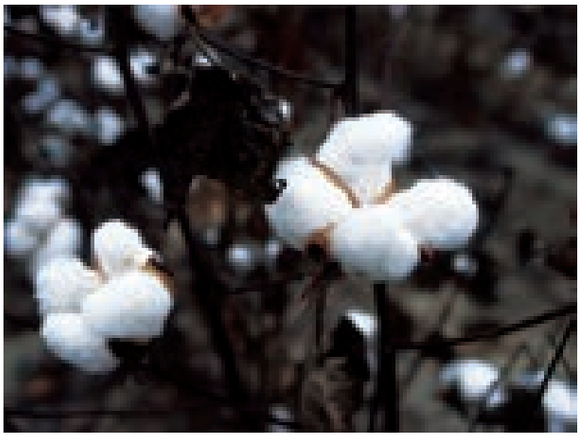
Fibres may be classified based on the origin and chemical type as natural fibres and man-made fibres. Table-1 describes the classification of fibres.

4.2.1 Natural Fibres

Natural fibres are taken from plant and animal sources. Cotton, Silk and wool are the most well-known natural fibres. There are several other commonly used natural fibres such as jute, linen and asbestos.

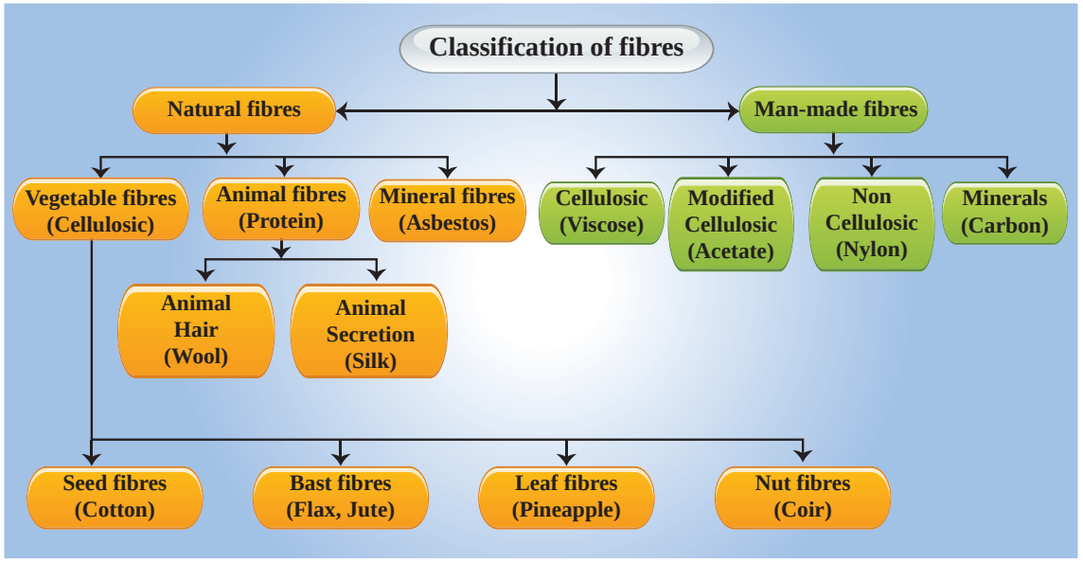
A. Cotton

The word "cotton" is derived from the Arabic word "qoton" or "qutun", which means a plant found in conquered land. Cotton is a fibre that grows on the surrounding surface of seeds in the pods, or balls of a bushy mallow plant. Cotton is referred to as the "**King of fibres**" as it is most important textile fibre in the world.



Cotton plant

The cotton fibre is a long cell- made up of countless cellulose molecules.

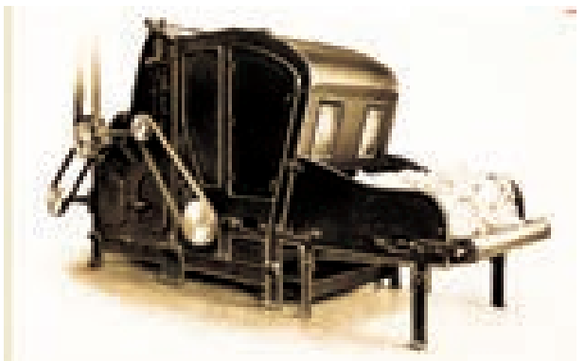


Cotton is removed mechanically from the seed balls by the cotton gin. The ginned cotton is then pressed into bales and sent to the factories to be spun into yarn.

i. Manufacturing process

The main processes are bale breaking and cleaning, carding, combing, spinning, weaving, scouring, bleaching and dyeing.

a) **Bale breaking and cleaning:** The tightly pressed cotton fibres from the bales are loosened in a machine and the impurities falls out. Another machine removes more impurities until sheets of loose fibre like cotton wool emerge ready for carding.



Bale breaking

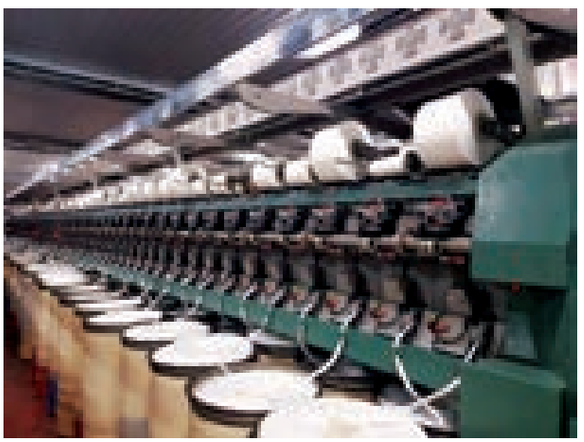
b) **Carding:** The fibres emerge from the carding rolls as a thin filmy sheet which passes between two rolls and is formed is to a thick rope called "**Slivers**".

Carding

c) **Combing:** This process removes more short hairs and makes fibres more parallel.

Combing

d) **Spinning:** The combed sliver is now converted into yarn by spinning. Scouring and Bleaching is usually done after weaving to enable the cloth to be dyed easily.



Spinning

ii. Properties:

Lustre	:	Low
Tenacity/ Strength	:	Medium
Elastic Recovery	:	Low
Elongation	:	7%
Resilience	:	Low
Density	:	1.54 g/cm^3

Moisture absorption	:	8.5%
Dimensional Stability	:	Good
Acids	:	Damages, Weakens fibre
Alkalis	:	Resistant (mercerization)
Effect of sunlight	:	Weakens fibre slowly
Insects	:	Silverfish damages fibre
To flame	:	Burns readily
Shape	:	Fairly uniform in width, 12-20, length varies from ½ and 2 ½inches

Definition of important terms:

Elasticity: The ability of a fibre or fabric to return to its original length, shape, or size immediately after the removal of stress.

Density: Explains the thickness of textile products.

Tenacity: The customary measure of strength of a yarn.

Resilience: The ability of a material to absorb energy when it is deformed elastically, and release that energy upon unloading.

iii. Uses:

- Cotton is the most widely used fibre because it is inexpensive, easy-care, high absorbency, excellent launder ability and good colour fastness.
- It is not only used for apparel but also for household and industrial applications.

B. Silk

Silk has been considered as one of the most elegant and luxurious of fibres. It is popularly known as the "**Queen of Fibres**". The method of raising silk worms and removing the silk filaments from the cocoons and of using the silk in weaving for garments was discovered by **Hsi-Ling-Chi**, a little empress of China.

Silk thread and silk saree

Silk can be cultivated or it is found in forest as wild silk. Cultivated silk is the Mulberry silk. The common wild silk varieties are Eri, Tasar and Muga silk. The process of cultivating silkworm for silk production is called as sericulture.

When the silk worm is fully grown it starts spinning its cocoon on straw placed on the trays. The silk fluid from the special glands issues from two holes, one on either side of the head called **spinnerets**.

The fluid hardens as it comes in contact with the air and two long fibres which are stuck together with silk gum are formed. The cocoons are heated to kill the pupa inside, otherwise the moths would destroy some of the silk. Some are allowed to become moths to provide eggs.

i. Manufacturing process:

The manufacturing process involves Reeling, Throwing, Degumming, Weaving, Dyeing and sometimes weighting.

a) **Reeling:** This is the process of unwinding the silk filament from the cocoon. The cocoons are boiled in water to soften the gum so as to unwind the filaments.

b) **Throwing:** Throwing is the process of combining several reeled strands to make a yarn. The number of strands are twisted together to form a strong yarn.

c) **Degumming:** The gum left on the fibres to protect them are now removed by boiling in soap and water. Sometimes degumming is left until the fabric is woven. Weaving is carried out the same way as for other fibres.

d) **Weighting:** Weighting is the process of treating silk with certain metallic salts to give weight and body to the product.

ii. Properties:

Shape	:	Like glass rod
Length	:	30000 to 39000 cm
Elasticity	:	Good
Stretch ability	:	Good
Flexibility	:	Medium
Density	:	1.25g/cm^3
Reaction	:	Causes less damage with acid.
To Flame	:	Burns with a sputtering flame.
Sunlight	:	Increased exposures will break down the fibre.
Insects	:	Destroyed by Carpet beetles.
Drying	:	Quick and good.
Dyeing	:	good absorption for acid and basic dyes.

iii. Uses:

- Silk fabrics are noted for their soft luxurious handle, rich lustre, warmth, resilience and crease resistance, strength and excellent draping quality.
- A wide range of fabrics are made ranging from sheer chiffon to firmer dress and suiting material to heavy brocades to the rich pile velvet.
- Silk serves best for ceremonial occasions, evening or day ware and lingerie.

Manufacturing of silk

C. Wool

Wool is one of the oldest fibres used for protection from the cold climate. It is natural protein fibre and considered as Man's best friend. Sheep skin, including the hair, was probably used long before it was discovered that fibres could be spun into yarns or even felted into fabric.

DO YOU KNOW? The earliest fragments of wool fabric have been found in Egypt but Mesopotamia is the birth place of wool.

Wool can be sheared from the living animal or pulled from the hide after the animal has been slaughtered for its meat. Sheared wool is called **Fleece** or **Clip wool** and wool taken from hides of slaughtered animal is called **pulled wool** which is inferior in quality to fleece or clip wool.

The quality of wool is expressed by numbers. The higher the numbers, the finer the wool and better the quality. The finest wool is from young sheep. Very fine wool of excellent quality is shorn from lambs when eight months old.

i. Manufacturing process:

Once the raw wool reaches the mills, is has to pass through many processes before it finally emerges as woolen cloth. Sorting, Scouring, Carbonizing, Carding, Spinning, Bleaching, Dyeing, Weaving, Knitting and Finishing.

a) **Sorting:** When the bales are opened, the fleece is graded. It may be separated into sections such as shoulders, sides etc.

Wool

b) **Scouring:** The raw wool is washed in successive troughs of soapy alkaline water of decreasing strength to remove dirt and grease.

c) **Carbonizing:** Straw, burrs and other vegetable matters are removed by treatment with acid, heat and pressure of rollers.

d) **Carding:** The wool is passed through machine rollers with sharp steel wires which separated the fibre and mix them thoroughly.

e) **Spinning:** The mass of carded wool is drawn out and twisted or spun into woolen yarn which is a soft and fluffy thread.

ii. Properties:

Shape	:	Fibre contain scales
Length	:	3.75 cm
Elongation	:	Good
Fibre luster	:	Fair
Elasticity	:	Good
Stretch ability	:	Good
Flexibility	:	Good
Density	:	1.30-1.32 g/cm^3
Reaction with Acid	:	Not affected
Reaction with Alkalis	:	Most of alkalis destroy the fibre
Absorbency	:	Good
Reaction to Sunlight	:	More heat affects the fibre
Flame	:	Burns slowly in direct flame, but self-extinguishing.
Insects	:	Damaged by moths and carpet beetles.
Drying	:	Prolonged drying
Dyeing	:	Absorbs acid and basic dyes readily.

iii. Uses:

- Woolen fabrics are used throughout the world as warm fabrics and durable apparels.
- They are used in home furnishing as stuffing in pillows/cushions.

ACTIVITY 1

Collect the fabrics made with natural fibres and prepare an album.

ACTIVITY 2

Identifying different fabrics using flame test.

4.2.2 Man-made fibres

Man-made fibres are fibres made by man with combination of natural products along with chemicals.

A. Nylon

Nylon was the first synthetic fibre. In 1928 the Dupont Company decided to establish a fundamental research program. It was noticed that when a glass rod was taken out of one of the polyester stills the solution adhering to it stretched out into a solid filament. The filament could be stretched ever further and it did not go back to its original length. This stimulated the group to concentrate on textile fibres. The term nylon was chosen for the fibre and it was called the **Miracle fibre** for several years. The first nylon was referred to as type 6, 6.

Nylon

i. Manufacturing process:

Nylon 6, 6 is a linear condensation polymer made from hexa methylene diamine and adipic acid. Specific amounts of the two chemicals are combined in solution to form nylon salt. The salt is purified, polymerized, extruded in ribbon form, and chipped into small flakes or pellets.

The polymer chips are melted by heat in an autoclave and pumped to the spinneret. The hot syrupy solution is pumped through the spinneret. It emerges in strands which can be stretched like warm taffy. The size of the fibre is determined by the size of the holes and the speed with which the fibre is withdrawn from the spinneret. The fibres are cooled by air blown across them. By drawing process either filament or staple fibres are prepared.

ii. Properties:

Shape	:	Shape is controlled by the manufacturer, filaments are uniform and long.
Luster	:	Bright to Dull
Elastic Recovery	:	100%
Elongation	:	Good
Resiliency	:	Good
Density	:	Good
Moisture absorption	:	8 %
Dimensional stability	:	Excellent
Acids	:	Resistance is poor
Alkalis	:	Good resistance
Sunlight	:	Generally affects
Insects	:	Normally damages
To flame	:	Flammable

iii. Uses:

- Nylon is used in women's stocking or hosiery.
- It is also used as material for producing socks, swimwear, shorts, track pants, active wear, draperies and bedspreads.

- Nylon is used for making fishing nets, ropes, parachutes and tier cords.
- Nylon is used in cookware since it has a relatively high continuous service temperature.
- Nylon is used for making plastic machine parts as it is low cost and long lasting.
- It is often commonly used in electronics industry for its non-conductivity and heat resistance.

Nylon Thread

Hosiery: used in shops for things such as socks, tights and stockings.

Draperies: Cloth hanging or arranged in folds

B. Polyester

Polyester is sometimes referred to as the "workhose" fibre of the industry. The filament form of the fibre has been said to be the most versatile fibre and the staple form has been called the "big mixer" because it can be blended with so many other fibres, contributing its good properties to the blend without destroying the desirable properties of the other fibre. Its versatility in blending is one of the unique advantage of polyester. One of the important physical changes has been that of changing from the standard round shape to a trilobal cross-section that gives the fibre silk-like properties. The strength of the polyester reinforces the cotton fibres, which are weakened by the finishing process.

Polyester

i. Manufacturing process:

- Polyester is made by reacting a dihydric alcohol with a dicarboxylic acid.
- As the acid and alcohol are polymerized, they are extruded from the polymerizing vessel in the form of a ribbon.
- The ribbon is cut into small chips; the chips are diced and conveyed to a hopper from which they are fed to melt spinning tank.
- The hot solution is forced through spinnerets, and solidifies into fibre form on contact with cool air.
- It is stretched while hot, the stretching contributes strength to the fibre and controls elongation characteristics.
- The greater the amount of molecular orientation obtained during this strengthening step, the stronger the fibre and lower the elongation.

ii. Properties:

Shape	:	Controlled by Manufactures.
Luster	:	Controlled from semi bright to dull
Elastic Recovery	:	Varies
Elongation	:	Varies by type
Resiliency	:	excellent
Density	:	1.38 g/cm
Moisture absorption	:	very low
Dimensional stability	:	Excellent
Resistance to acids	:	Strong acids destroy fibre, weak acids have little or no effect.
Alkalis	:	moderate
Sunlight	:	resistance is excellent
Insects	:	Excellent
To flame	:	will burn, but slowly and melting fibres tend to drop off, preventing further burning.

Uses:

- Polyester fibres have immediate consumer acceptance because of their easy-care and wrinkle-free properties.
- They require no ironing, easy to launder and quick to dry.
- Polyesters are not only used as apparel but also in industrial use items such as laundry bags, calendar sheeting, press covers, conveyor belts, fire hoses, fish netting, ropes and protective clothing.
- An important use of polyester is for surgical implants.

ACTIVITY 3

Obtain a total of ten advertisement and labels identifying ten different polyester trademarks used in apparel, home furnishings, automobiles tires, and industrial fabrics and list the characteristics or properties of the fibre as advertised.

Polyester

ACTIVITY 4

Collect pictures and samples of man-madefibres.

4.3 Simple Test For Fibre Identification

The burning test can be used to identify the group-cellouse protein, minerals etc., to which the fibres belong. General direction for the burning test.

i. Ravel out and test several yarns from each side of the fabric to see if they have the same fibre content. Difference in lustre twist and colour will indicate that there might be two or more kinds of fibre in the fabric.

ii. Hold the yarn horizontally with the pair of tweezers or tongs. Feed the fibres slowly into the edge of the flame and observe what happens. Repeat this several times to check results.

ACTIVITY 5

Collect few natural and man made fibres and observe the burning characteristic by flame test.

Burning characteristics of Fibres.

Fibres	Cotton	Silk	Wool	Nylon	Polyester
Approaching flame	Ignites upon contact, does not shrink away	Curls away from flame	Curls away from flame	Melts away from flame, Shrink and fuses.	Fuses, melts and shrink away from flame
In flame	Burns quickly	Burn slowly and sputters	Burns slowly	Burns slowly with melting	Burns slowly and continuous to melt
Removed from flame	Continues burning, after glow	Usually self-extinguish	self-extinguish	self-extinguish	self-extinguish
Odor	Similar to burning paper	Similar to burning hair	Similar to burning hair	Celery	Chemical odor
Residue	Light, feathery ash grey in colour	Crushable bead, black in colour	Brittle, small black bead	Hard, tough, grey tan bead	Hard, tough, black or brown bead

4.4 Yarn Making

Yarns play an important role in the fabric manufacturing process . Yarn is "a generic term for a continuous strand of textile fibers, filaments, or material in a form suitable for knitting, weaving, or otherwise intertwining to form a textile fabric. Yarns are also used for products such as sewing and embroidery thread, string, and rope. Yarns are produced in various sizes and textures, and also vary in other characteristics. Performance, end use, and fabric care are affected by these yarn characteristics.

4.4.1 Yarn Twist

Yarns are twisted to hold the fibres together. The number of twists per unit length is used to measure twist. Yarn twist can be broadly divided by number of twists: none

or very low, low, average, and high twist. Yarn twist impacts the yarn's appearance, fineness, strength, and absorption.

Directions Of Twist:

Fibres can be twisted together in the clockwise or counter clockwise direction to form yarns. Yarns are twisted in the clockwise direction for "S" twist, and counter clockwise for "Z" twist. The "Z" twist is employed in a majority of the spun yarns used for fabric construction.

Directions Of Twist

4.4.2 Classification Of Yarns

Classification of yarns based on fibre length is used to broadly divide yarns into: – **Spun yarns (made from short, staple fibres) – Filament yarns (made from continuous filament fibres)**

Spun yarns are composed of short staple fibres, or long filament fibres that have been cut into short staple fibres. Spun yarns may contain fibres of the same type or a blend of different fibres. The characteristics of spun yarn depend on the amount of twist given to the fibres during spinning. A fairly high degree of twist produces strong yarn, a low twist produces softer, more lustrous yarn and a very tight twist produces crepe yarn.

Filament yarns are extruded yarns that are made of natural extruded fibres or manufactured fibres extruded through the spinneret. These yarns fibres can be broadly divided into:

1. Monofilament yarn

2. Multifilament yarn

Monofilament yarn is made from a single, relatively thicker filament fibre. Transparent sewing thread, metallic yarns, bare elastic, and fishing lines are examples of monofilament yarns.

Multifilament yarn is made from multiple filament fibres. Continuous filament fibre length requires little or no twisting to hold the multifilament yarn together.

Yarns are classified as simple, novelty and textured yarns.

a) Simple Yarns

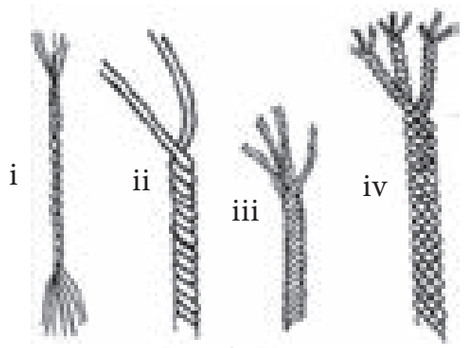
Simple yarns are characterized by uniform size and regular surface. They can be broadly divided into single, ply, cord, and rope yarns.

i. **Single yarn:** This is the simplest type of yarn. It is commonly produced by twisting together staple or filament fibres.

ii. **Ply yarns:** These are produced by twisting two or more single yarns. Each strand of single yarn is referred to as a ply. Thus, four single yarns twisted together would form a four-ply yarn.

iii. **Cord yarns:** They are produced by twisting two or more ply yarns.

iv. **Rope yarns:** They are produced by twisting two or more cord yarns.



Simple Yarns

b) Novelty Yarns:

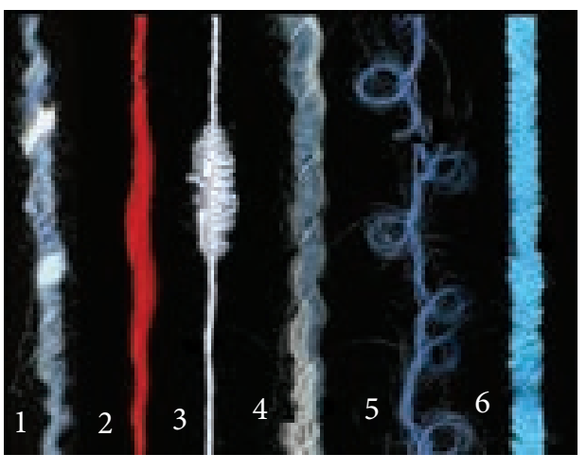
Novelty yarns, typically made of two or more stands, are produced to provide decorative surface effects. Based on the purpose, each strand is referred to as base/ core, effect, or binder.

The **base/core** strand provides the structure and strength.

The effect **strand** creates decorative detail such as knots and loops.

The **binder** is used to tie the effect yarn to the base yarn if binding is necessary.

There is a wide variety of novelty yarns that are produced using different techniques and types of fibres and strands. example: 1) Flake yarns, 2) Slub yarns, 3) Spot yarns, 4) Spiral yarns, 5) Loop yarns, 6) Chenille yarns.



Novelty Yarns

c) Textured Yarns

Textured yarns are made of fully drawn filament fibres with a changed surface, shape and texture developed by using the new spinning techniques. There are two main types of textured yarns: 1. Stretch yarns 2. Bulk yarns.

4.5. Weaving

Weaving is the process of making cloth with two components, a warp, and a weft, and can be done by very simple techniques on a complicated loom.

Preparing The Warp Yarns For Weaving

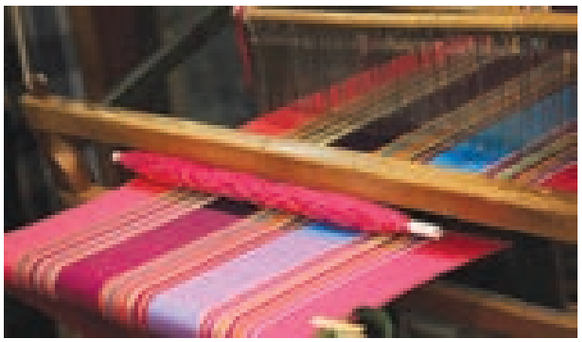
Before their use on the loom, warp and filling yarns must be prepared for weaving. In preparation for weaving, each warp end (yarn) must be threaded through its own drop wire, heddle eye, and reed dent. The Drop wire is a device that will stop the loom if an end should break, the heddle eye is the opening in a heddle that carries the yarn, and the reed comb-like device that will push each filling yarn close against the completed fabric.

Placing the warp yarns on the loom is done either by drawing-in or by tying-in. Heddle wires are held in frames called harnesses. The number of harnesses required for the loom is determined by the weave.

Preparing The Filling Yarns For Weaving

Yarn that is to be used for filling must be packaged in some form that allows it to be unwound easily for transport through the shed is called a shuttle and is made up of a

wooden carrier into which a quill or pirn is placed.



Warp Yarns & Weft Yarn

Basic Weaving Operation – 4 basic steps

Primary Motions

Once the filling yarns have been prepared and the warp beam containing the sized yarns is placed at the back of the loom. The warp yarns are conveyed to a cylinder called the cloth beam which is in front.

The loom goes through a series of motions

Shedding: raising and lowering of warp yarns by means of the harness to form shed, opening between warp yarns through which weft yarn passes.

Picking: inserting of weft yarn by the shuttle through the shed.

Beating up: packing the weft yarn into the cloth to make it compact.

Taking up: winding newly formed cloth onto the cloth beam, **Letting off**: releasing yarn from a warp beam.

Loom

Definition of important terms:

- **Weft:** The horizontal yarns are called weft yarns.
- **Warp:** Warp yarns run vertically the length of the fabric, known as the grain.
- **Selvedge:** The weft yarns are wrapped around the warp yarns to create an edge to the fabric, known as the Selvedge.
- **Bias:** The diagonal or cross grain of a woven fabric.
- **Grain:** Runs the length of the fabric.

4.5.1. Classification Of Woven Fabrics

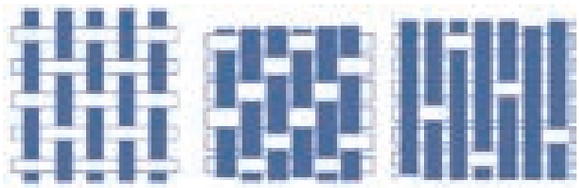
Basic/Simple Weaves

Plain Weave: - It is the simplest weave. Many fabrics that you commonly wear like mulmul dupattas, organdy and chiffon sarees are all plain weave. Each and every weft yarn goes alternately under and over the warp yarns across the width of the fabric.

Twill Weave :- This basic weave has a clear diagonal line on the face of the fabric. The denim or jean fabric you wear is twill weave. It is a very strong and durable weave. It is therefore commonly used in men's suit and coat fabrics. Twill weave fabrics show soil less quickly than plain weave.

Satin Weave : This basic weave has a beautiful shiny surface because of long floats on the surface of the fabric. In the satin weave warp yarns float over several weft yarns before interlacing with a weft yarn and so on.

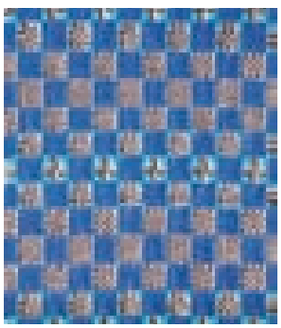
Basic Weaves



Plain Twill Satin

Compound / Complex / Novelty Weaves

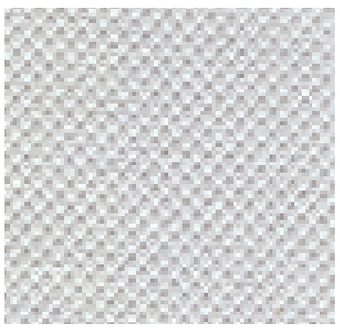
1. Dobby Weave
2. Jacquard Weave
3. Double Cloth & Double Weave
4. Pique
5. Pile Fabrics
6. Surface Figure Weaves



Dobby Weave

Double Weave

Pile Fabrics



Pique

4.6 Fabric Finishes

Fabrics which reach the consumer are finished by one treatment or other. Except for the white fabrics, colour is applied to all the fabrics. "A finish is any treatment given to a fabric to change its appearance". Finishes are applied to make fabric more be smooth, shrink resistant, easy care, flame resistant, etc. Finishes can be divided into two types, general and functional.

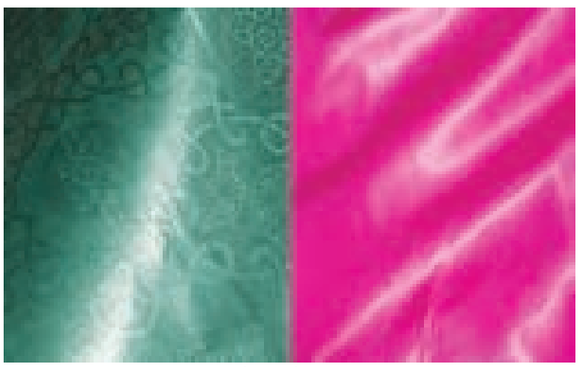
General Finishes or routine finishes are identified as mechanical, chemical or combination of the two. It is a basic procedure in preparing fabrics for consumer use.

i. **Scouring:** Fabrics can be scoured by immersing them in 2-4 percent of caustic soda (NaOH) with addition of wetting agents and emulsifiers under heat to remove waxes, foreign matter and discolouration.

ii. **Bleaching:** Bleaching is done to fibres, yarns and fabrics to make them white or prepare them for dyeing and printing. It is a chemical finish where sodium chloride or hydrogen per oxide bleach is used to bleach the fabrics. The chemical for bleaching depends on the textile fibre. Cellulose fabrics such as cotton can be bleached with sodium hypochlorite whereas silk and wool respond well to hydrogen peroxide.

Bleaching

iii. **Calendaring (Pressing):** Calendaring is also called pressing done on cotton, wool, silk as well as rayon. It is a mechanical process where the fabric is fed between flat, heated plates and pressed under heat and pressure.



Calendaring

iv. **Heat Setting:** Mostly thermoplastic fibres are given heat setting finish to produce fabrics with wrinkle resistant, good elastic recovery, and give relative permanent design detail such as pleats, planned creases and surface embossing. The fibres are exposed to a certain temperature called the glass transition temperature (Tg temperature) where they are shaped. If at any later period the fabric is exposed to temperature higher than Tg temperature the fabric may take a new shape. So fabrics should be laundered or dried under the Tg temperature.

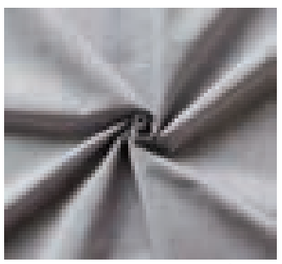
Embossing

Permanent Design -Pleats

v. **Tentering:** Tentering is a mechanical finish where the fabric is held horizontally by each selvedge between pins. There is a tenter frame which moves with a speed slightly higher than the speed with which the chains holding the fabric are moving. This process,straightens the fabric which involves many finishing processes like mercerizing, resin finishing and drying.

Tentering

vi. **Mercerization:** Mercerization is a chemical finish mostly done on cotton fabrics. The fabric is immersed in 16 – 27 percent of sodium hydroxide and fed between rollers for a specific period of time. Then it is passed on a tendering frame to have specified dimensions. At last it is washed and dried. This process causes the fabric to have increased lustre, improves dying characteristic and strength.



Unmercerized

Mercerized

vii. **Sizing:** Sizing is a process of stiffening materials to yarns or fabrics. Sizes is composed of starch or resin. Starch is applied mostly to cellulose fabrics to improve its luster and to add strength. Resin when applied reacts with the fibre molecules and chemical change occurs in the fibre. Starch is applied to the fabric which then passes between rollers that pad the starch into the fabric and remove excess solution. Thus a fabric with additional stiffness and improved luster is obtained.

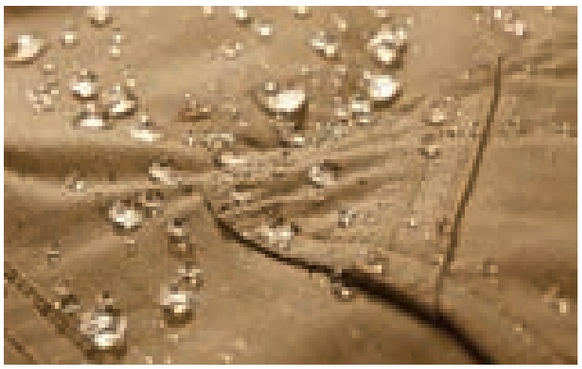
Sizing

viii. **Weighting:** Weighting is a process applied to silk fabrics. After removal of gum i.e. degumming, the silk fabric, becomes very soft. To make the silk fabric heavy and stiff the Federal Trade Commission ruled that silk fabric can be given stiffness by addition of 10% stannous chloride a metallic salt. If this 10% exceeds very high the silk fabric tends to crack and split. Weighted silk has body and density but they are not durable and can be damaged by sunlight, air and perspiration.

ix. **Functional finishes** are those which alter, improve or change the behavior or service characteristics of the fabric and produce certain properties. Example: A durable press fabric, a water proof fabric.

x. **Water Proofing:** Water Proof finishes are those that prevent water entering the fabrics. These fabrics do not allow air also to enter and thus not suitable for wearing apparel. Earlier, rubber,

oxidized oil or varnish were used to waterproof fabrics. Modernfabrics are coated with synthetic polymers.



4.7 Dyeing

Dyeing is the substance which is fixed more or less permanently on the fabric which evokes colour.

4.7.1. Types of Dyes

Dyes are classified according to hue produced chemical class, method of application and the types of fibres to which they are applied. Some of the different dyes include:

Dyes

i. Direct dyes:

Direct dyes colour the fabric directly in a single operation without any affixing agent. Direct dyes are water soluble and are applied mostly to cellulosic fibres. These dyes are dissolved in water and salt is added to control the absorption rate of the dye by the fibre. Then the cloth which is to be dyed is immersed. Direct dyed stuff have relatively excellent light fastness and good colour fastness to sunlight.

Example: Cotton

ii. Acid dyes:

When acidification is done on basic dyes, acid dyes are formed. Acid dyes are used on protein, acrylic and nylon fibres. They have no affinity for cellulosic fibre and are not suitable for fibres which are sensitive to weak acid solutions. They have excellent light fastness and some have good colour fastness to dry cleaning and perspiration.

Examples: Nylon, Silk, Wool

iii. Basic dyes:

Basic or cationic dyes are excellent for colouring acrylic fibres. They are mostly used as "topping" colours to give brilliant colour effects of fabric. Because of the variety of colour effects produced, it is successfully used on modified nylon and modified polyester.

Examples: Wool and Silk

iv. Vat dyes:

Vat dyes have excellent colour fastness property and are suitable on all cellulosic fibres and man-made fibres. It is not suitable on protein fibres because of the alkaline bath which will damage the fibres. There is a wide choice of vat dyes and they withstand hard wear and are fast colours.

Examples: Cotton

v. Reactive dyes:

Reactive dyes are suitable for mostly all fibres- cellulosic, wool, nylon, silk, acrylic, as well as blends. Bright colours with excellent wash fastness &colour fastness are obtained. Color fastness to crocking is excellent. **Example:** Cotton

Crocking: Crocking is tendency of a fabric or paint to give off the colour when the surface is rubbed.

4.7.2. Dyeing Methods

There are four steps involved by which colour may be applied to textile materials.

i. **Solutions:** Pigments or dye stuffs can be dispersed in the spinning solution where the fibres are manufactured. Solution dyed yarn is highly resistant to UV fade and shade changes. Solution dyed yarns are fully uniform in colour and typically do not vary from lot to lot. They are colour fast, resistant to multiple washing and mild bleaching.

ii. **Fibre dyeing:** Fibres are dyed in their loose state where the fibres can be less tangled and dyed thoroughly. Fibre dyeing is expensive to produce. There is better penetration of the dye into the fibre which produces a higher degree of colour fastness on fabrics. Direct, sulphur, vat and developed dyes are used on cellulose fibres.

Fibre dyeing

iii. **Yarn dyeing:** Yarns are dyed by three methods namely, skein dyeing, package dyeing and beam dyeing. Yarn dyeing is best way to adopt for large quantity dyeing.

iv. **Fabric dyeing:** Fabric dyeing consist of either piece dyeing the fabric or printing followed by an after treatment to fix the dye. Piece dyeing is nothing but most solid colour fabrics are dyed after the fabrics has been completed. Fabrics made of cellulosic fibres, cotton, rayon and flax are most frequently piece dyed.

4.8 Printing

Designs are applied on fabrics by means of printing. Printed fabrics are defined as those that have been decorated by a motif, pattern or design applied to the fabric after it has already been constructed(Marjory Joseph 1977). Printing can be done by two basic methods –Resist printing and direct printing.

4.8.1. Resist printing

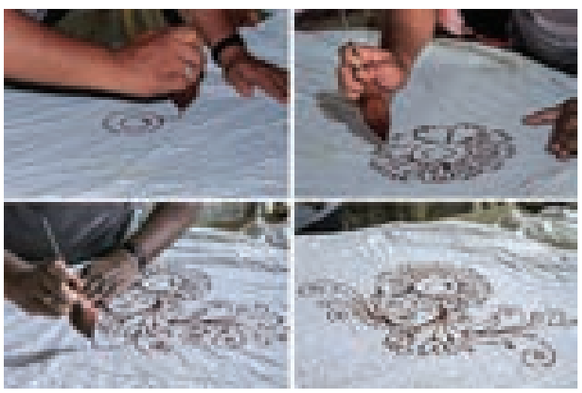
Resist printing is done by preventing the dye to enter some specific portions of the fabric by some method.

i. **Tie and dye:** Fabrics are made into tiny puffs with some object inside and tied with a waxed thread wherever the dye has to be prevented. The fabric is immersed in the dye solution. If two or more colours are desired the thread is removed and the fabric re-tied. After drying the object is removed. Other methods of tie and dye includes holding the

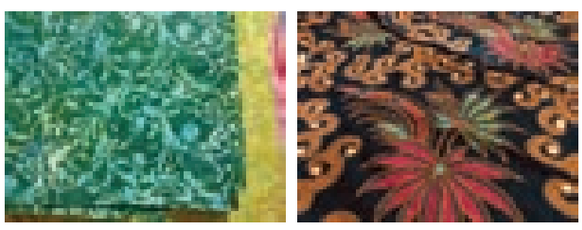
fabric and stitching it and pulling the threads to draw the fabric to resist the dye from penetrating into the fabric called as **Tritik**. Tie and dye fabrics are quiet popular in apparel and home furnishing.

Tie and dye

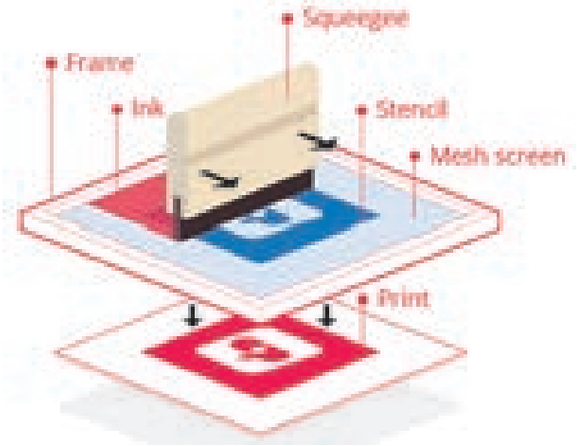
ii. **Batik:** A resist method developed by the Japanese involves wax as the resist substance. A copper cup called "tjanting" is attached to a reed handle. The wax is taken in this tjanting and applied in the design areas, wherever necessary to resist the dye. The fabric is immersed in dye solution. The wax resists the dye from entering the fabric.



Batik



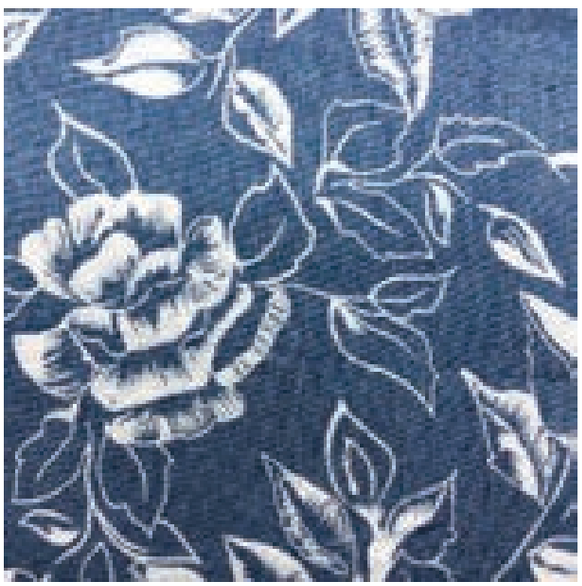
In some places it forms cracks and forms fine lines in the design. The fabric is later washed in boiling water to remove the wax.



Screen printing

iii. **Screen printing:** A Screen is made by covering a frame with blotting cloth of silk, metal or nylon filament yarns. The fabric is covered with a film and the design areas are cut out of the film. Some areas of the mesh are left open to allow the dyestuff to pass through and print the fabric. The frame is laid on the fabric, and the dye is placed at one end of the frame. A rubber knife moves the dye across the screen and forces the dye through the open mesh of the fabric. One screen is prepared for each colour. Screen printing is considered by many textile authorities to be the newest method of decorating fabrics.

iv. **Discharge printing:** Discharge printing is used to print designs on fabrics which has been previously dyed. A reducing bleach is used which removes the base dye and leaves a white pattern on a coloured ground. Dark fabrics with white designs such as polka dots are examples of discharge printing.



Discharge printing

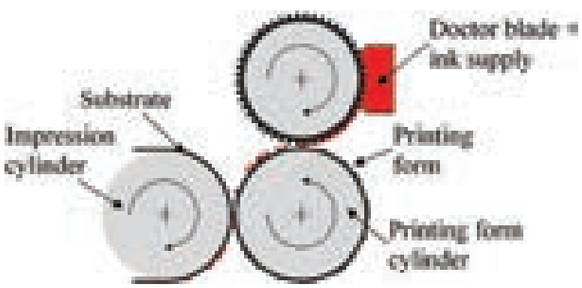
v. **Stencil printing:** Stencil Printing was developed by the Japanese. Designs are cut in stencil paper which is coated with wax. The stencil designs are placed on fabric and colour is applied by sponge, air brush or by spray gun. This method is done on minimum fabrics like scarves and similar products.

Stencil Printing

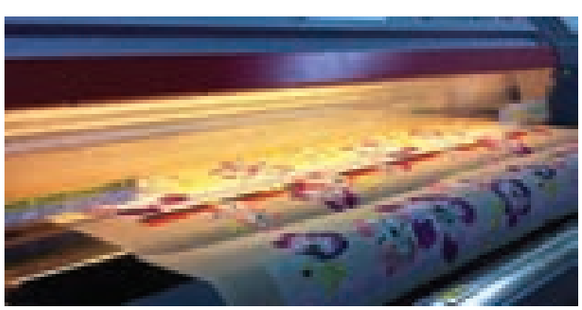
4.8.2. Direct Printing

Direct Printing is the method of applying colour directly on to the fabrics by one of the following methods.

i. **Roller Printing:** Designs are engraved in metal rolls and arranged around a main cylinder and locked into place. Many rolls can be used. A trough containing in the dye solution along with a doctor blade which scrapes of the excess dye is placed for each roll. The large cylinder is covered by a padded blanket and a grey cloth is used on top of the printing blanket. The cloth to be printed is on the outer surface. The layers move together, the rolls take up the dye from the trough, print on the cloth as it comes and goes to the drying oven which sets the colour on the fabric. Roller printing has steadily increased during the past decades for its quality prints and unusual patterns produced.



Roller Printing



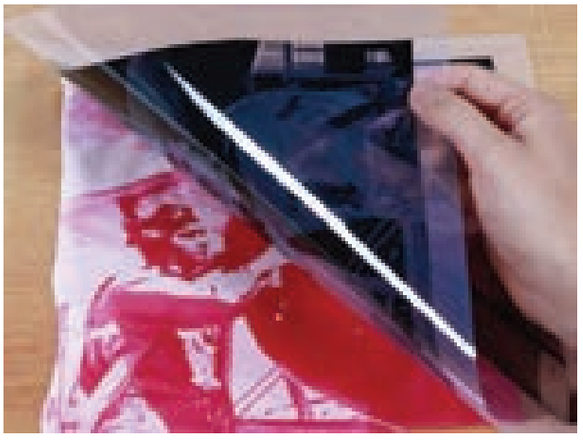
ii. **Block Printing:** Block made of wood or metal are engraved with designs. Each block prints only one colour. The blocks are dipped in dye solution. Only the raised portion in the blocks picks up the dye and is then pressed on the fabric, forcing the dye to be printed on the surface.

Block Printing

iii. **Duplex Prints:** Duplex print are produced by modified direct roller print equipment. The design is made by a machine, which is set up to print on both the face and back of the fabric.

Duplex Print

iv. **Photographic Prints:** Photographic prints are made similar to that used in making photograph. A negative is placed on the fabric and light is transmitted to it and the design is developed. The fabric is washed and the design is as permanent as a photo.



Photographic Prints

v. **Transfer Printing:** Transfer printing involves heat and pressure. The dye in the desired design, is first printed onto a special paper. The paper is laid on the fabric and the design is transferred by sublimation. The dye

is changed from solid state on the paper to vapor and again changes to solid and fixes on the fabric. The heat sets the colour on the fabric. Transfer printing is suitable for nylon and some acrylic fabrics.

Transfer Printing

ACTIVITY 6

Decorate a plain woven white fabric by each of any three methods of printing or dyeing with household dyes.

4.9 Basic Stitches

Basic Stitches are the fundamental stitches which have to be learnt before doing actual sewing. It is necessary to learn basic stitches to do temporary and permanent stitching.

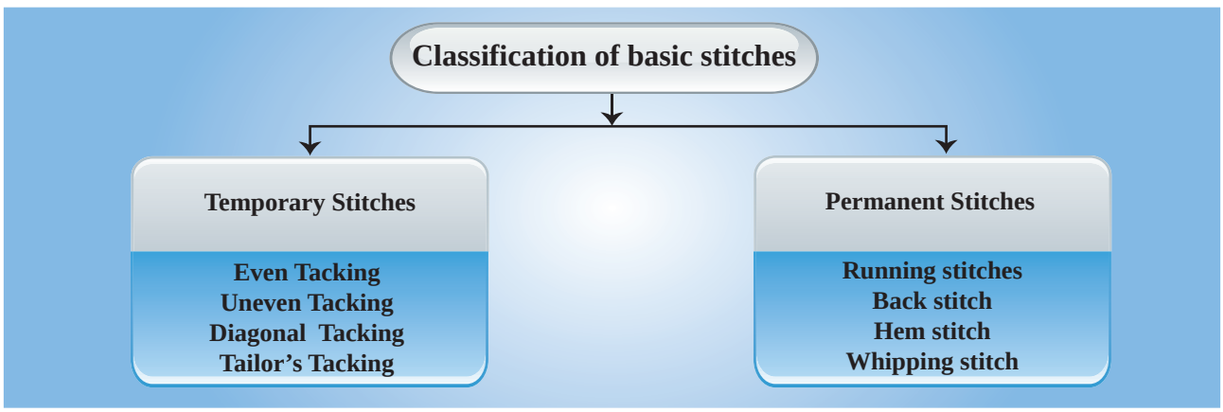
4.9.1 Temporary Stitches

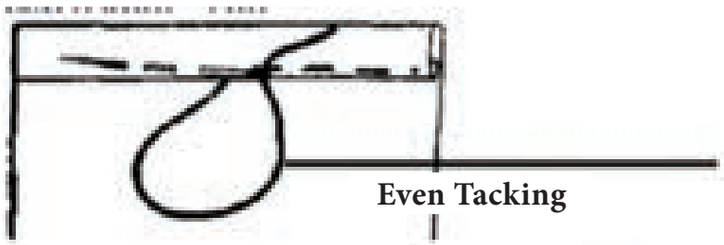
Tacking or basting is a temporary stitch used for holding two or more layers of fabric together before a permanent stitch in made. Usually the stitch is worked from right to left, starting with a knot in contrasting colour thread, so that it can be easily removed.

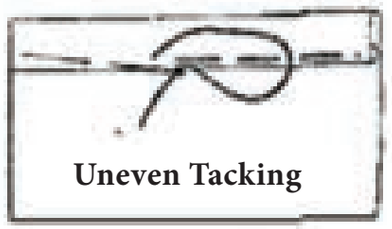
i. **Even Tacking:** Secure the thread with a knot on the wrong side or several firm small stitches at the end of the seam. Make the running stitches ¼ long, where the stitch is the same length on the right and wrong sides. Even Tacking is used where there is strain while stitching bodice seams and also as a guideline for stitching intricate top stitched details.

ii. **Uneven Taking:** In this, the stitches on the upper side is ½ or at least twice that on the underside (¼) . This stitches can be used for longer folds and seams. This is comparatively stronger than even tacking. Use this type tacking as a guideline or where there is little or no strain.

iii. **Diagonal Tacking:** While attaching two or more layer of fabrics this type of stitch is made about ¼" apart before making machine stitch. Work stitches through the material at right angles to the fabric edge so that a diagonal or slanting is made on the upper side and a vertical stitch is made on the underside.







Temporary Stitches

iv. **Tailor's Tacking:** Start tacking using double thread of contrasting colour, so that they can be easily seen. Tack through double layer of fabric along the seam lines using even stitches of ½ " length apart, leave them as loop without pulling it tight. So that the thread tuft, will remain on both the layers of fabric and remain as a guide line. This is especially used for marking details between patterns such as dart markings and pleat markings.

4.9.2 Permanent Stitches:

i. **Running Stitch:** This is the simplest form of the hand stitch which is used for permanent sewing stitched using same colour thread used to make seams, darning, gathering and finishing. It is similar to even tacking, much smaller, straight, fine and evenly spacious, easy and can be worked fast.

Running Stitch

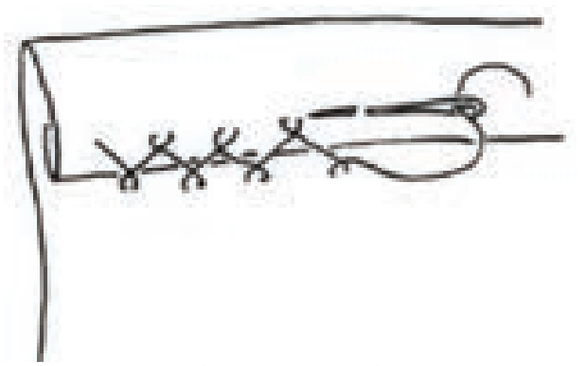
ii. **Back Stitch:** The back stitch is strong and sometimes substituted for machine stitch. It takes much time. Care must be taken while stitching, since stitching is done on the right side of the fabric. On the back side of the fabric the stitch is similar to stem stitch. Stitches should be about 1/8" long on the right side. Repeat this way, keeping stitches uniform in size and fairly firm.

Back Stitch

iii. **Hem Stitch:** This is used to finish the raw edge of the garment usually referred as the hem. Hemming must be fine, evenly spaced and must be inconspicuous from the right side of the garment. Start the hem with a tiny knot and finish with the same. Hemming must be as invisible as possible on the right side. Of the garment do slanting stitch on wrong side, close enough to hold the hem securely, picking one or two yarns of the fabric. Usually this stitch is seen in all types of garments.

Hemming Stitch

iv. **Whipping stitch:** This stitch is used to finish raw edges, sleeves, collar of kid's wear. The other name for this stitch is overcasting. Whipping produces slanting stitches taking stitches over the rolled fabric edge with needle in a straight position. The finished fabric gives continuous 'X' shape stitches. On both the sides stitches appear similar in shape.



Whipping Stitch

Case Study 1

Karthick was in a great hurry in the morning to go to school on time. Unexpectedly he tore his school pants while he was trying to wear it. How will you help Karthick and his mom to get the pant stitched and board the school van on time?

4.10 Care And Maintenance Of Fabric

The care of garments and other products made of fabrics has always been a concern of consumers. Such care is reflected in economy, the household budget, service ability, and appearance. There are certain care procedures which consumers should observe in order to get the greatest use and satisfaction from textile products. Textile products should not only be carefully selected, they should also be given proper care throughout their service. This care includes (1) frequent brushing and airing, (2) clean storage when not in use (3) immediate mending when damaged by tearing (4) stain removal before washing or further use, (5) intelligent choice of cleaning method - washing or dry cleaning, (6) frequent laundering when the fabric is washable (7) proper method of laundering for type of fabric (8) proper ironing or pressing.

4.11 Stain Removal

Clothing can get stained with curry, grease, blood, tea/coffee and ink spills. It is very important that the stain is removed while fresh, Most stains will be totally removed because they would

not have penetrated into the fabric. The stain removal should be systematic and methodical.

It should be remembered that many dilute applications are better than one concentrated treatment as strong chemicals can damage the fabric.

Stains can be removed by the following methods.

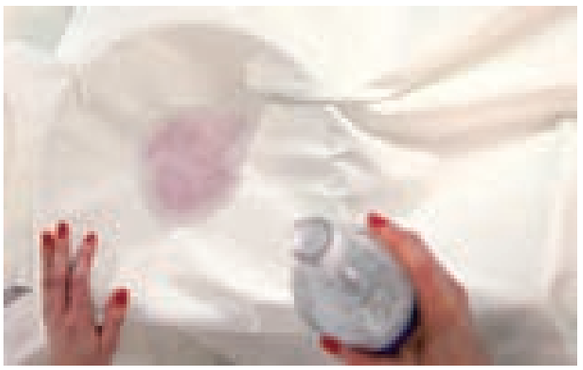
i. **Dipping:** The stained material is dipped into the reagent. It is then scrubbed to remove the stain and finally rinsed with water.

Dipping

ii. **Sponging:** The part of material from which the stain has to be removed is placed on blotting paper and the reagent is applied with a sponge on the stained area and scrubbed gently.

Sponging

iii. **Drop Method:** The reagent is put on the stained cloth stretched over a bowl with a dropper.



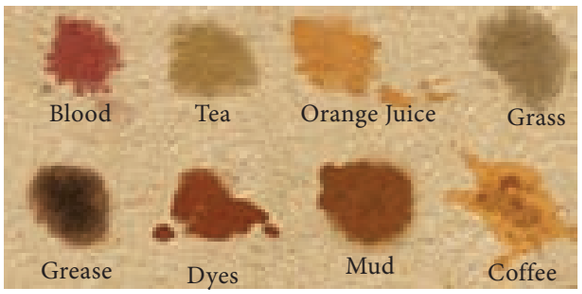
Drop Method

iv. **Steaming:** The stained area is exposed to steam from boiling hot water.

Steaming

Simple tips to remove stain from washable fabrics

- **Alcohol paints:** Soak for 30 minutes in strong ammonia solution and then wash.



Types of Stain

- **Blood:** Soak in cold water till stain lightens then wash in warm soapy water.
- **Dyes:** Soak or wash in cold or lukewarm water for 10 to 12 hours. Then wash, dry in the sun.
- **Egg:** Sponge with cold water. Then wash in warm soap water.
- **Grass:** Dip in Javelle water sodium hypochlorite (Naclo) for 1 minute then rinse in cold water.
- **Grease:** Put soap on stain and soak in cold water.
- **Iodine:** Hold over steam of boiling tea kettle.
- **Ink:** Rub in glycerine, rinse with cold water or use absorbent powder.
- **Lipstick:** Rub in glycerine or vaseline. Then wash with soap and water.
- **Nail polish:** Sponge with nail polish remover or peroxide and rinse.

Case Study 2

Michael is a mechanic. His clothes after gets stains with grease and paints. How will you help him to remove the stain.

SUMMARY

- Natural fibres play a very important role in the growth and development of textiles and clothing. These fibres are obtained from naturally available sources like plants, animals and minerals.
- Man-made fibres are combination of natural products and chemicals.
- All man-made fibres and synthetic fibres are filaments, their length and thickness can be modified based on the end product.
- The burning test can be used to identify the group-cellouse protein, minerals etc., to which the fibres belong.
- Finishes gives a high level of satisfaction to the consumer in terms of looks, texture, colour and suitability for dyeing, printing etc.,
- Basic stitches are used as a foundation prior to garment construction. These are used to enhance the functionality and decoration of the garment. These basic stitches are used as guidelines while sewing.
- Clothing can get stained with curry, grease, blood, tea/coffee and ink spills. It is very important that you remove that stain while fresh. The stain removal should be systematic and methodical.

A-Z GLOSSARY

- Absorbency: Capable of absorbing heat, light, moisture etc.
- Crease: A line or ridge produced on paper or cloth by folding, pressing, or crushing.
- Extrude : thrust or force out.
- Tweezers : a small instrument like a pair of pincers for plucking out hairs and picking up small objects.

EVALUATION

I. Choose the correct answer

1. Match the following:

	Fibres		Titles
A)	Cotton	i)	Manmade fibre
B)	Silk	ii)	Best friend
C)	Wool	iii)	King of fibre
D)	Polyester	iv)	Queen of Fibre

Options:

a) i, ii, iii, iv.

b) iv, iii,ii,i.

c) iii,iv,ii,i

d) ii, iv,iii,i.

2. Assertion, (A) Cotton is a natural fibre

Reason (R) it is taken from plants.

Options:

a) Both A and R are true, R explains A.

b) Both A and R are true but R does not explain A

c) Only A is true and R is false.

d) A is false and R is true.

3. Pick out the odd stitch from the given.

a) Back stitch

b) Hem stitch

c) Running stitch

d) Even tacking

4. Cotton is stronger when it is wet. This is because of

a) Crystalline fibre

b) hydrophilic in nature

c) Cellulose layer

d) all the above

5. Cotton plant is

a) Lengthy

b) shallow

c) bushy

d) hard

6. The silk fibre is invented by

a) Egyptian

b) Japanese

c) Indian

d) Chinese

7. Stitches are made of equal lengths in

a) Even Tacking

b) Uneven Tacking

c) Diagonal Tacking

d) Tailor's Tacking

8. _____ is used for holding two or three layers of fabric before sewing

a) Even Tacking

b) Uneven Tacking

c) Diagonal Tacking

d) Tailor's Tacking

9. _____ is used to finish the raw edges of the fabric

a) Back stitch

b) Hem stitch

c) Whipping Stitch

d) Machine stitch

10. Polyester is referred as
    a) dupont
    b) work hose
    c) cellulose acetate
    d) acrylic

II. Write Very Short Answers (2 marks)

1. Name any two natural fibres?
2. Name the method of removing seeds from dried cotton. How is it done?
3. Is polyester man-made or natural? How is it made?
4. Name the process by which nylon is manufactured?
5. Do you agree that permanent stitches are used in stitching? If so what are they and where it is used?
6. Tacking makes the dress beautiful. How?
7. Name the fibre that is given weighting. Why is it given to the fabrics?
8. Give some uses of nylon fabrics.
9. Name the fibre which is made by combining two chemical and it is a polymer.

III. Write Short Answers (3 marks)

1. Cotton has multiuse in our daily life Explain?
2. Can Nylon be manufactured in industry. Mention the raw materials used for Nylon fabric.
3. What are the uses of even tacking?
4. Name the strongest stitch among stitches and give reason.
5. Name the stitch used to cover the edges. How is it done?
6. Write a simple stain removal procedure followed at home?
7. Batik is done on the fabric to make it more attractive-Explain?
8. Define dyes Give two example of dyes?
9. Vat dyes are applied to cellulose and man made fibres- Justify?
10. What is block printing?
11. Care and maintenance of fabric is a concern of consumers-Explain
12. Why are direct dyes appllied to cotton?

IV. Write in detail (5 marks)

1. Describe the manufacturing of silk fibre?
2. Discuss the different types of direct printing methods?
3. How can natural fibres be classified? Explain their sources.
4. What is the difference between man made fibres and natural fibres?
5. Do you prefer natural or synthetic fibres? Give reason for your selection.
6. Finishing is done on fabric to make the product complete. Explain the various finishing methods?
7. A Mechanic's clothes have lot of grease stain. What are the methods you would suggest to remove those stains?

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ICT Corner

Textiles - Cotton

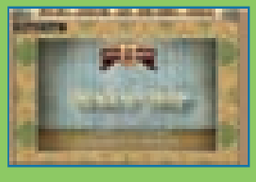
This activity enables the students to enrich themselves with the fibre cotton. It helps them understand about the cotton plant as well as the cotton fibre. It contains more facts also

Steps:

- Type the URL link given below in the browser or scan the QR code. A page opens with OPTIONS on the top. When you click the games it shows four options. All worthy with many informations on cotton.
- For example if you click drag and drop the game will display .
- A picture of the scientist will be there in the centre with the question at the bottom and two option at either side of the scientist. When we drag the scientist to the correct option it shows 'reveal the answer' when we click that we can check whether the answer is correct or not. Then for next question have to click "Next"
- Three more options are True or False, Choose the best and quiz time. Try all and enjoy.


Step 1


Step 2


Step 3


Step 4


Step 5

URL:

http://www.cottoncampus.org/CC-US-Environmental-Science/CC-Habitat/

UNIT 5

Housing and Interior Decoration

LEARNING OBJECTIVES

After completing the chapter, the student should be able to:

- Describe the importance of house
- Gain information on site selection and principles of organising rooms while planning a house
- Identify activities in the house and space allocation
- Understand the elements and principles of design
- Learn about colour and colour schemes
- Know the types of floor decorations

5.1 Introduction

Housing is one of our basic needs. Home is where our heart lies. Nowadays, the space in the home is of great importance because it is limited. Due to over population, land has become very expensive. Therefore, within less available space, many apartments are constructed to accommodate many families. When we purchase our homes, we need to consider many factors to ensure safety and economy. We have a number of equipment, furniture, furnishings at home and they need to be properly organised and arranged to provide maximum convenience and comfort. To lead a happy, satisfying life, our interiors must have pleasing environment in terms of colour schemes, furniture, furnishings and accessories.

House is a shelter made of floors, walls, windows, roof etc where family members live together and spend maximum part of their life. Housing, next to food and clothing, satisfies one of the basic needs of man. According to National Building Organization a **house** is defined as a **pucca or semi-pucca unit** of dwelling that can accommodate an average household. Its importance is given below:

5.1.1 Importance of house

1. The house protects the family members from excessive cold and heat, wind and rain and from all external anti-social elements.
2. A house is a physical structure consisting of walls, doors, windows, roofs, etc. in which human beings live and seek refuge from tensions and worries of the outside world.
3. The house forms the centre of family life. It is a place where family members are bound together by love and affection and enjoy group living.
4. The house provides space for group and individual activities for the members of the family such as cooking, serving, washing, storage, disposal of waste, recreation, reading and hospitality.
5. The house offers facilities for self-expression and a degree of freedom of action.
6. A good house provides a healthy environment for its members to develop their personality, attitudes, values and a sense of security in addition to rest and privacy.
7. An individual acquires customs, traditions, habits and culture of the family only in the house.
8. House is the place where some family members who cannot support themselves for reasons of sickness, unemployment, old age, widow-hood or other handicaps get shelter and care.
9. Housing is the determining factor for the standard of living of a family and act as a status symbol of a family.
10. Housing contributes to national income, national wealth and national employment.

5.1.2 Classification of residential building

Detached house	*Semi-detached house*	*Row of houses*	*Apartments or flats*	*Skyscrapers*
This is an independent house surrounded by its own land on all the sides.	A common boundary wall to form a structural barrier and divides an independent plot into two units. This helps in achieving economy by sharing expenses on amenities such as water lines, drainage lines, and electric cables.	This is preferred for low-income group of families. These rows of houses, have a common wall between two houses, with minimum requirements such as living room, and kitchen.	This consists of three to seven storeys and each floor or storey may accommodate two or four tenements. The land and other amenities are shared by all the occupants.	These are multi-storeyed building. This is common in big cities where the price of the land is very high.

Types of residential buildings

5.1.3 Factors affecting choice of house

The following points should be kept in mind while looking out for a house.

- **Physiological needs**: The house should have adequate ventilation and proper orientation so that there is proper temperature balance, adequate fresh air circulation and light.
- **Psychological needs**: The house should provide privacy and safety.
- **Family size**: A large family with more than six members have to go for a larger house than a small family with four members.
- **Family type:** Families can be classified as nuclear, extended or joint families. The size of the house will vary according to the type of family.
- **Stage of family life cycle:** The stage in which the family is should be considered. A family in the expanding stage will need a larger house than a family in the beginning or contracting stage.
- **Permanence of residence:** There are two types of family in this regard.
  1. **Transient family** - which has to move from place to place, because of occupational or other needs.
  2. **A Permanent family** - which is reasonably sure of staying in the same place for a long time. This factor should be considered while making decision to rent or own a house.
- **Cost of living:** The cost of living in a particular area should be taken into account while deciding on the locality of the house.
- **Cost of building:** The financial status of the family should be considered while selecting a house.

5.1.4 Owning or renting a house

In general, many families feel that owning a house is far better than renting.

Owning: This is buying a house outright in order to secure it services.		**Renting:** Rent is the compensation that is paid to the owner, generally in terms of money, by the user for the services of a house, from month to month.
Advantages of Owning		**Advantages of Renting**
1	People who own a house will feel secure and have a feeling of belongingness.	Renting is cheaper.
2	Can develop long standing friendship with neighbours.	Can change the house according to the needs and income of the family.
3	Become a means of compulsory saving.	Money spent on buying the house can be invested in other business to get more money returns.
4	Can stay in a house for a long period.	No responsibility of maintaining the property.
5	Changes or improvement in the house can be made whenever needed.	Freedom of mobility.
6	Gives a feeling of happiness, pride and sense of security during old age.	Higher living standards can be achieved
7	Credit can be acquired easily.	Can take advantage of different occupational opportunities.
8	It is a good investment.	Gives financial freedom.
9	Have tax benefits.	The family will not get affected if the property value decreases.
10	Better furniture and furnishing can be purchased.	No need to invest on furnishings and furniture as furnished house can be rented.

5.2 Site Selection

Each family attempts to meet its housing needs through the selection of a suitable dwelling unit. The house is undoubtedly the largest single investment you will make in your life. One cannot change one's residence often. Hence it becomes essential for each one of us to have adequate knowledge about selection of a site and house planning. A site in a good locality should be selected.

5.2.1 Factors to be considered while selecting a site for the construction of a house

i. Physical Features

a) The site should be regular in shape and should have exact boundaries marked on the land.

b) A low lying ground is unhealthy because it is capable of causing dampness during rainy season and it becomes a breeding place for flies and mosquitoes.

c) The site should be on an elevated ground for drainage of water especially during rainy season.

d) A site on an elevated ground gives wider and brighter view of the house. Site which faces South/North direction is preferable.

ii. Soil Conditions

a) The best soil is one where soft soil is at the surface and hard soil beneath 3 or 4 ft.

b) A mixture of sand and gravel is good.

c) Rocky surfaces afford good foundation, but poses difficulty while levelling or excavating the ground due to its hardness. On rocky surface, laying drainage pipe is very costly. Besides, it is not suitable for growing plants.

d) Clay and sandy soils are unsuitable because clay surface holds water for a long time and sandy soil absorbs water.

iii. Sanitary Facilities

a) There should be no stagnant pools or water tanks and unused wells around the site.

b) The site should not be surrounded by public drainage and toilet.

c) The site should not be selected near cattle sheds, poultry farm and factories for health reasons.

d) Reclaimed land filled with debris and refuse is unhealthy for building purposes, as it will give out obnoxious gases. During rainy season it becomes a good breeding place for flies and mosquitoes.

e) The site should have fresh air, ample lighting and good water supply.

f) A site in a busy locality may not be suitable for health reasons because of dust and the constant smoke from vehicles.

g) A site with modern sanitary facilities is the most suitable.

iv. Practical Convenience

a) The value of the site depends upon the convenience available around it.

b) The site should be within easy reach to school, market, bank, hospital or nursing home, railway station, bus terminus and post office.

v. Good Neighbourhood

a) The site should be selected near a developed area for safety.

b) Good neighbourhood adds to the permanent happiness of the family.

c) The site in the neighbourhood of a sea commands pleasant sea breeze. But one disadvantage is that sea breeze carries with it a thin spray of salty water, which corrodes all iron articles.

vi. Legal Characteristics

a) The legal description of the plot and the exact location of the plot must be known.

b) The site should be a freehold land without encumbrance.

c) A legal advisor should be consulted, the place surveyed and the boundaries marked on.

5.2.2 Principles of Organising Rooms While Planning a House

The principles to be considered for organising rooms while planning a house are aspect, prospect, privacy, grouping, roominess, furniture requirements, circulation, flexibility, sanitation and practical consideration.

i. Aspect

Aspect is the arrangement of doors and windows on the outside walls of a house which allows good breeze, sunshine and a good view of the nature. Aspect is also needed from hygienic point of view.

- With careful placement of windows, it is possible to admit sun's rays into any desired room. Kitchen should face the eastern side so that the morning sun's rays can purify air.
- Bed rooms should have southern aspect-either southeast or south west to facilitate enjoyment of good breeze.
- The living room can be north-east or south-east in its aspect.

ii. Prospect

It is the impression that the house creates on a person who views it from outside. It must be attractive in appearance, modern, cheerful and comfortable.

- A beautiful window, carved pillars, modern design on the walls and roof may add to the charm of the house.

iii. Privacy

Privacy is of two kinds-privacy of the entire house from the road side; privacy of each room from other rooms and from the entrance.

- Privacy from outside can be gained by planting trees and growing creepers or having a compound wall.
- Privacy within the house can be obtained by proper arrangement of doors and windows.
- Privacy to bedrooms, toilets, water closets and dressing room is of utmost importance.

Principles of organising rooms in a house

iv. Grouping

It is the arrangement of rooms in the house in respect to their relative positions and activities towards each other.

- The dining room close to the kitchen and living room, the living room near veranda, the toilet near bed room and so on.
- Grouping is based on convenience.

v. Roominess

It is the spacious effect a room gives to those who live in. The available space should be fully made use of.

- One can have built in wall cupboard, shelves and storage area so that the floor of the room is left free for various activities.
- The space under the staircase, window sill, area below the ceiling (attic/loft) can be made use of for storage.
- In addition the size and shape of the room, the furniture arrangement as well as the colour scheme used, have a bearing over the roominess of the house.

vi. Furniture Requirement

The rooms must be planned with due thought to the furniture to be placed there.

- The type, the position, size and the number must be planned earlier in respect to the size and placement of doors, windows and built-in cupboards in the room.

vii. Circulation

The circulation from room to room must be good. Good circulation means independent entry to each living space through a common space.

- It should provide privacy to the members and not to disturb any member doing his/her work in the room.
- Straight, short, direct passages must be provided.
- Circulation can be achieved by proper placement of the doors, grouping of the rooms and furniture arrangement.

viii. Flexibility

This means making use of a room originally designed for one purpose, for different purposes at various occasions.

- Converting a living room to a dining hall during function, a back veranda near the kitchen can be used as play centre for children, a dining room converted as child's study centre or play centre are examples.
- Screens, cupboards, folding partitions may help to make a room flexible and serve more than one purpose.

ix. Sanitation

It includes provision of light and ventilation and attention to general cleanliness and sanitary conveniences.

- There should not be any room in a house without enough light.
- Ventilation must be adequate. It means supplying fresh air and evacuating polluted air.
- Opposite windows and doors as well as ventilators must be provided for easy movement of air.
- Sanitary conveniences as provision for drainage of waste water, disposal of refuse and human waste must be planned ahead.

x. Practical Considerations

One may have to take into consideration, while planning the house, the following practical points as **strength, convenience, comfort, simplicity, beauty, possibilities of extending the house in future** and above all **economy**.

5.3 Activities in the House and Space Allocation

A number of activities are carried out at home. Space is required to carry out these activities. Limited space is available for carrying out various activities within home. It is therefore essential to manage space for efficient household work. Some of the household activities and space allocated for them are as follows:

Table 1 Activities In The House And Space Allocation

	Household Activities	Space Allotted
1.	Sleeping	Bed room
2.	Cooking food	Kitchen
3.	Eating meals	Dining area
4.	Washing clothes	Laundry area/ bathroom
5.	Washing utensils	Kitchen
6.	Studying	Study room/ Children's room/ bed room/Dining room
7.	Staying of guests	Guest room
8.	Bathing	Bath room
9.	Recreation	Living room

It is sometimes not possible to assign space for these activities. In small houses, a number of activities can be carried out in a particular place for example: Bed room can be used as study or dressing room in absence of separate area for these activities. Space management therefore plays a vital role in carrying out different household activities efficiently.

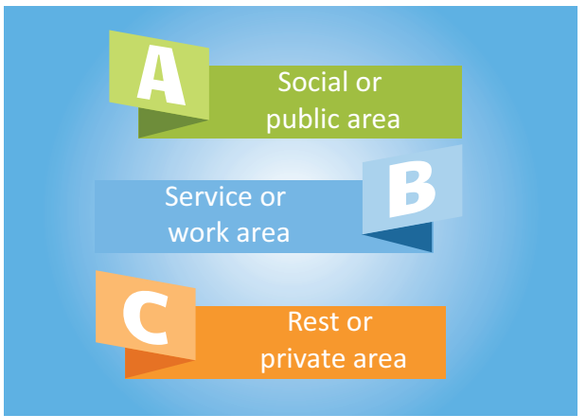
ACTIVITY 1

List the household activities your family members do in each room of your house.

S.No	Living room	Bed room	Study room	Children's room	Kitchen	Bath room	Veranda
1							
2							
3							
4							
5							
6							
7							

5.3.1 Effective Space Allocation in a House

The house and its grounds can be divided into three major areas based on the various activities of the house.



Division of major areas in the house

1) **Social or public area** - The rooms allotted are, veranda, living room, reception, dining, music, reception and games room.
2) **Service or work area** - The rooms allotted are kitchen, serving, laundry, drying yard, ironing room, garage, storage areas, office and study room.
3) **Rest or private area** - Bedroom, dressing room, bathrooms, prayer room etc. It is not possible to allot room for each and every activity separately, but it is important to allot spaces for the more important ones.

5.3.2 Rooms in the House

The rooms in the house and various activities carried out there are discussed in the following paragraphs:

A veranda serves many purposes. It is a place for stranger or a visitor to wait. It is a place for keeping shoes, walking sticks, umbrellas and a place to store vehicles. It provides place for business, the postman, the newspaper boy, milkman, and the vendors to call on the family members at the entrance. It serves as a passage to other rooms of the house. It protects the walls of the house from the direct rays of the sun. It is a place for pets and also a place for growing plants.

The Back Veranda / Balcony

It serves different functions such as grinding, drying clothes etc. A veranda/ balcony facing south or west is comfortable.

Living Room

Living room is placed adjacent to veranda. The living room should provide place for many of the family activities as reading, conversation, get together, indoor games and light music. It is a place to receive friends and also to hold social functions. In a small house, it can serve as a study room for children, sleeping area for one or two members. It can be a dining room during special occasions. At times it can accommodate guests. Thus it may serve multi various functions, depending upon the type of the family. A living room should express cordial welcome to the friends of the family. The furniture and furnishing that are used in the living room must be comfortable and suitable for the room. **For example**,

Conversation	-	Sofa, chairs
Hospitality	-	Centre coffee table
Reading	-	Table, chairs and bookcase
Recreation	-	Radio and television cabinet, table and chairs

There should be enough wall space for hanging pictures and for display of decorative articles. Flower arrangements add beauty to the room. A shelf may be provided for art objects.

Bed Room

A bed room is included under the private area of the house. It is used for sleeping, relaxing and studying. It can provide place for dressing and storage of clothes. An individual spends about one third of her/his day in a bed room. Therefore, it is important to plan the bed room efficiently. Bed rooms should not be located around the busy area of the house such as kitchen.

A rectangular room is more convenient than a square one. Ventilation is of utmost importance in bedroom. It should be on the side of the direction of prevailing wind. The door of the bedroom should be located in such a way that when opened the bed is not visible fully. Bathroom attached to a bedroom would add to the convenience of the family members. Adequate storage space should be provided in the bedroom. Built-in cupboards for clothes and bed linen save space. A chest of drawers could also be provided. A small table and a chair may find a place to keep some of the books for light reading, table lamp, and flower arrangements etc.

Children's Room

As children grow up they need a separate room for studying, playing etc. children's room should be planned wisely. Bunk beds (beds one above the other) can also be provided to save space.

- Furniture with sharp edges should be avoided in children's room. The height of the furniture such as bed, chair, table etc, should be low and it should be light weighted.
- The storage cupboards should be low in height for easy accessibility by the children.

Kitchen

Kitchen can be aptly described as the hub of the home. It is the nucleus of the house, a place where we cook food, store our food, utensils and provisions. It can provide space for eating too. The comfort, health and happiness of the family mainly depends on the activities carried out in the kitchen. Kitchen should well lit and ventilated and should never be a suffocating chamber of pungent smoke irritating the eyes, nose, and lungs of the housewife. Kitchen should have chimney/exhaust fan to exhaust smoke and fumes out of the kitchen. The floor of the kitchen should be selected properly so that it is easy to clean. It is very essential that one gives enough thought to the kitchen arrangements.

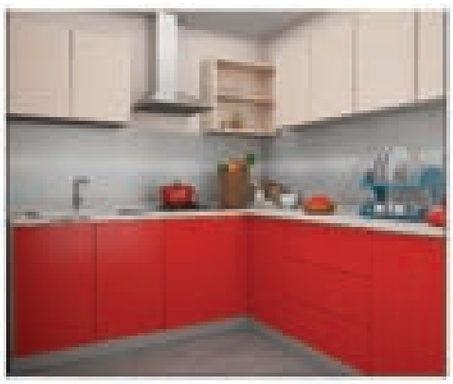
i. **Location:** The best location will be eastern or north-eastern corner of the house. This is helpful in having purified air and also warmth in the morning and coolness during the other part of the day.

ii. **Size and shape:** For actual efficiency the kitchen should be neither too small nor too large. A rectangular kitchen is step saving.

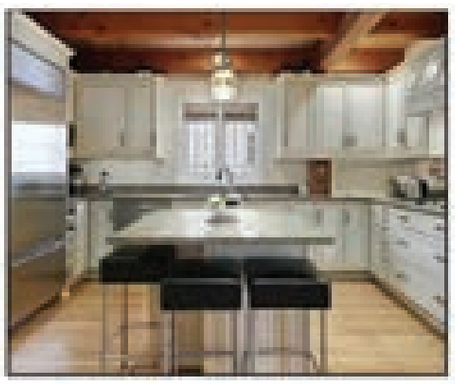
iii. **Activities and work centres:** The main activities in the kitchen are food preparation, cooking and cleaning of food items and equipment. The

work area for these three activities should be carefully planned. The kitchen should have the preparation, cooking and washing centres adjoining each other at comfortable heights to form a triangle. This work triangle ensures convenience and safety.

- The various shapes in which the major work centres can be arranged are 'U' shaped, 'L' shaped, one wall and parallel walls. The ideal shape for the kitchen arrangement is 'U". It consists of preparation and cooking centres on either side and the cleaning centre in the middle. This is a compact arrangement and labour saving too. In the 'L' shaped kitchen arrangement of the work centres are placed on two adjoining walls. The one wall and two wall arrangements are suitable for small kitchens.
- **Cooking centre:** The range with the storage of utensils needed for cooking occupied an important place in the kitchen. A peg board for frying pans and sauce pans, a holder for knives and spoons and all the food items and equipment must be placed within easy reach in the cooking centre. The main appliance in this area is a gas burner or stove. The gas burner or stove is placed on top of the counter at an appropriate height to carry out cooking.
- **Washing centre:** Washing area should be near the cooking area. It should have proper arrangement for water and proper drainage system. Storage cupboard for

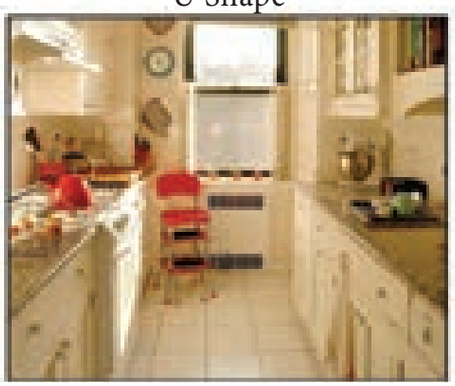


L-Shape



U Shape

One wall

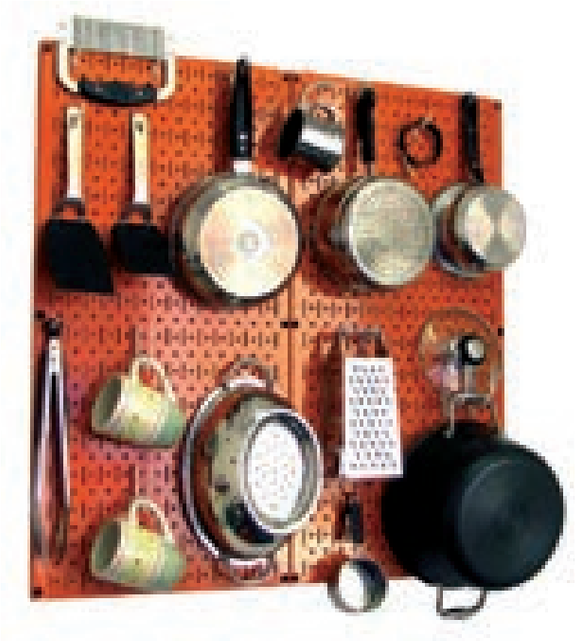


Two wall

Kitchen types

dishcloth and brushes can be hung in convenient place provided there. Sink should always be placed in front of a window. Garbage pail should be kept near or under the sink.

- **Preparation centre:** Placement of a refrigerator in the preparation centre facilitates easy handling of vegetable, milk, egg and fruits during preparation. The equipment like blenders, beaters, sifters, saucepans, measuring cups, spoons, knives, and ladles should be stored here. This area should have adequate electrical points to use various appliances.
- **Storage facilities in the kitchen:** Built-in cupboard or cupboard with drawers and rack can be provided. Care should be taken to avoid insects. The wall area above and below the counter should be fully used.



Peg board

Bathroom

The purpose of a bathroom is to provide facilities for bathing, washing and dressing too. The main bathroom should be in the ground floor not far away from the main rooms. It can be attached to the bedroom for convenience. There should be good ventilation in the bathroom. A window at the usual level with frosted glass shutters, admitting light but keeping privacy, is good. Loft can be provided to store things if necessary. Small built-in shelf may be used for keeping oil, soap, brush, paste, etc. The flooring finish should be easy to clean. It should never be slippery. The wall should have a polished surface to a height of 90cms from the floor. There should be good drainage facilities for removal of waste water from the bathroom.

Storage

Successful housing needs the provision of adequate storage facilities throughout the various parts of the house. Good storage facility with closed doors is needed for the following reasons.

- Gives a neat and orderly background for a family living.
- Avoids unnecessary waste of time and energy.
- To have easy access to things.
- To have maximum use of space allotted.
- To preserve and protect the things against mice, flies, ants etc.
- To keep things away from dust, sunlight, moisture, obnoxious gases and adverse temperature.
- To prevent pilferages.
- To keep things out of reach of children.

Some of the things in the house that need to be stored are clothing, bedding, food supplies, kitchen equipment, sports equipment, garden and yard tools, cleaning agents, cleaning equipment, books, medicines, disinfectants and recreational equipment. Provision for storage in a house can be made in lofts, shelves and built in cupboards.

The following points should be kept in mind when planning storage.

1. Store materials and equipment near the place of work.
2. Store materials at proper heights to avoid unnecessary stooping and stretching.
3. Arrange articles properly.
4. Group articles of similar nature together.
5. Label the items stored.

5.4 Interior Decoration

Decoration aims at beauty, functionalism and expressiveness. Beauty is a quality which is pleasing to the eye and ear, functionalism represent usefulness, whereas expressiveness indicate definite idea or theme. The ideas expressed in a house are warmth, coolness, sophistication, intimacy, naturalness and delicacy.

A house constructed with floors, walls, and roof can be made to look attractive and comfortable by decorating its interior tastefully. When our home looks beautiful, we feel happy and satisfied. "A thing of beauty is a joy forever". All of us enjoy beautiful things be it our possessions or surroundings. One's imagination, good taste and aesthetic sense are very much needed to have a beautiful and functionally useful interior.

Interior decoration is a creative art of adjusting the space and equipment to suit the fundamental and cultural needs of the inhabitants. Use of colours and accessories is one of the key ways of decorating the house. Proper selection and arrangement of accessories and colours helps in interior decoration of the house. Accessories such as curtains, lamps, carpets, upholstery, flower vases, potted plants and other art objects like statues etc. can be used in interior decoration. Designs in the art objects make them individualistic and beautiful.

Design

Design is selecting and arranging of materials with two aims – order and beauty. In which, the order denote structure and beauty show character through the interpretation of an idea by an individual. While creating the design in this way, the designer express various ideas, moods and values and such expressions evoke some response in the minds of the viewers. Design can thus be defined as the selection and arrangement of elements of art such as lines, form, colour and texture of an object or a drawing of it on a piece of paper. A good design shows an orderly arrangement of the materials and creates beauty in the finished product.

There are general characteristics found in beautiful art objects that establish certain principles. Any piece of art that satisfies these principles is always admired by all. One should have the knowledge of the principles fundamental to good taste. Based on this, one can identify and appreciate beauty in art objects. Now let us deal with the elements of art.

Design can be classified into two types.

DESIGN		
Structural design Structural design is the design made by the size, form, colour and texture of an object. Structural design is essential to every object.		**Decorative design** Decorative design is the surface enrichment of a structural design. This adds luxury to a design.
Requirements of a good structural design		**Requirements of a good decorative design**
1.	It should be simple and beautiful.	The decoration should be in moderation.
2.	It should be suited to its purpose. It should strengthen the shape of the object.	The decoration should be placed at structural points. It should strengthen the shape of the object.
3.	It should be well proportioned.	There should be enough background space to give an effect of simplicity and dignity to the design.
4.	It should be suited to the material of which it is made.	Surface patterns should cover the surface quality.
5.	It should have originality.	Designs, based on their source can be classified into natural, geometric and abstract designs.

5.5 Elements of art

Elements of art are parts of a work of art that can be defined. These elements are the building blocks of a design. All art work is created by combining the elements of art guided by principles of design. Elements and principles of design are foundation of all visual matter.

The elements of art are as follows:

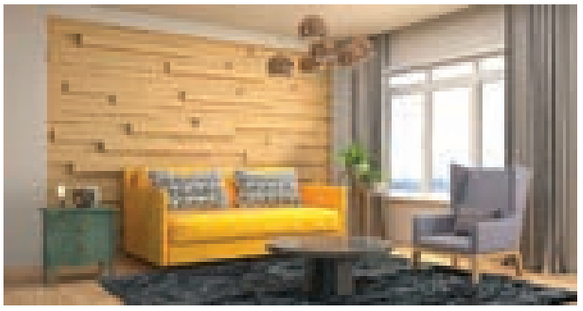
1. Line
2. Shape and form
3. Texture
4. Space
5. Colour

5.5.1 Line

Line is the basic element of art. It is a series of points joined together in two-dimensional form. It has length but no width. Line is capable of communicating emotion, movement, direction, growth and states of mind through its character.

Types of lines

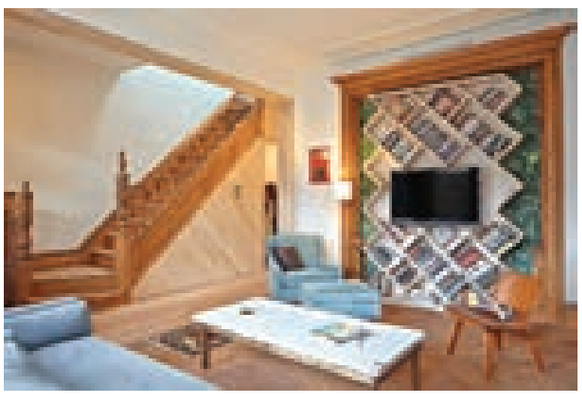
i. **Horizontal lines:** Horizontal lines suggest a feeling of rest and repose. It also creates the effect of width as they carry eye from left to right or vice versa and make objects appear broad and fat.



ii. **Vertical lines:** Vertical lines are associated with upright position

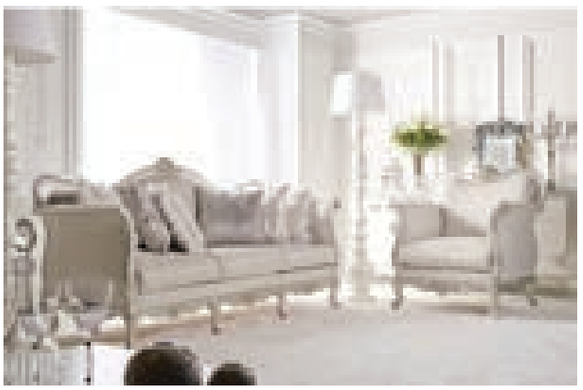
of human body which signifies alertness and stability. Vertical lines communicate a sense of height. They also suggest the feelings of strength, regularity, loftiness, spirituality and action. They move the gaze from top to bottom or vice versa.

iii. **Diagonal lines:** Diagonal lines suggest a feeling of movement or direction, restlessness and excitement. They also suggest lack of stability. Diagonal lines are associated with running posture and signifies action and movement.



iv. **Curved lines:** There are two types of curved lines.

a) **Soft shallow curved lines:** Soft shallow curved lines suggest grace, joyful feelings, comfort, safety, familiarity and relaxation.



b) **Deep acute curved lines:** Deep acute curved lines suggest confusion, turbulence, even frenzy.

5.5.2 Shape and forms

Shape is an area enclosed by lines. Shapes are flat and generally considered two dimensional. Basic shapes are rectangles, squares, triangles and circles. **Form** is the organization of visual elements in three dimensions. In addition to height / length and width, form also has actual depth or illusion of depth. Basic forms are spheres, cubes and cones.

Types of shapes and forms

i. **Naturalistic shapes/forms:** Naturalistic shapes or forms are found in nature and are irregular or asymmetrical forms such as mountains, flowers. Man-made objects may also imitate the naturalistic shapes.

ii. **Abstract shapes/forms:** Abstract shapes of forms are stylized or simplified versions of natural shapes/ forms. Abstract shapes are usually used to convey meaning or identity without the use of written language. Many signs, icons and logos found in advertisements, posters use abstract shapes and forms.

iii. **Geometric shapes/ forms:** These corresponds to mathematically shapes and forms such as circles, squares, cubes, cylinders and cones etc.

5.5.3 Space

It is the area around, between, above, below or within object. Space can be two-dimensional as well as three dimensional. Two dimensional space has only height and width whereas three-dimensional space also has a depth.

Implications of space

- Large spaces without boundary give a feeling of being exposed and lonely.
- Small spaces may lend a feeling of protection and privacy.
- Space be judiciously used in design for best impact.
- Too much empty space is as bad as too little space.

5.5.4 Texture

Texture refers to the tactile quality of an object which may be felt by touch or may be identified through visual examination. The different kinds of texture are furry, fuzzy, satiny, silky and rough. Texture helps in adding beautification to the objects. Textures are very important in designing any artwork as it helps in creating emphasis or unity between different components.


ROUGH


MEDIUM


SMOOTH

Texture can be of two types:

1. Visual texture is what you see through sight.
2. Actual/tactile texture is what you can feel by you.

Effects of texture

1. Rough textures suggest informality.
2. Smooth textures suggest formality.
3. Textures are helpful to create emphasis, harmony or separation between parts of a whole.

5.5.5 Colour

Colour is an important element of art. It is defined as the impression formed by the mind according to stimulations of the retina. Objects in the environment absorb certain wavelengths of light and reflect back others, the reflected wavelengths enter the eye, act upon the optic nerves cause sensation of light and colour. Light waves with different wavelengths produce different sensations and appear as different colours.

5.6 Principles of Design

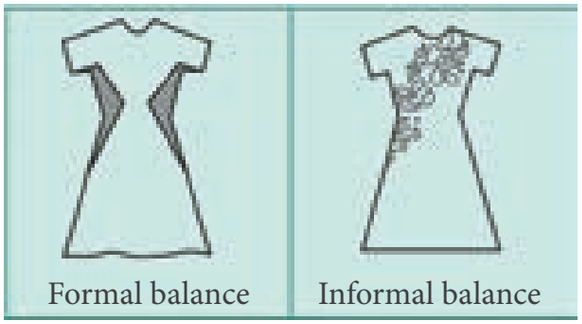
The principles are concepts used to organize or arrange the structural elements of design. The principles of design help in determining whether an object is aesthetically good or poor. They are just guidelines in creating an effective art work or design. The principles of design are as follows.

1. Balance
2. Proportion
3. Rhythm
4. Emphasis
5. Harmony or unity

5.6.1 Balance

Balance is **equalization of attraction on both sides of the centre.** It is rest or repose. Balance is the fundamental principle of design. Balance is the arrangement of elements so that all is equalized. Visually all the weight is equal and no part dominates completely. It is a way to compare the right and left side of a composition. The placement of elements of design should be in such a way so as to make them look appealing on a particular space. Balance can be of three types:

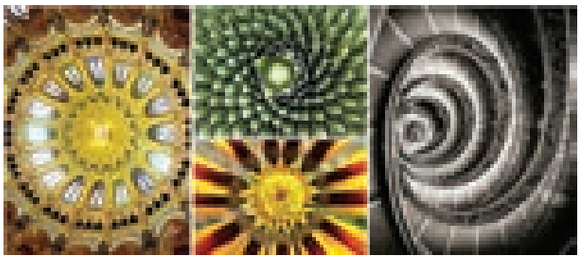
a) Formal balance
b) Informal balance
c) Radial balance



a) **Formal balance:** Symmetrical or formal balance is referred to as when sides of a composition from a centre/ focal point, are similar in visual weight and almost mirror. Formal balance gives a sense of formality, stiffness, precision, exactness and carefulness.

b) **Informal balance:** Informal balance is achieved when both sides of a composition from centre/focal point, are dissimilar in visual weight and also not mirrored. Informal balance is more subtle, casual, dynamic, active and suggest informality and flexibility.

c) **Radial Balance:** Radial balance is obtained by arranging elements equally around a central/focal point.



5.6.2 Proportion and scale

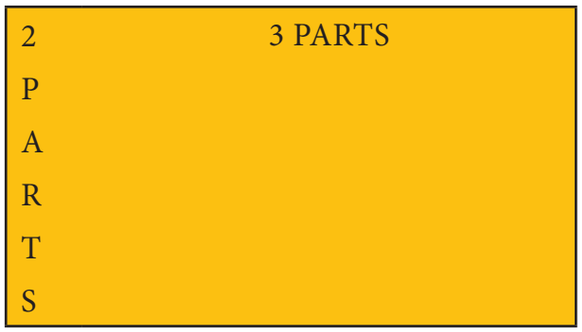
Proportion is the feeling of unity created when all parts relate well with each other. Proportion means **the relationship of sizes or areas to one another or to a whole. The principle of proportion is sometimes called 'the law of relationships'.**It also refers to the relative size and scale of the various elements in a design. Proportion is achieved when the different sizes of objects are successfully grouped in an arrangement the elements making up the structure having a pleasing relationship for the whole and to one another. For example, a very small sofa would be 'out of scale' in a very large room.

REMEMBER

Scale refers to the size of an object.

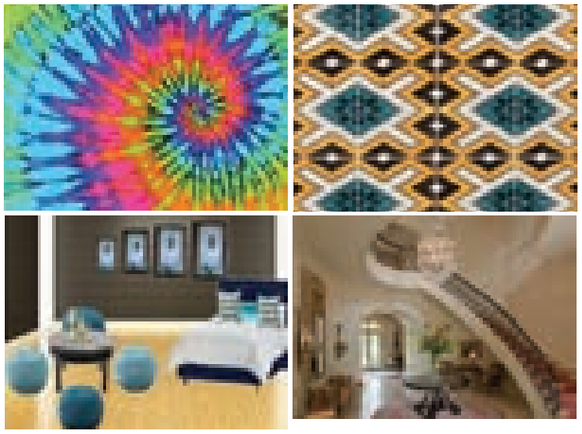
Proportion is part of an object in relation to whole.

Greek oblong or Golden Oblong refers to proportions of parts to one another and to the whole. Golden section is a standard of good proportion and divides the space interestingly. This oblong uses the ratio of 2:3 or 3:5 in case of flat surfaces and 5:7:11 in case of solids.



5.6.3 Rhythm

Rhythm is **organized movement in continuity.** It is one of the fundamental principles in any design. Rhythm is created when one or more elements such as colours, shapes, forms and size are used repeatedly to create a feeling of organized movement. Variety is essential to keep rhythm exciting and active and moving the viewer around the artwork. If a piece has a rhythm the work should flow freely without interruption. Rhythm can be achieved through four ways. They are **continuous line, repetition, progression of sizes/gradation and radiation.**



5.6.4 Emphasis

Emphasis is the **art principle by which the eye is carried first to the most important thing in any arrangement and from that point to every other detail in order of importance.** Emphasis is the part of the design that catches the viewer's attention. In a particular composition, there are things which the artist wishes to highlight and these things should dominate, whereas there are other things which play just a supportive role and hence should not be emphasized. By emphasis one can stress important parts of an artwork.

Emphasis can be created by various ways.

- It can be done by using different colour, size, texture and shape.
- Another way of creating emphasis is by the use of decoration, contrasting colour, by grouping objects, by placing things with sufficient space as background.
- Emphasis can also be created by making a focal point.

5.6.5 Harmony or unity

Harmony is the fundamental requirement of any piece of work. It means a single idea or impression. All objects in a group have a 'family resemblance or friendliness'. Unity is the feeling of harmony between all parts of the artwork creating a sense of completeness. It is used to create a feeling of completeness where everything flows together. **According to Goldstein and Goldstein V., Harmony is the art principle which produces a feeling of unity through the selection and arrangement of consistent objects and ideas. One element should merge with another in terms of line, shape, form, colour, idea, texture etc. Unity can be achieved through the effective and consistent use of above mentioned elements.** Pattern is the most fundamental element for a strong sense of unity.

5.7 Colour and Colour Schemes

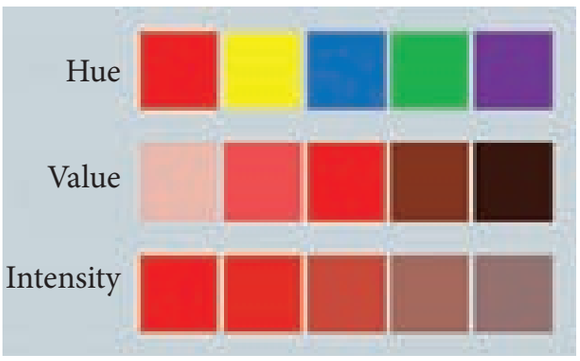
Colour is an inherent visual property of all forms. It is an essential part of our environmental settings. The colours we attribute to objects, however, find their source in the light that illuminates and reveals form and space. Without light, colour does not exist.

When white light falls on an opaque object, selective absorption occurs. The surface of the object absorbs certain wavelengths of light and reflects others. Our eyes pick up the colour of the reflected light as the colour of the object. Pigmentation of a surface determines which wavelengths or bands of light are to be absorbed and which are reflected as object colour. For example, a red surface appears red because it absorbs most of the blue and green light falling on it and reflects the red part of the spectrum, similarly, a black surface absorbs the entire spectrum, and white surface reflects all of it. This distribution of colour in light rays is reflected as a rainbow on a rainy day when the light ray passes through a water droplet, which acts as a prism.

5.7.1 Dimensions of colour

There are three properties or qualities which may be called the dimension of colour, and which are just as distinct from one another as the length, breadth, and thickness of an object. All three of these dimensions-hue, value and intensity-are present in every colour, just as every object has length and breadth and thickness.

These colour dimensions are Hue, Value, and Intensity or chroma.



DIMENSIONS OF COLOUR

HUE	VALUE	INTENSITY / CHROMA
• Hue refers to the **name of the colour** such as red, yellow and blue and it describe the kind of colour and also represents the difference between the colours. • The hues or colours can be divided into **warm and cool** colours. The colours that have more of yellow, red are considered to be warm colours as they represent the colours of fire, sun and heat. • The colours which have more of blue are considered to be cool colours as they represent the sky and water. • Warm colours make the objects appear bigger and closer where as cool colours make the objects appear smaller and far away. • Warm colours are cheerful and stimulating where as cool colours are calm and restful. • **Advancing colours** such as yellow, red are those that tend to **advance** towards one by **reducing the distance**. • The advanced colours make the room smaller. • **Receding colours** are those that tend to **recede** or **go back** by **increasing distance** and make the room larger.	• It indicates the **lightness or darkness** of a colour in relation to white or black. • Light values are called **tints** and dark values are called **shades**. • Tints are made by addition of white and shades are made by addition of black. • The lightness and heaviness are given by the use of the different colours. • **Red and yellow** seem to be **heavy colours** while **blue or purple** are considered to be **light colours**. • Heavy colours are used at the lower part of the room and light colours are used on the upper side of the room. • **Light values increase the size of the rooms/ objects and dark values reduce the size**.	• It refers to the **brightness or dullness** of a colour. • It also refers to the degree of purity or saturation of a colour with respect to grey. • It can be said it is the property describing the distance of the colour from grey or neutrality line. e.g as in the case of the lemon which is brighter than the banana though both of them are of the same colour. • A colour in its purest form has the greatest brilliance or intensity. • Adding more of hue strengthens the intensity, adding grey or complementary colour lowers it. Hues that are neutralized or greyed are called **tones**. • **Warm colours like yellow, orange and red with high intensities** are stimulating, visually active and therefore should be **used in small areas**. • **Cool colours like blue, purple and green with low intensities** are subdued and relaxing, can be **enjoyed in large areas**.

Case Study

1. Sharmila's study room looks small. The walls are painted with dark purple colour paint. What change can she do to make that room look bigger?
2. In Raji's house, the living room is too narrow and long. How can she make the room to look approximately square?

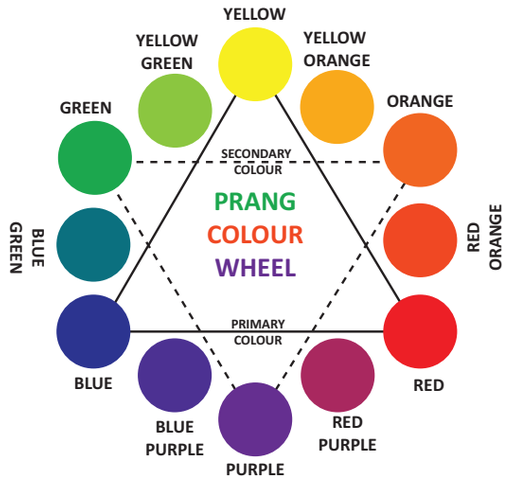
Answers

1. The walls can be painted with light colours as they give the feeling of spaciousness e.g banana yellow, light pink etc.
2. The two narrow walls in the living room can be painted with light value colours to make them recede/go back, while other two walls can be painted with full bright intensities to advance. Thereby making the room look like a square room.

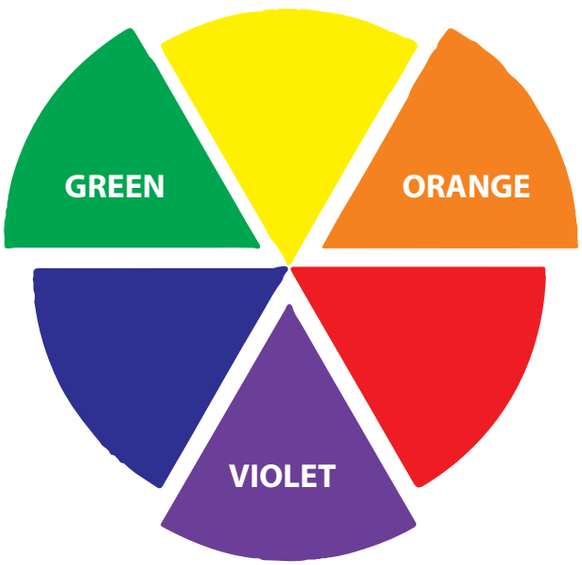
5.7.2 Classification of colours-Prang colour chart

In the Prang System, colours may be divided into five classes: Primary, secondary, intermediate, tertiary and quaternary.

1. **Primary colours:** All colours may be obtained by mixing in various proportions three fundamental hues: red (R), Yellow (Y), and blue (B). These are called the three primary colours, because they are the elements in the use of pigment. They are the only hues in pigment that cannot be obtained by mixing other hues.



2. **Secondary colours:** When two primary colours are mixed in equal proportions, we get secondary colours.



Yellow + Blue = Green.
Blue + Red = Violet or Purple.
Red + Yellow = Orange

The primary and secondary colours together are called **basic colours.**

3. **Intermediate Colours:** When a primary and an adjacent secondary colour is mixed an intermediate colour is produced. There are six intermediate colours. They are

Yellow + Green = Yellow Green.

Blue + Green = Blue Green.

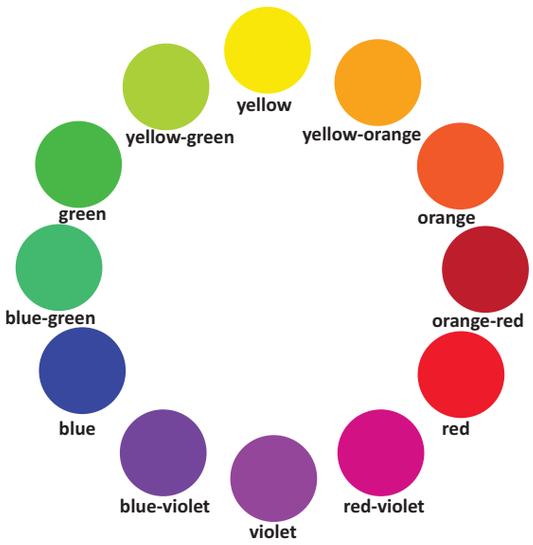
Blue + Violet = Blue Violet

Red + Violet = Red Violet

Red + Orange = Red Orange

Yellow + Orange = Yellow Orange.

The three primary colours, three secondary colours and six intermediate colours form the outer circle of the Prang colour chart.



4. **Tertiary Colours:** When two secondary colours are mixed a tertiary colour is produced.

There are three tertiary colours. They are

Green + Orange = Grey Yellow or Smoky Yellow.

Orange + Violet = Grey Red or Old brick Red.

Green + Violet = Grey Blue or Slate Blue.

5. **Quaternary Colours:** When two tertiary colours are mixed a quaternary colour is produced. There are three quaternary colours. They are

Smoky Yellow + Old Brick Red= Grey Orange or Buff.

Smoky Yellow + Slate Blue = Grey Green or Olive Green

Old Brick Red + Slate Blue = Grey Violet or Prune.

ACTIVITY 2

Take red colour pencil and yellow colour pencil and fill up the circles. In the third circle apply both red and yellow colours at the same time in equal proportion and see the colour change. For the second one, take red and blue colour pencils and apply simultaneously in the third circle.(**Answer: Refer Classification of colours-Prang colour chart-Secondary colours)**

1. Red + Yellow = ?

○ + ○ = ○

2. Red + Blue = ?

○ + ○ = ○

The three tertiary and three quaternary colours form the inner circle of the prang colour chart. Grey colour is in the centre of the Prang colour chart.

5.7.3 Colour Harmonies / Schemes

Harmony can be defined as a pleasing arrangement of various parts in to a complete one. In visual experiences, harmony is something that is pleasing to the eye. It engages the viewer and it creates an inner sense of order, a balance in the visual experience. Colour harmony delivers visual interest and a sense of order. Colour combination or colour harmonies can be classified into related and contrasting colour harmonies.

1. **Related colour harmony:** They are obtained by using colours which are similar. They are classified into **monochromatic and analogous** colour harmony.

   i. **Monochromatic colour harmony:**

   a) This is also known as one hue colour harmony. It involves use of tints, shades and tones of the same hue. Example: yellow.

   b) In a monochromatic colour scheme, charming effects can be obtained through contrast in textures of the materials used.

   c) **Neutral colours such as white, black and grey** can be integrated into the colour scheme.

   d) It results in less vibrant colour scheme compared to other harmonies.

   ii. **Analogous colour harmony:**

   a) In this colour scheme the colours which are lying adjacent to each other in the prang colour chart are used.

   b) They provide interesting variety than monochromatic harmony.

Yellow, yellow green and green Orange. Yellow orange, yellow

c) The colours should be of different intensities and values. Examples: Red, Red Orange, Orange.

d) One colour is used as dominant while others are used to enrich the scheme.

e) It is used widely in creating art work.

2. **Contrasting colour harmonies:** Contrasting colour schemes are based on opposing colours and tend to be stimulating and balanced because they include both warm and cool colours.

i. **Complementary colour scheme:**

a) Two colours that are directly opposite in the Prang colour chart are combined. Example: Yellow and Violet, Blue and Orange.

b) In this colour scheme, one colour should be dominant, other colour should be used as the subordinate colour.

c) This scheme makes use of one warm and one cool colour.

d) High degree of contrast in this scheme makes it striking drawing maximum attention.

Blue and orange

Red, red orange, blue green and green

ii. **Double complementary colour harmony:**

a) Two adjacent colours and their opposite colours in the Prang colour chart are combined. For example: Yellow, Yellow Green, Violet and Red Violet.

b) In this colour scheme, one colour should be dominant, other colours should be used as the subordinate colours.

c) Attention should be given to balance between warm and cool colours.

iii. **Split complementary colour harmony:**

a) In this scheme, one dominant colour and two subordinate colours that lie on either side of its complementary colour are combined. For example: Yellow, Blue Purple and Red Purple.

b) Due to the contrast, this colour scheme is attention seeking.

Orange, purple and blue green

3. **Triad colour harmony:**

   a) In this, three colours which are at equal distance in the Prang colour chart are combined.

   b) It is a rich colour scheme which offers plenty of possibilities for variations.

   c) Utmost care is required to balance the colours in a pleasing triadic colour harmony.

Secondary Triad - Green, Orange and Violet

   d) We get four triads namely primary, secondary and two intermediate triads.

   Primary Triad - Yellow, Blue and Red.

   Secondary Triad - Green, Orange and Violet.

   Intermediate Triad

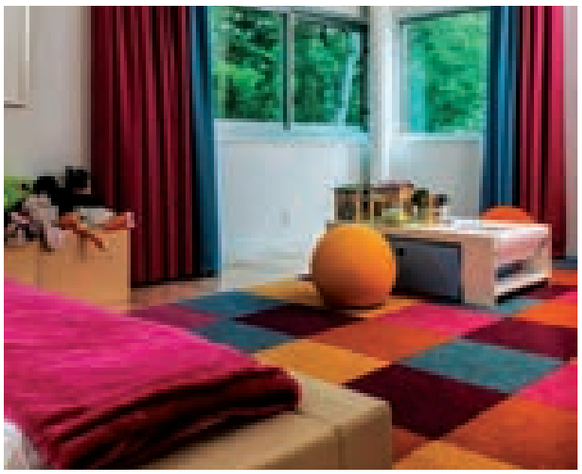
   a) Blue Green, Red Purple and Yellow Orange

   b) Yellow Green, Blue Purple and Red Orange.

ACTIVITY 3

Match the following

1.	Analogous	three colours which are at equal distance
2.	Monochromatic	Directly opposite hues
3.	Complementary	Hues lying adjacent
4.	Double complementary	one dominant colour and two subordinate colours either side of its complementary colour
5.	Split complementary	Two adjacent colours and their opposite colours
6.	Triad	Four hues equidistant
7.	Tetrad	One hue



Green, Yellow Orange, Red and Blue Purple

4. **Tetrad colour harmony:**
   - a) This is formed by any four hues equidistant on the Prang colour chart. Example: Green, Yellow Orange, Red and Blue Purple.
   - b) It works best if one colour is dominant
   - c) Attention is to be paid to the balance between warm and cool colours in the design.

5.7.4 Factors to be considered while planning colour scheme

The following points must be taken into consideration while planning colour scheme for the interiors.

- The expected effect in size, shape and direction of the room.
- The mood to be created in the room. Example: Masculine, feminine, traditional, formal, etc.
- Individual preference of the family members.
- The activities to be carried out in each room.
- Colours of other existing furniture and furnishings in the house.
- **Only one colour should dominate.**
- The basic colour should occupy at least 60-70% of the whole colour scheme. Second hue should be used in lesser quantity and if a third colour is used, it should be used in least quantity.
- Follow '**Law of areas**' that is, **larger the area lighter the colour and smaller the area brighter the colour.**
- The current trends and fashions.

5.8 Flower Arrangement

Flowers are nature's gift to mankind. Flowers are artistically arranged along with other plant materials in receptacles and organized into compositions having harmony of form, texture and colour. Flowers brightens up any room in the house and provide variety and interest. Flower arrangements are used at various locations such as tables, window sills, walls and corners to suit the space and occasions.

5.8.1 Materials used in flower arrangement

There are three basic materials are needed for creating flower arrangements:

1. Flowers, foliage, fruits and berries
2. Vases/containers
3. Stem holders, knife, scissors and wire

1. Flowers, foliage, fruits and berries:

Any kind of flowers, foliage, fresh, dry or artificial ones can be used in this art.

Selection and preservation of flowers

1. Flowers should be collected either early morning or evening.
2. Select buds or flowers just blossoming than flowers in full bloom. These flowers are liable to shed their petals or droop and wither fast in a short period.
3. The stems should not be broken with the hand. It should be cut with scissors or a sharp knife. The stem should be as long as possible.
4. The cut portion of the stem should be immersed in water. Only the petals of the flowers should be exposed.
5. The leaves close to the base of the stem should be removed.
6. The flowers should be wrapped either in a piece of paper or a broad leaf, such as the banana leaf, above the stem ends and stored in dark corner of a room in a bucket of water, to protect them from sunlight. If they are not going to be used soon, polythene covers may also be used to cover the cut flowers.
7. The container or the vase should be filled with warm water. The water should be changed every day. Add sugar or salt to enable the flower to last.

2. Selection of Vases / Containers

The main function of the vases or container is to support the flowers and foliage. The container should be subordinate to the flower arrangement. It should be of the right size, shape, colour and material.

Types of vases or containers

- Jars, attractive bottles, tins.
- Tall cylinders, narrow necked vases, flat round dishes, deep trays, low round bowls.
- Bottles of different colours.
- Block of wood or bamboo baskets.
- Household pots, vessels, tumblers, shallow dishes.

3. Flower Holder

A flower holder is one which has sharp spikes upon which the stems can be firmly placed. This is known as pin type holder. Other than this we also have crumpled wire, split twigs etc. Flower holders must be strong and flexible, so that any type of stem can be easily fixed.

It should also be rust proof. Pin holders can be fixed to the bottom by clay or candle. This fixing must be done when the vase as well as the holders are dry. Large flowers and foliage can be arranged at the bottom so that the holders are concealed. **Oasis** is a trademarked name for wet **floral foam**, the spongy phenolic **foam** used for real **flower** arranging. It soaks up water like a sponge and acts both as a preservative to prolong the life of the **flowers** and a support to hold them in place.

5.8.2 Styles in flower arrangement

1. **The traditional style:** Where a mass of flowers of all kinds, colours and size are used together. This produces a multi-coloured mass effect.

2. **Oriental style:** This is Japanese mode of flower arrangement. **Ikebana** which means «living flowers» is the Japanese art of flower arrangement. Ikebana can be divided into two styles - the moribana shallow vase style and the nageire tall vase style. It gives an impression of a natural growing plant. The stems are so arranged that their lines form an attractive pattern. The flowers are placed in such a way so as to produce balance. The flowers are always in odd numbers, three, five, seven or eleven.The Japanese oriental style usually follows three principles at different levels. The **highest** level signifies heaven (shin), the **middle** refers to the man (soe) and **lowest** indicates the earth (hikae).

- Heaven- **1 ½** times to 2 times the height or width of the vase.
- Man - **3/4th** the height of heaven.
- Earth - **1/2** the height of man.

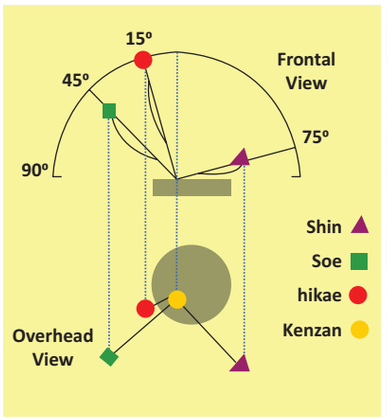
The arrangement of these branches and the kenzan or spiked metal holder are drawn in a simple diagram, called a kakeizu. Today there are four main styles of flower arrangement: 1) *rikka (standing flowers); 2) nagarie (throw in); 3) moribana (piled-up); and shokai (living flowers).*

3. **The modern style:** A combination of traditional and oriental style.
4. **Floating arrangement:** This arrangement can be made in shallow bowls and trays with short stemmed flowers. The largest, highest and most attractive flower can be allowed to float in the centre and others grouped around. Flowers should not completely cover up the water.

Points to be considered while arranging flowers

1. Have an idea about the arrangement.
2. Arrange the flowers first and then fill up with leaves and twigs.
3. Have big bright flowers at the bottom and small light coloured flowers on higher levels.
4. Work from centre and then deviate from that to one points in the arrangement.

Ikebana
Source: Sogetsukai Foundation



KakeizuMoribana (piled-up flowers)

5. Fill the flower vase with enough water to dip the stem ends.
6. Sprinkle salt, sugar or suitable preservative to keep up the freshness of flower for long.
7. Display the flower arrangement beautifully in a place to be seen and enjoyed. Select suitable accessories to go in with the arrangement.
8. All the principles of design should be followed for pleasing effects.

5.8.3 Types of Flower Arrangements

Mass Arrangement: A group of flowers of all kinds, colours, size and textures are combined in a container. Usually decorative container is used.

Line arrangement: This arrangement is simple, meaningful, beautiful and informal. This arrangement gives an impression of natural, free growing plant. Odd numbers of flowers are used at various levels.

Combination arrangement: A combination of line and mass arrangement gives rise to geometric shapes as cone, crescent, circle, triangle, 'L' shape and so on.

Foliage arrangement: Arrangements using leaves or branches of plants are foliage arrangements, (e.g.) ferns, crotons, cannas, cactus, weeds can also be arranged effectively with a touch of imagination.

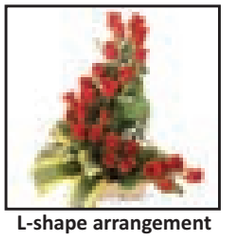
Miniature arrangement: They are small arrangements usually within four inches in height arranged in small containers like egg shell, small bottles, lids, etc.

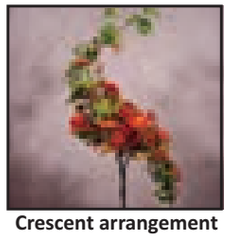
Dry Arrangement: These are particularly useful during rainy season when there are very few flowers, Dry arrangements with fruits, vegetables, seed pods, bare branches, flower plumes of tall grasses, sugar cane, roots, stems of money plant, a small dead tree, the clustering, especially peacock feathers if well-arranged presents a unique appearance and are suitable for interior decoration. Dry arrangements with wood can be painted in silver, white or gold for variation in style.

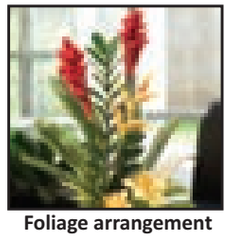
Arrangement of Flowers


Mass arrangement


Line arrangement


L-shape arrangement


Crescent arrangement


Foliage arrangement


Miniature arrangement

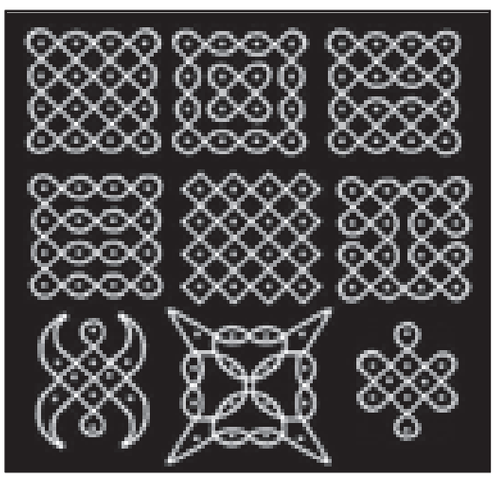

Dry arrangement

5.9 Floor Decorations

Floor decorations are essential part of the rich heritage of Indian culture and imparts colour, joy, and happiness. The various types of floor decorations are:

- **Kolam:** Kolam is a free hand drawing of various designs. It can be either dotted or in various designs. For drawing kolams, either white stone or chalk powder, enamel paint, white or coloured salt, sand or powders and solutions prepared by mixing rice flour and water is used. Red mud solution is used as painting to give added brightness. In rural areas, people spray cow dung mixed with water as base on floors before putting Kolam.
- **Rangoli:** Coloured dry powder which are usually made from kolam powders are used. They are mixed with either sand or salt.
- **Alpana:** Alpana is a traditional art where the design is painted with white paint. Usually zinc oxide and gum are mixed to keep it for a longer duration.
- **Flower Carpet:** Different coloured flowers, petals and leaves are arranged over the design. Wet sand may be evenly spread beneath the flower carpet to have a raised effect.

1



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2

4

SUMMARY

- House is a shelter made of floors, walls, windows, roof etc where family members live together and spend maximum part of their life.
- The residential buildings may broadly be classified into five categories – namely detached houses, semi-detached houses, row houses, apartments and sky scrapers.
- While selecting a site for the construction of a house the factors such as physical features, soil conditions, sanitary facilities, practical convenience, good neighbourhood and legal characteristics are to be taken into consideration.
- The principles to be considered for organising rooms while planning a house are aspect, prospect, privacy, grouping, roominess, furniture requirements, circulation, flexibility, sanitation and practical consideration.
- Design is selecting and arranging of materials with two aims – order and beauty.
- Structural design is the design made by the size, form, colour and texture of an object. Structural design is essential to every object. Decorative design is the surface enrichment of a structural design. This adds luxury to a design.
- The elements of art are line, shape and form, texture, space and colour
- Line is the basic element of art. It is a series of points joined together in two-dimensional form.
- Shape is an area enclosed by lines. Shapes are flat and generally considered two dimensional. Basic shapes are rectangles, squares, triangles and circles.
- Form is the organization of visual elements in three dimensions. In addition to height/ length and width, form also has actual depth or illusion of depth. Basic forms are spheres, cubes and cones.
- Texture refers to the tactile quality of an object which may be felt by touch or may be identified through visual examination.
- The principles of design are harmony or unity, proportion, balance, rhythm, and emphasis.
- Harmony is a single idea or impression.
- Proportion means the relationship of sizes or areas to one another or to a whole.
- Greek oblong or Golden Oblong refers to proportions of parts to one another and to the whole. Golden section is known as law of relationship which helps in dividing the space interestingly. This oblong uses the ratio of 2:3 or 3:5 in case of flat surfaces and 5:7:11 in case of solids.
- Balance is equalization of attraction on both sides of the center. Rhythm is organized movement in continuity. Emphasis is the art principle by which the eye is carried first to the most important thing in any arrangement and from that point to every other detail in order of importance.
- All colours may be obtained by mixing in various proportions three

fundamental hues: red (R), Yellow (Y), and blue (B). These are called the three primary colours, because they are the elements in the use of pigment. They are the only hues in pigment that cannot be obtained by mixing other hues.

- When two primary colours are mixed in equal proportions, secondary colours are obtained. When a primary and an adjacent secondary colour is mixed an intermediate colour is produced. There are six intermediate colours-Yellow Green, Blue Green, Blue Violet, Red Violet, Red Orange and Yellow Orange.
- When two secondary colours are mixed a tertiary colour is produced. When two tertiary colours are mixed a quaternary colour is produced. There are three quaternary colours.
- Warm colours with dark values and in bright intensities make the objects appear bigger and closer where as cool colours, light values and dull intensities make the objects appear smaller and far away.
- Related colour harmony is obtained by using colours which are similar. Monochromatic colour harmony also known as one hue colour harmony. It involves use of tints, shades and tones of the same hue. Analogous colour harmony involves colours which are lying adjacent to each other in the prang colour chart are used.
- Contrasting colour schemes are based on opposing colours and tend to be stimulating and balanced because they include both warm and cool colours.
- In Complementary colour scheme, two colours that are directly opposite in the Prang colour chart are combined. Double complementary colour harmony include two adjacent colours and their opposite colours in the Prang colour chart are combined.
- Split complementary colour harmony, combines one dominant colour and two subordinate colours that lie on either side of its complementary colour. Triad colour harmony makes use of three colours which are at equal distance in the Prang colour chart are combined. Tetrad colour harmony is formed by any four hues equidistant on the Prang colour chart.
- Flower arrangement is defined as an art of arranging flowers with other plant materials in receptacles and organized into compositions having harmony of form, texture and colour.
- Floor decorations are essential part of the rich heritage of Indian culture and imparts colour, joy, and happiness. The various types of floor decorations arekolam, rangoli, alpana and flower carpet.
- In Kitchen/ terrace gardening greens, fruits and vegetables can be grown at the backyard or terrace/ balcony of the house by using kitchen waste water.

GLOSSARY

- **Peg board** - Perforated hardboard which is pre-drilled with evenly spaced holes. The holes are used to accept pegs or hooks to support various items, such as frying and sauce pans
- **Loft**- roof storage space
- **Built-in- cupboard** - cabinet attached with wall
- **Complementary- opposite**
- **Tint-light value**
- **Shade- dark value**
- **Tactile quality**–texture felt by touch
- **Florist foam**-oasis/ spongy **foam** used for **flower** arranging

EVALUATION

I. Choose the correct answer

1. _____ is the impression that the house creates on a person who views it from outside.
   a) Aspect
   b) Prospect
   c) Flexibility
   d) Grouping
2. The best location for kitchen will be _____ corner of the house.
   a) East
   b) West
   c) North
   d) South
3. This _____ design adds luxury to a design.
   a) Structural
   b) Decorative
   c) Natural
   d) Artistic
4. The _____ lines suggest the feelings of strength, regularity, loftiness, spirituality and action.
   a) Horizontal
   b) Vertical
   c) Diagonal
   d) Curved
5. _____ shapes of forms are stylized or simplified versions of natural shapes/forms.
   a) Abstract
   b) Natural
   c) Geometric
   d) Actual
6. _____ balance is more subtle, casual, dynamic, active and suggest flexibility.
   a) Informal
   b) Formal
   c) Bilateral
   d) Radial
7. _____ is organized movement in continuity.
   a) Rhythm
   b) Emphasis
   c) Proportion
   d) Harmony
8. White, black and grey are _____ colours.
   a) Neutral
   b) Secondary
   c) Tertiary
   d) Primary

9. _____ refers to the brightness or dullness of a colour.
   a) Hue
   b) Value
   c) Prang
   d) Intensity
10. This colour scheme involves two colours that are directly opposite in the Prang colour chart.
   a) Complementary
   b) Double complementary
   c) Split complementary
   d) Triad

II. Write Very Short Answers (2 marks)

1. Define housing.
2. What do you mean by owning a house?
3. What do you mean by renting a house?
4. List the type of furniture that can be used in a living room.
5. What are the different types of kitchen arrangements?
6. What is design?
7. What is structural design?
8. What is decorative design?
9. What are the various types of lines?
10. What does vertical and horizontal line suggest?
11. Name three common shapes.
12. Give the meaning of naturalistic shapes.
13. What do you understand by geometric shapes?
14. Give examples of naturalistic, geometric and abstract shapes.
15. Define space as an element of art.
16. Name two types of space.
17. Name two types of texture.
18. What do you understand by tactile/ visual texture?
19. Name three qualities of colour.
20. Define value.
21. Define intensity of colour.
22. Name tertiary colours.
23. Name two neutral colours.
24. Name any two light colours and two heavy colours.
25. What is the difference between shade and tint?
26. Name two warm colours.
27. Name two cool colours.
28. Name any two intermediate and quartnery colours.
29. Define prang colour chart.
30. What are the types of balance?
31. What is symmetrical or formal balance?
32. Name any two asymmetrical or informal balance .
33. What do you understand by proportion?
34. What is meant by harmony?
35. What is flower arrangement?
36. What is floor decoration? Give two examples.

III. Write Short Answers (3 marks)

1. List various activities carried out and space allotted for them at home.
2. Classify major areas based on various activities carried out at home.
3. What points should be kept in mind while making arrangement in living room?
4. What are the requirements of structural design?
5. What are the requirements of decorative design?
6. Highlight the importance of veranda.
7. What do understand by colour harmonies?
8. Give an account of the following colour schemes.
   a) Monochromatic colour scheme.
   b) Analogous colour scheme.
   c) Complementary colour scheme.
   d) Split complementary colour scheme.
   e) Triad colour scheme.
   f) Double complementary colour scheme.
   g) Tetrad colour scheme.
9. Write short note on dimensions of colour.
10. Blue and green are considered to be receding colours. Why?
11. Which colours are considered to be advancing colours? Where can be used?
12. Highlight the importance emphasis as a principle of design.
13. What do you understand by Greek/ golden Oblong?
14. Bring out the significance of proportion in designing.
15. What are the ways of bringing emphasis in interiors?
16. What are the various styles of flower arrangement?
17. What are the points to be considered while arranging flowers?
18. What are the different types of floor decorations?

IV. Write in detail (5 marks)

1. Explain the importance of housing.
2. Give an account of various types of residential buildings.
3. List the factors affecting choice of house.
4. Compare the advantages of owning and renting a house.
5. How kitchen should be organized? Discuss in detail.
6. Explain the points to be considered while making arrangements for bed room?
7. Explain the factors to be considered while selecting a site for the construction of a house.
8. Discuss the principles of organising rooms while planning a house in detail.
9. Enlist the various elements of art.
10. Elaborate on the various principles of design in detail with suitable examples.
11. Bring out the effect of vertical and horizontal lines in interiors of home.

12. Pavithra is short and obese. What type of lines she should choose in her dress to overcome height and why?
13. Elaborate on different types of colour schemes.
14. What do the diagonal and curved lines represent?
15. Explain the different types of shapes and forms.
16. Differentiate between formal and informal balance.
17. In Sheela's house, there is a room with dark coloured walls. How can we make the room bigger?
18. What are the different colour harmonies? Give suitable examples.
19. Differentiate triadic and tetrad colour schemes.

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UNIT 6

Preschool Organisation

LEARNING OBJECTIVES

- To know the importance of preschool education.
- To understand the different needs of preschool children.
- Helps the student to understand the importance of inculcating good habits among preschool children.
- To enhance the knowledge of students about different types of pre school.
- Helps the students to understand the need of day care center and the procedure to start a crèche/ day care center.

6.1 Introduction

Modern thinking on preschool education concentrates on "how to learn". This process initiates the child to explore,discover and practice thinking skills. And also to process information to understand the world around them. This cannot be taught, but also has to be learnt.

The preschool years are one of the most important stages in a child's life, since it is rapid. The child's cognitive and physical growth lays the foundation for social and personal habits and values. Ninety percent of the child's brain growth occurs during this period, which is mostly influenced by environmental experiences. Hence, varied experiences should be provided during this period. These experiences and skills will be acquired in an ideal pre-school. Preschool education is the foundation for a child's education. It is described as an important period in child's development. The emotional, social and physical development of young children or preschoolers has a direct effect on their overall development and on the adult they will become. That is why pre-school education is so important to maximize children's future well-being.

6.2 Need for pre-school organization

Preschool age (2 1/2 yrs – 5 yrs) is the most suitable age *for acquiring skills*. If this period is not utilized properly for the all-round development of the child, the damage cannot be easily rectified. *Cleanliness and healthy habits* can be taught very effectively at this age.

- *Good habits* and *moral values* can be developed through preschool education by means of interesting, entertaining and goal-oriented play activities. Thus, we can mould children in the right direction.

DO YOU KNOW?

I have *the Right* to a good education and everyone has *the Responsibility* to encourage all children to go to school.(Article 28, 29, 23).

- Children can be provided with *a healthy and progressive* environment.
- The *feeling of security and self-esteem* in children can be strengthened.
- The *best foundation for lifelong learning can be laid in this period.*
- *Development of children* of educationally and economically *backward families* can be facilitated.

6.3 Objectives of preschool education

The *broad objectives of preschool* education aim at the overall development of the child namely physical, social, emotional and intellectual. The objectives are:

- to sharpen *aesthetic sense* of the children by encouraging them to appreciate the beauty of nature by observing flowered plants, trees, birds, green grass lawns, etc.,
- to develop *healthy habits* in the child and necessary *skills for personal adjustment* like putting on clothes, eating on his own, observing cleanliness etc.,

- to help children in expressing, understanding, accepting and controlling their views, feelings and emotions.
- to develop *good physique*, adequate *muscular co-ordination* and basic motor skills.
- to observe and identify interests, needs and capabilities.
- to observe the pace of child's development.
- to organize a supportive learning environment by taking care of the physical environment, equipment, scheduling of learning experiences, events and the grouping of children.
- to interact with children in a calm, positive, respectful and friendly manner.
- to provide numerous activities for co-ordination and concentration.
- to encourage the child *to experiment and investigate* their immediate environment.
- to develop the child's ability to express spontaneously their thoughts and feelings in fluent, correct, clear speech.

DO YOU KNOW?

Behavioural problems like nail biting can be controlled among preschoolers in preschool.

6.4 Types of preschool

Preschools vary greatly. One type of school may emphasize social and personal growth, getting along with others and gaining a feeling of mastery over the environment. While, another may stress on

the importance of the senses and developing motor abilities. Still some other preschools may concentrate on cognitive growth in one or many ways. But many preschools claim that they have goals in all these areas.

The types of preschool included are,

(i) Day care
(ii) Montessori school
(iii) Kindergarten
(iv) Nursery school
(v) Balwadi
(vi) Anganwadi
(vii) Laboratory nursery school

ACTIVITY I

- Visit a nearby preschool and observe the children.
- Write a report on it.

(i). Day care

Day care means day time care for preschoolers who are dependent. This is provided in the absence of child's parent. Parents are employed and are not available to cater to the needs of their preschoolers.

Day care refers to the *care provided for toddlers, preschoolers and school-aged children,* either in their own homes, in the home of a relative or other care givers, or in a center-based facility. Center based care is also called child care centers or day care centers.These facilitate care for groups of children. Many parents prefer center-based care because they want their *children to be safe* and have a *better learning environment.*

Day care center have trained staff and their work is supervised. Care is still available even when a staff member is absent/ on leave. More resources and equipment are available. In day care center, children's *cognitive development* is enhanced. This may be because of day care children have opportunities to interact with other children and are exposed to more learning materials.

The only drawback of day care center is that is quite costly and permanency of staff is doubtful.

Family child care providers

Family child care providers offer care for children in the provider's home. This is also a part of day care for children. Parents often make this child care choice because they prefer their children to stay in a home like environment. This arrangement may be less expensive than day care centers. Moreover, the children's groups are small so better care is given.

DO YOU KNOW?

The medium of education at preschool must be in mother tongue or in regional language of the child. Because, it helps the preschooler to learn the language that lays foundation for their future learning.

In-home care givers

In-home care is given in the child's own home. Children receive one-on-one care. Children may be safer and feel more secure in their own home. Parents have more control over the type of care their children receive. However, this care is often more expensive. The parent may bear the burden of conducting background checks and constant supervision.

Importance of Day care center

Children's eating habits are improved by giving them good nutritious food. It helps in keeping the body and mind, fit and fresh all through the day. Day care center has a crucial role in making a child's future.

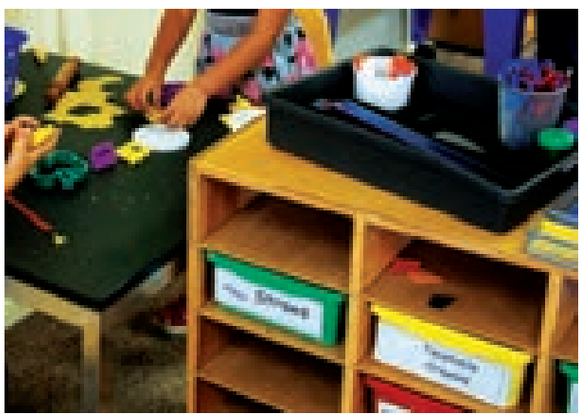
(ii). Montessori school

The concept of Montessori schooling was developed by *Maria Montessori* and has gained popularity all over the world. Montessori believed that there is a close relationship between *senses and intellect*.

Training the senses is the basis for reading and writing in Montessori school education. Every activity in the school has an educational purpose. Many activities are self-correcting so that children can proceed at their own rate and no pressure is placed on them. There is no punishment for not finishing an exercise. In Montessori classroom, each item has its proper place and children are expected to pick-up and keep it back in its place once the activity is completed.

The significant features in Montessori school training are as follows:

- It is a process of unfolding of the children inherent potentialities to learn and to acquire knowledge.
- It attempts at educating children based upon the desire of the child to learn spontaneously. The classroom environment is planned to meet the interest of the child, and to guide the child.



Items arranged neatly

- *Self-activity* by the child is given emphasis as it leads to better and more permanent learning.
- Exercises in practical life is an essential part of the programs.

- Exercises are mainly focused on helping the child become *self-reliant* and *efficient.* eg.,reading, writing and number Work.

FACT

To develop confidence among children, encourage them to perform individually before other children. E.g., story telling, reciting rhyme, narrating an experience and free conversation.

The drawback of Montessori training is that which does not consider on play activities which play an important role in a child's development.

(iii). Kindergarten

Friedrich Froebel was the originator of the *"Kindergarten"*.Kindergarten means"children's garden" in German. It is a preschool where educational approach is based on *playing, singing, practical activities* such as drawing and social interaction as part of the transition from home to school.

Friedrich Froebel

"Play is the highest expression of human development in childhood for it alone is the free expression of what is in a child's soul." **- Froebel**

"Children are like tiny flowers; they are varied and need care, but each is beautiful alone and glorious when seen in the community of peers." **- Froebel**

At Kindergarten, the child grows socially and emotionally. Most importantly, the child learns the art of becoming an effective learner. This form of education helps children develop and extent their communication skills, build their self-confidence and learn to be creative. It helps children to develop skills that assist with reading, writing and mathematics.

Children drawing

(iv). Nursery School

The *Macmillan sisters* started the first *nursery school in London, in 1911.* In India, a preschool located in an urban area is called nursery school. This form of schooling emphasises the following :

- Creativity- It is developed in children by providing them with expressive activities, play, art and movement.
- Imagination - This grows naturally in young children and if fostered will help them advance in all areas of development.

- Development of self-caring skills, perceptual motor learning as well as activities for academic readiness is acquired.

ACTIVITY 2

Provide children with multicolor beads and string. Ask the children to thread the beads under the supervision of the teacher.

(v). Balwadi

Grewal defines balwadi as "A rural pre-primary school run economically but scientifically and using as many educational aids as possible, prepared from locally available material"

Balwadi is a preschool in *rural areas*. It is run by the state government and funded by the *Social Welfare Board*. Free meal is provided for all the children. Regional language is used as a medium of instruction. Education is provided free in Balwadi's and teaching is done mainly through *play way method*. Balwadi also *offer crèche services* for children below 2 years. Balwadi is run for *economically weaker* sections. The purpose of balwadi is to provide a child, facilities for physical and mental growth at school and at home.

Balwadi

(vi) Anganwadi

Anganwadi is a rural child care center. It was started by Indian government in 1975 as part of the ICDS program to eliminate malnutrition among preschoolers. The preschool children are given education non-formally. No specific curriculum is followed to educate the children. Songs and stories are taught to the children .As a part to alleviate malnutrition and deficiency diseases, supplementary food is supplied throughout the year to the preschool children.

(vii). Laboratory Nursery School

Laboratory nursery schools are run by Home Science departments which aims at the all-round development of a child. Non-formal education system is adopted. It helps the Home Science students to observe the children and their various aspects of development, without being aware of.

Why start a crèche?

Families with two working parents are common. Creche is an alternate place to provide the essential need of the child to meet out.

6.5 Setting up a crèche / Daycare center

In setting up of a day care center either in the home or in a separate facility needs to follow certain rules and regulations.

Steps involved in setting up a day care center:

Identify the kind of day care, that is needed.

- In-home
- Separate place

In home:

- It is cost operative as it does not need rent.
- Only limited children can be admitted.
- It will be stressful as living and working in the same place.

Separate place:

- Need to find a suitable commercial space for the center.
- May be costly.
- Need to enroll more admissions to meet out the expenses.
- Know to draw a boundary line between your work and personal life. Otherwise leads to unfavorable changes.

Licensing and approval for day care center:

Before starting a preschool organisation, it is important to understand the kinds of permit and licenses needed to start day care. The following points are needed to be considered while starting a center.

- Location approval: Location must meet specific area, health and safety standards.
- Background checks: Check out for adults help from your family or trained employees to run the center
- Training requirements: staff may need to undergo an approved training program.
- Business licensing: It may need one or more licenses namely general license and a separate license for day care service.

Setting up a crèche:

Creche is a place where small children can be left to be looked after while their parents are working and away from the home.

Starting a crèche is challenging for several reasons due to the regulations and laws. It is given utmost important because the crèche need to work close relation with children. Financially, running a crèche can also be tough, as profit margins are low and overheads high. But running a crèche is a rewarding business.

Skills needed for a crèche employee:

- Patience
- Time management
- On time care provider
- Enthusiasm
- Communication skills
- Decision making skills

To get approval of a crèche, the following essential facilities should be met. These include:

- The amount of space required per child-food, sleep, play and other activities.
- The ratios of children to staff.
- Minimum provision of toilets and washing facilities.
- Premises safety.
- Adequate parking.
- Promotion of children's emotional, social and physical welfare.

The parents must research locate and select a child care facility. They can be confident in their decision and know that they have provided the best possible setting for their child. The parents also should ensure that the child is comfortable, safe and feels happy in the selected center. Utmost care for the emotional and physical well-being should be given.

6.6 Infrastructure need for a pre-school

The place and the infrastructure are both dependent factors required for a good preschool. Pre-school is the place to educate the children about "the art of living", but not the place for formal learning. The environment helps the child to realize their goals. To meet this, the place of pre-school must be stimulating or conducive to the development of children.

A clean, pleasant and well-maintained building help the preschoolers to achieve their "gracious living".

Children spend most of their time during the day in the preschool rooms or grounds. The elements which characterize the total situation of a building significantly influence the behavior of children. Therefore the school building, its situation, design, lighting and ventilation have an important role to play in the behavior and welfare of the children.

Essential Requirements for a Preschool

Preschool is the place for children to perform different activities and to play with their peers. It is the owner's responsibility to have a well-planned and good building.

The essentials of a good preschool building include:

i. Surroundings
ii. Site
iii. Building Plan

(i). Surroundings

A child's health, attitudes and development of personality is greatly influenced by surroundings. So, a pre-school cannot be built anywhere and everywhere, if it is to satisfy its functions efficiently. If the aim of the

preschool is to bring about mental, moral and physical development of children. The school building must be in the desirable surroundings. On the other hand, unclean surroundings are detrimental to the mind and body. Unclean surroundings have adverse impacts on character formation.

(ii). Site

Site means the location selected for the preschool. Site includes:

a) Vicinity

b) Soil

c) Aspect and Elevation

(a). Vicinity

Vicinity indicates the area. The preschool area must constitute a refreshing environment. But should avoid stagnated pools, swamps, sewers or other settings which are sources of disagreeable odour, mosquitoes, flies and harmful micro-organisms. It is essential for the preschool to have a good water supply.

The preschool may be located at a short distance from the towns to get a fresh air and have less risks of epidemics. This will also reduce the cost of the land to be purchased or the building to be rented.

The preschool must be close to a road, but not on its brink. It should be well back from the road. It should not be in close to the proximity of a burial or cremation ground. The selected location must permit any expansion in future. The preschool must be away from industrial noise, dust, smoke and pollution. It should also avoid physical dangers such as factories, rail-roads or bus services. A garden in the vicinity of the school or public park near the school proximity develop children's appreciation of beauty.

DO YOU KNOW?

Nature walk means taking children on an outing in a park, garden, etc., It plays an important role in children's language development as they converse about what they see/ watch.

(b). Soil

Soil makes the school building strong, safe, congenial and educational. The soil condition of the preschool should have a raised area, dry and have natural drainage free from water-logging.

(c). Aspect and Elevation

- South facing is ideal for the preschool.

DO YOU KNOW?

- south facing helps to absorb sun's heat energy, to warm the building during winter.
- a system of shading or an overhang can be made to keep the building cool during summer.
- constructing building in this way, can reduce its heating and cooling costs by 85%

- Verandah should be planned on only one side of the rooms to allow free light.
- Planting trees and herbs on the otherside will act as a sun-breakers especially during very hot climate

Building plan

Building plan would vary according to the type of preschool. Blue print can be decided based on the following.

- the building plan should strictly adhere to the laws of sanitation, hygiene, ventilation and lighting and allows the sun rays to reach all the rooms.
- to permit free and easy access of fresh air to all parts of the building.
- to fulfill the minimum requirements of play rooms, laboratories and wash rooms.
- single storey building is preferable for convenience and safety.
- first aid facilities and place for isolation of sick child should be provided.
- Safety exits and fire extinguishers should be available.

Table: 6.1 Space requirement of a preschool based on play rooms

Types	Plinth area of built up space	Total area
Preschool with two play rooms	218sq.m	318sq.m
Preschool with single play rooms	164sq.m	264sq.m

Source: Sushila Srivastava, Sudha Rani k, Textbook of Human Development-A Lifespan Developmental Approach (2014)

Rooms

- Rectangular rooms ease the activity of the children.
- Rooms should have outlet and inlet.
- Rooms for indoor play should be large enough for children.
- The area must be adequate for the child to move around.
- The area specification must be 1.5 square meter per child and 3 meters above for ceiling.

Walls

- The wall space should be functional and lend itself to promote activities
- Pinning space should be available at the eye level of the child to have picture boards.
- Walls should be painted with pleasant colours.

FACT

Black board in preschool should be at low height, at the level of children to allow them for drawing, scribbling, etc.,

- The windows and doors of the room should have large spaces for bulletin boards for attaching things.
- The walls should be coated with suitable, washable material to deaden the noise.

Floors

- Floors should be made of such material that can be cleaned easily and maintained in a good sanitary condition.

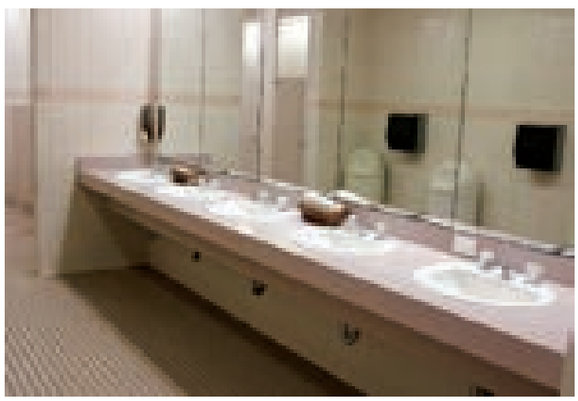
Windows and doors

- The place to fix windows and doors need careful consideration.

- The windows should be low enough to enable a child to look out and should be fitted with shades or blinds.
    - Light weight doors must be installed to facilitate easy handling by the children.
    - The knobs in the door should be in easy reach of the children.
    - The door can be operated without being hurt.

Sanitary facilities

- Water facilities are essential for cleaning up activities in the preschool.
- One toilet for every ten children is important.



- Toilet fixtures with seats varying at heights from 25-30 cm from the floor are desirable.
- Toilet floor should be of washable but not slippery tiles.

Storage space

- Storage space is necessary in the preschool for keeping play equipment, linen, books, teaching aids and records.
- All storage space should be well ventilated and kept free from insects and cobwebs.
- Place for large toys and blocks should be provided.

Outdoor space

Children's most important need is playground. It should be large enough and safe. A minimum of 2 square metre is a desirable play-space for a child. In case of limited space, schedule should be planned and provided to avoid all children out doors at the same time.

Some specifications can be adhered for a play area. They are:

- space for sand play.
- space for water play.
- space for wheel toys and bouncing balls (usually the area needs to be a hard surface).
- green lawns for the children to romp around.
- an area for pets and gardening.

6.7 Safety Precautions In Indoor And Outdoor

- There must be child-friendly and disabled-friendly functional toilets separate, both for boys and girls.

- The classroom should have adequate space for movement; the play space should ensure safety of children i.e. prevent children from running out and getting hurt from grievous injury.
- The furniture and toys need to be child –friendly and free from any sharp edges.
- Doors should be light in weight and should not be of self locking or swinging type.
- There should be mesh in all the windows to prevent mosquitoes coming in.
- No toxic paint should be used for play material/ equipment. The equipment should not have any sharp corners, jutting nails etc. and should be sturdy.
- Play material should not have any loose parts which children may swallow by mistake.
- Maintenance of outdoor equipment should be regularly attended to, in order to protect children from injury.
- Electric outlets which are accessible to the children must have protective caps when outlets are not in use.
- Any arrangement made by the school for transporting children should be safe, comfortable and convenient.
- Items of potential danger or cleaners like: flammable liquids, toxic material, soaps and detergent etc. must be kept in original container with original label. These should be stored in an area not in use by the children and is away from the kitchen.
- During cleaning, daily inspection of indoor and outdoor area must be done to search for sharp objects (needle, pins, branches), poisonous foliage and mushrooms, bee or wasp nest and depth of area under swings.

Identity Cards

- Every center must provide photo identity card to each child.
- Who so ever is coming to pick and drop children must carry their identity cards issued by the school administration. Security guards must check their Identity cards every time they enter in the school premises.

Pickup and Drop off Facility

- There should be a designated place to drop and pick up the children by the parents. Teachers of their respective classes must be present at one side of that area and should themselves, handover the children to their parents/ guardians.
- The place must be restricted with door/ screen or rope. Any outsider and parent should not be allowed to cross the restricted area.

Closed-Circuit Television (CCTV)

- CCTV cameras should be installed in all the classrooms. So that, the entire center could be monitored video surveillance.
- Camera should also be installed at the entry and exit gates, at reception area, waiting area, play ground, outside the toilets, and corridors.
- At least one security guard should be assigned duty to continuously observe the activities on TV screen.

Child Abuse and Rights

- No physical or emotional abuse. No corporal punishment. Children should not be neglected.

- All teachers must be trained to identify, understand and respond appropriately in case they observe any signs of child abuse /neglect.

6.8 Handling Emergencies

Emergency protocol

- All centers must have clear written procedures in the event of emergency. The staff must follow the following procedure:
- One staff stay with injured child.
- One staff to telephone for an ambulance and child's parents.
- If possible transport the children directly to the hospital.
- 2-3 staff stay to take care of other children.
- All accidents or incidents should be recorded in an accident or incident register with time and nature of accident/incident and the action taken.
- Accidents that do not require any medical treatment must be reported to the parents or guardians on the day that occurred.

Pest control

- There has to be Periodic pest control to prevent dengue, chikungunia and malaria like diseases.

Disaster management:

- A diagrammatic building evacuation plan should be displayed near exit in each center. Also, fire and earthquake drill/building evacuation may be practiced regularly.
- Normal and emergency exits must be well marked with approved 'EXIT' signs. Exit points and ways should also be kept free from obstacles.

Fire safety

There must be fire safety equipments installed such as fire extinguishers at appropriate places

Availability of First Aid Kit

Medical kit must be updated regularly and kept in one designated place that should be readily accessible to staff, but kept out of the reach of the children

- Bandages
- Sticking Plaster
- Sterilized surgical cotton wool.
- Gauze
- Thermometer
- Scissors
- Pincers
- Antiseptic ointment

6.9 Preschool Lesson Plan

Everyindividualchildneedstobegiven attention while planning a lesson plan. The plan should include a variety of experiences such as interpersonal relationships, sensory experiences, exploration of natural and physical surroundings, intellectual stimulation development of large and small muscles and opportunities to hear and use language. Active play and quiet play also should be considered. National festivals and community festivals, celebrations need to be included.

To make a very good lesson plan, the following points must be considered.

- The plan must be simple.
- Proper time must be allocated to experience one idea. After the child

is familiarized with the idea, new experiences can be added gradually.

ACTIVITY 3

To inculcate creativity among children, allow the child to do the following activity without teacher's instruction except providing the basic need or arranging the area:-

- Provide the children with colour chalk and allow them to draw on a slate or board.
- Prepare wet mud area and provide them with a stick. Ask them to draw shapes/scribble on the wet mud as they like.

- The teacher needs to refresh the child at frequent intervals.
- Planning above the level will frustrate the child and planning below his level bore him.
- The readiness of children must be identified and programs should be planned accordingly.
- Planning should include free play (both indoors and outdoors), creative time to explore and express their feelings, music and story time, muscle development and language development.
- Plans should not be rigid. Allow to include changes or additions.
- To encourage independence and creativity, play equipment and materials should be placed in easily accessible levels.

Types of curriculum

Careful and creative planning is required in carrying out the appropriate learning programmes for preschool children.

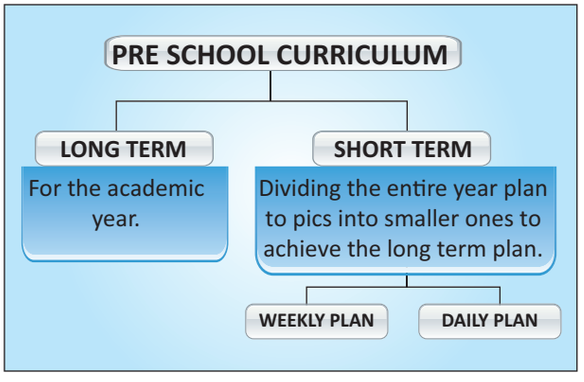
ACTIVITY 4

During the visit to nursey school, encourage the child to perform the activities for finer motor skill development.

- Clay activity _Provide the child with clay and allow them to make any shape or design that they want.
- Vegetable printing on a fabric or paper.

  -provide the child with vegetable cuttings, paper/fabric and paints/ water colours. Ask the child to print the paper/fabric with cut vegetables after it is smeared with paint/water colour.

  (cut vegetables like lady's finger, brinjal, potato, etc., can be used to print).



Considering the age, interest, abilities of the preschool children, a flexible plan can be planned. The table below is an example of a daily program.

In the daily program, music, dance, discovery learning, excursion, etc., can be suitably included.

Table 6.2 The daily programme for a preschool

Hours	Activities
8.30-8.45 am.	Arrival and preparation of the teacher
8.45-9.00am.	Arrival of the children
9.00-9.15am.	Morning prayer and exercise
9.15-9.45am.	Independent, creative activity
9.45-10.30am.	Group work-drawing, coloring
10.30-11.00am.	Break-snack
11.00-11.30am	playground
11.30-11.50am.	Writing work
11.50-12.10am	Reading/oral classes
12.10-12.50am	Lunch break
12.50-1.00	Story time
1.00-2.00	Sleep/quiet activities/ dispersal

6.10 Records And Registers

For efficient management of Preschool program there is a need for maintaining systematic records and registers. These should be simple in format to facilitate their maintenance. The filling of records and registers should not be so cumbersome as to be done at the cost of the actual implementation of the program. Given below are some essential records and resisters which each Preschool centre must keep and maintain regularly.

Records

Essential

- Admission Records
- Registration forms
- Personal data sheet of the child
- Detailed background information of the child

Progress Records (Portfolio)

Records of progress of children in the various developmental aspects at given period of time on the basis of:

- Children's work
- Teachers observations

Teacher Diary

Monthly and Daily program diary of teachers

Registers

- Attendance Register of Staff, Children
- Accounts Register
- Stock Register
- Staff Profile
- PTM Register

SUMMARY

- Modern thinking on pre-school education concentrates on "how to learn".
- The preschool years are one of the most important stages in a child's life, since it is rapid.
- Preschool age is the most suitable age for acquiring skills.
- Cleanliness and healthy habits can be taught very effectively at this age.
- The objectives of preschool education are focused on over all development of children in physical, social, emotional and intellectual.
- Day care, Montessori school, kindergarten, Nursery school and Balwadi's are various types of preschool available to impart preschool education.
- Day care means day time care for preschoolers who are dependent to meet their needs.
- Training the senses is the basis for reading and writing in Montessori school education.
- In Kindergarten, the educational approach is based on playing, singing, and practical activities.
- Creativity is developed among children by providing them with expressive activities, play, art and movement.
- Balwadi is a pre-school available in rural areas where rural preschoolers given opportunity to learn basic skills in their local languages at free of cost.
- The place and the infrastructure are both dependent factors required for a good preschool.
- Building plan would vary according to the type of preschool. Blue print can be decided based on sanitation, hygiene, Ventilation, lighting, play rooms, laboratories, etc.,
- Careful and creative planning is required in carrying out the appropriate learning programs for preschool children.
- Curriculum can be long term and short term.
- Creche/Day care center is an alternate arrangement for the preschoolers and school going children to meet out their needs in the absence of their parents.
- Safety premises, enough toilet and washing facilities, adequate parking, good and spacious rooms are essential to start a crèche/day care center.

A-Z GLOSSARY

- Rapid- Fast
- Cognitive-Mental process of knowing, learning and understanding
- Preschool-learning space for the children of 2½ yrs to 5 years
- Preschoolers-below the age of 6 years.
- Security-defence
- Self-esteem-self respect
- Aesthetic sense-appreciation of beauty
- Physique-physical structure of the body

- Interact-communicate and react
- Supervise-watch over
- Doubtful-Not clear
- One-on-one-Individual
- Unfolding-to open
- Drawback-disadvantage/Hindrance

EVALUATION

I. Choose the correct answer

1. Pick out the correct statement
   a) Good habits and moral values can be developed through preschool education.
   b) Cleanliness and healthy habits need not be taught during preschool education.
   c) Preschool education is not important to maximize the children's well-being
   d) Preschool education is not described as an important period in child's development
2. Choose the correct option, that supports the statement. Preschool education helps to
   i) strengthen the preschoolers.
   ii) lay best foundation for life -long learning.
   iii) educate economically back ward children.
   iv) Provide a healthy and progressive environment.
   a) (i)&(ii) is correct
   b) (iii)&(iv) is correct
   c) (i)&(iii) is correct
   d) (i),(ii),(iii),(iv) is correct
3. I have the right to a good education and everyone has the responsibility to encourage all children to go to school. Select the article, that assures this right to the children.
   a) 28,29,23
   b) 27,28,29
   c) 26,27,28
   d) 25,26,27
4. Preschool education aims at
   a) Physical and social development
   b) Social and emotional development
   c) emotional and intellectual development
   d) physical, social, emotional and intellectual development
5. Pick out the wrong statement. Healthy habits of preschool children include
   a) putting on clothes
   b) muscular co-ordination
   c) eating on his own
   d) observing cleanliness
6. Day care means care provided to children
   a) in the absence of mother
   b) in the absence of father
   c) in the absence of parents
   d) All the above

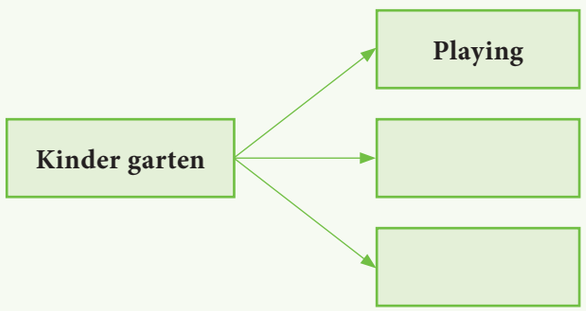
7. One-on-one care given to preschoolers in
   a) In-home care
   b) Day care
   c) Creche
   d) All the above
8. Montessori system of pre-school education establishes the relationship between
   a) Physique and physical activity
   b) reading and learning
   c) Writing and drawing
   d) Senses and intellect
9. Balwadi is a preschool in
   a) rural areas
   b) urban areas
   c) Sub-urban areas
   d) All the above
10. Choose the correct match

	A	B
(i)	Kindergarten	Macmillan
(ii)	Nursery school	Maria Montessori
(iii)	Balwadi	Friedrich Froebel
(iv)	Senses and intellect	Grewal

   a) (i), (ii),(iii)&(iv)
   b) (ii),(iii), (iv)&(i)
   c) (ii), (iv),(i)&(iii)
   d) (iii),(ii),(i)&(iv)

II. Write Very Short Answers (2 marks)

1. Preschool years are so important in one's life.How?
2. To set an objective is an important task in any organization. If you feel so, write any two objectives of preschool education.
3. List out any four activities that help the preschooler for finer muscular co-ordination.
4. Many parents select center-based care for their children in their absence. Justify.
5. What do you understand by the term family child care providers. Justify the reasons for selection of this care option by parents.
6. List out the different types of preschool that are available .
7. Surrounding of pre-school building plays an important role in child's health and attitudes-Explain.
8. Write the components of site?
9. Write the space requirement of a preschool?
10. Fill in the empty boxes with correct words.



III. Write Short Answers (3 marks)

1. Balwadi plays an essential role in rural preschoolers' education. Support the given statement with your justification.
2. List the emphasis focused by nursery school?
3. Soil type plays a major role in preschool building. Why?

4. Storage space is needed in preschool. Explain the statement.
5. Curriculum is an essential component of preschool. Classify the curriculum.
6. Crèche employees must have a skill. What are they? How does it help in upbringing of preschoolers.
7. How should the walls of preschool classroom be?
8. Why are certain specifications needed for windows and doors in preschool classroom?
9. Aspect and elevation is an essential criteria for a preschool building. Explain.
10. How will you handle emergencies in a preschool.

III. Write Short Answers (5 marks)

1. Objectives help us to focus and reach our aim. Explain how the objectives of preschool education help preschoolers to reach their different needs?
2. Day care is an alternate for parents-Justify.
3. What are the various types of preschool that are available. List out and explain any two.
4. Different factors ensure good preschool building- Enumerate and explain?
5. Vicinity determines the selection of the preschool. Is it true? Explain.
6. Systematic program planning plays an important role in educating the preschoolers. Plan a model daily program for a preschool child.
7. Nirmala is interested in starting a crèche to supplement her family income. Guide her on steps to be taken to start a crèche.
8. List the records and registers to be maintained in a preschool.

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UNIT 7

Entrepreneurship

LEARNING OBJECTIVES

This chapter will enlighten students about

- Learn about various definitions of entrepreneurship
- Understanding the characteristics, importance and function of entrepreneurs
- Developing knowledge on the steps for starting a small scale industries
- To develop the traditional cuisine of the cottage industry

7.1 Introduction

Over the past few decades entrepreneurship has assumed great importance for accelerating economic growth both in developed and developing countries. Entrepreneurship is the process of exploring the opportunities by an individual or group of individuals in the market place and arranging resources required to exploit these opportunities for long term gain. This

systematic process requires proper planning and forecasting in order to promote capital formation and create wealth in country. It also helps to pave the way to reduce unemployment and poverty. In view of this in recent times entrepreneurship has become the hope and dreams of millions of individuals around the world.

7.2 Meaning of Entrepreneurship

The word **Entrepreneurship** has been derived from **French** word **'Entrependre'** which means '**to undertake**'.Today, people call it by various names, e.g., **Adventurism, Risk taking and Innovating.**

Definition of Entrepreneurship

Higgins defines, 'Entrepreneurship as the function of seeking investment and production opportunity, raising capital, hiring labour, arranging the supply of raw materials, finding site, introducing new techniques and commodities, selecting top managers of day-to-day operations of the enterprises'.

A.H. Cole defines, Entrepreneurship as "The purposeful activity of an individual or a group of associated individuals undertaken to initiate, maintain or aggrandize profit by production or distribution of economic goods and services".

Definition of Entrepreneur

According to **Joseph Schompeter**, "Entrepreneur is an innovator who brings economic development through new combinations of factors of production".

- An entrepreneur is a person who has already started or is in the process of starting an enterprise.

Difference between Entrepreneurship and Entrepreneur	
Process	Person
Organization	Organizer
Decision making	Decision maker
Creation	Creator
Administration	Administrator
Management	Manager
Leadership	Leader

Women Entrepreneur

Women entrepreneur may be defined as the women or a group of women who initiate, organize and operate a business enterprise. Women are expected to innovate, imitate (or) adopt an economic activity to be called "woman entrepreneurs".

The Government of India has defined a women entrepreneur as "an enterprise owned and controlled by a women having a minimum financial interest at **51%** of the capital and giving at least **51%** of the employment generated in the enterprise to women."

- **August 21st is the world entrepreneurs' day.** The purpose of the day is to create awareness for entrepreneurship innovation and leadership throughout the world.
- **Women's Entrepreneurship day- November 19.**

7.2.1 Concept of Entrepreneurship

- It has assumed super important for accelerating economic growth both in developed and developing countries.

- It promotes capital formation and creates wealth in country.
- It is the hope and dreams of millions individuals around the world.
- It reduces unemployment and poverty and it is a pathway to prosper.
- It is the process of planning, organising, opportunities and assuming.

7.3 Scope of Entrepreneurship

The scope of entrepreneurship is very great in a developing country like India. Entrepreneurship is powerful tool that can combat unemployment and under employment. The **Labour Bureau** reports that the unemployment rate was **5 % in 2015- 2016** which was highest in the last five years. Entrepreneurship offers itself as the only solace to encourage people to start their own business that would in-turn lead to financial independence. Particularly, entrepreneurship can be emphasized among young people as they are ambitious, bold enough to take risks, equipped with skills and information acquired though the wide array of information available through technological advancement. It also gives them the opportunity to be their own boss and pursue their own ideas.

7.3.1 Importance of Entrepreneurship

Entrepreneurship is important for the following reasons:

- **Decreases Unemployment**
  Development of entrepreneurship can reduce unemployment dramatically as it creates opportunities for self-employment.
- **Creates competition in the market**
  Entrepreneurship can create competition in the market thereby enabling customers to acquire new products with greater variations at competitive prices.
- **Utility of the local resources can be used**
  Entrepreneurship development ensures uses of local resources and it increases local cash flow.
- **Improves the living standard**
  Successful business endeavours improve the financial status of the individual and this subsequently improves the standard of living.
- **Economic Independence**
  Entrepreneurship gives economic independence which can help in the overall development of an individual.

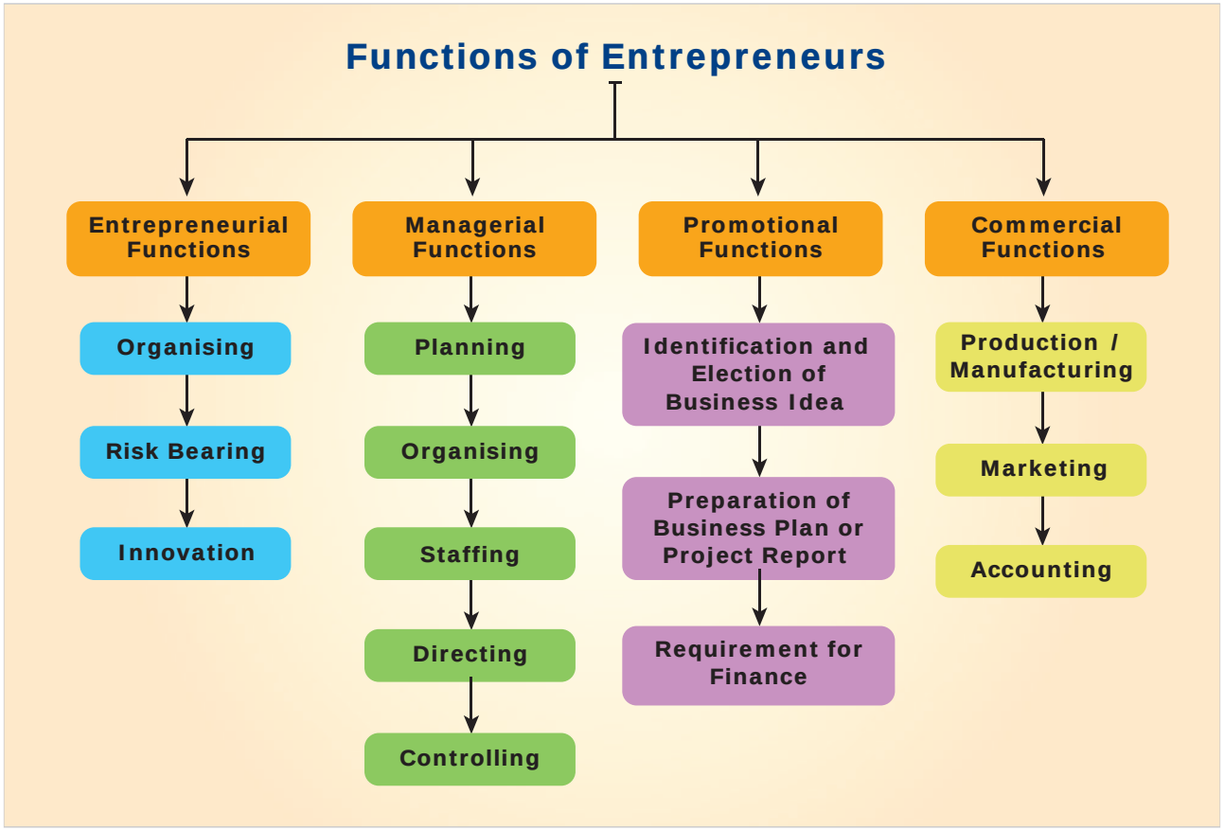
7.3.2 Functions of Entrepreneurs

The main functions of an entrepreneur are classified into four broad categories:
(1) Entrepreneurial Functions
(2) Managerial functions
(3) Promotional function
(4) commercial functions

1. Entrepreneurial functions

The major entrepreneurial functions include **organizing, risk bearing, and innovation.**

An organizer mentally first of all decides certain things like what, how and how much to produce. This is based on the demand for the commodity. The location of the industry, scale of production is then determined by the availability of raw materials, labour, capital etc.



An entrepreneur not only organizes the entire production process but also undertakes risks and uncertainties. Successful entrepreneurship involves an anticipation of demand for the new product. Sometimes, there may or may not be demand for the new product. This is a non-insurable risk an entrepreneur has to undertake. Thus a brave organizer has to shoulder certain insurable and non-insurable risks also.

An entrepreneur must be an innovator to survive in the market and to retain the same position for his product. One cannot be assured of innovation always. It appears, disappears and reappears. This unpredictable outcome calls for boldness, confidence and perseverance for an entrepreneur to be successful in his mission.

2. Managerial Functions

Management is the art of getting things working with and through others. According to **Henri Fayol (1949)** who is known as the **father of principles of management,** "management is to forecast, to plan, to organize, to command, to co-ordinate and to control."

The managerial functions performed by entrepreneur are classified into the following five types:

(i) **Planning**
(ii) **Organising**
(iii) **Staffing**
(iv) **Directing**
(v) **Controlling**

(i) Planning:

Planning is a pre-determined course of action to accomplish the set objectives. An entrepreneur has to make decisions as to what is to be done, how it is to be done, when it is to be done, where it is to be done, by whom it is to be done and so on. Proper

planning prevents confusion which, in turn, affects the smooth performance of job what so ever it may be.

(ii) Organising:

The organizing function of an entrepreneur involves the bringing together the men, material, machine, money, etc. to execute the plans. Thus, organizing function of an entrepreneur ultimately provides a mechanism for purposive, integrated and co-operative action by many people in a joint and organized effort to implement a business plan.

(iii) Staffing:

Staffing involves human resource planning and human resource management. Thus, staffing function of an entrepreneur includes preparing a list of:

- Available personnel
- Requirement of personnel
- Sources of manpower recruitment
- Selection of personnel and remuneration,
- Training, development and periodic appraisal of personnel working in the enterprise.

(iv) Directing:

Direction is the process, by which the entrepreneur guides, counsels, teaches, stimulates and activates his/ her employees to work efficiently to accomplish the set objectives.

(v) Controlling:

Controlling is the last management function performed by the entrepreneur. It is the comparison of actual performance with the target or standard performance and identification of variation between the two, if any, and taking corrective measures so that the target is accomplished.

3. Promotional Functions:

(i) Identification and Selection of Business Idea:

The selection of a profitable and rewarding business project involves a process. This is based on the knowledge and prior experience of the individual as well as information gathered from friends and relatives. The information acquired can enable the individual identify new profitable innovative ideas which can be examined and pursued as a business enterprise.

This process is also described as 'opportunity scanning and identification'. The generated ideas are analyzed in terms of costs and benefits associated with them and the most beneficial idea is finally selected to be pursued as business enterprise.

(ii) Preparation of Business Plan or Project Report:

The entrepreneur prepares a statement called **'business plan'** which is a well evolved course of action devised by entrepreneur to achieve the specified objectives within a specified period of time.

It contains information about the intending entrepreneur, location of enterprise, requirement for land and building, plant and machinery, raw material utilities, transport and communication, manpower, requirement for funds including working capital along with its sources of supply, break-even point and implementation schedule of the project.

(iii) Requirement for Finance:

The entrepreneur should plan requirement for funds with its detailed structure. Long term as well as short term requirements is to be identified separately.

Then, the sources of supply to acquire the required fund are also to be mentioned. The share capital in terms of equity and preference shares and how much will be borrowed capital from different financial institutions and banks are to be clearly determined.

4. Commercial Functions:

(i) Production / Manufacturing:

Goods are produced once the enterprise is finally established. Production function includes decisions relating to the selection of factory site, design and layout, types of products to be produced, research and development, and design of the product.

The additional activities include production planning and control, maintenance and repair, purchasing, store-keeping, and material handling. Proper production planning and control are crucial for the effective performance of production function.

(ii) Marketing:

Marketing is the performance of those business activities that direct the flow of goods and services from producer to consumer or user. Thus, marketing essentially begins and ends with the customers. Marketing is not just selling. It includes other marketing activities such as market or consumer research, product planning and development, standardization, packaging, pricing, storage, promotional activities, distribution channel, etc. The success of marketing function is linked with an appropriate 'marketing mix'. Traditionally, marketing mix is referred to 4 P's, namely, product, price, promotion, and physical distribution. Of late, 3 more P's namely, packaging, people, and process are also added to 'marketing mix'.

(iii) Accounting:

The main objective of any business enterprise is to earn profits and create wealth. This is ascertained through accounting. Accounting is the art of recording, classifying and summarizing in a significant manner and, in terms of money, transactions and events which are, in part at least, of a financial character and interpreting the results thereof."

The **Profit and Loss Account** is prepared for ascertaining whether the business earned profit or incurred loss during a particular accounting period. The Balance Sheet is prepared to know the financial position of business on a particular date hence, the Balance Sheet is also called **'Position Statement.'**

7.3.3 Characteristic of Entrepreneurs

In order to be a successful entrepreneur one should possess the following qualities:

- **Mental Ability:** Entrepreneurs must have creative thinking and must be able to analyse problems and situations and be able to anticipate changes.
- **Business Secrecy:** Entrepreneurs should guard business secrets from competitors.
- **Human Relations:** Entrepreneurs must maintain good relation with customers and employees.
- **Communication Ability:** Entrepreneurs should have good communication skills.

- **Technical Knowledge:** Entrepreneurs should have sufficient technical knowledge.
- **Innovative Ability:** Entrepreneurs should possess creative ability to search for new opportunities.
- **Risk Taking:** Entrepreneurs takes moderate risks to achieve their goals
- **Perception of Good ideas:** Entrepreneurs should have the ability to collect and analyse facts for accomplishing the tasks
- **Future oriented:** Entrepreneurs should be able to plan and think for the future.
- **Flexibility:** Achievement oriented entrepreneurs should be adaptable and flexible to adjust with the changed circumstances.

7.3.4 Types of enterprises

1. Manufacturing Enterprises

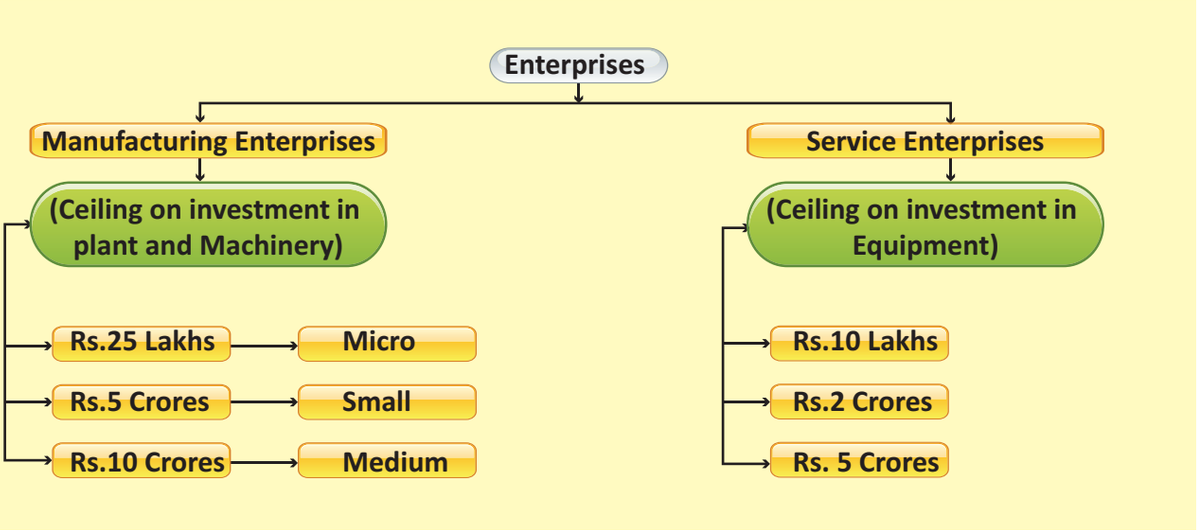
Manufacturing based enterprises produce goods, implement machines and items for different purposes.

(i) Micro Enterprise:

- Micro enterprise generally refers to a small business employing **10 number of peoples or less.**
- It is an enterprise in which investments in plant and machinery is between **5 lakh to 25 lakh.**
- These enterprises works and operates not by choice but by art of necessity.

(ii) Small Enterprise:

- Small enterprise generally refers to a business employing **50 persons or less.**



- It is an enterprise in which investments in plant and machinery is between **25 lakh to 5 crores.**
- These enterprise works and operates to earn a small amount of profit.

(iii) Medium Enterprise:

- Medium enterprise refers to a business employing **maximum to 250 employees.**
- It is an enterprise in which investment in plant and machinery is between **5 crores to 10 crores.**
- These enterprises works and operates to earn a fair amount of profits to increase their standard of living.

(2) Service Enterprise

The service based enterprises provide services to the customer. These services may be related to field such as education, health, banking, communication etc.,

- Micro enterprise in which investment in plant and machinery is **upto 10 Lakhs.**
- Small enterprise in which investment in plant and machinery is from **10 lakhs to 2 crores.**
- Medium enterprise in which investment in plant and machinery is from **2 crores to 5 crore.**

7.4 Steps for Starting a Small Industry

An enterprise involves a large number of formalities which are grouped under **preliminary stage** and **implementation stage.**

7.4.1 Preliminary Stage

The preliminary stage consists of **9 steps.** They are:

Step-1: Decision to be Self-employed

All new entrepreneurs should have technical and commercial knowledge of their product along with required education, technical qualification, training etc. He should have capacity to raise the required resources and managerial skills. The decision to become entrepreneur is influenced by internal and external factors. Internal factors include educational background, occupational experience, desire to work independently in manufacturing line, desire to branch out to manufacturing and family background. The external factors include assistance from government assistance from financial institutions, availability of technology and raw material, demand

for the product utilization of excess funds and other factors.

Step-2: Scanning Business Environment

The new entrepreneur should plan administrative frame work, policy guidelines, rules and regulations pertaining to their enterprise.

Step-3: Selection of Idea

The third step in setting up the enterprise is selection of idea. The entrepreneurs has to consider whether idea is:

- Innovative and competitive in the area
- In tune with the availability of raw materials
- Conforms to available infrastructural facilities.

Relevant experience, government policies and availability of profit margin will help in selection of ideas. The analysis of these factors helps the entrepreneur to select the right idea for its implementation.

Step-4: Deciding Organization Structure

The entrepreneurs should decide type of organizational structure for the proposed business.

Proprietary Unit: Sole proprietorship is a form of business concern in which single individual introduces his own capital, enjoys the profits and bears the risk and losses. No specific document is required to be created except obtaining trade license from municipal authorities.

Partnership Firm: Partnership is an association of two or more persons who pool their financial and managerial resources and agree to carry on a business and share its profit or losses. No partnership firm can have **more than 20 persons.** A written agreement creating the partnership firm is known as partnership deed.

Co-operative Society: Cooperative society is a voluntary association of persons who work together to promote their economic interests. It works on the principle of self-help and mutual help. The primary objective is to provide support to the members.

Joint Family Business: The Joint family business is a form of business organization run by the family members of three successive generations own the business jointly. The head of the family known as **Karta** manages the business. The other members are called **coparceners**. All of them have equal ownership rights over the properties of the business

Company: A company is either a private limited company or a public limited company. A private limited company is formed with a minimum of two persons and a maximum of 50 persons. A public limited company is formed with a minimum of 7 persons and maximum number of persons is unlimited.

Depending on the suitability of business organization, the entrepreneur has to select and decide to setup organizational structure for his proposed business.

Step-5: Preparation of Project Report

Next the entrepreneur has to prepare a project report which provides detailed information about the proposed business. The project report covers introduction of the proposed project brief history, the constituents of the unit, nature of the unit, key personnel, product information, marketing details, competition, manufacturing processes, machinery, details of raw

materials, land, building requirements, general management, technical staff, cost of the project, cost of production, profitability, repayment schedule and securities needed.

Step-6: Project Appraisal Stage

To provide financial assistance banks and financial institutions examine the viability of a project and to ensure that the project will generate adequate return on the investment of resources. The project must repay the principal amount and interest on terms of the loans within the reasonable period. Project appraisal undertaken by financial institutions will be based on the technical, financial, economic, managerial operation and organizational appraisals.

Step-7: Selection of Location and Site

The selection of location and site depends upon the nearness to market and raw materials, availability of power and water, transportation, industrial estates, required skilled personnel, prevailing climatic conditions, Government incentives and subsidies, distribution channels etc.

Step-8: Provisional Registration

Provisional registration application should be submitted with the district industries centre. The issue of provisional registration is normally automatic and is given within **7 days** on the receipt of the application. The initial validity of the provisional registration is **6 months**. It may be renewed for a further period of 6 months on submission of satisfactory proof that the party has taken effective steps to establish the unit but could not complete the same. When all steps to establish the unit have been taken. i.e., the factory building is ready, power connection is given, the machinery is installed, and application may be made for the conversion of provisional registration into permanent registration.

The documents required for provisional registration are application form, duly filled in and signed by the proprietor or partner or directors, prescribed court fee stamp, 3 pass port size photos, copy of project profile, photo copy of ration card, affidavit on the stamp paper, copy of partnership deed/ memorandum of association.

Step-9: Enquiry for Machinery and Technology

The entrepreneur has to make the assessment of size of the plant and machinery. The name of suppliers of the plant and machinery and quotations should be obtained. After careful comparison of specifications, quality, delivery time and price, a decision should be taken to purchase the required machinery

7.4.2 Implementation Stage

The implementation stage consists of **12 steps.** They are:

Step-1: Statutory Licenses Arrangement

The small scale and ancillary units are required to be registered with **Directorate of Industries** in the State for obtaining the license. The new entrepreneur has to get different types of clearances from different authorities such as district health offices, director of public health chief inspector of factories, state electricity boards, municipality, state pollution control board, local sales tax authorities, superintendent of central excise etc.

Step-2: Arrangement of Finance

The new entrepreneur after obtaining license and clearances from competent authorities has to make arrangement of finance. They require loans and working capital to set up is business.

Small Industries Development Bank of India **(SIDBI)**, State Financial Corporation **(SFC)**, National Small Industries Corporation **(NSIC)**, Small Industrial Development Corporation **(SIDCO)**, Regional Rural Banks, Cooperative banks, Commercial Banks provide **financial assistance to set up the new ventures.**

Step-3: Application for Financial Assistance

The entrepreneur has to submit an application for financial assistance along with project report to the agency or financial institution for obtaining the required loan. Along with the application he has to submit, project report, partnership deed, quotations in respect of plant and machinery, copy of lease agreement of land and proposed building plans, architect estimates of factory building etc.

Step-4: Building Construction and Civil Works

The construction of work-shed should be done with the consultation with an architect by a good civil contractor. Before commencing construction activities, the entrepreneur should obtain necessary license from the corporation or municipal authorities or other local authorities and should also ensure that the plan of the building conforms to the norms stipulated by the inspector of factories. In some cases a pre-build factory shed is obtained from state government and industrial estate.

Step-5: Placement of Order for Plant and Machinery.

The orders for Plant and Machinery and other fixed assets are placed with selected suppliers. The timing of placing the order should be synchronized with the completion of the building construction.

Step-6: Installation and Commissioning of Plant and Machinery

The entrepreneur should formulate a suitable layout which would facilitate production operations in the best possible manner. They have to pay attention to the provision of adequate workspace and ventilation for each worker to perform his operations effectively. The entrepreneur should formulate a blue print converting the actual layout of factory and segregate the areas allocated based on the installation and commissioning needs of plant and equipment.

Step-7: Power and Water Connection

The formalities for water and electrical connection are obtained. A consumer can avail **LT** (Low Tension) supply if the connected load is **less than 75 HP.** If connected load is between **75HP - 130 HP** the consumer has an option of either availing **LT** supply or **HT** (High Tension) supply. If the connected **load exceeds 130HP** the unit is classified as **HT** consumer.

Step-8: Recruitment of Personnel and their Training

The personnel should be selected on the basis of their ability, knowledge of the job and other skills required in execution

of the job. The entrepreneur should adhere to **Employees State Insurance** (ESI) Act. **Minimum Wage Act**, **Payment of Bonus Act**, **Workmen's Compensation Act, Employees provident Fund Act** etc. Entrepreneur can avail the facilities of the various training institutes to provide necessary training needed to their employees.

Step-9: Raw Material Procurement

Entrepreneur should have to ensure timely flow of raw materials before launching their new product into the market. They should have more sources of supply of the required raw materials instead of depending on a single source of supply. Imports of raw materials are being controlled as per the latest import trade control policy. SSI units should apply to the State Directorate of Industries in the prescribed form enumerating their requirements. They in turn recommend such cases to the concerned **Joint Chief Controller of Imports and Exports.**

Step-10: Marketing

Marketing is the complex process of creating customers for products and services. It involves knowing and reaching out to customers, listening very carefully to their needs and preferences and acting to serve them better every time. Effective marketing planning and promotion begin with gathering factual information about the market place. A very important part of marketing plan should be overall promotional objectives to communicate message, create an awareness of product or services, motivate customers to buy and increase sales. The entrepreneur should develop marketing strategies which help to face the competition effectively in the market based on knowledge of regulations of the governments, store purchase programmes, international exhibition, fairs and trade centers.

Step-11: Permanent Registration

Permanent Registration is obtained from District Industry Centres (DIC's) when the entrepreneur has taken all the steps to establish the unit i.e., readiness of factory building, availability of power supply, installation of the machinery etc. Within 7 days of the receipt of application, the district industries officer or other designated officer informs the party of the date and time for inspection of unit. The inspection includes an assessment of installed capacity of the unit. On being satisfied that the unit is capable of production activity a permanent registration certificate will be issued by the Directorate of Industries. For permanent registration the entrepreneur has to submit the various documents to the directorate of industries which includes municipal license, application in prescribed form, rent receipt or no objection certificate from land lord, copy of sale bill of each item purchased, affidavit attested notary public etc.

Step-12: Profit Generation and Repayment:

Entrepreneurs should be ever vigilant about the cost of production and profit generation. If profits are not generated, they should find out the reasons and try to minimize costs and adjust production volume. Then should also adopt cost control measures and minimize waste. Then should maintain profits chart per month and workout profits by calculating total sales revenue per month minus total cost per month. At the end of year they should also see what the profit rations are

by calculating their return on investment and profitability ration on sales.

ACTIVITY 1

To establish an Enterprise- to meet - Steps to be taken to meet an entrepreneur who has recently established the enterprise and discuss the steps in establishing the enterprise.

Entrepreneurs should also be prepared to have contingency plans regarding the repayment of loan amount. Normally banks and financial institutions insist on its payment along with interest charges by the borrower as per the repayment schedule formulated in respect of the project. The period normally permitted for repaying the instalments of the principle amount varies from **12 - 24** months from the date of the first release of the loan.

If proper precautions are taken in these two stages, the entrepreneur will be highly successful in his endeavour to sustain in the market and attains the desired goal.

7.4.3 Environmental factors affecting entrepreneurship

Some of the environmental factors which hinder entrepreneurial growth are given below.

1. Sudden changes in Government policy.
2. Sudden political upsurge.
3. Out-break of war or regional conflicts.
4. Political instability or hostile Government attitude towards industry.
5. Excessive redtapisum and corruption and corruption among government agencies.
6. Ideological and social conflicts.
7. Unreliable supply of power, materials, finance, labour and other inputs.
8. Rise in the cost of inputs.
9. Unfavorable market fluctuations.
10. Non – cooperative attitude of banks and financial institution.

7.4.4 Important role that entrepreneurship plays in the economic development

- Entrepreneurship promotes capital formation by mobilising the idle saving of the public.
- It provides immediate large-scale employment. Thus, it helps reduce the unemployment problem in the country, i.e., the root of all socio-economic problems.
- It promotes balanced regional development.
- It helps to increase the concentration of economic power.
- It stimulates the equitable distribution of wealth, income and even political power in the interest of the country.
- It encourages effective resource mobilisation of capital and skill.

- It also induces linkages which stimulate the process of economic development in the country.

Entrepreneurs are Born or Made?

Entrepreneurs are not born. Entrepreneurs are not like athletes, they don't need natural inherent body and muscles. An athlete's child may grow up an athlete, but it would happen in an entrepreneur's family. However entrepreneurs are nurtually made, and they own some special qualities and also need some trainings and experiences as athletes. Many people form non – entrepreneur's families start their own business and become entrepreneur's every day.

7.5 Cottage industry preparation of traditional foods

Cottage Industries have helped to preserve the cultural heritage of the country. Certain products made in the cottage industry are based on skillful production. The skill for making such products is passed on through generations in the family. The products have a distinct identity of its own and bear the impression of the Indian culture.

In rural regions of India many families engage in small production activities from their homes. There scale of operations is very miniscule and the workers are generally the family members themselves. There are rarely any machines involved and the production is carried out entirely by hand. The produce generally consists of **handicraft, wollens, carpets, handlooms articles, earthenware, jewelry and food products etc.** The products are generally unique. Any Industry where the creation of product and services are home based rather than factory based and specific skills is required is called as **cottage Industry.**

Tamil Nadu is rich for its cuisine with most of the districts having their own **Signature dish** and hence giving out unique dishes from each and every corner.

Aims of cottage industry

Cottage industries are generally small scale house hold industries, producing goods to full fill the demand of the local community. Their main aim is to provide employment to rural people.

Importance of cottage industries

- Cottage industries are considered to be the backbone of rural economy as the generate employment in rural areas.
- Employs both skilled and semi skilled workers.
- It also makes optimum use of the local resources available.
- These industries have helped in improving standard of living of the people in rural areas.
- These industries have allowed women also to exhibit their skills.

Characteristics of Cottage Industry

- Use of traditional skill
- Small scale production

- Un organized sector
- Employment generation
- Preservation of culture
- Use of agricultural resources
- Eco- friendly industries
- Flexible in the operation
- Use of indigenous raw materials

7.5.1 Traditional Foods

- Traditional Foods are foods and dishes that are passed through generations or which have been consumed many generations.
- Traditional foods and dishes are traditional in nature and may have a historic precedent in a national dish regional cuisine or local cuisine.

Tamil Nadu has **37 districts** and many small villages. Each location is famous for its authentic food. The native people have magic in their hands that make these recipes world famous. Let us take a sneak peak at some of the traditional dishes.

Preparation of Traditional Foods

Chennai Vada Curry

Vada Curry is one of the popular dishes in the hotels of Chennai. It is a side dish suitable for Idly, Dosa and even Chapathi. Set dosa and Vada curry is the best combination. The vada mixture contains channa dal, chili powder, and Onions. People use Coconut milk in making the gravy. The vadas are mixed with the gravy and cooked for some time. Vada Curry is a famous street food in Chennai. Set dosa and the hot Vada Curry gives you an amazing taste.

Madurai Jigarthanda

The Jigarthanda from Madurai is a cold drink. It is a dish with a heavenly taste. It is a popular drink during the summers. Almond Pisin, reduced milk, Ice Cream, and Nanari syrup are the main ingredients for this drink. Take a glass, add some Almond Pisin, then add the reduced milk and Nanari syrup and mix it well. Add a spoonful of Ice Cream. The Ice Cream used also plays a role in enhancing the taste of the Jigarthanda. It is a refreshing drink during the hot summer days.

Srivilliputhur Palkova

Srivilliputhur is the birthplace of Andal. People visiting Srivilliputhur never leaves the place without having a bite of the tasty Palkova. It is a sweet dish. Boil the milk in big earthen pots lit with firewoods or Cashew nut shells and when it begins to solidify, add sugar and mix it well. People get pure milk from the local farmers. Still, the traditional method of cooking the Palkova is followed. They use good quality ingredients which add a unique taste to the Palkova.

Kovilpatti Kadalamittai

Kadalamittai is a candy made from Peanut. Kadalamittai is

famous all over Tamil Nadu. In Kovilpatti they use good quality ingredients which make the Kovilpatti Kadalamittai different from other sweet candies. Heat Jaggery and make syrup out of it. Add glucose water, Vanilla essence and Peanuts to it. Then cut it into rectangular slabs and allow it to cool.

Sattur Kara Sev

Kara Sev is a famous snack in Sattur. It is popular for its perfect balanced combination of spices and Garlic. Usually, Channa dal flour is the main ingredient in making Kara sev, but in Sattur they use rice flour along with Channa dal flour. To this flour add Cumin seeds, Asafetida, Chili Powder and Garlic paste. Pour the batter into the perforated ladle, long strands of Kara sev fall into the oil, then cook it for some time. The snack is crispy and has a delicious taste. People and Sattur usually have curd rice and Kara sev together which makes it a heavenly food.

Nanjilnaadu Fish Curry

Nanjilnaadu comprises of the Kanyakumari and Nagercoil districts. Since these places are near sea shores, they are famous for sea foods. It is a very delicious dish. People use raw Coconut paste to cook the fish. It is the specialty of the Fish curry. The Fish is well soaked in the masalas and has a unique taste. The smell of Coconut oil adds a different flavour to the dish. Nanjilnaadu Fish curry along with rice makes the best combination for a perfect meal.

Kancheepuram Idly

Idly is one of the regular foods for the people of Tamil Nadu. The Kancheepuram idly or the Kovil idly is different from the usual recipe of idly. It is offered as a holy food in the Varadharaja Perumal temple in Kancheepuram. Rice, Urad dal, and Fenugreek seeds are ground together to make a thick paste. Add pepper, Cumin seeds, and Ginger to the batter. People in the temple cook the idly in Mantharai leaves, which gives a flavour to the idly. It is a healthy food.

When traditional foods were included in the diet, benefits were:

Less Calories	–	Helpful for weight control
Less Saturated Fat	–	Better for the heart
More Lean	–	Meats and fish
More Iron	–	Better for muscles and blood
More Zinc	–	Better for wound healing and fighting infection
More Vitamin A	–	Better for vision and fighting disease
More Calcium	–	Better for strong bones and teeth

Strengthened cultural capacity and well-being.

ACTIVITY 2

Collect recipe for any two traditional dishes. Prepare and calculate the cost of the product you prepared. Compare the selling price of same products with you cost. Analyse and present the percentage of profit by selling it in a suitable market.

SUMMARY

Entrepreneurship contributes for the social and economic development of the country. Entrepreneurship makes the people self-dependent. An entrepreneur is a person who establishes the enterprise in planned manner to earn profit. The small enterprises are operated using local resources. The operation of small enterprises does not require much of machines, resources, money and training. The amount of profit and rate of profit is less in small enterprise. Enterprises are classified on many criteria such as technology, techniques, business, work area, motivation, ownership etc. Careful planning, forecasting, sustained motivation and perseverance are key factors that will ensure successful entrepreneurship and will also enable the entrepreneur to be highly successful in his endeavour to sustain in the market and attain the desired goal.

GLOSSARY

- **Aptitude:** (மனப்பான்மை) It is the ability of entrepreneurs to learn new competencies related to enterprise management.
- **Beneficiary:** (பயனாளி) A person or group of persons taking benefits from the enterprise.
- **Enterprise:** (நிறுவனம்) A well-designed and established organization to achieve specific goals serving the customers, clients and beneficiaries
- **Feasibility:** (சாத்தியக்கூறு) It is a systematic investigation of relevance, merit and quality of any significant enterprise idea.
- **Firm:** (நிறுவனம்) Business (or) enterprise, such as a corporation limited liability company or partnership, that sells goods or services to make a profit.
- **Profit:** (இலாபம்) It is expressed in terms of net gain from entrepreneurial activities through legal means.
- **Working Capital**: (மூலதனம்) It is the money required to be invested in day-to-day operations of the enterprise.
- **Techniques:** (நுட்பங்கள்) The scientific systematic and tried out methods used in establishment, operation and evaluation of enterprise.

EVALUATION

I. Choose the correct answer

1. The word entrepreneurship is derived from _____ word.
   (a) English
   (b) Italy
   (c) Germany
   (d) French

2. The Bureau of Labour reported that the unemployment rate in 2015-2016 was high _____.
   (a) 5%
   (b) 6%
   (c) 7%
   (d) 8%

3. The father of principles of Management _____.
   (a) Henri Foyol
   (b) A.H. Cole
   (c) Higgins
   (d) Joseph Schompeter

4. The last management function to be studied by entrepreneurs
   (a) Planning
   (b) Organizing
   (c) Arranging
   (d) Controlling

5. The balance sheet is also called_____.
   (a) Business Plan
   (b) Profit and Loss Account
   (c) Position Statement
   (d) Accounting Period

6. World Entrepreneurship Day_____.
   (a) August 2
   (b) August 11
   (c) August 21
   (d) August 29

7. Women Entrepreneurship Day_____.
   (a) Novemberr 9
   (b) Novemberr 19
   (c) Novemberr 29
   (d) Novemberr 30

8. Head of the Joint Family Business_____.
   (a) Karta
   (b) Coparceners
   (c) Proprietor
   (d) Partner

9. Permanent Registration is obtained from _____.
   (a) SSI
   (b) DIC
   (c) NSIC
   (d) SIDCO

10. Growth of Entrepreneurship _____ helps to reduce the problem.
    (a) Money
    (b) Poverty
    (c) Unemployment
    (d) Resource

II. Write Very Short Answers (2 marks)

1. What is the meaning of Entrepreneurship?
2. Define Entrepreneurship.
3. Define Entrepreneur.
4. Difference between Entrepreneurship and Entrepreneur?
5. "What are the concepts of Entrepreneurship?

6. What is 4 Pcs and 3 Pcs in the Market Mix?
7. What is Accounting?
8. What are the Balance Sheet?
9. What is an Accounting Period?
10. What are the institutional agencies providing financial assistance to entrepreneur?
11. What are the Aims of Cottage Industry?
12. Define - About Traditional Food.

III. Write Short Answers (3 marks)

1. Write about Women Entrepreneur?
2. Tell about the types of Entreprises?
3. "Entrepreneurs are made, not born" - Discuss.
4. What are the environmental factors that affect the growth of entrepreneurship?
5. What is the Cottage Industry. Give some examples?
6. Characteristics of the Cottage Industry?
7. What about the importance of the Cottage Industries?

IV. Write in detail (5 marks)

1. Describe the Importance of Entrepreneurship.
2. Nickle is a successful entrepreneur. Explain what is the functions of his success?
3. What are the basic characteristics of an entrepreneur?
4. Enumerate the steps involved in starting a small industry.
5. Explain the important role of Entrepreneurship in Economic Development.
6. What are the Traditional Foods? Describe the traditional cuisine in any of the three districts?

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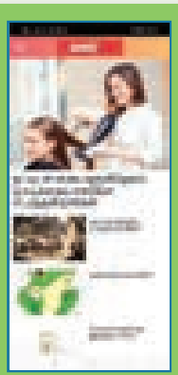
ICT Corner

Entrepreneurship

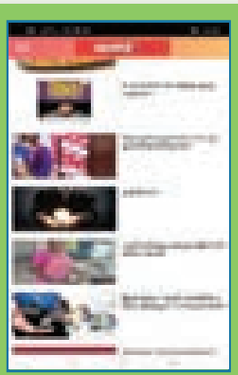
Innovation is the root of all success story. This activity enables the students to read more about the innovative and success stories of other people. Thus by make them more knowledgable and self confident. Another aspect is GST.

Steps:

- Type the URL link given below in the browser or scan the QR code. A page opens with the app 'vazhar ..in".
- Then the page open into many titles.
- When we touch the titles it opens with the image of the person or the object with the success story.
- You select your story and read. Lastly some tips on business and GST also is given.



Step 1



Step 2

Step 3

Step 4

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https://play.google.com/store/apps/details?id=appymaker.jkavin&hl=en

UNIT 8

Community Development

LEARNING OBJECTIVES

This chapter will enlighten students about

- Understanding the need for Rain water harvesting and learn the different methods of rain water harvesting
- Understanding the need for safe drinking water
- Learning the different methods of water purification
- Creating, awareness on waste management
- Importance of Organic food and Organic farming
- Gaining knowledge on the use of medicinal plants to cure common ailments
- Understanding the various income generating schemes by government
- To bringing awareness about the rights of a girl child

8.1 Introduction

Community development is a professional discipline that brings sustainable development, provides economic opportunity, rights,equality and social justice, promotes education and empowerment of people with their skills within their communities, creates identity or interest in urban and rural settings".

The United Nations defines **community development** as "a process where community members come together to take collective action and generate solutions to common problems. Community development practitioners work along side people in communities to help build relationships with people to identify common concerns.

The Community Development Programmes are based on the following principles:

1. Planning programmes and developmental activities by involving the people to fulfill the various needs of the community.
2. Bringing psychological betterment of the individual.
3. Creating the local leadership and developing socialism.
4. Creating awareness about national policies and political setup in democracy.
5. Setting up of cooperative societies for carrying developmental works.

The Community Development programme is focused on selected areas such as rain water harvesting, water safety, waste management, organic food and organic farming, use of medicinal plants to cure common ailments, protecting the rights of a girl child and various Income generating schemes.

8.2 Rain Water Harvesting

Water is a precious natural resource that needs to be managed and used wisely. Rainwater has nearly neutral pH, and is free from disinfection by products, salts, minerals and other natural, manmade contaminants. The time, duration and the amount of rainfall varies from place to place. With rising population the demand for water is increasing day by day. Modern lifestyle demands more amount of water. This leads to shortage of water in many parts of the country. Hence water must be conserved for future use. One method of conserving water is to collect rainwater and store it for later use. This is called rain water harvesting.

Rainwater harvesting is gathering, or accumulating and storing of rainwater. It has been used to provide drinking water, water for livestock, water for irrigation. Rain water collected from the roofs of houses, tents and local institutions or from specially prepared areas of ground makes an important contribution to drinking water. Roof rainwater is usually of good quality and does not require treatment before consumption.

8.2.1 Benefits of Rainwater Harvesting

- Rainwater supplements our domestic,industrial and other water needs.
- Ground water is constantly getting depleted or polluted in large areas.
- Water is free, only cost is for collection and use.
- Rain water is sodium free and is therefore important for persons on low sodium diets.
- Rain water is superior for landscape irrigation.
- Rain water harvesting reduces consumer's utility bills.

8.2.2 Methods of Rainwater Harvesting

Broadly there are two ways of harvesting rainwater.

1. Surface runoff harvesting

In urban area rainwater flows away as surface runoff. This runoff could be caught and used for recharging aquifers by adopting appropriate methods.

2. Rooftop rainwater harvesting

It is a system of catching rainwater where it falls. In rooftop harvesting, the roof becomes the catchments, and the rainwater is collected from the roof of the house/ building. It can either be stored in a tank or diverted to artificial recharge system. This method is less expensive and very effective and if implemented properly helps in augmenting the groundwater level of the area.

Components of the Rooftop Rainwater Harvesting

The system mainly constitutes of following sub components:

Catchments

Transportation

First flush

Filter

Catchments

The surface that receives rainfall directly is the catchment of rainwater harvesting system. It may be terrace, courtyard, or paved or unpaved open ground.

Transportation

Rainwater from rooftop should be carried through down take water pipes or drains to storage/harvesting system. Water pipes should be UV resistant (ISI HDPE/ PVC pipes) of required capacity. Water from sloping roofs could be caught through gutters and down take pipe. At terraces, mouth of the each drain should have wire mesh to restrict floating material.

First Flush

First flush is a device used to flush off the water received in first shower. The first shower of rains needs to be flushed-off to avoid contaminating storable/rechargeable water by the probable contaminants of the atmosphere and the catchment roof. It will also help in cleaning of silt and other material deposited on roof during dry seasons Provisions of first rain separator should be made at outlet of each drainpipe.

Filter

Filters are used for treatment of water to effectively remove turbidity, colour and microorganisms. After first flushing of rainfall, water should pass through filters. A gravel, sand and 'netlon' mesh filter is designed and placed on top of the storage tank. This filter is very important in keeping the rainwater in the storage tank clean. It removes silt, dust, leaves and other organic matter from entering the storage tank. The filter media should be cleaned daily after every rainfall event.

INTERESTING FACT

Roof top rainwater is the most common practice in Shillong, Meghalaya. Eventhough Cherapunjee and Mawsynram situated at a distance of 55 km. from Shillong, receive heavy rainfall The state capital Shillong, faces acute shortage of water.Hence every household in the Shillong city has a roof top water harvesting structure.

Why water has to be purified?

If water is contaminated many diseases such as Hepatitis, Cholera, Diarrhoea, Typhoid fever, Dysentery, Amoebic dysentery results. Hence water has to be purified for consumption.

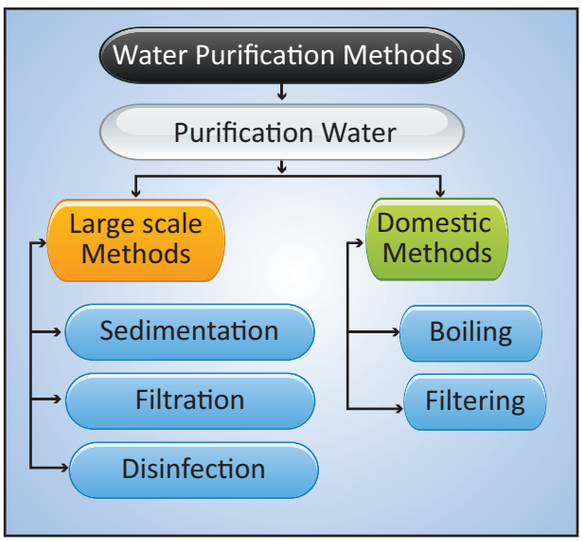
8.3 Water Safety

Safe drinking water is most important for consumption. It is necessary to protect drinking water from contamination for public health, economic and environmental reasons.

8.3.1 Importance of Safe Drinking Water

Safe drinking water is the basic necessity of a community. The availability and quality of water determines the quality of life. Thus water is a finite resource that has limits and boundaries to its availability and suitability for use.

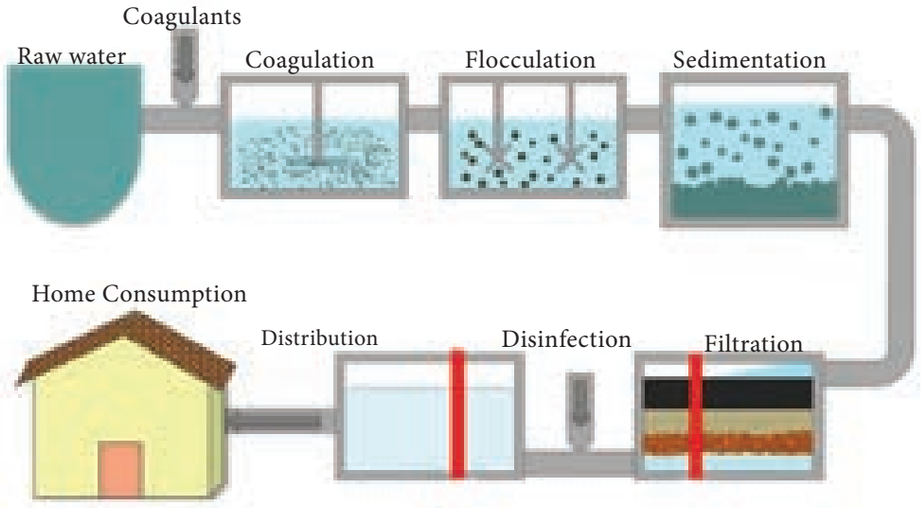
Water purification methods help to ensure availability of safe drinking water. **Water purification** is the process of removing undesirable chemicals, biological contaminants, suspended solids and gases from water. Purifying water may reduce the concentration of particular matter including suspended particles, parasites, bacteria, algae, viruses, fungi, as well as reducing the concentration of a range of dissolved and particular matter.



8.3.2 Water Purification Methods

Industrial Methods (Large Scale Methods)

1. **Sedimentation:** Water taken from deep borewells and similar underground sources may be almost free from suspended impurities. But river,tank and lake waters carry a large amount of suspended matter, causing the water to be turbid and coloured. Storage in reservoirs makes these impurities settle to the bottom. The settlement and removal of impurities is effective by adding chemical agents to the water such as alum. The chemical hydrolysis in water forms flaky, flocculent precipitates in which the suspended particles including a large number of bacteria are trapped and carried to the bottom by sedimentation.
2. **Filtration:** Sedimentation may not remove all suspended impurities in water. Therefore water is further purified by filtration. For the filtration of water for human consumption two types of filters are used. They are Slow Sand Filters and Rapid Sand Filters used in industries.
3. **Disinfection:** The filtered water is disinfected. The most common disinfectant used is chlorine. Chlorine is a strong oxidant that rapidly kills many harmful micro-organisms.Other possible pathogens include viruses, bacteria, including *Salmonella, Cholera,Campylobacter* and *Shigella*. Chlorine is added to water in the form of solution of chlorine gas drawn from steel



Water Purification Process

cylinders of liquid chlorine or in the form of bleaching powder.

DO YOU KNOW?

22nd March is celebrated as world water day. The theme for 2018 world water day is Nature for water. The theme focuses on the importance of water.

Domestic Methods

1. Boiling

Boiling water is the cheapest and safest method of water purification. In this method, clean water should be brought to boil and left at rolling-boil for 1-3 minutes. For people living in high altitude areas, boil water for longer than water boiled at lower altitudes. This is because water boils at lower temperatures in higher altitudes. Boiled water should be covered and left to cool before drinking. Boiling kills bacteria,parasites and viruses.

2. Use of filters

In household water is purified by muslin cloth and by reverse osmosis. Reverse osmosis is a water treatment process that remove contaminants from water by using pressure to force water molecules through a semipermeable membrane. The water is filtered leaving clean drinking water.

DO YOU KNOW?

Chlorine levels up to 4 milligrams per litre (4 parts per million) are considered safe in drinking water

8.4 Waste Disposal

Proper waste disposal is essential for community development if waste is not disposed properly it will affect the community leading to various problems.

Waste management or **waste disposal** are all the activities and actions required to manage waste from its inception to its final disposal. This includes amongst other things collection, transport, treatment and disposal of waste together with monitoring and regulation.

Waste can take any form that is solid, liquid, or gas and each have different methods of disposal and management. Waste management normally deals with all types of waste whether it was created in forms that are industrial, biological, household, and special cases where it may pose a threat to human health. It is produced due to human activity such as when factories extract and process raw materials. Waste management is intended to reduce adverse effects of waste on health, the environment or aesthetics.

Disposal methods

Land fills

Throwing daily waste/ garbage in the landfills is the most popularly used method of waste disposal used today. This process of waste disposal involves burying the waste in the land.

This method causes numerous contamination problems. Landfills give rise to air and water pollution which severely affects the environment and can prove fatal to the lives of humans and animals.

Incineration / Combustion

Incineration or combustion is a type of disposal method in which municipal solid wastes are burned at high temperatures so as to convert them into residue and gaseous products. The biggest advantage of this type of method is that it can reduce the volume of solid waste to 20 to 30 percent of the original volume, decreases the space they take up and reduce the stress on landfills.

This process is also known as thermal treatment where solid waste materials are converted by incinerators into heat, gas, steam and ash.

Composting

Composting is a easy and natural bio-degradation process that takes organic wastes i.e. remains of plants and garden and kitchen waste and turns into nutrient rich food for your plants. Composting, normally used for organic farming, occurs by allowing organic materials to sit in one place for months until microbes

decompose it. Composting is one of the best method of waste disposal as it can turn unsafe organic products into safe compost. On the other side, it is a slow process and takes lot of space.

Vermicomposting

Vermicasting, also called vermicomposting, is the processing of organic wastes through earthworms (Figure 1). It is a natural, odourless, aerobic process, much different from traditional composting. Earthworms ingest waste then excrete casts – dark, odourless, nutrient- and organically rich, soil mud granules that make an excellent soil conditioner. Earthworm casts are a ready-to-use fertilizer that can be used at a higher rate of application than compost, since nutrients are released at rates that growing plants prefer.

Vermicasting can be done on a small scale by homeowners with household organic wastes, on a large-scale by farmers with manure or by the food industry using organic wastes such as fruit and vegetable cull materials. Through proper design, vermicasting is a method of waste handling that:

- is clean, socially acceptable, with little to no odour.
- requires no energy input for aeration.
- reduces the mass of waste by 30%.
- produces a valuable vermicast byproduct.
- even generates worms as fishing bait.

Recovery and Recycling

Recycling is the process of converting waste products into new products to prevent energy usage and consumption of fresh raw materials. Material for recycling may be collected separately from general waste using bins and collection vehicles, a procedure called kerbside collection. In some communities, the owner of the waste is required to separate the materials into different bins (e.g. for paper, plastics, metals) prior to its collection. In other communities, all recyclable materials are placed in a single bin for collection, and the sorting is handled later at a central facility. The latter method is known as "single-stream recycling.

The most common products recycled include aluminium such as beverage cans, copper such as wire, steel from food and aerosol cans, old steel furnishings or equipment, rubber tyres, polyethylene and

PET bottles, glass bottles and jars, paperboard cartons, newspapers, magazines and light paper, and corrugated fiberboard boxes.

Recycling is the third component of Reduce, Reuse and Recycle waste hierarchy. The advantages of recycling are to reduce energy usage, reduce volume of landfills, reduce air and water pollution, reduce greenhouse gas emissions and preserve natural resources for future use.

Recycling is very important as waste has a huge negative impact on the natural environment.

- Harmful chemicals and greenhouse gas are released from rubbish in landfill sites. Recycling helps to reduce the pollution caused by waste.
- Habitat destruction and global warming are some the affects caused by deforestation. Recycling reduces the need for raw materials so that the rainforests can be preserved.
- Huge amounts of energy are used when making products from raw materials. Recycling requires much less energy and therefore helps to preserve natural resources.

8.5 Organic Food and Organic Farming

Consumers are aware of the relationship between nutrition and health. Concerns over food safety and quality have fuelled the growing popularity of organic foods, and many people believe that eating organic is best for their health and well being.

Organic food is food produce which has been grown on farms using environment-friendly practices and is free of artificial fertilizers, chemical insecticides and pesticides. Organic food does not include any form of genetically modified crop.

The advantages of an organic diet in enhancing health of individual and subsequently overall development of community is given below.

- The environment benefits because natural habitats are less threatened.
- The soil is in better condition because of the manure used.
- Biodiversity increases with use of fewer chemicals which harm bees and other insects.
- Crop diversity can be ensured.
- Organic food is more nutritious as several recent studies have suggested

that such food contains higher amounts of essential nutrients and minerals, including vitamin C, iron, and zinc.

- Organic food has no chemical additives whereas conventional farming methods expose foods to chemicals in the form of pesticides, fertilisers, and preservatives. These conventional methods greatly improve productivity but they are very harmful to human beings and can cause irreversible damage.
- Organic food lacks artificial hormones and antibiotics. To maximise productivity, some modern farms inject their livestock with hormones and antibiotics which enter the human body when products like meat, milk, and eggs, are consumed. These chemicals, which are proven to cause hormonal imbalances and drug resistant bacteria in human beings.
- Organic food has increased antioxidants which help in preventing cancer and boosts mental health of children.

DO YOU KNOW?

An organic diet decreases the chances for depression and concentration problems in children (and adults) thereby enchancing their mental health. This means the child will perform better in school, will not feel tired and will work harder than others.In addition, eating organic foods can help with attention deficit disorder (ADD), a common condition among children.

8.6 Kitchen / Terrace Gardening

Landscape gardening is an art of laying out grounds in a way which is ornamental imitating natural scenery. Such gardening is difficult nowadays, due to limited space and increased population. Kitchen/ terrace gardening is a new option available. Kitchen/ terrace gardening is growing of greens, fruits and vegetables at the backyard or terrace of the house by using kitchen waste water. Even balconies can be used for this garden. Old buckets, unused bottles, jars can be used for growing plants. Neem oil and Neem seed kernel extract can be used to protect the plants from weeds.

The advantages of Kitchen/ terrace gardening are given below:

- Fresh fruits and vegetables high in nutritive value.
- Fruits and vegetables free from toxic chemicals.
- Help to save expenditure on purchase of vegetables.
- Vegetables harvested from home garden taste better.
- Effective utilization of kitchen waste water and kitchen waste materials.

Plants suitable for Kitchen/RTerrace garden

Vegetables		Medicinal Plants		Flowers	Fruits	Spices
Tomato	Bottle gourd	Aloe vera	Pirandai	Rose	Guava	Turmeric
Brinjal	Amaranthus	Vasambu	Thoothuvelai	Jasmine	Papaya	Coriander
Chilly	Moringa	Vallarai	Ponnanganni	Hibiscus	Lemon	Fenugreek
Onion	Curry leaf	Mint	Poduthalai	Alari (Nerium)	Amla	Ginger
Big Onion	Spinach	Basil	Manathakali		Pome granate	
Lady's finger	Cowpea	Thulsi	Vettiver		Sapota	
Bitter gourd	Cluster bean	Omavalli	Kandanth thippili			
Snake gourd	Beetroot	Karisilanganni	Thippili			
Ribbed gourd	Radish	Keela nelli				

8.7 Medicinal Plants

Plants have traditionally been used as a source of medicine in India for the control of various ailments afflicting human and domestic animals thereby improving the health status and economic development of the community. Medicinal plants are used for therapeutic properties.

Medicinal value of Plants

1. ALOE VERA (Chirukattali):

Used for skin diseases, anthelmintic. Leaf extracts inhibits the growth of mycobacterium tuberculosis.The pulp of leaves is given in fever and liver enlargement.

	**2. CORIANDER LEAVES** Acts as a tonic for stomach and heart. Used for treating urinary tract infection.
	**3. CURRY LEAVES** It has antioxidants which helps in losing weight, sharpens memory, relieve morning sickness, nausea, good for hair growth and eyesight.
	**4. MINT LEAVES** Contains antioxidant and anti-inflammatory agent. Used as mouth freshener.
	**5. ASAFOETIDA** Used as a spice.It is used to relieve spasms, indigestion, flatulence, colic, cholera and whooping cough.

	**6. FENUGREEK LEAVES** Controls cough and flatulence. Helps to cure ulcers and regulates Diabetes.
	**7. TULSI** Promotes hunger,well known immunity booster.
	**8. NILA VEMBU** Bitter, given in fever, malarial fever, diarrhoea and weakness. Useful for reducing blood sugar.
	**9. GARLIC** It reduces blood pressure and cholesterol thereby reducing risk of heart diseases,releives stress fatigue and has anti-inflammatory property.

10. GINGER

It contains gingerol a substance with powerful medicinal properties, it treats nausea and morning sickness, reduces muscle pain and soreness.

8.8 Income Generating Schemes

Income-Generating Programmes are those types of vocational continuing education **programmes** which help participants acquire or upgrade vocational skills and which enable them to conduct **income generating** activities.

The main purpose of Income-Generating Programmes is

- Vocational skills, knowledge, attitudes and values are developed to promote a better quality of life of all people.
- To upgrade work ethics so that people become useful and productive members of society.
- To alleviate poverty and to contribute to the development of human resources.
- To identify their economic needs and explore ways and means of fulfilling those needs
- By developing self-confidence and ability to undertake income generating activities through appropriate and adequate training and motivation;
- By providing opportunities for continuous upgrading of vocational knowledge and skills for gainful employment;
- By developing team spirit for working together for sustainable social and economic growth.

Followings are some schemes of Poverty alleviation schemes generating income

Programmes	Characteristics
1. PM's Employment Generation Programme:	Initiated on 15th August 2008 by Prime Minister.
2. Integrated Rural Development Programme (IRDP):	Started in 1980. Main aim is to create sustainable opportunities for self-employment in the rural sector. Finance was provided to poor families for creating self employment. Funded by the centre and the state.
3. Food for Work Programme:	Central government started this program in 2004 in 150 most backward districts to provide wage employment. Food grains are supplied to states free of cost.
4. Jawahar Gram Samridhi Yojana (JGSY):	Started on 1 April 1999.The main objective of this program is for the development of rural areas and to give out sustained wage employment.This is only for those below poverty line.
5. National Rural Employment Guarantee Act (NREGA):	Started in 2006. Later modified as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in October 2, 2009. Aims to guarantee the "right to work". 100 days of guaranteed wage employment in a financial year.
6. Sampoorna Grameen Rozgar Yojana (SGRY):	It came in existence by merging Jawahar Gram Samridhi Yojana (JGSY) and Employment Assurance Scheme (EAS). It was launched in September 2001 to provide additional wage employment in the rural areas.
7. Swarnjayanti Gram Swarozgar Yojana (SGSY)/ National Rural Livelihood Mission:	Started in 1st April 1999 by providing self employment of the rural poor. IRDP and TRYSEM merged in this scheme.
8. Unemployed Youth Employment Generation Programme (UYEGP):	The Micro, Small and Medium Enterprises Department, Government of Tamil Nadu introduced the scheme. Aims: To mitigate the unemployment problems of socially and economically weaker section of the society, particularly among the educated and unemployed to become self employed in their native places itself and to prevent the mass migration from rural areas to urban areas due to unemployment by setting up Manufacturing / Service / Business enterprises by availing loan up to the maximum of Rs.10 Lakhs, Rs. 3 Lakhs and Rs. 1 Lakh.
9. TAHDCO	To increase the entrepreneurs in the community through setting up of petrol/diesel outlet.

8.7 Rights of a Girl Child

To achieve true women empowerment, girl children rights are important. This is because girls of today are the women of tomorrow. It is the role of social welfare organizations to support for the eradication of female infanticide and women empowerment. Some yardsticks of women empowerment are:

Helping women to develop a positive self-image and increase their confidence level.

Enabling them to develop the ability to think critically.

Ensuring that they have equal participation in decision making, whether it's in the family or at the community level.

Providing economic independence to women.

Why Girl Children Should be Given Rights

The role of education is extremely important here and goes a long way in empowering women. Girl children need to be sent to school, provided quality and holistic education. Numerous benefits come with educating girls the right way. Educated girls are able to take the right decisions in life. For example, when an educated girl falls sick, she will have better understanding and awareness to avail proper healthcare services. At the same time, a society in which girls are educated will see less child marriages, decreased levels of poverty and heightened participation of women in socio-economic processes. Educating a girl has far-reaching impacts. When a woman is educated, an entire generation benefits from it. Therefore ensuring the rights and privilege of a girl child pave way for development of a community.

Literally meaning 'Educate the Girl Child, Save the Girl Child' the Beti Padhao, Beti Bachao Scheme is an ambitious scheme of the Government of India which is intended to generate massive awareness, improvement of quality of welfare services for females and helping them (girls and women) access these services better. It was Introduced in October 2014, It is a joint initiative of three important Central Government ministries – the Ministry of Women and Child Development, Ministry of Health and Family Welfare and Ministry of Human Resource Development.It is therefore imperative that both government and non-government organizations work in cohesion to spread the message of saving and educating the girl child.

SUMMARY

- The key areas for developing the community include to provide safe drinking water, Rain water harvesting, proper waste disposal and sanitation, ensuring availability of crops through organic farming, use of medicinal plants to cure common ailments, protecting the rights of a girl child and alleviation of poverty through income generating schemes.
- **Community development** as "a process where community members come together to take collective action and generate solutions to common problems.
- Water must be conserved for future use. One method of conserving water is to collect rainwater and store it for later use. This is called rain water harvesting.Recent trends in rain water harvesting are Surface runoff harvesting,Roof top rainwater harvesting,Catchments and Filter.
- Safe drinking water is most important for consumption. It is necessary to protect drinking water from contamination for public health, economic and environmental reasons. Water purification methods help to ensure availability of safe drinking water. **Water purification** is the process of removing undesirable chemicals, biological contaminants, suspended solids and gases from water. Water is purified through large scale and domestic methods.
- **Waste management** or **waste disposal** are all the activities and actions required to manage waste from its inception to its final disposal and prevent the spread of communicable diseases.
- Organic food is food produce which has been grown on farms using environment-friendly practices and is free of artificial fertilizers, chemical insecticides and pesticides. Organic food does not include any form of genetically modified crop.
- Medicinal plants are used for therapeutic properties like aloevera, coriander leaves, curry leaves, mint leaves,ginger, garlic etc.
- Ensuring the rights and privilege of a girl child pave way for development of a community. Some important rights are freedom to Education, Freedom to live life freely.
- **Income-Generating Programmes** are those types of vocational continuing education **programmes** which help participants acquire or upgrade vocational skills and which enable them to conduct **income generating** activities.

A-Z GLOSSARY

- Weeds (களைகள்) – wild plant growing in unwanted place.
- Hormones (ஹார்மோன்) – chemical substance produced by body.
- Antibiotic (நோய் கிருமி கட்டுபடுத்தி) - medicine that inhibits or destroys the growth of microorganisms.
- Anthelmintic (குடல்புழு அகற்றும் மருந்து) – medicine used to destroy parasitic worms.
- Empower (அதிகாரம்) – authority or power to do something.
- Suspended impurities (கசடுகள்) – constituent which impairs the purity of something in suspension.
- Depression (மனஅழுத்தம்) - sadness.
- Antioxidants (ஆக்ஜினேற்றி) – substance that inhibits oxidation to delay deterioration.
- Flatulence (வாயு) – Accumulation of gas in the alimentary canal.

EVALUATION

I. Choose the correct answer

1. Community development seeks to empower _____.
   a) Individual alone
   b) Individual and Groups
   c) Groups only
   d) Women

2. **ASSERTION:** Organic foods when served fresh provides maximum nutrients.

   REASON: Foods needs to be served always fresh to obtain maximum nutrients.
   a) Assertion is correct
   b) Reason is correct
   c) Reason for assertion is correct
   d) Assertion for reason is correct

3. Organic farming needs
   a) Farming with chemicals
   b) Farming without chemicals
   c) Farming with the use of pesticides
   d) Farming with the use of aritifical fertilizer

4. pH of rain water is _____.
   a) Acidic
   b) Basic
   c) Neutral
   d) None of the above

5. Match the following
   a) Prime Minister Employment Generation Scheme 2006
   b) Swarnjayanti Gram Swarojgar Yojana (SGSY): 2001
   c) National Rural Employment Guarantee Act 1999 (NREGA):
   d) FOOD FOR WORK 2008.

6. Cheapest and safest method of water purification _____.
   a) Boiling
   b) Filtration
   c) Sedimentation
   d) Osmosis

7. Match the medicinal use of

a)	Garlic	Relieves digestion problems
b)	Coriander	Improves bowel syndrome
c)	Mint	Hair growth
d)	Curry leaves	Reduces cholesterol

8. Recycling components are → [ ] [ ] [ ]

9. _____ is celebrated as world water day
   a) 2 March
   b) 22 September
   c) 12 August
   d) 22 March

P3EVW

II. Write Very Short Answers (2 marks)

1. Write the medicinal properties of Aloe vera and Ginger.
2. What is the main aim of rain water harvesting?

3. Define waste management.
4. List the barriers which prevents buying organic food.
5. Write 2 different methods of water purification.

III. Write Short Answers (3 marks)

1. How do landfills severely affect the environment?
2. What are the aims of income generating schemes?
3. A building which was constructed 20 years back by your neighbour had no provision to store rain water during rainy season. Suggest ways to store the rain water effectively.
4. What is vermicomposting?
5. Write 3 positive aspects of organic food.
6. Explain the Beti Bacho Beti Padhoa scheme to an illiterate women.
6. Write the advantages of kitchen garden.

IV. Write in detail (5 marks)

1. Community development seeks to empower individuals – Justify.
2. Organic food does not lead to hormonal imbalance - explain.
3. Vinodhini is a 18 year old village girl. She is ignorant of her rights in the society. As a friend suggest her the rights of a girl child.
4. Girls of today are women of tomorrow. Brief this statement with women empowerment.
5. Explain the different methods of waste disposal.
6. Is reverse osmosis water safe for drinking?
7. Explain the different methods of purification of water.
8. Write a detailed note on kitchen garden. List the plants that can be grown in kitchen garden.

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4. Economic Botany by B.P. Pandey, S. Chand & Company, 2000.

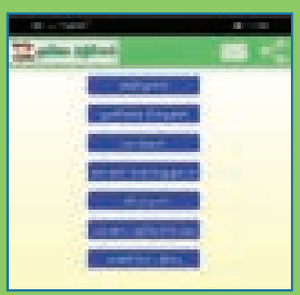
ICT Corner

Medicinal Plants

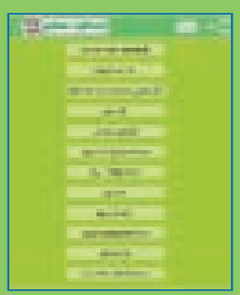
This activity enables the students to know more about medicinal plants and it's uses. It's in their own language that is the added benefit.

Steps:

- Type the URL link given below in the browser or scan the QR code. A page opens with the name of the app. (mooligai maram)
- When we touch the app it opens into a page it contains the menu of the app.
- When we touch the name of the plants.
- When we touch the plant it gives it's name and all the medical benefits of the plant.



Step 1



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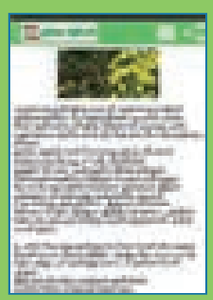

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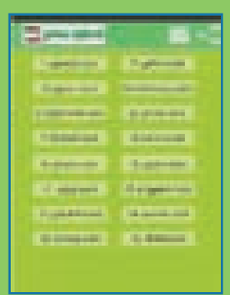

Step 4

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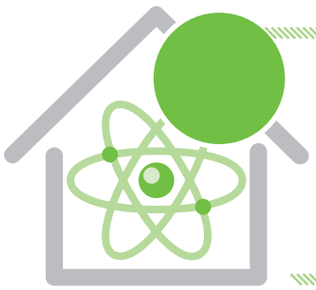


Practicals

PART – A 5 X 1 = 5

1. Identify the type of flower arrangement.
2. Identify the standard mark on the food item and comment on it.
3. Identify the given teaching aid used in the preschool and comment on it.
4. Identify the given colour schemes that comes under prang colour chart.
5. Identify the given medicinal plant and write about it.

PART – B 1 X 10 = 10

1. Plan a day's Menu for a diabetic person prepare and serve any one item by using millets.
2. Plan a day's Menu for a person suffering from Ulcer and prepare any one item.
3. Plan a label for the pickle you prepare.
4. Identify the adulterants used to adulterate the given food write the tests that helps you to Identify the given Food and find whether it is adulterated or not.
   a. Milk
   b. Honey
   c. Sugar
   d. Chilli powder
   e. Pepper
5. Write a note about tie and dye process. Dye the sample cloth with tie and dye technique.
6. Prepare any one flower arrangement with locally available flowers.
7. Draw the prang colour chart to understand colour harmonies in rangoli and write about primary, secondary and tertiary colours.
8. Prepare an interesting toy for a preschool child.
9. Prepare any one traditional sweet or savoury.
10. Prepare a food items using any one medicinal herbs to treat cold.

Experiment No: 1

Aim:

To formulate a diet for a person suffering from peptic ulcer.

Equipment needed:

Vessels, Bowl, Small container, Knife

Peptic ulcer:

Peptic ulcer is a term used to describe any localized erosion of the mucosal lining of alimentary tract that comes in contact with gastric juice. This is known as a disease due to hurry, Worry and hot Curry.

Principles of Diet:

High energy, high protein, moderate fat and low fiber diet.

Permitted foods:

Cereals – cooked rice; idly; idiappam, milk curd, paneer, Butter milk, low fiber fruits- papayas, banana, Water melon, vegetable soups, ladysfinger, potato, light desserts and custard.

Restricted Foods

1. Cereals- Whole wheat flour.
2. Pulse - whole pulses- rajmah cholam, soyabean, peas.
3. Milk & milk products – milk based desserts, milk shake.
4. Meat and poultry: spicy meat, gravies, curries and fried fish.
5. Fried items, fat rich food, bakery items, creams cakes, savouries.

A days menu – peptic ulcer

Meal time	Food items
Early morning	Milk- 1 cup
Breakfast	Idly-3 nos, vegetable sambhar -1 cup (ladysfinger) (less seasoning) (low fiber vegetables to be included
Mid morning	Egg custard – cup Fruit juice – 1 cup (avoid citrus fruits)
Lunch	Rice-11/2 cup, plain egg omlette. Carrot poriyal, Dhal-1cup (less seasoning), Sweet curd, papaya – 1 slice
Evening	Tea- 1cup Vermicelli payasam-1cup
Dinner	Idly/ Idiappam, Egg curry, Banana-1

Recipe formulation – Egg Custard

Ingredients		Quality
Egg	-	1
Milk	-	200 ml
Sugar	-	10 gms / or 2 tsp
Vanilla Essence	-	few drops (Optional)

Method:

1. Beat the egg well in a bowl.
2. Add sugar and Milk to the beat egg and mix well.
3. Put all the mixed contents in a small container till half
4. Steam the content till it is done.
5. To check the end point insert knife in the content when taken out. If the content does not stick on the knife or if the knife is clean. It is cooked well.
6. Invert the container to remove the egg custard and serve in a plate.

Experiment No: 2

Aim

To plan a days menu for a diabetic person, prepare and serve any one item by using millets.

Equipment needed:

Tawa, Spatula, vessels, measuring cups, cutting board, knife.

Diabetes mellitus:

Diabetes mellitus is a chronic metabolic disorder that prevents the body to utilize glucose completely or partially. It is characterized by raised glucose concentration in the blood and alterations in carbohydrate, Protein and fat Metabolism. This can be due to failure in formation of hormone insulin or action of insulin.

Dietary principles:

1. High protein intake helps to increase insulin production.
2. Calories from carbohydrates can be 60-65% simple carbohydrates like sugar and honey are avoided.
3. Vitamin C and E supplements are essential.
4. Low fat diet is preferred.
5. High fiber is recommended, vegetable salad to be included.
6. Sprouted grams and whole grams to be included in diet.

Permitted Foods:

Green leafy vegetables, fruits except banana, salads, plain coffee, tea, skimmed, milk and butter milk, Chicken, Fish.

Restricted Foods:

All simple sugars (Glucose, Honey, Sweets) dry fruits, cake, candy, jaggery, Sweetened Juice,

A Days menu- Diabetes Mellitus

Meal time	Food items
Early Morning	Plain coffee without sugar – 1 cup
Break fast	Multi millet soya rotti, Tomato chutney -1/2 cup-3
Mid morning	Araikeerai soup
Lunch	Rice 1 cup fish kulambu- 1 cup Beans poriyal -1/2 cup, vegetable salad-1/2 cup
Evening	Channa sundal, plaintea
Dinner	Idli-3 , coriander chutney-1/2 cup
Bed time	Skimmed milk without sugar -1 cup

Recipe formulation – multi millet soya Rotti

Ingredients		Quantity
Ragi flour	-	½ cup
Bajra flour	-	½ cup

Jowar flour	-	½ cup
Soya flour	-	¼ cup
Onion	-	1 cup
Greean chillies	-	4
Cumin seeds	-	1 tsp
Salt	-	to taste
Oil	-	2 tsp

Method:

1. Mix all the above ingredients and add sufficient water to form a soft dough.
2. Put on a hot tawa into thin circles using wet hand.
3. Cook for 5 to 7 minutes. Turn rotti, twice and smearing with oil.
4. Serve hot with chutney.

Discussion

Experiment No 3

Aim:

Draw a food label with all the specifications mentioned below for a pickle you have prepared

Equipment needed:

Pan, laddle, bowl

1. Preparing a pickle

   Pickling

   Gooseberry pickle

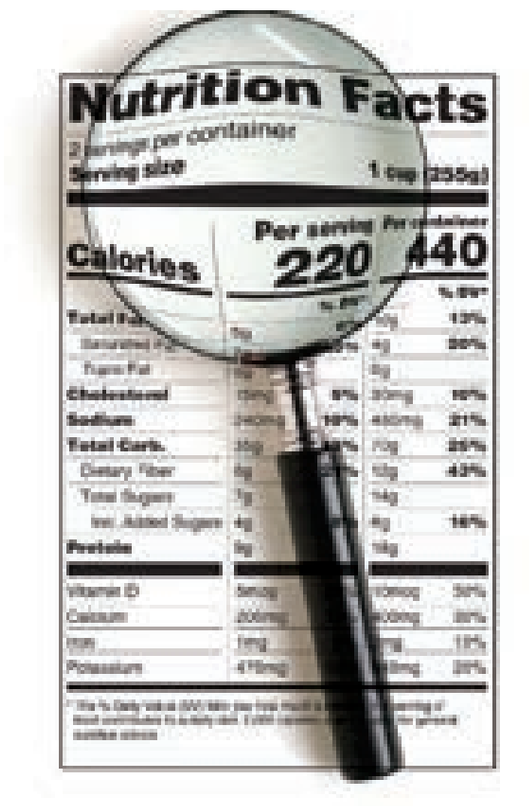
Ingredients:

Ingredients		Quantity
Gooseberry	-	100 gms
Oil	-	25 gms
Salt, Chillie powder	-	To taste
Roasted mustard and fenugreek powder	-	1/2 tsp

Method:

Wash gooseberry and steam for 10 minutes. Cut in to pieces and saute with oil, salt and chillie powder. When gooseberry is cooked add mustard and fenugreek powder finally, saute for 2 minutes and remove from fire. Store in a dry, clean bottle can be used for 3-4 days

2. Draw a label with following information for the prepared pickle
   1. Registered brand name
   2. Manufacturers name and address
   3. Batch number
   4. Date of manufacturing
   5. Best before/Use bu
   6. Retail sale price
   7. Vegetarian/Non Vegetarian mask
   8. List of Ingredients
   9. Net content in terms of weight or size
   10. Certification mark
   11. Instructions for storing/Usage
   12. Warning (in case of spoiled food)



Experiment No 4

Aim:

To identify common food adulterants found in food substances

Materials required:

Milk, honey, Sugar, Chilly powder, Black pepper, cotton wick of test tube

S.No	Food item	Adulterant	Test	Inference
1.	Milk	Water	1. Lactometer reading should not be less than 1.026 2. Drop of pure milk flows slowly leaving a white trail behind whereas adulterated milk with water will flow immediately.	Adulterated/Not adulterated
2.	Honey	Molasses	A cotton wick dipped in pure honey when lighted with a match stick burns. If adulterated the presence of water will not allow the honey to burn.	Adulterated/Not adulterated
3.	Sugar	Chalk Powder	Dissolve in a glass of water, chalk will settle down at the bottom	Adulterated/Not adulterated
4.	Chilli powder	Stones	Any grittiness present may be felt by tapping the sediment at the bottom of glass confirms the presence of brick powder or sand.	Adulterated/Not adulterated
5.	Black Pepper	Papaya seeds	Papaya seeds give a repulsive flavour distinct from the bite of black pepper	Adulterated/Not adulterated

Experiment No 5

Aim:

To equip the children about tie-dye process

Tie-dye is a resist dyeing technique

The process of tie and dye consists of folding, twisting, pleating or crumpling fabric or garment. Then bind with string or rubber bands, followed by application of dyes. Tie and dye process is called resist dyeing as they partially or completely prevent the applied dye from coloring the fabric. Bright, saturated primary colors and bold patterns are used in tie and dye process.

Material used:

Fabric	-	Either cotton, silk, wool or nylon
Salt	-	as required
Water	-	as required
White vinegar	-	as needed
Metal spoon		
Water bottle		
Dye colours / Water colours / Fabric paint/ink		

Method:

- Mix fabric dye with water.
- For darker or brighter colors, use twice the amount of dye
- Stir well using the metal spoon for the dye to mix well with the water
- After the dye solution is ready, make knots in the fabric and then dip in the colored solution then the fabric can be dried.
- For cotton items add a cup of salt to the dye bath to bring out the color
- For silk, wool or nylon add 1 cup of white vinegar to protect the material

Note:

- Heat adequate water in a water bath and add required dye color, salt to make dye solution
- Knots can be made by using rubber band or strings
- Rubber gloves can be worn by the person to protect the hands from the dye and the hot water.

Discussion:

Experiment No 6

Aim:

To prepare a simple flower arrangement for a living room with locally available flower

Things required:

Flowers, filler leavers, pin holder, scissors, water and vase.

Method:

1. A simple flower arrangement is mass arrangement which emphasizes a large number of flowers as a whole unit, rather than individual branches or flowers. A mass arrangement always represents a thick full-bodied look.
2. Arrange the flowers first and then fill up with leaves and twigs.
3. Have big bright flowers at the bottom and small light coloured flowers on higher levels.
4. Start from centre and move towards periphery in the arrangement.
5. Fill the flower vase with enough water to dip the stem ends.
6. Sprinkle salt, sugar or suitable preservative to keep up the freshness of flower for long.
7. All the principles of design should be followed for pleasing effects.
8. Display the flower arrangement beautifully on a centre table.

Mass arrangement

Experiment No 7

Aim:

To draw and learn Prang colour chart depicting various colours to understand colour harmonies in Rangoli.

Objectives:

a) To identify and understand Prang colour chart.

b) To learn colour combinations by drawing prang colour chart in the form of rangoli.

Details:

Prang System is an organization of colours and shows relationships between colours. Colours may be divided into five classes: Primary, binary, intermediate, tertiary and quaternary.

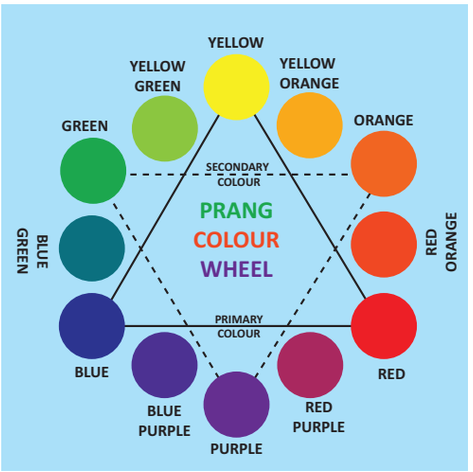
1. Primary colours: All colours may be obtained by mixing in various proportions three fundamental hues: red (R), Yellow (Y), and blue (B). These are called the three primary colours, because they are the elements in the use of pigment. They are the only hues in pigment that cannot be obtained by mixing other hues.
2. Secondary colours: When two primary colours are mixed in equal proportions, we get secondary colours.
3. Intermediate Colours: When a primary and an adjacent secondary colour is mixed an intermediate colour is produced. There are six intermediate colours.
4. Neutral colours are black, white and grey
5. Warm colours are yellow, orange and red
6. Cool colours are blue and green

Things needed:

Paper, colour pencils, ruler, white kolapodi and colour powders.

PRANG COLOUR CHART

PRANG COLOUR



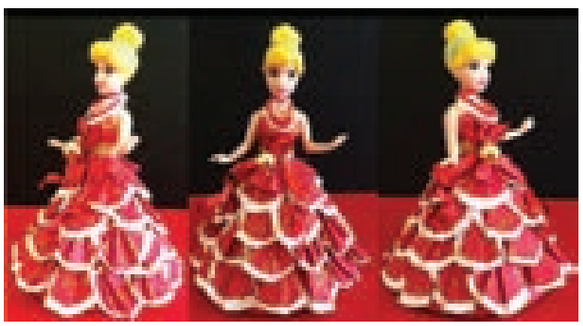
Experiment No 8

Aim:

To prepare a toy for a preschool child

Materials needed:

Coloured paper, chart, felt cloth, clay



Method of preparation for toy

1. Draw cindrella picture on a white chart
2. Draw the frock with designs
3. Now, take the clay of different colors, and flatten it according to the patterns decided. After flatteing, shape it
4. Fill the flattened and sharpened clay patterns on the dress as per your taste
5. Place the clay for the body, face and arms also
6. Now a beautiful cindrella is ready to tell story to the preschool children

Note:

1. Children can be initiated to make the toy model
2. It helps the children to co-ordinate their finger, muscle and eye co-ordination
3. It helps to focus and concentrate on shapes and patterns

Experiment No 9

Aim:

To prepare any one and traditional sweet and savory

Ashoka Halwa

Ashoka Halwa recipe a very famous sweet in Thiruvaiyuru in Thanjavur District. This Halwa is made using moong dhal (Passiparuppu).

Ingredients

- Yellow split Moong Dhal –1/2 cup
- Water – 2cup
- Wheat flour – 1/8 cup
- Sugar – 1 cup
- Melted ghee –1/3 cup
- Cardamom Powder – ¼ tsp
- Broken Cashew nut – 1.5 tsp
- Food color – Red and Orange 1 drop

Preparation

- Dry roast moong dhal for 2 mins, do not let it brown. Now add 2 cups of water to it. Pressure cook for 4 whistles in medium flame.
- Once pressure releases by itself, take it in a blender and blend it until smooth. It may look watery but will be perfect as it thickness.
- See the texture; it should be smooth, Set aside. In a small pan add 2 tsp ghee, add cashews and fry until golden brown, remove it.
- Now add wheat flour and fry for 2 mins. Switch off and set aside.
- Now in a thick bottomed kadai, add moong dhal paste along with sugar. Switch on the flame and mix it well, it will be goey at this stage add wheat flour mixture.
- Mix well then add red and orange food color, mix it well with a ladle
- Now keep cooking in low medium flame and keep adding the remaining ghee spoon by spoon, keep stirring. It will start to thicken. Add ghee, and keep cooking.
- It will start to roll and leave the sides of the pan and leave ghee at the sides. After sometime the ghee will be absorbed. Now add fried cashews and cardamom powder.
- Mix well, and cook for few more mins until the mixture turns glossy and start to roll nicely. This is the correct stage, switch off.

Notes

- Use a thick bottomed kadai. Be patient and keep stirring.
- The halwa will become thick with time, heat it while serving so that ghee oozes out.
- The ghee measure should be almost equal or little less than the quantity of moong dhal.

Manapparai Murukku:

Manapparai Murukku is very famous among the varieties of murukku available in Tamil Nadu. Murukku business is very native to this town and people earn, as the murukku is so special and people love to have them.

Ingredients:

- Rice Flour – 1 cup
- Urad Flour – 1 tsp
- Ajwain/ Omam – ½ tsp
- Butter – ½ tsp
- Salt to taste
- Oil to Deep Fry

Preparation:

- In a bowl mix together rice flour, salt, butter and omam.
- Add enough water to make soft dough.
- Load a murukku press with dough.
- Heat oil in a pan
- In a small plate press out small murukku and transfer it to hot oil.
- Deep fry until the sizzling stops.
- Drain oil and transfer to a plate.
- When completely cool, store in air tight jar.

Experiment No 10

To prepare two food items using medicinal plants to treat cold. Common cold is a viral infection of nose and throat children younger than six are at greater risks of colds. Some medicinal plants are used to treat common.

Common cold

i. Thuthuvalai for cold and cough: This herb is effective for treating cough, cold and asthma. It works effectively on throat irritation and itching. Consumption of Thuthuvalai reduces the congestion of nose, chest and in treatment of tuberculosis.

Recipe using Thuthuvalai for treating cold

Thuthuvalai Adai / Dosai

Ingredients

- Raw rice – 1 cup
- Parboiled rice – 1 cup
- Gram dhal – 2 tsp
- Toor dhal – 2 tsp
- Pepper – few
- Cumin seeds – few
- Red chilies – 3 or 4
- Thuthuvalai leaves – 1cup
- Ginger – 1 piece
- Salt to taste

Preparation

- Wash the Thuthuvalai leaves nicely.
- Soak all the dried ingredients for 2 hours
- Grind all the ingredients into red chilies, cumin seeds, pepper and ginger. Grind it to a fine paste.
- Leave it aside for 15 minutes
- Then place the dosa pan and prepare Adai or dosa based on consistency.

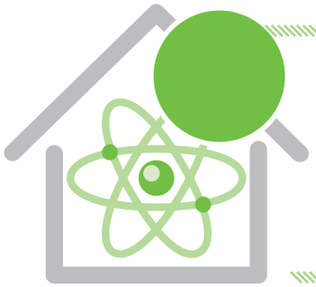
ii. Herbal Kashayam:

Ingredients

- Karpuravalli – 3 leaves
- Water – 2 cup
- Tulsi – 3 leaves
- Betal leaves – 3 leaves
- Crushed pepper – ½ tsp
- Crushed ginger – ½ tsp
- Jaggery/panarkandu – 1tsp

Preparation

- Boil 2 cups of water
- Add all the ingredients together
- Close with the lid
- Boil for 5 minutes
- Filter the mixture
- Serve the Kashayam hot
- Consumption pattern: Have 2 to 3 times a day to get maximum relief from cold and cough.



Glossary

Absorbency	Capable of absorbing heat, light, moisture etc.
Adulteration	when some substances are either added or removed from a product which changes its composition, nature or quality .
Adulteration	Refers to mixing of an inferior and sometimes harmful quality substances with food or drink intended to be sold.
Aesthetic sense	appreciation of beauty
Anthelmintic	medicine used to destroy parasitic worms
Antibiotic	medicine that inhibits or destroys the growth of microorganisms.
Antioxidants	A group of substances that prevent the damage by free radicals.
Appropriate	suitable for a particular person, place, condition etc.
Appropriate	Suitable or right for a particular situation or occasion
Aptitude	It is the ability of entrepreneurs to learn new competencies related to enterprise management
Atherosclerosis	Thickening of the walls of blood vessels by deposits of fatty materials.
Black marketing	illicit trade in goods or commodities in violation of official regulations
Blood clot	A semi-solid mass consisting of a mesh of a protein, in which various blood cells are trapped.
Built-in- cupboard	cabinet attached with wall
Calorie	Unit used to indicate the energy value of foods. ie., kilocalories(kcals)
Cognitive	Mental process of knowing, learning and understanding
Commercial	Buying and selling
Competencies	It is a cluster of knowledge, skills, altitude, experiences and expertise of a person in a particular context
Complementary	opposite
Consumer	Is a person who buys goods and services or use of public utilities or natural resources
Crease	A line or ridge produced on paper or cloth by folding, pressing, or crushing.
Deceptive-	misleading believe about something which is not true

Diuresis	Increased secretion of urine.
Doubtful	Not clear
Drawback	disadvantage/Linderance
Empower	authority or power to do something
Epigastric pain-	discomfort right below the ribs in the area of your upper abdomen
Essential fatty acids (EFA)	Fatty acids which are not made in the human body and must be supplied through the diet. They are linoleic acid, n-6 and alpha linolenic acid, n-3.
Extrude	thrust or force out.
Fabian entrepreneur	Fabian entrepreneur is one who is very cautious in taking the decisions, very skeptical and takes calculative steps
Feasibility	It is a systematic investigation of relevance, merit and quality of any significant enterprise idea
Febrifuge	medicine used to reduce fever
Flattulence	the accumulation of gas in the alimentary canal.
Food contamination	presence of harmful chemicals and microorganisms in food, which can cause illness.
Food poisoning	The illness resulting from eating food or drinking water containing bacteria, viruses, pesticides, or toxins.
Food safety	A scientific discipline describing handling, preparation, and storage of food in ways that prevent food-borne illness.
Food Storage	Food storage allows food to be eaten for some time after harvest rather immediately.
Fundamental	-forming the base from which everything else develops
Glomerular filtration rate	the test to measure level of kidney function and determine the stage of kidney diseases
Gruel -	a thin liquid food or other meal boiled in water or milk
Hemorrhage-	an escape of blood from a ruptured blood vessel.
Hormones	chemical substance produced by body
Hypermotility-	excessive motility of all or part of the gastrointestinal tract
Illegal	not according to or authorized by law
Imitation	copying or resembling something of better quality
Inflammation	The reaction of the tissues to injury, characterized clinically by heat, swelling, redness and pain.
Interact	communicate and react
Ischemia	lack of blood supply to a tissue resulting in reduced oxygen supply.

Isoflavones	A phytochemical found in (especially, soyabeans) that may have cancer-preventing properties
Junk food	It is food containing high levels of calories from sugar or fat with little fiber, protein, vitamins or minerals
Loft	roof storage space
Malpractice-	an injurious, negligent or improper practice
Misleading	giving the wrong idea or impression.
Necrosis	cell death caused by progressive enzyme breakdown
One-on-one	Individual
Peg board	Perforated hardboard which is pre-drilled with evenly spaced holes. The holes are used to accept pegs or hooks to support various items, such as frying and sauce pans
Physique	physical structure of the body
Preschool	The place with school building
Preschoolers	Those who join and study
Public distribution agencies	It is a government chain of shops distributing basic food and non-food commodities to the needy sections of the society at very cheap prices.
Purgatives	medicine used to get rid of unwanted waste from body
Rapid	Fast
Sale gimmicks	It is a creative way to attract attention to business, product or service and to increase urge to purchase in the mind of customers.
Scarcity	shortage in supply
Security	defense
Self esteem	-self respect
Stroke	a sudden condition that results from blocking or bleeding of blood vessels in the brain, resulting in paralysis
Subsidy	Money given as part of the cost of something to help or encourage it to happen
Supervise	watch over
Tweezers	a small instrument like a pair of pincers for plucking out hairs and plucking out hairs and picking up small objects
Unfolding	to open
Weeds	wild plant growing in unwanted place
Working capital	It is the money required to be invested in day-to-day operations of the enterprise like raw material, finished products etc
Zollinger	Elison syndrome – a typical peptic ulcer disease, characterized by enzyme gastric hyperacidity

HOME SCIENCE – Class XII
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