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WHAT IS HOME SCIENCE?

As the name suggests, Home Science is concerned with the home, health and happiness of all the people living in it. As a field of specialization, Home Science draws its content from courses in both science and art. Thus, representing an interdisciplinary field that prepares young learners for the two most important goals in their lives – caring for their home and family as well as preparing for a career or vocation in life. Hence, its scope extends to activities associated with setting home based enterprises as well as consultancies.

Today, men and women share the responsibility of a home and family equally. They need an equal amount of preparation in making the best use of the resources available to make their lives comfortable. In this lesson, you will discover the scope of the science and art behind Home Science and the different professional avenues available to you after specializing in this field.

OBJECTIVES

After reading this lesson, you will be able to:

- explain the meaning and importance of Home Science;
- establish the relevance of Home Science to men and women;
- present some facts about Home Science as a discipline and profession, and
- identify various academic and vocational opportunities available to you after studying Home Science.

1.1 MEANING OF HOME SCIENCE

Home Science or the science of managing a home, includes all the things that concern ourselves, our home, our family members and our resources. It aims at getting maximum satisfaction for us and our family members through the efficient and scientific use of your resources. ***Home Science means the art of managing your resources efficiently and the science of achieving a healthy and happy home as well as successful career.***

You must have noticed the words 'art' and 'science' being used together in the definition given above. This is because Home Science teaches you the art of using things so that a harmonious whole is achieved and an overall pleasant effect is created. At the same time, it gives you all the scientific knowledge of the procedures involved in making a home aesthetic. Let us take an example- Home Science will teach you about the different nutrients required by the body and the different functions they perform. This is the 'science'. When you are able to select various dishes having those necessary nutrients and serve them attractively to your family and motivate them to eat the right foods, it is an 'art'.

Developing the ability to communicate effectively with all the family members including children and elderly, is an important skill and art that we all have to inculcate for harmonious interpersonal relationship and a happy and peaceful life. This essential skill is also learnt by studying Home Science.

Home Science draws an important part of its content from pure science disciplines such as physics, chemistry, biology, physiology and hygiene. It also draws its content equally from economics, sociology, anthropology, psychology, community development, communication, media and technology. Thus, making it an interdisciplinary field which draws from the strengths of science and arts courses.

This combination of science and art holds true in all the areas of Home Science. Some of these are as follows:

- the interpersonal communication amongst family members;
- the family that you care for;
- the food that you eat;
- the house that you live in;
- the clothes that you wear;
- the resources that you use;
- the environment around you and
- the skills and environment that can lead to successful career.

ACTIVITY 1.1

State the art and science in following activities you perform at home. The first two have been done for you:

Activity	*Art*	*Science*
to have a bath	feel fresh and clean	• dirt and germs are removed from your body • pores on skin get open

prepare breakfast	serve attractively	• select right food • use of correct method of cooking to preserve nutrients • enhance nutritive value of food.
wash clothes		
clean the house		
make grocery purchases		
use household appliances		
caring for children		

1.2 RELEVANCE OF HOME SCIENCE

Traditionally Indian society had clearly demarcated areas of work for both men and women. However, with the changing social and economic environment, managing a home requires the efforts of all the family members. Today, more and more women are working- whether they go to an office or work from home. Therefore, gender based stereotype roles do not hold relevance any longer. Today, you can learn to manage your own resources better by studying various areas of Home Science. If you face any problem, Home Science gives you the right tools to solve. In doing so, you become more organized and efficient. Home science opens up a large arena of possible job opportunities for both men and women. This knowledge helps in the improvement of not only your home and personal life but also your professional life.

Home Science is for both Boys and Girls

- Both have to succeed in an increasingly competitive world
- Both have to share household responsibilities and tasks
- Both need to manage resources
- In case of a problem they have to solve it together with other family members.
- Home Science offers varied vocational and professional avenues for both boys and girls
- Joint knowledge and skills help to improve the standard of living.

You and your family members can achieve personal satisfaction and use the skills gained through Home Science to improve your family's economic condition as well. As in Home Science you will learn several skills that can enable you to set up home based enterprises or consultancies like a boutique, catering unit, crèche, day care centre, etc. You will learn more about this aspect later in this chapter.

ACTIVITY 1.2

Do you agree with the following statements? Give reasons for your opinion?

Situations	*Agree/Disagree*	*Reasons*
Only a mother can look after a sick child	Disagree	Anyone with a caring attitude can look after a sick child. Gender does not play any role. Male doctors take equally good care of patients as female doctors do.
Purchasing of electronic appliances items should be preferably done by men		
Washing, ironing, folding and keeping away the weekly laundry is best handled by women		
Money is best managed by men		

Discuss your opinion with your friends. Find out their opinion also. Decide who needs to change his/her opinion and why.

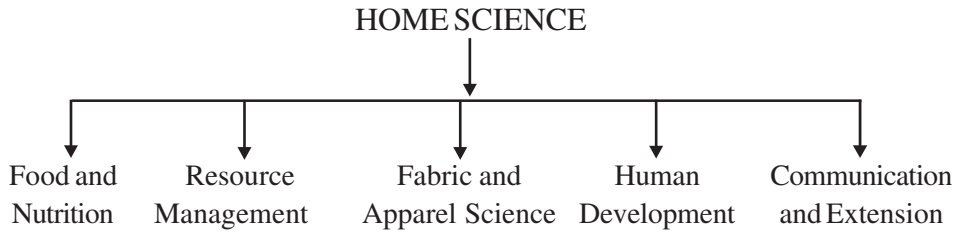
1.3. HOME SCIENCE- A DISCIPLINE AND PROFESSION

- Home Science covers a few areas of specialization such as Food and nutrition, Communication and Extension, Resource Management, Human Development, Fabric and apparel science. We learn and develop good interpersonal relationships within and outside the family. We also learn to manage our resources like time, energy and money so that we get maximum satisfaction. Home science also involves learning the skills intending all this useful to our family or community, especially the underprivileged for better life.
- We value our traditional knowledge, experiences offered to us by our parents and grandparents. We should continue and value this. The new advance in science and technology and management equip us better and deal with the changing social and economic environment and meet the challenges of the 21st centaury.
- Home science syllabus draws its strength from both science and arts discipline. This enables the student to develop the ability and understand the concept as well as apply them in various contents situation. This gives home science students an edge above all other disciplines. This prepares them for vast range of opportunities unlike other discipline.

1.4 AREAS OF SPECIALIZATION IN HOME SCIENCE

By now you must have understood that Home Science is an important area of study. Let us now find out in detail the specific areas that you have to study in this subject.

There are five major components or areas of specialization in Home Science:



Today, Home Science is so advanced that each specialization is a domain in its own with its areas of specialization and vocation/professional opportunities. Some of the areas of further specialization are as follows:

Main Branch	*Area of further specialization*
Food and Nutrition	• Food Science • Nutrition-Clinical Nutrition and Community Nutrition • Institutional food service

Fabric and Apparel Science	• Clothing Construction • Textile Science • Textile Designing • Garment Designing • Care and Maintenance of Clothes
Resource Management	• Resource Management • Housing and Equipment • Interior Decoration • Consumer Education
Human Development	• Child - Welfare • Adolescence, Marriage and Family Guidance • Care of the Elderly • Care of special children
Communication and Extension	• Media for communication • Programme planning and evaluation • Training and capacity building • Management of community service organisations

These options may be only at higher level of studies and not at school level. There are many Home Science colleges in India where you can study these courses. There are various vocational courses based on Home Science discipline like creative embroidery and tailoring, early childhood etc. You may visit the NIOS website www.nos.org for more information about this. The courses are available at graduate and post graduate level. You can conduct doctoral and post doctoral research and contribute to adding new content to Home Science. These courses are offered as regular programmes in colleges as well through distance education made through IGNOU.

ACTIVITY 1.3

Study the Home Science syllabus given at the end of this Book. Find out the areas that interest you. Make a list of three vocations that are available in that area of Home Science.

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.....

.....

INTEXT QUESTIONS 1.1

1. Select the correct alternative from those given below.

   (i) Home Science means _____.

   a) learning to build interpersonal communication

   b) the art of managing your resources

   c) developing a skill to start an enterprise

   d) all the above

   (ii) Which of the following is not a specialization area in Home Science?

   a) Food Science

   b) Garment Designing

   c) Nursing

   d) Interior Decoration

2. Read Section 1.1 and list any four ways by which Home Science can help you.

   1 .....

   2 .....

   3 .....

   4 .....

   5 .....

1.5 CAREER OPPORTUNITIES IN HOME SCIENCE

Before you study the different opportunities available in the subject of Home Science, you must understand the concepts of wage employment and self-employment. To understand these concepts, let us take an example - a tailor who sets up a tailoring shop is self-employed whereas he/she is said to be in wage employment when he/she works in a garment factory and gets a salary or wage. **Wage employment** means that you work for another person and receive wages or salary for your services. **Self-employment** means that you are the owner of an enterprise which you run and finance.

You have already read that specializing in Home Science may choose to work in salaried jobs or as self-employed entrepreneurs or as consultants using any of the skills that they may have developed.

Table 1.1 lists these knowledge, skills and opportunities.

Table 1.1 Job opportunities in Home Science

Knowledge/ Skills	Wage Employment Opportunity	Self-Employment Opportunity
Catering 	• Staff in canteen, restaurant • Cook; coffee/tea shop, etc. • Service Staff	• Owner of a canteen, restaurant, coffee/tea shop etc. • Food Service from home • Conducting hobby classes
Food preservation / Bakery and Confectionery 	• Production • Training of Service Staff • In-charge of a community centre	• Owner of a production unit • Home based production services • Conducting hobby classes • Training NGO functioning as a livelihood promotion initiative
Interior Decoration 	Work for an organisation • Interior Designer • Furniture Designer • Staff at show rooms • Conducting hobby courses/ classes • Show case and window display design	Self employed as • Interior Designer • Furniture Designer • Staff at show rooms • Conducting hobby courses/ classes • Show case and window display design
Arts and Crafts 	• Staff at government emporiums/show rooms/ antique shops • Designer for arts and crafts items • Staff at production units	• Running own shop/ enterprise • Home-based craft centre • Conducting hobby courses/classes
House Keeping and Laundry Services 	• Staff at hotels and guest houses • Facilities manager	• Running a guest house • Home based paying guests service • Contract services

Dress Designing, Garment Construction; Textile Designing 	• Staff in a Production unit/export house • Staff at textile designing unit • Staff at boutique	• Owner of a shop or boutique • Home based services • Conducting hobby classes
Teaching 	• Staff at crèche, play school, day care centre • Teaching in a school/ college • Teaching in polytechnics	• Owner of a crèche, play school etc. • Day-care or after care in school for young children • Conducting tuitions at home • Conduting short term in areas of Home Sci. courses
Communication and Extension 	• Staff in development organisation • Counsellors • Researchers • Social Entrepreneurs • Trainers and facilitators • Staff in Public Relations and Human relations department	• Counsellors • Establishing development organisation • Market research agencies. • Media production and management. • Communication and development consultant • Offering short-term courses- content development, theatre, puppetry etc.
Resource Managers and Consumer Education	• Staff in retail outlets • Staff in event management firms	• Event managers • Small savings agent

Having read Table 1.1 you will agree that besides providing education for your overall development, Home Science prepares you to take up a job outside the home as well as set up a home enterprise. For example, as a Home Science trained person, you can join a garment export house as a wage employee but if you are not able to leave the house, you can set up a tailoring boutique at home. You will also agree that you can be engaged in both wage and self-employment in all areas of Home Science.

You must remember that to be successful you need to have thorough knowledge of the subject, some practice and experience. The school level course in Home Science gives you only basic knowledge in the subject. In order to get ready for a job, you need to

do specific advanced courses offered by a number of institutes. The National Institute of Open Schooling also offers a number of vocational courses in the area of Home Science. You can consult the counsellor at your PCP or visit the NIOS website for further information.

INTEXT QUESTIONS 1.2

1. Give any four examples of home-based self-employment opportunities in the area of Home Science.

   (i) _____

   (ii) _____

   (iii) _____

   (iv) _____

2. List any one wage-employment opportunity in the five specialisation areas of Home Science

	Specialisation	Employment Opportunity
(i)	Food and Nutrition	
(ii)	Resource management and Designing	
(iii)	Clothing and Textiles	
(iv)	Human Development	
(v)	Communication and Extension	

3. Classify the following either as wage-employment (WE) or as self-employment (SE). Tick mark the option you choose.

		WE	SE
i.	Pre-school teacher		
ii.	Owner of a home accessories showroom		
iii.	Production unit staff		
iv.	Consultancy service provider		
v.	Research Assistants		
vi.	Conducting hobby classes		
vii.	Owner of a boutique		
viii.	Guest House manager		
ix.	School teacher		
x.	Development Consultant		

WHAT YOU HAVE LEARNT

- teaches everything concerning the home
- is useful for both men and women
- needs to be studied formally

HOME SCIENCE

has five basic component areas

Food and Nutrition	Resource Management	Textiles and Clothing	Human Development	Communication and Education

Academic Courses at Graduate and Post Graduate level

Research

can lead to self and wage-employment

TERMINAL EXERCISES

1. Discuss in 10 lines the relevance of Home Science in your day-to-day life.
2. What are the various components or areas of Home Science? List areas of further specialisation in any one of these areas?
3. List the various opportunities for people in wage-employment and self-employment capacity in any one area of Home Science.
4. Sate whether the following statements regarding Home Science are correct or incorrect. Give reasons for your answer if marked as incorrect. Write T for true and F for incorrect.
   (i) Study of Home Science does not lead to a career.
   (ii) Home Science equips both girls and boys to perform their dual role as home makers and as professionals.

ANSWERS TO INTEXT QUESTIONS

1.1 1. (i) d (ii) c

2. (i) resources efficiently (ii) beautiful, well managed (iii) successful career

1.2 2.

(i) Catering, Home based production services

(ii) Interior decoration and Furniture Designer

(iii) Dress/Textile designing, Owner of a shop or boutique

(iv) Social welfare, Day-care or school after care for young children

(v) Researcher, Organisation communication consultant

3.

Wage-employment	Self-employment
i, iii, v, viii, ix	ii, iv, vi, vii, x

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FOOD AND ITS NUTRIENTS

Think about the meals you ate yesterday. Write all the food items you consumed in the table given below. You will realize that you ate different kinds of food item. Why do we need to eat a variety of food? How do these food items help us? In this lesson you will find answers to these questions.

Table 2.1. Food items consumed by you yesterday:

Breakfast	*Lunch*	*Snack*	*Dinner*

OBJECTIVES

After studying this lesson you will be able to :

- define the term 'food' and explain its functions in our body;
- state important functions and sources of each nutrient in our body;
- explain the role of nutrition and nutrients in healthy living;
- describe the term malnutrition and its effects and
- suggest appropriate measures to prevent and cure malnutrition.

2.1 FOOD AND ITS IMPORTANCE FOR HEALTHY LIVING

Food satisfies our hunger and provides energy for day to day living. It is also an important part of all our social occasions. When you go to a friend's house, you are generally greeted and offered something to eat and drink. So food serves a social

function. Similarly when you are away from your home you not only miss your family but also food. Thus, food is important in our life.

Can you elaborate the importance of food in our life? Yes, you are right. We eat to satisfy our hunger, feel happy and even celebrate special occasions. Let us now learn about the various functions of food.

2.1.1. Food gives us energy to work

We need energy to do our work. We need energy for walking, playing, eating, working in the house or outside and for other activities.

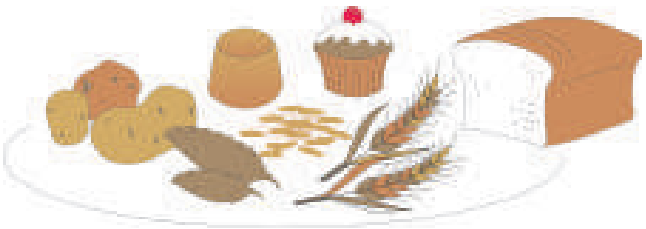


Fig. 2.1

2.1.2. Food helps in the growth and repair of tissues

A small child grows into an adult. Do you know the relationship between the growth of our body and the food we eat? The body is made up of thousands of small cells. New cells are added to help the body to grow in size. We need food for the formation of new cells. In addition to growth, new cells are made to replace the dead and damaged cells. Therefore, food helps not only in growth but also in the repair of tissues.

2.1.3. Food gives strength to fight against diseases

We are always surrounded by disease causing organisms. The food we eat helps us in providing protection against them. If we fall ill, food helps us to recover from illness.

2.1.4. Food helps the body to function normally

Do you think we need energy even when we are at rest? Yes you are right, it is because the vital organs inside your body are always working. For example, our heart is pumping blood, stomach is digesting food and lungs are breathing in air. These organs need energy to perform their role which is provided by the food we eat.

ATIVITY 2.1

Anuradha and Shonali were living happily with their parents, younger brother and a dog. Suddenly they lost their parents one after the other and then their dog. The younger brother also left them because of his posting in another town. The sisters went into depression and initially stopped eating regularly and then totally. They became weak

and stopped communicating with others. Finally they had to be admitted in a hospital in a state of acute depression and nutritional deficiencies. Anuradha died due to severe under nutriton. Shonali survived and had to be treated by doctors, nurses and social workers for a long time for both depression and malnutrition. She had to learn to eat proper meals all over again.

Think about this situation and try to find answers on the basis of the functions performed by food:

Q. What could be the reasons due to which the sisters stopped eating?

Q. Do you stop eating food when you are angry or sad?

You have seen that food performs many functions in our body and all of them are important for not only our existence but also for a healthy life.

2.1.5. Food satisfies hunger

We eat food to satisfy our hunger. It also provides mental and psychological satisfaction. Therefore is the prime need to be satisfied in life.

2.1.6. Social functions

Food has always been a central part of our social existence. It helps to relax and creates a friendly mood. People take special care in planning and cooking food for social occasions, so food promotes a sense of community.

2.1.7. Psychological functions

In addition to social functions food must also satisfy our items emotional needs. These include a sense of security, love and attention. Familiar food items make us feel secure. A baby gets emotional security while being breast feed. Anticipating food needs and fulfilling them are expressions of love, care and attention. Similarly, sharing of food is a token of friendship and acceptance.

2.2 NUTRITION AND NUTRIENTS

Have you ever thought what happens to the food we eat? How do we get energy from the food? Now we will discuss about the science behind food and its functions. We can define **nutrition as the science which tells us about what happens to the food when it enters our body and thereafter.** How is food digested and utilized in our body? How does one grow from a little child to a young adult and then an old person?

The food we eat contains many chemical substances. These chemical substances are known as nutrients. We can say that **nutrients are invisible compounds in the food which are necessary for keeping the body healthy.** These nutrients have different names and functions to perform in our body.

The common nutrients in our food are:

- Carbohydrates
- Proteins
- Fats
- Vitamins
- Minerals
- Fibre
- Water

2.3 FUNCTIONS AND SOURCES OF NUTRIENTS

We will now learn about the functions of various nutrients and their sources.

2.3.1 Carbohydrates

Carbohydrates are as important to our body as fuel is to a car. As fuel makes a car run, similarly carbohydrates provide energy to our body, which keeps it going throughout the day. Which food items in our diet contain carbohydrates?

Yes, foods like potatoes, rice and sweets give carbohydrates.

There are two types of carbohydrates in food sugar and starch.

Sugar: Sugar is also called simple carbohydrate. Fruits, honey and sugar are some sources of sugar.

Starch: starch is called complex sugar. Plants store energy in the form of starch. When we eat plant products containing starch, our digestive system breaks down starch into glucose. This glucose is absorbed in blood and provides energy.

Some foods give carbohydrates to our body in the form of starch. These are cereals, potatoes, sweet potatoes etc. Some other foods give carbohydrates in the form of sugar. For example sugar, honey, jam, jaggery, etc.

One gram of carbohydrate gives four kcal. An adult person needs 400-420 gms of carbohydrates everyday.

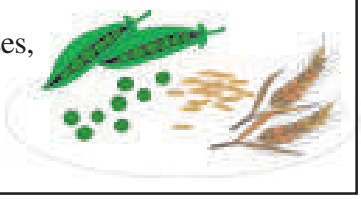
Functions of Carbohydrates	Sources
• Give energy and feeling of fullness. • Increase the bulk of our food. • Spare proteins to perform other functions. • Helps to make the food tasty.	Starch sources: cereals – like wheat, rice, bajra, maize, potatoes, sweet potatoes, calocasia, etc. 

	sugar sources: sugar, honey, jaggery, sweets, jam, murabba, etc. 

2.3.2 Proteins

Proteins are needed for muscle building and repairing worn out cells and tissues. Our muscles, organs and even blood are made up of mostly proteins. If we do not eat proteins our body will not be able to repair damaged cells or build new ones. Proteins in our diet come from both animal and plant sources.

The proteins from animal source are known as animal proteins and the proteins from plant sources are known as plant proteins. **One gram of protein gives four kilo calories of energy (kcal).** An adult needs 1gm of protein for every kilogram of body weight per day. For example if Shivali weighs 52 kg then her protein requirement would be approximately 52gms per day.

Functions of proteins	Sources
• Needed for making new cells in the body • Helps in repairing old and damaged cells. • Helps in healing wounds. • Needed for making blood, enzymes and hormones	**Animal Sources** Meat, egg, fish, poultry, milk, curd, cheese, etc.  **Plant sources** All cereals, pulses, peas, soyabean, nuts especially groundnut, etc. 

ACTIVITY 2.2

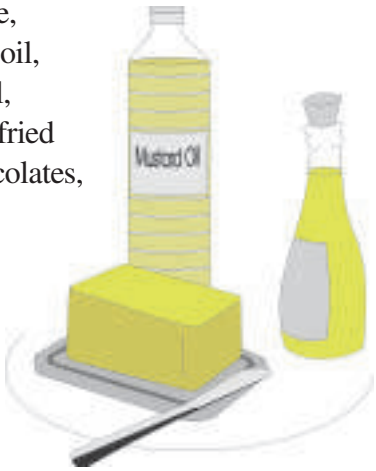
Calculate the amount of protein you would require for yourself and for other members of your family. Enter their body weight and protein requirements in the table below:

Member	Body Weight (kg)	Protein requirement (g)/ day
Self		
Father		
Mother		
Brother/Sister		

2.3.3 Fat

One gram of fat gives you nine kcal. Fat which we get from animals are called **animal fat**. Fat which we get from plants are called **plant fat**.

Although fat gives more energy than carbohydrates, you eat very little fat and hence fat is not the major source of energy in our body. Food containing large amount of fat can lead to obesity. An adult needs only 30 gms (2 table spoons) of fat everyday. Do you know that chocolate, biscuits, pakoras and patties also contain fat?

Functions of Fat	Sources
• Give energy, is the concentrated source of energy. • Helps to keep our body warm. • Help in the utilization of fat soluble vitamins like A, D, E, K. • Provides protection to delicate organs like heart, liver and also provides padding on our skeleton and muscles. • Makes the food tasty.	butter, ghee, groundnut oil, coconut oil, vanaspati, fried oods, chocolates, etc. 

ACTIVITY 2.3

Find out the average monthly consumption of oil and/or ghee in your family and calculate your average daily fat consumption. Keeping in view the number of family members, find out if your consumption is adequate or not? Carry out the activity in the space provided below:

Total consumption of oil in the family per month……..kg (or lt)

Total consumption of ghee in the family per month……..kg (or lt)

Number of family members……..

Total fat consumption per member/month =……..

Total fat consumption per member/day =……..

**Hint – Fat consumption = Total consumption/number of family members*
**Hint – 1 lt of oil = 910 gm (approximately)*

INTEXT QUESTIONS 2.1

1. State four reasons for eating food.

_____

_____

_____

_____

2. Choose the correct alternative given at the end of each statement given below:

(i)	The main use of proteins in the body is	(a)	energy for work and play
(ii)	Besides energy fat helps in	(b)	growth and repair of tissues
(iii)	Carbohydrates are needed to provide	(c)	making food tasty
		(d)	protection to delicate organs in the body

3. Name the main nutrient present in the following:

No.	*Food*	*Nutrient Present*	*No.*	*Food*	*Nutrient Present*
(a)	Fish liver oil		(g)	Milk	
(b)	Butter		(h)	Jaggery	
(c)	Vanaspati		(i)	Wheat	
(d)	Cheese		(j)	Egg	
(e)	Dal		(k)	Sweet potato	
(f)	Meat		(l)	Mustard oil	

4. Find out the answers for following questions from the puzzle below. You may look horizontally or vertically. Write your answer in the space provided.

C	E	R	E	A	L	S
A	P	I	S	Z	Q	D
B	R	K	X	F	W	S
D	O	M	W	A	H	A
C	T	G	A	T	R	K
N	E	R	Q	V	Y	K
M	I	F	W	B	I	L
T	N	D	E	M	K	Y
P	O	T	A	T	O	T

a) Which nutrient provides maximum amount of energy _____

b) Nutrient found in eggs in abundance _____

c) Major source of energy in our daily diet _____

d) Good source of carbohydrate _____

2.3.4 Minerals

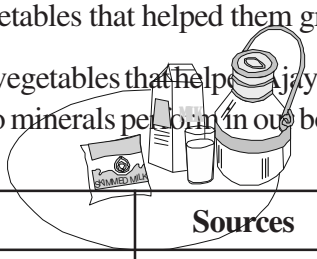
Minerals are present in all body tissues and fluids. Minerals like **calcium** and **phosphorus** are found in bones and teeth. **Iron** is a mineral which is found in blood as a part of the red pigment haemoglobin. Minerals occur in food as salts.

Calcium and **Phosphorus** are present in the body in large amounts especially in bones and teeth and are known as **macro or major minerals.**

Iron and **Iodine** are found in the body in smaller quantities, hence are known as **micro minerals**.

Ten year old Ajay and his eight year old sister Priyanka asked their mother why she insists that they should consume more milk and green vegetables. Mother showed them their childhood photographs. The children were surprised to see the photographs. They asked their mother how had they become so tall and big! Their mother explained that it's the milk and green vegetables that helped them grow so well.

What is there in milk and green vegetables that helps Ajay and Priyanka grow? Have you ever wondered what role do minerals perform in our bodies? The main functions of minerals are:



Functions of Minerals	Sources
• Growth of our body and strength of bones. • Maintenance of water balance in the body. • Contraction of muscles. • Normal functioning of nerves and clotting of blood when needed.	Milk Green vegetables

(a) CALCIUM

We all require calcium in our daily diet as it performs the following functions in our body:

Functions

(i) Helps bones to grow and become strong.

(ii) Makes teeth healthy and strong.

(iii) Helps in clotting of blood. You may have noticed that in case of a minor injury blood stops flowing in few seconds and a hard crust is formed on the wound this is known as clotting of blood, for which calcium is needed. Blood clotting can prove to be a life protecting function.

(iv) It also helps in the movement of muscles.

Calcium is required in large quantity for optimum growth during childhood. A pregnant woman also needs additional calcium to support the growth of foetus. Absorption of calcium is reduced as a person grows old. So, we should be careful regarding the calcium needs of the elderly persons.

Sources

- Milk and its products like paneer, cheese, curd, lassi, chhach, butter milk etc. These are the best sources of calcium.
- Green leafy vegetables like spinach, fenugreek, curry leaves and coriander leaves are also good sources of calcium.

(b) IRON

Functions

Iron is a very important mineral. It is needed for the formation of a compound called haemoglobin in our blood which helps in carrying oxygen to all parts of the body. Do you know in adolescence (10-19 years) iron requirement of the body increases? The need for iron increases specifically for girls. We must include iron rich foods in our daily diet.

Fig. 2.2

Sources

- Green leafy vegetables like spinach, mustard leaves, fenugreek, mint, etc.
- Whole cereals and legumes
- Liver, heart, kidney and egg yolk.
- Gur/jaggery
- Dates and pomegranate.

ACTIVITY: 2.3

Amla is the richest source of iron. It is a very economical source to enhance the iron content in our food and can be eaten on a regular basis. List two food items made of amla.

(c) IODINE

Iodine is required for normal functioning of our brain and the growth of our body. **Deficiency of iodine leads to a disease called cretinism.**

Cretinism is a condition of severely stunted physical and mental growth.

Fig.2.3

Functions

Iodine is needed for proper functioning of thyroid gland in our body.

Sources

- Sea foods like fish and sea weeds.
- Plants which grow in iodine rich soil.
- Salt fortified with Iodine.

Food fortification or **enrichment** is the process of adding micronutrients to food. This has been explained later in lesson 4.

2.3.5 VITAMINS

These are the substances which are required in very small amounts in our diet, but are essentials for proper functioning of the body. Vitamins cannot be produced by the body, therefore must be present in our diet. Vitamins are classified into two groups on the basis of their solubility in fats and water.

- **Fat soluble vitamins** are those vitamins which are soluble in fat e.g. Vitamin A, D, E, and K.
- **Water soluble vitamins** are those vitamins which are soluble in water e.g. B-complex vitamins and vitamin C.

You must know the functions and sources of vitamins. Table 2.1 lists vitamins, their functions and sources.

Table 2.2

Vitamins	Functions	Sources	Deficiency Disorders
Fat Soluble Vitamins			
Vitamin A	• For better vision specially in dim light • Makes our skin healthy • Necessary for normal growth and development • Provides resistance to infection.	Vegetables, fruits (especially in dim light yellow ones), milk, cheese, eggs yolk, butter, ghee, liver green leafy 	Night Blindness
Vitamin D	Works with minerals - phosphorus and calcium to make teeth and bones strong	Oily fish, milk, cheese, butter, ghee, etc. Our body can make Vitamin D when the skin is exposed to sunlight. 	Rickets in children and Osteomalacia and Osteoporosis in adults
Vitamin E	Prevents tissue breakdown. It is an antioxidant	Whole pulses and cereals 	
Vitamin K	Needed in the process of clotting	Green leafy vegetables	Avitaminosis

Water Soluble Vitamins			
B Complex	Helps the body to use energy Keeps the digestive system healthy	Pulses, whole grains cereals, wheat, rice etc. 	
Vitamin C	All the body cells need Vitamin C because it helps to hold cells together. It also keeps our teeth and gums healthy.	Fruits, leafy vegetables, potatoes, sprouted grains, guava. and amla are the richest sources	Scurvy

*The details of some of these are discussed later in the chapter

INTEXT QUESTIONS 2.2

Choose the correct option to complete the statements given below.

1. i. Calcium is needed for
   - (i) improving the taste of food.
   - (ii) healthy bones
   - (iii) strong teeth
   - (iv) clotting of blood

   ii. Richest source of iron is
   - (i) iodized salt
   - (ii) milk
   - (iii) leafy vegetables
   - (iv) wheat

   iii. Fortified salt is rich in
   - (i) iron
   - (ii) iodine

Notes

(iii) calcium

(iv) all the above

iv. Person suffering from iodine deficiency must eat/drink

(i) sea food

(ii) root and tubers

(iii) milk products

(iv) fibre rich food

v. Movement of muscles definitely requires presence of

(i) iodine

(ii) iron

(iii) calcium

(iv) all the above.

2. Tick Mark (√) the fat soluble vitamins from the choices given:

(a) Vitamin A

(b) Vitamin B

(c) Vitamin C

(d) Vitamin D

3. Which vitamin will you get from the following food items?

(i) amla……

(ii) carrot……

(iii) cereals……....

(iv) eggs……

(v) fish oil…….

(vi) green leafy vegetables……

(vii) sprouted pulses……

(viii) sunlight on skin……

(ix) milk……

(x) butter……

(xi) pumpkin……

(xii) liver……

4. Fill in the blanks:

(i) Vitamin D can be produced by the …… in the presence of ……

(ii) One function of Vitamin A is to keep our……. healthy.

(iii) To keep our gums and teeth healthy we must take ……..

(iv) The vitamin which makes bones and teeth strong is …….

2.4 DIETARY FIBRE

Shruti's grandmother is an active and cheerful old lady. However, she was uncomfortable as she had not passed stool since last three days. She realized that the in last two-three days she had not been taking enough fresh fruits, vegetables and water. Fresh fruits and vegetables contain fibre that helps in relieving constipation

Constipation refers to bowel movements that are infrequent and/or hard to pass.

Dietary fibre, also known as roughage, is the indigestible carbohydrate present in food. Fibre is present in foods of plant origin only.

Foods rich in fibre are:

- whole wheat flour, dalia (porridge)
- fruits such as guava, apples, pineapples ,banana
- whole pulses like lentil, rajmah, bengal gram
- vegetables such as peas, beans, carrots, cauliflower, green leafy vegetables

When foods are processed there is loss of fibre, vitamins and minerals. For example unpolished rice has higher fibre content than polished rice. Can you think of some other examples? Wheat flour is something many of us consumes everyday. Often people sieve the flour and then make chapaties out if it. In the process, wheat bran which is rich in fibre is removed. Thus, reducing the fibre content of the flour. The skin of fruits and vegetables is also rich in fibre.

Fibre performs many essential functions in the body;

– It increases the bulk and softness of stool, thus making it easier to pass;

– Foods which contain fibre require more chewing and thus have a high degree of satiety.

Satiety means being satisfied especially when referring to eating. It prevents over eating.

High fibre diet helps in the prevention of:

- Constipation
- Cancer of the large intestine
- Diabetes
- Obesity

ACTIVITY 2.4

Recall what did you eat yesterday and list the fibre rich foods included in your meals.

_____

_____

_____

2.5 WATER

Mohan's mother was travelling to Jaipur in Rajasthan in the month of May for some work. She packed two bottles of water along with her lunch. Mohan asked his mother about the necessity of carrying the water bottles. Mother explained that during hot weather, our body sweats a lot. This results in depletion of body water. We should drink plenty of water to replenish the loss. Body water need can also be fulfilled by beverages like buttermilk (*lassi*), milk, fruit juices etc. On the other hand, our body's need for water is less during winters.

Fig.2.4

Now Mohan understands that water requirement vary with the season. On an average, one should drink about 8-10 glasses of water everyday.

Water is not a nutrient, yet it is very important for our body because;

- It is a constituent of all body fluids.
- It helps to digest food and takes the nutrients from the food to the different cells of your body.
- It helps to keep our body temperature constant. In summer, when we sweat, extra heat is removed from the body.
- It helps to remove the waste products from your body in the form of urine.

ACTIVITY 2.5:

Observe the colour of your urine when you do not drink water for about 6-8 hours and then when you drink water every ½ hour. Answer the following.

Interval between water intake	Colour
Water after 6-8 hours (when you pass urine for the first time in the morning)	
When you drink water after every ½ hour	

INTEXT QUESTIONS 2.3

State whether the following statements are true or false, if true, give the justification:

(i) True/False Fiber is not essential in the diet.

.....

(ii) True/False We must remove the outer skin of apples before eating.

.....

(iii) True/False Fiber helps in the prevention of cancer.

.....

(iv) True/False Fiber makes fat.

.....

(v) True/False Fiber is found in tomatoes and grapes.

.....

(vi) True/False Fiber increases bulk of the food.

.....

(vii) True/False You will lose weight if you do not eat fibre.

.....

2.6 DEFICIENCY DISEASES

Geetika wants to lose weight and often skips her meals. Her teacher complained that she is not alert and attentive in the class. One day, she fainted during morning assembly. Her mother was called by the teacher. The mother explained that for the last four months, Geetika was eating very little. She had become very weak. The teacher advised Geetika that by reducing her food intake, she was not getting adequate nutrients essential for her body. This was causing weakness. This would have detrimental effect on her physical, mental and emotional well being.

Geetika became aware of the importance of a nutritious diet for her overall well being. She realized that each nutrient has a specific role in keeping us healthy.

If you do not take these nutrients in the diet, do you know what will happen? Yes, you are right. The body will not be able to function properly and you will fall sick. Interestingly, if you start eating the food with the missing nutrients, the symptoms of the disease start disappearing.

This is the reason why such diseases are called **deficiency diseases**. The deficiency is caused due to shortage or absence of certain nutrients in our daily diet. Deficiency disease is a condition which occurs in the body when a particular nutrient in our daily meals has been missing for a long period. Often the deficiency is reversible if the missing nutrient is detected early and missing nutrient is adequately replaced.

Children and old people are more prone to deficiency diseases. Let us now study some common deficiency diseases.

2.6.1. Protein Energy Malnutrition (PEM)

When there is lack of proteins and energy in the diet for a long time a deficiency disease known as **Protein Energy Malnutrition** (PEM) occurs. This deficiency occurs mainly in children below 5 years of age. In our country PEM is widely prevalent in children belonging to poor and underprivileged communities. When the child is suffering from PEM, often diarrhea and other infections occur due to low body resistance to diseases.

PEM is of two types-

(1) When the protein intake is deficient but calories or energy from carbohydrates are sufficient, the condition is known as **Kwashiorkor.** The child dvelops a pot like belly due to this deficiency diseases.

Fig. 2.5 A child suffering from Kwashiorkor

(2) When protein and energy both are insufficient for a prolonged period then a disease condition known as **Marasmus** occurs. In both these conditions there is growth failure, child does not grow to full potential.

Fig. 2.6 A child suffering from Marasmus

(3) A child loses weight and becomes thin when there is deficiency of carbohydrates in the diet. Yet another kind of malnutrition is consumption of excessive calories. If there is excess of carbohydrates in the diet then the person becomes **obese** or fat. This is the condition mostly found in the well-to-do families. This is increasingly becoming a problem in urban areas where more and more people are leading inactive or more sedentary lines.

Fig. 2.7 A child suffering from Obesity

2.6.2. Vitamin A deficiency

Vitamin A deficiency is also found mainly in children. Pregnant women are also susceptible to this deficiency. Since Vitamin A is required for growth and development of the body. Lack of this vitamin results in stunted growth. Deficiency of Vitamin A also leads to dryness of conjunctiva (the white portion of the eye). At a later stage the conjunctiva may become wrinkled. The cornea (black part of eye) may also become cloudy. At this stage the problem of night blindness sets in, i.e., the child cannot see in dim light. Improvement in the condition can occur if a diet rich in Vitamin A is taken. You would be sad to know that more than 40,000 children in India become blind every year because of vitamin A deficiency. This could be easily prevented.

2.6.3. Iron deficiency anaemia

Iron deficiency anaemia is another major nutritional problem in our country. It is found in women and children in all income groups.

Major causes of anemia in our country are:

- inadequate intake of dietary iron or its poor absorption
- hook worm infestation mainly found in young children and adults
- excessive blood loss due to accidental injury, during child birth in women

You have already studied that iron is required for hemoglobin formation. In iron deficiency anemia, there is not enough haemoglobin in blood, therefore, the supply of oxygen to the cells is reduced. When this happens, we feel tired, restless and fatigued all the time. Therefore, we cannot work to our full potential.

2.6.4. Vitamin B Complex deficiency

Low intake of Vitamin B rich food in our diet is the main cause of this deficiency. Common symptoms of vitamin B complex deficiency are sore mouth, sore tongue, redness of the tongue and cuts at the angles of mouth.

Some accompanying symptoms like diarrhea and dysentery may also occur. One does not feel hungry and has difficulty in digesting food. In earlier times a disease known as Beri Beri was quite prevalent in areas where polished rice was the staple food. This deficiency is no longer seen now. Consumption of brown rice instead of white rice prevents the occurrence of this disease.

2.6.5. Vitamin C deficiency

In the absence of fresh fruits and vegetables in our diet often deficiency of Vitamin C occurs. It is called **Scurvy**. Our gums, bones and teeth become weak. Gums swell up and start bleeding. Wounds also do not heal quickly. The only solution is to include fresh fruits and vegetables in our diet on regular basis.

2.6.6. Iodine Deficiency Disorders (IDD)

Iodine is very essential for the proper functioning of the body. Deficiency of iodine leads to a number of disorders like goitre, cretinism, mental retardation and deaf mutism.

Goitre is generally seen among adolescents, young adults and children. More females than males are affected. A severe deficiency of iodine during prenatal life may lead to Cretinism (severe mental retardation).

In India there are certain regions where goiter is quite prevalent areas. The foothills of Himalayas and the areas where there are frequent floods are the most goiter prone areas. Recent surveys have shown that areas in Andhra Pradesh, Madhya Pradesh, Maharashtra, Bihar, Gujarat and Kerala also have regions where goiter is prevalent.

The only solution to this problem is to eat **iodized salt**. For this reason our Government has banned the used of non-iodized salt.

Fig. 2.8. : A woman suffering from Goitre

Remember: Store iodized salt in air tight containers to prevent loss of iodine.

Cover and cook food to which iodized salt has been added.

INTEXT QUESTIONS 2.4

I Put a tick mark (√) against the right answer.

1. Deficiency diseases are those that occur in your body because of
   (i) less water
   (ii) absence of a nutrients
   (iii) absence of exercise
   (iv) presence of disease germs
2. Vitamin A is important because it
   (i) prevents night blindness
   (ii) keeps the skin healthy
   (iii) prevents anaemia
   (iv) prevents constipation
3. Haemoglobin formation is reduced in
   (i) scurvy
   (ii) anemia
   (iii) goiter
   (iv) night blindness
4. If you take excessive amount of carbohydrates, you will become
   (i) underweight
   (ii) anaemic
   (iii) obese
   (iv) Marasmic
5. An example of a food which prevents vitamin A deficiency is
   (i) spinach
   (ii) lemon
   (iii) banana
   (iv) potato

2.7 NEED FOR EATING VARIETY OF FOOD

Now you know the different nutrients and also the functions they perform in our body. You also know what happens when these nutrients are missing in our diet.

So what should we do to remain healthy?

We should eat food which provides all the nutrients. As you have seen, there is no single food which gives all the nutrients. You must therefore, eat variety of food items so that our body gets all the nutrients in the required amounts and we do not suffer from deficiency diseases.

ACTIVITY 2.6:

Examine your diet and check if you are receiving all the nutrients. If yes, mention nutrients you are getting in food items included in each meal in the table provided below. If not, modify your existing diet to include food items that will give you the required nutrients.

Existing diet	*Food Intake*	*Nutrient Intake*
Breakfast		
Lunch		
Dinner		

Modify the diet, if needed;

Modified diet	*Nutrient Intake*	
Breakfast		
Lunch		
Dinner		

2.8 RELATIONSHIP BETWEEN NUTRITION AND HEALTH

Knowledge of nutrition helps us to know the type and quantities of different foods to be taken in the diet in order to maintain good health. The World Health Organization (WHO) has defined health as "The state of complete physical, mental and social well being and not just the absence of disease". Hence, to be healthy in the real sense, one must not only eat right but also have a healthy mental and social outlook.

WHAT YOU HAVE LEARNT

- Carbohydrates, proteins, fat, vitamins and minerals are essential nutrients for our body.
- Water is not a nutrient but is essential in our diet to maintain important body functions.
- Sources of proteins are milk, cheese, egg, meat and pulses.
- Calcium and vitamin D are required to keep the bones and teeth healthy.
- Fresh vegetables and citrus fruits are rich in vitamin C.
- Green leafy vegetables, whole cereals, pulses and dates are good sources of iron.
- Deficiency of iron causes anaemia.
- Good sources of vitamin A are green leafy vegetables, milk and milk products, egg, butter and ghee.
- Deficiency of vitamin A causes night blindness and dry and rough skin.
- Ignorance is the main cause of deficiency diseases.

TERMINAL EXERCISES

1. List the four important functions of food?
2. Recommend three energy giving foods for an active school going child.
3. Justify the need of extra calcium and iron in diet of adolescents.
4. Write names of any four deficiency diseases and mention one symptom of each.
5. Match the nutrient given in column A with their functions in column B:

	Column A	Column B
i	Vitamins and minerals	Body building and repair of tissues
ii	Proteins	Energy giving
iii	Carbohydrates	Protection from the diseases

6. Complete the table given below :

S. No.	Name of nutrient	Main function	Sources 1 2	Deficiency Disease
1	Vitamin B			
2	Vitamin C			
3	Vitamin D			
4	Calcium			
5	Iron			
6	Iodine			
7	Water			

ANSWERS TO INTEXT QUESTIONS

2.1

1. Refer to text
2. (i) b (ii) c (iii) a
3. (a) Fat (b) Fat (c) Fat (d) Protein
   (e) Protein (f) Protein (g) Protein, fat (h) Carbohydrates
   (i) Carbohydrates (j) Protein (k) Carbohydrates (l) Fat
4. (a) Fat (b) Protein (c) cereal (d) potato

2.2

1. i. (iii) ii. (iii) iii. (ii) iv. (i) v. (iii)
2. Vitamin A and Vitamin D
3. (i) Vit. C (ii) Vit. A (iii) Vit. B (iv) Vit. A, Vit. B
   (v) Vit. A, Vit D (vi) Vit. A, Vit. B (vii) Vit. C (viii) Vit. D
   (ix) Vit. A, (x) Vit. A, Vit. D (xi) Vit. A (xii) Vit. A
4. (i) body, sunlight (ii) eyes (iii) Calcium (iv) vitamin B

2.3

(i) F, Makes digestive system healthy (ii) F,apple skin is rich in fibre
(iii) T (iv) F, makes you fit and healthy (v) T
(vi) T (vii) F, Fibre gives a feeling of satiety and prevents overeating.

2.4 (1) ii (2) i (3) ii (4) iii (5) i

Notes

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3

FOOD GROUPS

All of us eat different types of food everyday. There may be rice, dal, vegetables, milk, curd and fruit. We already know that all of these food items provide us nutrients, required by our body for energy, body building, repair of tissues and protection from diseases. Can you list the various nutrients in our food? Yes, you are aware that these are proteins, carbohydrates, fats, vitamins and minerals.

In the previous lesson we have learnt that some food items are rich in protein while others may be rich in carbohydrates, fats, vitamins or minerals. For example rice is a good source of carbohydrates while dal is a good source of protein.

So, it is necessary to select different food items so that our body gets all the nutrients it requires to remain healthy. You must be wondering what a healthy meal is. How can we make the right selection of food in our meals? In this lesson, you will learn that selection of right food which makes a balanced meal, results in good health.

OBJECTIVES

After studying this lesson, you will be able to :

- classify food items into different food groups;
- state the major nutrients and group the food items with similar nutrients for food exchange;
- understand the food pyramid for choosing balanced meals;
- recognize the importance of meal planning and associated factors, and
- plan balanced meals for the family to suit every member's needs.

3.1 FOOD GROUPS

You have already learnt about the nutrients, their functions and food sources. Now you must be wondering what are food groups. Based on the functions that are

performed by various types of food items available, they can be broadly divided into three groups as presented in table 3.1.

Table 3.1

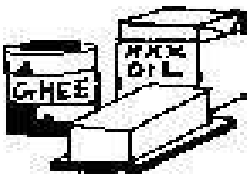
	Function	Nutrient	Food
1.	energy giving food	carbohydrates and fats	cereals, fats, sugar
2.	body building food	proteins	pulses, milk, meat, chicken
3.	regulatory and protective foods	vitamins and minerals	fruits and vegetables

There are several types of food items and each type can not be studied individually. Therefore, they have been categorized into different food groups. This grouping has been done on the basis of the nutrient content of each food. Let's learn about various food groups

3.1.1 The five food group system

Table 3.2 Food Groups

Food Groups	Food	Major nutrients present
cereals, grains and their products	rice, wheat, *ragi*, *bajra* maize, *jowar* barley, rice flakes, wheat flour etc. 	carbohydrates, proteins, vitamin B, iron, fibre
pulses and legumes	bengal gram, black gram, green gram, red gram lentil (whole as well as *dals*), cowpea, peas, *rajmah*, soyabean, soya nuggets, etc. 	carbohydrates, protein, vitamin B, iron, fibre
milk, egg and meat products	milk, curd, *paneer*, cheese, *chhachh*, *lassi*, buttermilk, skimmed milk. 	proteins, fat, vitamin B, calcium, vitamin A
	meat – chicken, liver, fish, egg, meat.	protein, fat, vitamin A

fruits and vegetables	fruits viz. mango, guava, orange papaya, banana, sweet lime, water, apple and vegetables viz. correct, pumpkin tomoto etc.  green leafy vegetables like amaranth, spinach, coriander leaves mustard leaves and fenugreek leaves and fruits like amla and pomegranate.	vitamin A, vitamin C, fibre
	other vegetables: brinjal, lady finger, capsicum, beans, onion, drum stick, cauliflower potato etc. 	vitamin A, calcium, iron, fibre carbohydrates and fibre
fats and sugar	fats: butter, *ghee*, hydrogenated oil, ground nut, mustard, coconut oil  sugars sugar, jaggery honey 	carbohydrates , fats carbohydrates

All cereals like rice, wheat, *ragi*, *bajra*, maize etc. give the same nutrients that is carbohydrates, proteins, vitamin B, iron and fibre, whereas all pulses contain protein, carbohydrates and vitamins. Similarly fruits and vegetables give vitamins and minerals while milk, egg and meat products are comparable in terms of their nutrient content. Therefore, if we substitute one food for the other in the same group, we will get almost the same nutrients. So it will be beneficial if we learn more about each food group.

3.2 CHARACTERISTICS OF FOOD GROUPS

3.2.1 Cereals

Cereals like rice, wheat and maize form the main component of our diet. As they are consumed in large quantities, they become the main source of energy in our diet. Whole cereals and grains contain considerable amount of fibre which, though not a nutrient, has a great importance in maintaining a healthy digestive system.

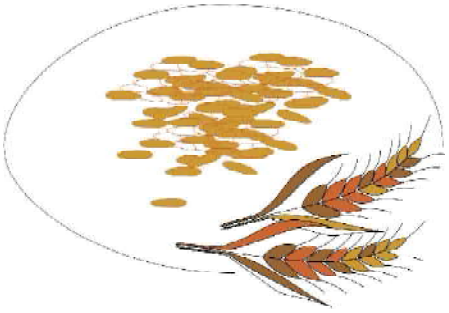


Fig.3.1 Cereals

In addition to this, fibre plays a crucial role in preventing several lifestyle diseases. You will learn about them later. We should eat cereals in the unrefined form to get sufficient amount of fibre. Cereals are also rich in vitamin B complex. This gets lost when cereals are refined, e.g. *maida* and polished rice. So our diet should have whole wheat flour instead of *maida* and home pounded or parboiled rice instead of polished rice. *Daliya* and brown rice should also be included in our meals.

You also know that most of us always eat cereals along with pulses, curd, milk, meat and vegetables. For example, *dal*-rice, *khichri*, *sambar, idli*, *dosa, dal-bati* and *biryani*. Can you guess why? Yes, because when cereals are combined with pulses or vegetables, the nutritive quality of our meal improves.

3.2.2. Pulses and legumes

Pulses and legumes like *arhar, urad, rajmah* and bengal gram, green gram *dal* are the major source of protein in Indian diets especially for vegetarians. They have a appreciable amount of vitamin B, calcium and iron.

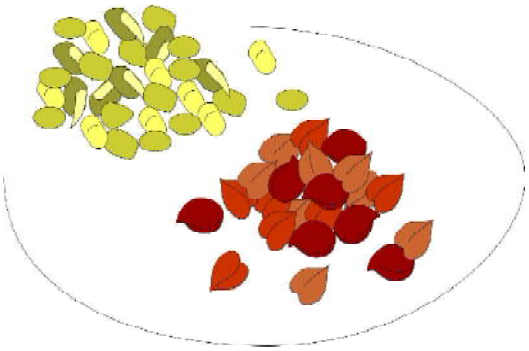


Fig. 3.2 Pulses and Legumes

You have already learnt that protein quality of pulses can be improved by combining them with cereals. Vegetarians should be careful in including both pulses and cereals in every meal to obtain optimum quality of protein.

Soya nuggets can be added for variety in the food.

3.2.3 Milk, egg and meat products

All of us know that milk is considered to be the best and complete food for small children. Do you know why? Yes, because it is a rich source of protein, fat, vitamin A and calcium. Curd and *paneer* also contain all the nutrients but skimmed milk contains very little fat.

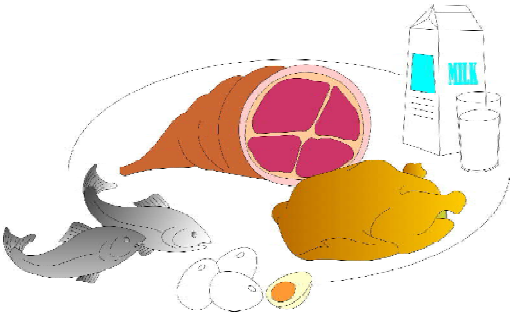


Fig. 3.3 Milk, egg and meat products

You must have seen that while making *paneer*, we drain away the water and hence water soluble nutrients are also drained off. Therefore, cheese and *paneer* have mainly protein as a nutrient. Remember this water can be used in cooking *dal* and kneading dough for *chapati*.

Eggs are a rich source of almost all nutrients except vitamin C. Eggs contain proteins of excellent quality therefore they are specifically recommended for growing children, pregnant women and lactating mothers.

Meat products include meat, chicken and fish. They are a rich source of high quality protein, vitamin A and vitamin B. As you know that a large percentage of population in India is vegetarian, it is advisable that they consume a combination of cereals, pulses and milk products. This combination is comparable with animal foods in terms of protein quality. Many of our traditional food combinations such as *khichri, dal*-rice, *dal-roti, idli-sambar, dosa-sambar* along with curd and butter milk are excellent examples of high protein quality meals. We must continue to value these traditional food combinations and avoid junk food.

INTEXT QUESTIONS 3.1

1. Match the food groups in column A with foods in column B:

	Group A		**Group B**
1.	cereals	(i)	*rajmah* and soyabean
2.	pulses		(ii) papaya and guava
3.	milk products	(iii)	*ragi* and *bajra*
4.	fruits	(iv)	brinjal and carrot
5.	vegetables	(v)	*paneer* and curd
		(vi)	ghee and butter

2. State whether the following statements are true or false. Give reasons for the same.

   (i) Cereals are the main source of energy in our body. True/False
   because _____ .

   (ii) We should eat cereals in refined form. True/False
   because _____ .

   (iii) Milk is considered the best food for small children. True/False
   because _____ .

   (iv) We should not consume a combination of cereals and pulses. True/False
   because _____ .

   (v) Pulses are specially recommended for vegetarian people. True/False
   because _____ .

3.2.4 Fruits and Vegetables

Fruits: Citrus fruits such as oranges and lemons are rich in vitamin C. Amla and guava are cheap and good sources of this vitamin. Yellow fruits like mango, papaya contain carotene which is converted into vitamin A in the body. We all know that vitamin A is very important for our eyes. Banana is a good source of iron, calcium and carbohydrates. Pomegranate is rich in iron. All fruits contain plenty of fibre, which helps in bowel movement. Dried fruits like raisins, figs, walnuts and almonds are rich in fats, iron, calcium and fibre. Locally available fruits should be preferred by us as they are fresh and economical.

Green leafy vegetables: Green leafy vegetables such as spinach, fenugreek, soya, *amaranth (cholai)* and mint are rich in carotene, calcium, iron and vitamin C. These are abundantly available in rural areas. We can easily grow them in our kitchen garden. It is very important to include them in our daily meal.

Others Vegetables: Potato, sweet potato, turnip, raddish and carrots are some examples of roots and tubers. These vegetables are a good source of carbohydrates. We all know that potato is considered to be the master of all vegetables. It is added in most of the vegetables. Do you know that potato also contains vitamin C along with carbohydrates?

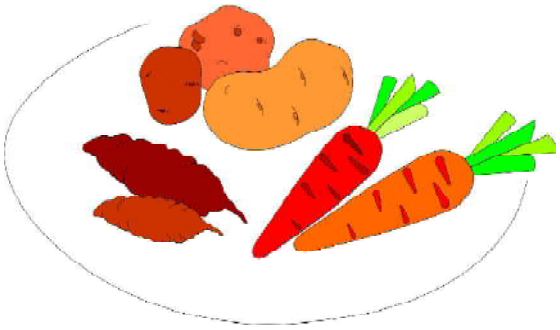


Fig. 3.4 Roots and Tubers

Now let us discuss carrots. Carrots are rich in carotene and provide colour and taste to a meal. You must have eaten sweet and tasty *"Gajar Ka Halwa"*, which is a very popular sweet dish made of carrots. Other vegetables like ladys finger, beans, brinjal, gourds, tomato, cauliflower and capsicum provide variety, taste, colour along with fibre to the daily meals. Some vegetables also contain an appreciable amount of vitamin C and minerals such as iron, calcium, zinc, sodium and potassium.

3.2.5 Fats and sugar

Butter, ghee, oils like mustard oil, groundnut oil, coconut oil and soya oil are the common types of fats consumed in India. Fats are a concentrated source of energy. Some amount of fat is needed in daily diet because they supply essential fatty acids. Besides this, some vitamins like A, D, E and K are fat soluble and important for our body.

Sugar, jaggery and honey are sweetening agents and provide carbohydrates to the body. Do you know that jaggery is better than sugar? Jaggery contains iron which is important for formation of Red Blood Cells (RBC) in our body. We should try to avoid excessive consumption of sugar or jaggery in our daily diet. Why? Extra sugar eaten by us gets converted into fat and gets accumulated in the body and makes us obese.

INTEXT QUESTIONS 3.2

Help Jenita, Jaspreet and Victor choose their breakfast from the two meal choices given below. Select the more nutritious meal out of the two and give reasons for the same.

Name	*Meal Option I*	*Meal Option II*	*Reasons*
Jenita	boiled egg and toasted bread	toasted bread with jam	
Jaspreet	stuffed potato *paratha* and butter and whole milk curd	fenugreek, paratha, butter, milk	
Victor	mixed vegetable daliya, curd	puri and potato *sabji*,	

3.3 FOOD EXCHANGE

Now, after learning in detail about each food group, we can conclude that similar food items have been placed together in one food group. Therefore, if we substitute one food for the other in the same group, we will be able to get almost the same nutrients. For example, Guddi takes one glass of milk and *roti* in breakfast, Arul eats

poha and one *katori* of curd whereas Sugna eats one fresh cheese (paneer) sandwich. Comment on their food selection. Yes, all of them take milk or its product along with cereals and get approximately the same nutrients. So we can say that substitution of one food item with the other within a group in such a way that the nutrients provided by them are approximately the same is called **Food Exchange.**

3.4 PYRAMID OF FOOD GROUPS

In order to assist in selecting food items from a food group a food pyramid has been developed.

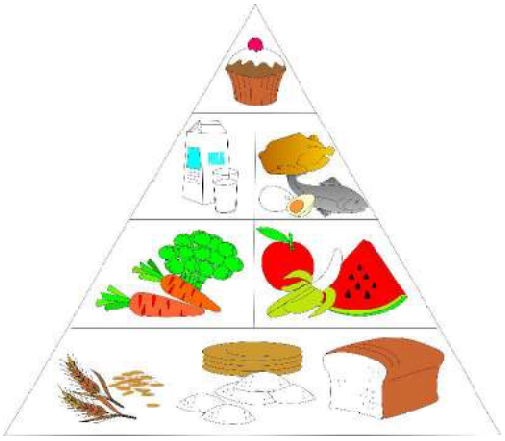


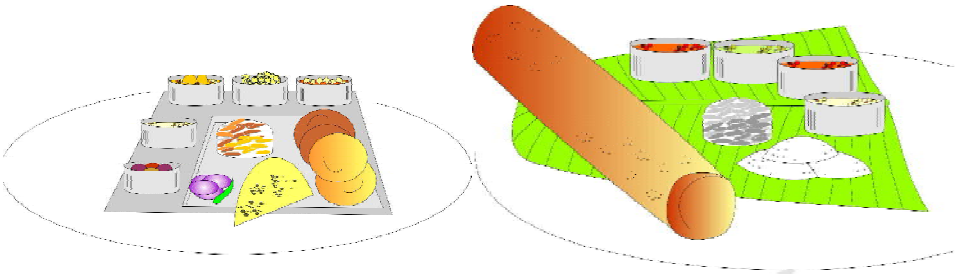
Fig.3.5 Food Pyramid

Pyramid of food groups clearly indicates that we should consume food from each of the five food groups to ensure good health. This also tells us to include food items which are at the top of the food pyramid such as fats and sugar in less quantity as compared to cereals and pulses which are at the bottom of the pyramid. Use of food pyramid not only ensures good health but also helps in planning a balanced diet and facilitates selection of alternate foods.

3.5 BALANCED DIET

Now that you are familiar with the food groups, let us learn about a balanced diet. In a meal, if we include food items from all the five food groups then our body will be able to get all the nutrients collectively, such a meal is called a **Balanced Diet**. A balanced diet is one which contains all the nutrients in adequate quantity to meet the body's requirements and some amount of nutrients are stored in the body to withstand short period of low intake.

Assess your family meals using the food pyramid to find out whether your meals are balanced or not. Do you realize how much effort your parents make to serve balanced meals to the family? For every meal they plan, purchase, prepare and cook, they try to include most of the food groups.



North Indian Thali *South Indian Thali*

Fig. 3.6

If you see the contents of each thali in fig 3.6, you will observe that a traditional Indian meal includes food items from most of the food groups. This is the result of collective wisdom of our society and we should adhere to it.

3.6 IMPORTANCE OF MEAL PLANNING

Most of us usually take three meals a day. these are breakfast, lunch and dinner. In between the meals we also eat snacks. Our body gets the required nutrients from these meals of the day. Therefore it is very important that these three meals should include food items from all the five food groups. Thus we can say that **meal planning** is a process of making a plan about what we should eat each day in every meal.

3.6.1 Meal planning requires:

Food management skills such as-

- skills to ensure variety in food by using nutritious, locally available, fresh, seasonable and affordable food;
- knowledge to fulfil the nutritional needs and requirement of all the family members;
- ability to use under utilized foods such as leaves of root vegetables like carrot, radish, turnip and beetroot;
- ability to creatively use left over food items in the kitchen;
- sensitivity to include dishes according to likes and needs of every family member, and
- goal setting, planning, problem solving and decision making to save, time, energy and money to serve balanced meals.

3.7 FACTORS AFFECTING MEAL PLANNING

Every home maker along with using the above mentioned meal planning skills, has to consider many other important factors, such as:

Age: You would have seen that people eat according to their age. For example, a baby drinks only milk till about six months, a small child eats *dalia* and *khichri* in small quantities. Adolescents eat a variety of food and in more quantity as compared to children. Similarly old people eat soft and easy-to-digest food in small quantity. As the nutritional requirements vary with age so the type of food, its quantity and quality also change.

Sex: You must have noticed that your father can do more heavy physical work as compared to your mother. Do you know why? Yes, because a man's body is more muscular than a woman's body. Hence a man requires more protein and energy than

a woman. So, while planning a meal, it is important to keep in mind the sex of the family members.

Seasonal availability: Some vegetables like radish, fenugreek, carrot and peas are available in the winter season while other vegetables like bitter gourd, bottle gourd and ladys finger are available in summer. As you know seasonal food items are fresh, nutritious, less expensive and easily available than the off season food items. Therefore, seasonal food should be preferred while planning meals.

Weather: All of us eat more in winter than in summer. What do you think could be the reason? This is because in winters our body needs more energy to maintain the body temperature. We enjoy eating peanuts, peanut chikki, sesame chikki and dry fruits during winters. These are energy rich foods and help us maintain body temperature.

Occupation: Some people like labourers, rickshaw pullers, sports persons and farmers do more manual work as compared to people like businessmen, shopkeepers, and teachers. So they require more carbohydrates and proteins. We must consider the nature of occupation of each family member while planning meals.

Physiological needs: While planning a meal, physiological needs of individual family member should be kept in mind e.g. pregnant and lactating mothers require more nutrients. A growing adolescent needs more protein and energy rich food. An old person needs a diet which is light and easy to digest.

Economic considerations: Income of a family has a direct impact on meal planning. The amount of money available influences our choice of food quantity and quality in a meal. Do you know there are many ways in which one can plan balanced meals without increasing the budget. For example, use the less expensive nuts such as groundnuts instead of cashewnuts and almonds; soy nuggets instead of *paneer* and guava instead of an orange.

INTEXT QUESTIONS 3.3

1. Give one reason for the following statements :

   (i) Shyam needs more protein and energy than Reena

   because _____ .

   (ii) Nagma includes seasonal fruits and vegetables in her menu

   because _____ .

   (iii) Jenny's grandmother should eat mixed vegetable *upma* in breakfast

   because _____ .

(iv) Vijay is a farm labour. He needs more food as compared to Arun, who works in an office

because _____ .

(v) Seema is a mother of a two month old baby. She needs more food

because _____ .

2. Fill in the blanks with appropriate words indicating more healthy food practices.

1. Mary can eat _____ instead of an orange to get vitamin C.
2. Nagma can prepare stuffed _____paratha instead of stuffed potato paratha.
3. Instead of cashewnut ladoos, Rita can prepare ladoos using _____ nuts.
4. Jaspreet can use _____ instead of sugar while making chikki.
5. Meera can prepare _____ curry instead of paneer curry for getting protein.

3.8 FAMILY MEALS

After learning about various factors affecting meal planning, you can now certainly list the factors affecting the meal planning of your family. These factors may vary from family to family. However, the most important point is that everyone needs a balanced meal. A meal which contains all the essential nutrients that are required by the body i.e. protein, carbohydrates, fats, vitamin A, B, C, D, iron, calcium and iodine. So, while planning a meal for your family, you will have to make sure that every meal has all essential nutrients in it. Now, you must be wondering, how you will do this. Yes, you are right. You can include one food item from each of the five food groups in every meal. Take an example of a sample menu for Sarita and Lalitha who are girls of the same age.

Table 3.3

S. No.	Five Food Groups	Meal 1 (Sarita)	Meal 2 (Lalitha)
(i)	cereals	chapati	rice
(ii)	pulses	arhar dal	urad dal
(iii)	milk, eggs and flesh foods	paneer curry	chicken curry

(iv)	fruits and vegetables	• potato and beans *sabji* • tomato and cucumber salad • guava	• potato and peas *sabji* • tomato and cucumber salad • Orange
(v)	oil, ghee and Sugar	used for cooking	used for cooking

Now, you can plan every meal of this type for your family. Do you know; this is known as **family meal** or the ***thali* meal** .

ACTIVITY 3.1

Make a list of different food items included in the meals consumed in your family yesterday. Categorize these food items into the five food groups. Analyse and discuss whether your family ate balanced meals or not.

Previous day's diet

	Food items	Food group	Remarks
early morning			
breakfast			
mid morning			
lunch			
evening			
dinner			
post dinner			

Consider Sarita's family having members in different age groups, that is, parents, grandparents, an eight year old sister and eighteen year old Sarita herself. Now, you can understand that all the family members have different nutritional requirements. It is good to suggest certain modifications or adjustments in the family meal to meet every member's requirements. These adjustments are –

Sarita and her sister should be given a nutritious snack in between lunch and dinner. As both of them are in a rapid growth and development phase, they need more nutrients. Example; mixed vegetable *poha*, mixed vegetable and *chana dal upma* or *dalia* with vegetable and peanuts etc.

Sarita's grandparents are aged so they require less carbohydrates and fat as compared to Sarita's parents although the requirements for protein and other nutrients remain the same for both. A soft and well cooked high fibre meal is ideal for her grandparents. High fibre food and lots of water are suitable for her parents.

Thus, you have learnt how to make modifications and adjustments in the same menu for various family members to suit their individual needs. We are sure this has helped you to learn how to make modifications in your family meals as per the needs and requirements of all the members.

WHAT YOU HAVE LEARNT

In this lesson you have learnt about

- classification of foods into five food groups
- characteristics and nutrients present in each food group
- substituting one food for the other in the same group
- use of food pyramid in planning a balanced diet
- importance of meal planning
- factors affecting meal planning - age, sex, seasonal availability, weather, occupation, physical need of each family member, economic consideration.
- planning of balanced meals for the family to suit individual needs.

TERMINAL QUESTIONS

1. Explain the importance of classification of foods and list the five food groups.
2. Describe the term 'food exchange' with the help of examples.
3. Explain 'balanced diet' and 'meal planning' in your own words.
4. State the importance of meal planning.
5. Briefly explain three important factors that influence meal planning.

ANSWERS TO INTEXT QUESTIONS

3.1

1) 1. (iii)
   2. (i)
   3. (v)
   4. (ii)
   5. (iv)

2) (i) True

because they are rich in carbohydrates .

(ii) False

because whole cereals contain fibre and form the bulk of our meals

(iii) True

because it is a good source of protein, fat, vitamin A and calcium.

(iv) False

because quality of protein improves when we combine cereals and pulses together.

(v) True

because pulses are a major source of protein in a vegetarian diet.

3.2

Jenita – Meal I because it has more protein rich food.

Jaspreet – Meal II because it is more nutritious (green leafy vegetable).

Victor – Meal I because it has more dietary fibre *(daliya)* and mixed vegetables.

3.3

1. (i) because men are more muscular than woman.

(ii) because seasonal fruits and vegetables are more nutritious and less expensive.

(iii) because aged person should eat soft and high fibre diet.

(iv) Vijay does more physical activity than Arun.

(v) because Seema is a lactating mother and she has to nurse the baby.

2. 1) guava

2) radish

3) peanuts

4) jaggery

5) soya nuggets

Notes

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4

METHOD OF COOKING FOOD

Cooking is being practiced since times immemorial. Do you know that the ancient man ate only raw food? Once a piece of meat fell into the fire accidentally and got roasted. The ancient man ate this piece of roasted meat and liked it. Thus began the process of cooking. It has evolved a lot since then. You find a variety of food items like roti, puri, parantha, rice, pulao, pulses, vegetable, salad, chutney, pickle, curd, butter milk, fruits, etc. You notice that boiled rice tastes different from zeera rice or pea pulao because these are cooked differently. Similarly, a chapatti tastes different from a puree or parantha, again because all these are cooked differently. Generally, vegetables like tomatoes, cucumber and fruits are best eaten raw while wheat, rice, pulses, potatoes and other vegetables must be cooked. Do you know why?

In this lesson you will get familiarized with the reasons for cooking food, different methods of cooking, their suitability to different foods and effect of these methods on food items.

OBJECTIVES

After studying this lesson you will be able to do the following:

- explain the importance of cooking food;
- name and classify various methods of cooking food;
- elaborate on the process of each method of cooking;
- explain the effect of cooking on various nutrients present in the food;
- identify cooking practices that enhance or destroy the nutritive value of foods;
- evaluate procedures used in preparing and cooking food at home;

Notes

- convince those involved in cooking to bring about the needed changes in the *cooking process and*
- learn the importance of striking a balance between retaining the nutritive value of food and food preferences of family members.

4.1 IMPORTANCE OF COOKING FOOD

Think and make a list of reasons for cooking food.

1. _____
2. _____
3. _____
4. _____
5. _____

Now read about these reasons in detail.

(i) Cooking makes food easy to digest

When food is cooked it becomes soft and easy to chew and swallow. The juices that digest food are able to mix well with this softened food and carry out the job of digestion.

(ii) Cooking improves the appearance, texture, colour, flavour, and taste of food

Have you noticed the change in colour of carrots, beet root, spinach, peas and other vegetables on cooking? They look brighter and more attractive. The brown colour of roasted roti or parantha or toasted bread or baked cake is very tempting. When we make roti or parantha the soft sticky dough changes into a crisp roti or parantha. Its smell and taste are very inviting, too. A raw potato is not tasty but a boiled or fried potato improves not only its taste but also brings change in its texture which is more appealing.

Addition of spices and condiments while cooking helps in improving the taste and flavour of food. You have seen how the addition of salt, chillies and/or herbs, influence the taste. Thus, cooking improves the colour, flavour, texture and taste of the food and therefore the acceptability of the food.

(iii) Cooking of food adds variety to the our meals

You must have eaten potatoes cooked in different ways. Can you name some? Yes, potato pakora, potato chat, potato parantha, potato bhujia, potato curry, potato chips and so on. Can you list a few food items that can be made with wheat flour? Yes, parantha, puree, roti, bread, mathari, etc. You can state numerous examples of dishes

that can be prepared using any one main ingredient. In other words we are saying that cooking helps in creating variety in the food served.

Think and write about three food preparations of your region which can be made using one main ingredient.

1. _____

2. _____

3. _____

(iv) Cooking helps to keep food longer

Do you know why we boil milk? Yes, if we do not boil milk it will curdle soon. Boiling of milk helps to kill micro organisms which spoil milk and thus makes it last longer. You must have noticed that wheat dough gets spoilt after some time but chapatties or bread made out of it can be kept for much longer time. We are sure you can quote many more examples of foods that have longer shelf life because these are cooked.

(v) Cooking makes food safe

Micro-organisms are present in raw foods. Some micro-organisms are harmless while others are harmful. Micro-organisms that convert milk into curd are beneficial while those that cause disease like tuberculosis are harmful. Milk may contain bacteria that cause tuberculosis. These bacteria get killed when milk is boiled or pasteurized. Milk which is pasteurized can be consumed as it is. You already know the reason for this.

> Pasteurization: In this process, milk is heated to a high temperature and then quickly cooled. The microorganisms in the milk are not able to withstand the sudden change in temperature and are destroyed.

Animal products like meat, fish, eggs and chicken are more likely to have harmful microorganisms and should be cooked thoroughly before eating. However, keeping the food for more than two hours at room temperature during summers can make it unsafe for consumption. Do you know why? You are right, microorganism can re-grow.

ACTIVITY 4.1

Observe and list the changes in the colour, texture and taste of the following food items after they are cooked. Also note the method used for cooking them.

Notes

Food item	Colour, Texture and Taste		
	Before Cooking	After Cooking	Method of cooking
Spinach			
Rice			
Arhar/ toor dal			
Potato			
Egg			

4.2 CLASSIFICATION OF METHODS OF COOKING

Some food items have a lot of moisture (water) in them. Leafy vegetables, e.g., spinach and fenugreek have lots of moisture. These are cooked using methods that make use of this moisture. But food items like wheat, rice and pulses are low in moisture content. These are cooked by adding extra water. There are also methods which do not require any water while cooking. In fact these help in cooking and leaving the food crisp on completion. There are many methods of cooking food. You must be using many of these methods. Can you name some?

The methods of cooking are classified as given in table 4.1.

Classification of Methods

Table 4.1: Methods of Cooking

Cooking by Moist Heat	Cooking by Dry Heat	Cooking by Frying in oil or ghee
Boiling	Baking	Deep frying
Simmering/Stewing	Roasting	Shallow frying
Steaming	Grilling	
Pressure cooking		

4.3 DESCRIBE METHODS OF COOKING

We are sure you can describe the methods of cooking that you often use while cooking food. Of these, the most common methods are likely to be boiling, frying and pressure cooking. We will now describe the procedure of each method of cooking along with precautions, its suitability to various foods, and its advantages and disadvantages. Check if you are following the same procedure.

4.3.1. Cooking by moist heat

In this method, food is put into boiling water or cooked in the steam which comes out from the boiling water. Some common ways by which you cook food by moist heat are described here.

(i) Boiling

Boiling is a method by which food is cooked in adequate quantity of water. For example we boil potatoes, eggs, rice and vegetables. Usually green leafy vegetables such as cabbage, fenugreek and spinach are cooked without adding extra water. Vegetables such as green peas and green beans are boiled or cooked with a little water. Cereals such as rice and pulses are boiled in large amounts of water (1.5 to 3 times). Do you know why? Yes, you are right cereals and pulses need more water to cook as they are dry and they also need more time to cook. Vegetables take less water to cook as they have higher water content.

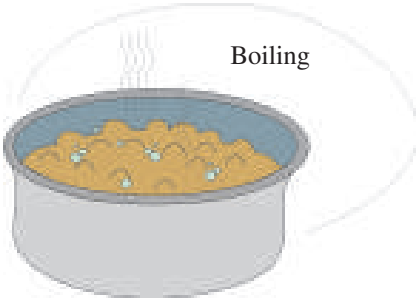


Fig. 4.1

Some points which must be kept in mind while boiling food are as follows:-

- wash the food thoroughly before boiling;
- first boil the water and then put the food;
- the water should cover the food completely;
- boil food in a pan which has a well fitted lid. This way the steam from boiling water will not go out from the pan and the water will not dry up. Food gets cooked (boiled) faster and fuel is also conserved in the process.
- do not boil food longer than needed. Once it is soft and tender, take it off the fire. If food is cooked for a very long time it loses its colour, shape and taste. Over cooking also destroys the nutritive value of food.
- potatoes and other root vegetables should be boiled with their skins on to retain their nutritive value.

Water soluble nutrients present in food dissolve in water in which the food is being boiled. If you throw this water, nutrients will be lost. What can you do with this water? You can use this nutrient rich water to make soup or gravy for other vegetables.

Advantages: Boiling is a safe and simple method of cooking also the food does not get charred. It is suitable for large scale cooking. Boiled food is also digested easily.

Disadvantages: While boiling, water soluble nutrients are lost if the water in which food is boiled is discarded. Some people may not like boiled food as they find it bland. The taste of boiled food can be enhanced by adding lemon or other herbs and spices.

Let us think

a) Why are certain food items boiled before they are used in a recipe?

b) Why does it take longer to boil chick peas (channas) or kidney beans (rajmah) as compared to potatoes? Can we reduce the time taken to boil channa or rajmah? How?

c) Name two foods which do not need boiling before cooking, two which need boiling before cooking and two which can be cooked either way.

(ii) Simmering or Stewing

Stewing is cooking food in a small quantity of water kept below boiling point and for a long time. Once boiling starts, the flame is lowered and the food is allowed to cook slowly. The food and the liquid in which it is cooked are served together.

Have you used this method of cooking food in your house? Yes you are right. When you cook dry and hard foods like pulses, meat and even vegetables in dry form you are using this method.

Advantages: In stewing, the juices of the food are retained and the food tastes good. The nutrients are also conserved better.

Disadvantages: Food takes longer to cook.

(iii) Steaming

When food is cooked with the heat from water vapours, it is called steaming.

How do you steam food? Well, you keep food in a pan in such a way that it comes in contact with steam from the boiling water. Look at Figure 4.2. The big utensil with a lid is the steamer. It consists of two pans and a tight lid.

Fig. 4.2

The lower pan contains water, the pan above this has tiny holes on its base and the food is kept in it. A tight fitting lid covers this food. When water boils in the lower pan the steam comes into the upper pan through holes and cooks the food kept here.

If you do not have a steamer can you devise one? Yes, definitely. Heat water in a pan which has a tight fitting lid. Cover this pan with a clean muslin cloth. The cloth should be of optimum size and should not get in touch with fire. Put food on this cloth and cover it with a tight fitting lid. Your steamer is ready and working.

Have you seen an idli maker? This is also a steamer. Idli batter is put in the idli mould which has tiny holes. This mould is then lowered into a container with a little water at the bottom. The idli maker is then kept on fire. When water boils steam is produced. Once again it is the steam which passes through the holes in that mould and cooks the idlis. Steaming can be done for both solid and semi-solid foods. You can cook momos, khaman, dhokla and caramel custard in the same way.

Advantages: Steaming shortens the duration of cooking and helps to conserve nutritive value, colour, flavour and palatability of food. Steamed food is light, nutritious and easy to digest. Such foods are especially good for people who are sick or people with weak digestion or for the elderly. Young children also can be served steamed food.

(iv) Pressure Cooking

Pressure cooking is a process of cooking in a special utensil which allows cooking with a lot of steam under pressure. Pressure cookers are made of steel or from a mixture of aluminium and other metals and can withstand high pressure. The steam produced is trapped inside the cooker thus increasing the pressure and temperature above 100°C. Rice, pulses, meat, potatoes, roots, beans, and peas are cooked well in a pressure cooker in the shortest possible time.

It is important to remember that once the pressure cooker develops optimum pressure the excess steam is released through the weight kept on its lid. One should lower the flame under the pressure cooker at this time. This maintains the pressure and avoids fuel wastage. We must also remember to clean the weight regularly as it has tiny holes which get blocked with food. This prevents the escape of excess steam built up in the pressure cooker which can lead to the bursting of the pressure cooker and causing severe injuries. You must also check the rubber gasket of the pressure cooker as it creates a seal because of which steam is trapped.

Advantages : Pressure cooking kills all bacteria and hence the food is safe and hygienic to eat. The food gets cooked faster i.e. almost in 1/3rd time than boiling. This also saves the fuel. Several foods can be cooked together in the pressure cooker by using separators. It is not necessary to immerse food in water while cooking and this reduces the loss of water soluble vitamins and minerals.

Disadvantages: If food is cooked for very long, it losses its texture and may even burn.

ACTIVITY 4.1

Your friend's family loves to eat boiled rice and dal. Rice has to be boiled with lots of water and the extra water is thrown away. You know that throwing this water means we throw away the soluble nutrients present in rice.

Why is it necessary to break this habit?

Why does the family refuse to change?

How can this problem be solved?

Fig. 4.3

INTEXT QUESTIONS 4.1

1. List four advantages of cooking food.

   (i) _____

   (ii) _____

   (iii) _____

   (iv) _____

2. Choose the best option from those given below:

   (i) A method of cooking where food is cooked without coming in contact with water is called _____.

   a) steaming

   b) boiling

   c) stewing

   d) pressure cooking

   (ii) Of the four methods of cooking food with moist heat, the one method which preserves the maximum nutrients is called _____.

   a) steaming

   b) boiling

   c) stewing

   d) pressure cooking

(iii) Stewing is characterized by _____.

a) high temperature and lots of water

b) high temperature and little water

c) low temperature and little water

d) low temperature and lots of water

(iv) Pressure cooking is done at _____.

a) above 100 degrees

b) below 100 degrees

c) 100 degrees

d) any of the above temperatures

4.3.2. Cooking by dry heat

We all like to eat khakhras, peanuts, bread, buns, cakes and rusks. Do you know how these are cooked? Yes all these are cooked by dry heat which is usually hot air. The temperature used is as high as 200-300°C. Dry heat cooking gives a crisp texture, brown colour and pleasant flavor to the foods.

There are three ways of cooking food by dry heat.

a) Baking

b) Roasting

c) Grilling

Let us learn about these.

(i) Baking

Baking is the method by which food is cooked by placing it inside a heated closed box called an oven. The air inside the oven gets hot due to fire lit at its base or with electricity and the food gets cooked by hot air, when placed inside. Have you seen a bakery in your neighbourhood? You must have also seen the big ovens which are heated by fire produced by coal or wood and which are used to bake roti, naan, pav, buns, biscuits, breads and pastries. These ovens are also known as 'bhattis'.

Fig. 4.4

You can easily make an oven at home. Take a kadhai or a thick walled vessel that will retain heat well. Put a layer of sand in it and fit it with a lid. Heat this over coal, kerosene

or a gas stove. Once it becomes hot, put the food inside and close the lid. Place the tin or kadhai on a low fire. Bake food till it is light brown in colour. Do not open the lid very frequently because the hot air from inside will escape and make the food dry and hard.

Advantages: Food cooked using this method adds a variety to the texture in our plate.

> Remember some baked products may be high in calorie content like cake and pastries. etc.

(ii) Roasting

Another method of cooking food by dry heat is roasting. While roasting, the food is put directly on a hot tava or girdle or sand or fire and cooked.

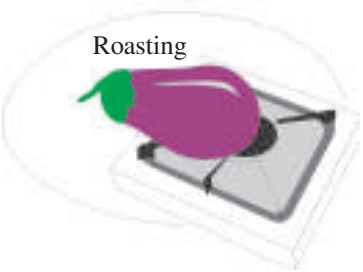


Fig. 4.5

Vegetables like brinjals, potatoes and sweet potatoes, can be roasted and so do grains like maize and chick peas. Nuts like ground nuts, cashew nuts and foods like papad, khakhra and meat are also cooked by this method. We are sure you have roasted many of these foods. Which foods do you usually roast at home? One of them would have been brinjal.

Well while roasting brinjal you must have placed it directly on the fire and must have kept on turning it every now and then so that all sides get roasted. How did you know that your brinjal is roasted and ready?

Have you seen grains or maize or chick peas or peanuts being roasted? How is that done? Yes you are right. These are roasted in hot sand placed in a huge vessel like a karahi. The food is stirred all the time for even distribution of heat. Tandoor is a kind of oven made of clay and used for roasting rotis, naans, paneer and chicken.

Find out how else roasting is done.

Advantages: Food is tastier when cooked this way. It also adds variety to a meal.

Disadvantages: It is a relatively slow method of cooking. Roasted food sometimes is too dry, therefore, it may be served with a chutney or sauce.

(iii) Grilling

Grilling is cooking over a glowing fire and uses more indirect heat and is slower than roasting. The food is supported on an iron grid over the fire, or between electrically heated grill bars. The grill bars are brushed with oil to prevent food sticking and can be heated by charcoal,

Fig. 4.6

gas or electricity. The food is cooked on both sides to give a distinctive flavour. Potato, sweet potato, brinjal, chicken and fish can be grilled. You have eaten bati chokha, chicken and paneer tikkas and kababs. All these foods are cooked by grilling.

Advantages: Grilling like roasting also gives nice flavor to the food. You can prepare a variety of dishes using this method.

4.3.3. Frying

Frying is the process of cooking food in hot ghee or oil. Food can be cooked either by shallow frying or by deep frying. Shallow frying means frying in little oil and deep frying means immersing food fully in hot ghee or oil. You must have cooked foods using both these methods. Name some food items which you cook at home using these methods and write in the table given below.

Table 4.2

	Shallow frying	Deep frying
1		
2		
3		

Deep frying

Several Indian foods are cooked using frying. These include foods like bhajias, pakodas, samosas, vadas and kachoris. Deep frying is carried out by dropping food in well heated ghee or oil in a kadahi. The food should fully dip in ghee or oil. A few pieces of food should be added at a time. We should avoid using large quantity of oil or ghee for frying. Overheating of ghee or oil while frying should be avoided.

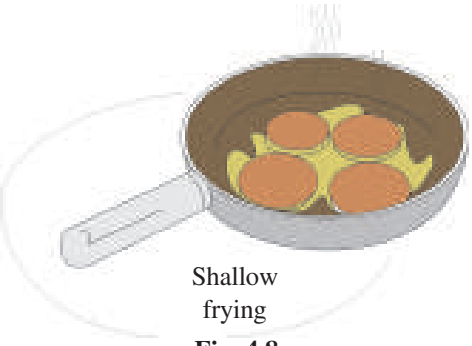

Deep frying

Fig. 4.7

After frying, cool the oil and store the leftover oil in a covered container to prevent any decomposition. Avoid repeated use of the same oil for frying.

Shallow frying

How will you shallow fry the food? What precautions will you take while shallow frying? Yes, you are right. Use as little oil as possible and control the heat. Turn the side of the food when needed and apply oil if needed again. Non-stick pans are good for shallow frying. As they need very little oil to fry.



Shallow frying

Fig. 4.8

Some precautions while frying food:

(i) food should be cut into even sized pieces to ensure even cooking;

(ii) the (ghee or oil should be heated well and then the flame or heat should be reduced a little;

(iii) a few pieces of food should be put at one time as adding a lot of food may lower the temperature of fat and increase fat absorption;

(iv) fried food should be placed on a clean, absorbent kitchen napkin or brown paper;

(v) all the pieces of food should be removed from the oil or ghee to avoid burning of these food pieces and spoiling of the ghee or oil;

Advantages: Fried food has longer life than food cooked using other methods;

Disadvantages: Fried food especially deep fried food is difficult to digest and has many calories, too. Excessive consumption of fried foods can be bad for health.

4.3.4. Other Methods of Cooking

(i) Microwave Cooking: It is a comparatively new method of cooking and gradually becoming popular. In this method food is cooked by microwave radiation. Water molecules in the food vibrate rapidly due to microwaves. The heat generated in the process cooks the food.

Microwave Cooking

Fig.4.9

Advantages:

It is a quick method of cooking. Cooking time is reduced significantly as compared to other methods of cooking.

Disadvantages:

(i) It uses electrical energy and therefore may not be useful in places where continuous electric supply is not available.

(ii) It may dry up the food products.

(iii) Solar Cooking: A solar oven or solar cooker makes use of sunlight as its source of energy. Box type solar cookers are useful for a family while panel type solar cookers can be used for community or large scale cooking.

Remember

While using a microwave, remember to open a microwave a few seconds after it has stopped. This will decrease your exposure to radiation.

Advantages:

(i) A solar cooker does not produce smoke. It has low maintenance and practically no running cost.

(ii) It is an environment friendly method of cooking food.

(iii) Solar cooking can be successfully done in many parts of India.

Solar Cooking

Fig.4.10

Disadvantages:

Solar cooker is used outdoors and works only when there is plenty of sunshine.

INTEXT QUESTIONS 4.2

1. Fill in the blanks with appropriate words.

   i) The method of cooking food in an oven is called …….

   ii) When sunshine is used for cooking it is called……

   iii) The process of cooking food in hot sand is called ……

   iv) …… is a method of cooking where food is cooked in a closed box which is heated on gas or coal or using electricity.

   v) When food is cooked on direct flame the method is called ……..

   vi) Cooking on hot tawa is called ……..

   vii) Cooking food in hot oil is called …….

   viii) …… is a method where heat is generated in the food by rapid vibrations of water molecules.

   ix) In ……. the temperature used is as high as 200-300°C.

2. Write two differences between baking and roasting.

   Differences

   i) ……

   ii) ……

3. Write two differences between shallow frying and deep frying.

   Differences

   i) ……

   ii) ……

4. State one advantage and one limitation of solar cooking.

   ……

   ……

5. Gauri is cooking *sooji halwa*. The recipe is given below. Identify the methods of cooking used while making the *sooji halwa.* Write in the space provided.

Steps for preparing the *Sooji Halwa*:

1. Add sugar to water and mix well and prepare a solution while heating

   ……

2. In a *kadai* (vessel) take a little ghee and sooji and cook for 3 minutes

   ……

3. Add more oil/butter and cook for 20 minutes on medium heat, till the sooji turns brown

   ……

4. In a *kadai* (vessel) add cardamom powder, raisins, grated almonds, water and sugar solution slowly, stirring continuously with a spoon and allow water to evaporate for 5-7 minutes

   ……

5. Garnish with a grated almonds.

4.4 LOSSES OF NUTRIENTS DURING COOKING

Food can loose its nutritive value in the process of cooking. Correct methods of preparation and storage must be used to preserve nutrients. Let us understand how these losses occur.

(i) Vitamin A:

It gets oxidized when it reacts with oxygen present in the air and gets destroyed. Cooking at high temperature in an open pan results in food coming in contact with oxygen for a long period of time and this brings about a reduction in vitamin A content.

You have already learnt that Vitamin A is a fat soluble vitamin. It gets dissolved in fat when foods like spinach or fenugreek (*methi)* are deep fried. Temperature as high as 300°C is reached during deep frying which destroys vitamin A rapidly. While preparing carrot potato vegetable, cook in a covered pan in order to prevent the loss of vitamin A.

(ii) Vitamin B Complex

It is a group of eight water soluble vitamins. They are generally found together in most foods and share certain properties in common. Vitamin B gets dissolved in water when these foods are washed, soaked or cooked in water. If this water is discarded, it results in the loss of Vitamin B.

Rice, pulses and some vegetables are the main sources of vitamin B complex in our diet and therefore care should be taken while washing, soaking and cooking these foods.

Another reason for the loss of Vitamin B complex from our food is the addition of cooking soda to the food during the process of cooking. Therefore use of soda while cooking food should be avoided.

Milk is a good source of Riboflavin also called Vitamin B_2 It gets destroyed when milk is exposed to sunlight (due to ultraviolet rays). In order to preserve Vitamin B in food, exposure to sun light should be avoided.

(iii) Vitamin C

It is another water soluble vitamin which is easily destroyed by heat and oxidation. When you cut vegetables and fruits rich in vitamin C and leave them exposed to air for a long time before cooking or eating it, some of the vitamin is lost. Vitamin C is also lost when you wash vegetables and fruits after cutting or if you cut them too fine.

When food rich in vitamin C are cooked for a long time or cooked with soda most of vitamin C is lost. This vitamin is also lost when the water in which the food is cooked is thrown away. Therefore, proper care during cutting, washing and cooking of vitamin C rich fruits and vegetables should be taken. Citrus fruits and vegetables (sour and juicy) have this vitamin in plenty and we can conserve it.

(iv) Proteins

Cooking results in softening of proteins in foods such as egg, fish and meat. All proteins present in the food items absorb water and get coagulated by heat. If the coagulated protein is further heated, it loses moisture and becomes dry and rubbery. It also becomes difficult to digest.

Addition of acidic ingredients like lemon juice, tomatoes, curd or tamarind juice increases cooking time and makes the protein tough and leathery. These substances should be added towards the last stage of cooking.

When protein rich foods like milk are cooked with sugar for a long time (for example, while making kheer or rabdi) the sugar and protein react to form a brown coloured compound and the quality of protein deteriorates.

Fig.4.11

(v) Oils and Fats

Oil and ghee are used for cooking and frying of foods. During frying the oil or ghee is heated to a high temperature i.e. 300°C. Repeated use of oil for frying is quite a common practice but must be discouraged because when ghee or oil are heated for long periods of time over and over again, their quality becomes poor.

Remember: Repeated use of the same oil or ghee as a cooking medium should also be avoided. You should keep changing the cooking oil used in your kitchen. You may choose any of the oils like groundnut oil, vegetable oil, sunflower oil or soyabean oil. You have already learnt that once oil or ghee has been used for frying it should be allowed to cool and then sieved and stored in a covered container.

Fig.4.12

(vi) Minerals

Minerals like sodium and potassium dissolve in water. Minerals get lost when food is first cut and then washed and the extra water in which they are boiled, is thrown away. Hence, we should not throw away water in which food has been cooked. While cooking, we should wash vegetables and fruits before cutting.

INTEXT QUESTIONS 4.3

1. Write true (T) or false (F) against each statement.

   (i) Cooking soda has no harmful effect on nutrients present in food that is being cooked. ……..

   (ii) Minerals are lost when the water in which the foods are cooked is thrown away.…….....

   (iii) Maximum loss of nutrients occurs when food is pressure-cooked. …….....

   (iv) Vitamin C gets easily destroyed during cooking. .....……

2. You are served the following - (i) boiled potato raita (ii) potato chips (iii) potato pakora (iv) roasted potato

   Answer the following questions with reasons.

   (i) Which dish would have least nutrients?

   (ii) Which dish would be suitable for a nine months old baby?

   (iii) Which dish would take the least time to cook?

Note : There may be more than one answer for each question.

4.5 CONSERVATION OF NUTRIENTS

Conservation of nutrients means saving nutrients during the process of preparation and cooking of food. We can conserve nutrients in food items by following some simple practices:

1. Wash vegetables before cutting them so that minerals and vitamins are not destroyed. Wash them only as much as necessary.
2. Scrape the peels of vegetables as thin as possible because vitamins and minerals are found just under the skin of the vegetables.
3. Cut vegetables into large pieces just before cooking. Small pieces mean greater loss of nutrients.

4. If vegetables are to be cooked in water, put them into boiling water.
5. Use just enough water for cooking. Do not throw away the extra water. Use this extra water to cook some other food.
6. Do not use cooking soda while cooking.
7. Use of tamarind or lemon juice during cooking helps to conserve the vitamins.
8. Cook rice in just enough water which gets absorbed during cooking.
9. Cook in a pan which has a well fitting lid. When you cook in an uncovered pan most of the nutrients are lost.
10. Do not overcook the food as many nutrients will be destroyed.
11. In order to preserve nutrients, use a cooking method which cooks food the fastest.

ACTIVITY 14.2

Lesson 4 discusses the common nutritional problems affecting large number of people in India. The most common ones are anemia (caused due to iron deficiency), goitre (caused due to iodine deficiency) and night blindness (caused due to vitamin A deficiency). Fortification is the technique of adding specific nutrients to a food (called the carrier) in order to overcome the commonly seen deficiency disorders. One such example is **Iodised Salt.** The symbol of smiling sun helps you identify the iodized salt. Similarly there are other products that are fortified with specific nutrients. Visit a grocery shop or mall in your neighbourhood. Carefully read the nutrition labels on cooking oil containers, wheat flour and biscuit packets. Note the nutrients added to them. Do they carry a special symbol?

4.6 ENHANCING NUTRITIVE VALUE OF FOOD ITEMS

You are now familiar with the different methods of cooking and ways that help us to conserve nutrients while cooking. It would be brilliant if we could increase the nutritive value of food items without increasing the cost. Can you suggest some ways of doing so?

The process of improving the nutrients in food items by special methods is called **Enrichment or enhancement of nutrients.**

You must understand the purpose of enhancing the nutritive value of food. It helps to–

- provide food which can meet the nutritional requirements of the body;
- provide opportunity for proper selection and preparation of food items;
- provide an opportunity for balanced food;

- improve the flavour and texture of the food;
- make available a variety in food;
- assist in planning the daily menu, keeping in mind the content of the nutrient in the food;
- prevent deficiency diseases in the body; and
- develop good food habits.

4.6.1. Methods of Food Enrichment

We can enrich the foods using the following simple methods:

i) Combination

ii) Fermentation

iii) Germination

Let us learn more about these methods.

(i) Combination

No single food provides us all the nutrients. Hence, we eat a variety of food. For example, we eat roti with vegetables and rice with dal. We include salad, curd, buttermilk chutney, pickle and papad, too, in our regular meals.

Combining foods from different food groups is the easiest way of eating all nutrients. Similarly we can also combine a number of food items in one dish and get all the nutrients from it. Khichadi, dhokla, missi roti are a few examples where we are combining ingredients from different food groups. Such a combination of food items improves the quality of nutrients. Do you know how this happens? Here are some examples.

You know that cereals lack certain amino acids. And these are present in pulses. When a pulse and rice are combined, the quality of proteins becomes as good as that of milk. Ideally cereals (rice, wheat, jowar, bajra and maize) should be combined with pulses, nuts and oil seeds like groundnuts, sesame seeds and milk products to get a good quality protein in our diet. Similarly vegetables like spinach, fenugreek and carrots are rich in vitamins and minerals. These when added to a meal can further enhance the nutritive value of food.

Advantages: The quality of a meal is improved without increasing the cost by combining two foods selected from same or different food groups. It is a simple technique that can be followed in every household.

(ii) Fermentation

Fermentation is a process in which micro-organisms present in the food or added in the form of curd or yeast, change nutrients already present in the food, into simpler and

better form. In this process some new nutrients like Vitamin C and B complex are also created.

Fig.4.13

Can you name some fermented foods? Yes, curd, bread, khaman, dhokla and idli are all examples of fermented food items.

Have you ever made bhaturas? These are made by mixing a little curd in maida (refined flour) which is kneaded into dough and kept covered for a few hours. During this time the dough rises. Do you know why? When you add curd to maida you introduce micro-organisms which begin to grow at a very fast rate. They start a process called fermentation which makes the dough rise and become almost double in quantity.

Similarly, idli is prepared by auto fermentation where microorganisms present in rice and pulse cause fermentation and the batter rises. During fermentation the micro-organisms use up some of the nutrients present in the batter and change them into better quality nutrients. They also produce additional nutrients like vitamin B-complex and vitamin C which were not present in the food earlier. These are two examples of fermented food.

Advantages

a) Fermentation improves the digestibility of food items. The micro-organisms which cause fermentation break the proteins and carbohydrates into smaller parts, which are easier to digest.

b) Fermented foods become spongy and soft and thus become, specially, useful for young children and elderly people.

(iii) Germination

Take some whole 'moong' or 'channa' and soak it overnight in a sufficient quantity of water. What do you see the next day? Yes, they become big in size and soft to touch. Now drain the water thoroughly and tie or wrap the soaked grains in a wet cloth and keep for another 12 to 24 hours, you will notice that small white shoots have started growing from these grains. This process is called germination or sprouting.

Fig.4.14

Grains like wheat, bajra and jawar can also be sprouted. These grains can then be dried in shade and roasted lightly on a heavy bottom pan. They can be grounded and used in preparing supplementary food items for young children and elderly people. Pulses like moong, peas and black grams are also sprouted first and then steamed and eaten after adding salt, chilli powder, lemon juice and chat masala.

The time and water which each grain or pulse or legume needs for soaking and sprouting is different. Normally 8-16 hours are needed for soaking and 12-24 hours for sprouting depending upon the season. The cloth in which the soaked grains is tied should be kept moist all the time.

Advantages

i) It increases digestibility of foods because some carbohydrates and proteins are broken down into smaller and easily digestible forms.

ii) It increases the nutritive value of food with no additional cost. You have already learnt how this happens.

INTEXT QUESTIONS 4.4

1. Arrange the following steps of cooking in the right order by putting a sequential order of 1, 2 … against each step.

	Order
a) watch the time while cooking	_____
b) wash the vegetables	_____
c) cook in covered pan	_____
d) peel the vegetables thinly	_____
e) cut the vegetables into big pieces	_____

2. Write three ways of preventing nutrient loss while cooking green vegetables.

……

……

……

3. Fill in the blanks

i) Combination of food items is important since no food supplies…… …..the nutrients.

ii) Combining food items is beneficial where …… money is available.

iii) Germination increases the nutritive value and …… of food items.

4. In Column I are listed three ways of enhancing the nutritive value of food items and the Column II contains the reasons for this improved quality. Match the method with appropriate reason.

Column I	Column II	Reasons
a) Combining	i) increases vitamin content due to activity of microorganisms	
b) Fermenting	ii) increases the vitamins	
c) Germinating	iii) improves quality due to different items eaten together	
	iv) increases the acidity of food	

5. You made arhar dal and rice for the lunch. You can also cook the same dal by mixing moong and spinach in it. Which meal is now more nutritious and why? Will this change be acceptable to your family? If not then what will you do?

Your family loves to eat 'aalu tikki' (potato cutlets) which are deep fried. If you made this snack using shallow frying and served them with channa and chutney. Will the change be acceptable?

TERMINAL QUESTIONS

1. List five advantages of cooking food?
2. Name two methods of cooking food for the following:
   i. Long cooking time
      a.
      b.
   ii. Short cooking time
      a.
      b.
3. Dolma prepared cabbage salad for herself, whereas Mohan cooked cabbage for his meal. Who got more vitamin C from the cabbage?
4. Saraswati is cooking spinach in her kitchen. She chopped the spinach finely, washed it thoroughly and shallow fried it in an open pan. Do you think she cooked it the right way? Give reasons for your answer

5. How do the following improve the nutritive value of foods?

   a. Fermentation

   b. Germination

5. Match the food items given in column I with the method used in cooking it from the column II.

Column I	**Column II**
Cooked food	**Method of Cooking**
(i) Dhokla	(a) Simmering
(ii) Dal	(b) Deep-frying
(iii) Puri	(c) Shallow frying
(iv) Parantha	(d) Steaming
	(e) Boiling

ANSWERS TO INTEXT QUESTIONS

4.1

1. Refer text

2. (i) c (ii) a (iii) b (iv) a

4.2.

1. i. baking ii. solar cooking iii. roasting iv. baking
   v. grilling vi. baking vii. frying viii. microwave cooking ix. dry heat.

2.

Baking	**Roasting**
(i) Food is placed inside a closed box called oven.	(i) Food is put directly on the hot tava, hot sand or hot fire.
(ii) It is used for making bread biscuits, cakes, etc.	(ii) It is used for roasting channas, brinjal, maize etc.

3.

Shallow frying	**Deep frying**
(i) little oil is smeared on the food.	(i) food should fully dip in ghee/oil
(ii) Tava or frying pan is used for frying	(ii) Karahi is used for frying

Notes

4. Refer text

5. 1. boiling
   2. roasting
   3. stewing
   4. frying

4.3

1. (i) False (ii) True (iii) False (iv) True

2. (i) Potato chips, potato pakora
   (ii) Potato raita, baked potato, roasted potato
   (iii) Potato baked in mirowave oven.

4.4

1. b) 1 (d) 2 (e) 3 (c) 4 (a) 5

2. Refer text

3. (i) All
   (ii) Less
   (iii) Digestibility

Notes

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5

PRESERVATION OF FOOD

You have already learnt that a balanced diet is drawn from various food groups which are composed of a variety of food stuffs. Very often some foods are not available through out the year because of changing seasons. We are sure that you would like to eat all vegetables and fruits through out the year. How will you eat mangoes in winter and carrots in summer? We all wish to enjoy fresh mangoes through out the year but is it possible? No, we can not relish fresh mangoes as such but preserved mango products like pickle, chutney, juice, squash and jam can be enjoyed through out the year. Therefore, preservation of food is very important to improve the nutritional content and have variety in diet. Let us learn how can we preserve vegetables and fruits when they are in abundance.

OBJECTIVES

After studying this lesson you will be able to:

- understand the terms food-spoilage and food-storage;
- categorize the food items of daily use according to their shelf life;
- define food-preservation and state its importance;
- discuss general principles of food preservation;
- know the household methods of preserving food;
- evaluate the hygiene practiced in handling food stored at home and see how it helps in preventing food spoilage and wastage.

5.1 FOOD SPOILAGE AND STORAGE

A. Food spoilage

Simply speaking food spoilage means food is no longer fit for eating. When you keep

bread outside the refrigerator for a few days, a spongy growth is seen on it, which may be white, green or black in colour. This growth is called mould. The bread is now spoilt due to growth of mould and has become unfit for our consumption. Likewise, if cooked dal or vegetable is left outside for sometime, it develops a bad smell and bubbles due to fermentation. The dal and vegetables are thus spoilt and cannot be eaten. How can we say that a food is spoilt? Yes, you are right. Food is said to be spoilt if it changes colour and gives off a bad smell, shows signs of fermentation i.e., bubbles are seen in the food or there is growth of mould (spongy or powdery growth on the food stuff). Formation of soft spots or soft brown spots on fruits and vegetables is also an indication of food spoilage.

Reasons for food spoilage

Food get spoilt mainly due to the presence of micro organisms, enzymes (present in food), insects, worms and rats. Let us discuss these factors in some more detail.

Presence of micro-organisms: You kneed the dough and keep it in the refrigerator. What do you observe? Yes, the top surface becomes black. Do you know why this is so. It is due to the presence of micro-organisms. These micro-organisms are very small organisms which cannot be easily seen. Micro-organisms spoil food items when the conditions for their growth are appropriate.

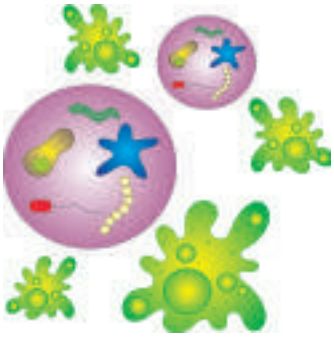


Fig.5.1

Like all living beings they require air and moisture, right temperature and food to grow and multiply. Conditions appropriate for growth of micro-organisms are:

- food having high moisture content; Can you tell which one has more moisture content Tomato or Potato. The answer is tomato and that is the main reason why it gets spoilt faster.
- air surrounding the food contains micro organisms.
- food kept for a long time at room temperature: Have you ever observed what happens to spinach kept at room temperature it turns yellow and stale.
- skin of fruits and vegetables getting damaged, if exposed to micro-organisms like banana. You may name some more fruits which get damaged.
- foods with low salt, sugar or acid content: Can you give some examples? Pickles, fruit jam etc.

Hence if you want to prevent spoilage of food by micro organisms, you must remove the conditions which are appropriate for their growth.

(ii) Presence of enzymes: Enzymes are chemical substances found in all plants and animals. Are enzymes harmful to foods? No, enzymes help in ripening of fruits

and vegetables. A raw green mango after a few days becomes sweet in taste and yellow in colour due to the enzymes action. What will happen if you keep this yellow, ripe mango for a few more days? It will become soft, develop black spots and give out bad smell. This is due to continued action of enzymes. No one likes to eat such an over ripe or rotten mango. You know that even when the skin of fruits is not cut or damaged, it gets spoilt. This is due to **enzymes action**.

(iii) Insects, worms and rats: Have you noticed small brownish black insects or small white worms in rice and dals? These insects eat the food grains. They make small holes in the grain and at times convert the grain to a fine powder. The food grains thus become unfit for human consumption. You must have also seen rats damaging the food.

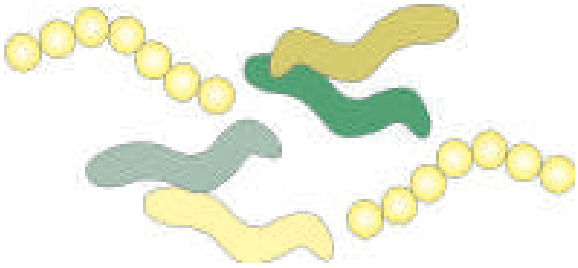


Fig.5.2

You have just learnt the three main causes of food spoilage. These are micro organisms, enzyme action and insects, worms and rats.

ACTIVITY 5.1

Make a note of spoilage of food in your house, in the following table.

Food	*Spoilage*
1. Milk	
2. Rice	
3. Orange	

Now after learning about the reasons for food spoilage, let us see, how food can be stored to keep it fit for consumption for a long time.

B. Food storage

Food storage simply means keeping food in a special place until it is needed for consumption. For example you buy cookies or snacks and leave them in air tight container till you want to use them. You buy milk and boil it or you store it in cool place to grow. You buy pulses, rice and wheat flour and store them in air tight containers. Why do you do this? Well, because you want your food to remain as fresh as possible and protect it from being spoilt.

The quantity of food you buy depends on:

i) your requirements

ii) how soon it is likely to be spoilt or what we call the **shelf life** of the food.

5.2 CLASSIFICATION OF FOOD ITEMS ACCORDING TO SHELF LIFE

You must have noticed the different food items take different length of time to get spoilt. Can you name three food items that spoil quickly and three which do not get spoilt for a long time?

No.	Spoil quickly	Spoil late
1.		
2.		
3.		

Fig.5.3

The time for which a food can be kept fresh is called its '**shelf life'**. It is also known as stability of food during storage. Food items are classified on the basis of their stability during storage into non- perishable, semi perishable and perishable foods.

Non- perishable food include whole grain cereals, pulses, nuts and oil seeds, sugar and jaggery.

Semi perishable food include processed cereals and pulse products (e.g. maida, suji), eggs, potatoes, onions, biscuits and cakes.

Perishable foods include green leafy vegetables, peas, beans, tomatoes, apple, bananas, bread, butter and cream.

As a guide to consumers, now it is mandatory for manufacturers to provide detailed labels on processed food items indicating their date of expiry. If you read the label on any packed food you will find written on it 'consume before' or 'best before' (a specified date). This is nothing but the shelf life of the food item as after that date the food may not look or taste the same as fresh and also start decomposing.

ACTIVITY 5.2

Look at the label of three packed food items you bought recently and see if 'shelf life' is mentioned on them. Enter the information in the table below:

S.No.	Item	Best before
1.		
2.		
3.		

5.3 FOOD PRESERVATION

Have you ever wondered why you boil milk or refrigerate food or put dry ingredients in the sun or store food items in air tight containers? Yes, you are right. These practices help in increasing the shelf life of food or preserve it. In other words to **preserve** is to keep food safe, retain quality, and prevent decomposition or fermentation. Thus food preservation can be defined as:

A process by which food items are prevented from getting spoilt for a short or long period of time. The colour, taste and nutritive value of the food are also preserved as far as possible.

Remember that

- Some food items spoil earlier than the others.
- Colour, taste and nutritive value of food can be preserved.

Preservation implies prevention of decay or spoilage of food either by avoiding contamination or inhibiting enzymatic or chemical reactions or changes. It helps to increase shelf life of food and thus food can be stored for future use.

5.3.1 Importance of food preservation

Now that we have understood the concept of food preservation, can you reason out why you should preserve foods? Well, here are some of the reasons.

1. Preservation takes care of the excess produce.

Can you think of some products which are made with mangoes? Yes, these may be juice, murraba, squash, aam papad, pulp, chutney, pickle and raw mango powder. You may be able to add a few more to the this list. Mango is a summer fruit and grows in large quantities in India during the months of April to August. Different varieties of mango are grown in different parts of our country.

Fig.5.4

Usually all the quantity of food grown in a region cannot be consumed by the people staying there as there is usually excessive production. What do the farmers do with this excess production? They make arrangements to transport the excess quantity to regions where either mango is not grown or where that particular variety of mango is not available. If they do not do this, the excess produce will rot and go waste. The farmers will then loose money. Often here is still some quantity left after the fresh produce is consumed by the people in a region. It is this quantity which has to be preserved so that it is available for consumption during the months when mango is not available. Preservation of food is done during the months when food is available in large quantity and is therefore priced very low. This helps in making preserved foods economical.

2. Preservation adds variety to our meals.

Have you ever got tired of eating the same vegetables in a particular season? Is it not nice to eat peas when they are either very expensive in the market or are not available? Eating cauliflower in pulav or cauliflower vegetable during the summer months adds variety and interest in meals. In the same way, eating some chutney, papad or pickle along with the meals adds to the variety in our meals. Preserving food items when they are in season makes this possible.

3. Preserved food items are sent to places where they are not grown.

In some areas of Rajasthan which are desert areas and in Himalayan regions that are covered with snow most of the time, very few food items can be grown. Therefore preserved food items can be sent to such places.

4. Preservation of foods makes transportation and storage of foods easier.

Preservation also reduces bulk of a food item. For example, if you dry green leafy vegetables such as mint, fenugreek, coriander, etc, their weight and volume reduces, thus making their storage and transportation easy.

INTEXT QUESTIONS 5.1

1. Choose the correct answer to complete the incomplete statements below:

   i) Food spoilage is due to

      a) micro-organisms and enzymes

      b) micro-organisms and excess production

      c) enzymes and excess production

      d) all the above

ii) Non- perishable food items are those which

a) do not spoil at all

b) take long time to spoil

c) spoil easily

d) spoil according to where they are kept

iii) Preservation of food means

a) to keep food safe

b) to retain quality of food

c) to prevent decomposition of food

d) all the above

iv) Shelf life of food is related to

a) freshness of food

b) quality of food

c) decomposition of food

d) time limit for which food can be used

v) the main reason for preserving food is to

a) improve its colour and taste

b) increase its shelf lie

c) make costly food available

d) change its texture

5.3.1 Principles of Food Preservation

You have learnt earlier that by boiling milk we are preserving it for a longer period. But, what are you actually doing by boiling? You are killing the microorganisms by raising the temperature of milk. Micro-organisms cannot survive at very high temperature. This is one of the principles of food preservation. Let us now learn about the principles of food preservation:

(i) killing the micro-organisms.

(ii) preventing or delaying the action of microorganisms.

(iii) stopping the action of enzymes.

(i) Killing the micro-organisms

You already know that boiling of milk kills microorganisms. Sometimes, heat is applied for a shorter duration to kill only undesirable microorganisms that is those

which can spoil the food stuff. It is done while pasteurizing milk. The cooking that you do at home also keeps food free from microorganisms. In canning (sealing in tins) food is heated to high temperature to prevent growth of micro-organisms in food.

(ii) Preventing or delaying the action of micro-organisms

You all know that a peeled apple spoils faster than the one with skin intact. Do you know why? This is because the apple has its skin as a protective covering which prevents the entry of micro-organisms. Similarly, the shell of nuts and eggs, skin of fruits and vegetables serve as a protective coating and delay the action of micro-organisms.

Food packed in polythene bags and aluminium foils are also protected against micro-organisms. You have read earlier that micro-organisms need air and water to grow. But if these are removed, you can prevent the action of micro-organisms and ensure that food does not get spoilt.

Lowering temperature or freezing a food also helps in delaying the action of micro-organisms and therefore in preserving the food. You must have seen frozen food items. Frozen food can be kept for a longer period than fresh food. This is because micro-organisms cannot act at low temperatures. Thus, when you are putting food in the refrigerator or freezer, you are preventing the micro-organism from growing. Lastly, certain chemicals like sodium benzoate and potassium metabisulphite also help in preventing the growth of micro-organisms. These chemicals are called **preservatives**.

Thus you have learnt that the action of micro-organisms can be delayed or prevented in many ways like-

- providing a protective covering
- raising the temperature
- lowering the temperature
- adding chemicals

(iii) Stopping the action of enzymes

Enzymes also cause food spoilage. They are naturally present in food. Take the example of fruits. Keep a raw banana for a few days and observe what happens to it. Yes, the banana will turn ripe, become yellow and then start decaying. All this happens due to presence of enzymes. What will happen if the action of enzymes is stopped? The foodstuff will be prevented from being spoilt.

Enzyme action can be prevented by giving a mild heat treatment. Before canning or freezing, vegetables are dipped in hot water or are exposed to steam for a few minutes. This is known as **blanching**. When you heat milk, you are not only killing micro-organisms present in it but also stopping the action of enzymes. This extends its shelf life.

INTEXT QUESTIONS 5.2

1. Which of the following will not help to arrest the action of micro-organisms on tomatoes :
   (a) put them is boiling water
   (b) put them in a freezer
   (c) leave them on the shelf.
2. List four ways of delaying action of micro-organisms on apples.

   .....

   .....

   .....

   .....
3. Define the terms preservation and shelf life.

   .....

   .....

   .....

   .....

5.3.2 Methods of Preserving Food at Home

Food can be preserved at home by using the following methods-

(i) Exposing food to low temperature

(ii) Exposing food to high temperature

(iii) Using preservatives

(iv) Dehydrating food

Let us now discuss each of these methods in some detail.

(i) Low Temperature

You have already learnt that food stays longer at low temperature i.e., in a cold environment. Using low temperature to preserve food works on the principle that low temperature slows down microbial and enzyme action. The food is thus prevented from spoilage. Do you use this method of preservation at home? Yes, if you have a refrigerator you can use it because a refrigerator helps to keep food at low temperature. Food can be preserved at low temperature by:

– Refrigeration- keeping food between 40^0 C- 70^0 C
– Cold storage - keeping food between 10^0 C- 40^0 C
– Freezing- keeping food between 180^0C or below

The duration for which the food can be preserved by using low temperature varies with the type of food and the temperatures. The lower the temperature, longer is the duration for which the food can be preserved. Of the three methods, freezing uses the lowest temperature. Since both cold storage and freezing are not used very commonly at home as methods of preservation, (we will not discuss their details in this section. You have already learnt about refrigeration in the previous section.)

Freezing of Peas

Method

Step 1: Select about half a kilogram of fresh tender peas and shell them.

Step 2: Take enough water in a stainless steel pan in which the peas can be completely immersed. Add one teaspoon of salt for half a litre of water, dissolve and bring the solution to boil.

Step 3: Completely immerse the peas in the boiling solution for about two minutes.

Step 4: Drain the peas immediately on to a stainless steel sieve and let them cool for 10-15 minutes.

Step 5: Pack the peas in polythene bags, remove the air by pressing and seal the bags.

Step 6: Put the packets of peas into a freezer.

Note: Similarly other vegetables such as cauliflower, beans and carrots can also be frozen.

Using Frozen Vegetables

1. Take out the frozen packet from the freezer one or two hours before use and let the food thaw at room temperature. Put peas in a sieve and keep under tap water for a few minutes. Drain and use.

2. Frozen vegetables can be stored up to six months in a freezer.

Precautions while freezing Fruits and Vegetables

1. Packaging material, that is, polythene bags should be strong enough to withstand expansion of food material on freezing.

2. The food once brought out of the freezer and brought to room temperature should not be refrozen.

3. Small packets should be prepared, as food once thawed must be consumed. So there is less chance of the remaining food material being spoilt. This also helps to avoid refreezing of the unutilized food material.
4. Exclude the air carefully and completely from the package before sealing.
5. The freezer should not be opened too frequently.

Thawing is the process of removal of ice from frozen food.

(ii) High Temperature

Micro- and enzymes are destroyed at high temperature, thus food is safe and does not spoil. Do all organisms get killed by increasing temperature? No, there are some micro-organisms which do not get destroyed at high temperature.

If these organisms are not killed, they can spoil food items once the temperature is decreased. There are two methods of preserving food by using high temperature-

– Pasteurization
– Sterilization

Pasteurization: When you think of pasteurization, which food item comes to your mind? Yes, its milk. We have often heard about pasteurized milk packets. In this method food is heated to a high temperature and then quickly cooled. The micro-organisms are not able to withstand the sudden change in temperature and are destroyed. However, some organisms still survive in this method.

Fig.5.5

Sterilization: This is done to prevent any spoilage of food items due to microorganism. What does the word sterilization mean? It means free from any living organism. The high temperature used in this method destroys all the micro-organisms in the food. The food items are exposed to high temperature for longer period and in some cases under pressure. e.g. when a pressure cooker is used for cooking, the food lasts longer because most micro-organisms get destroyed. You can also sterilize bottles and other equipments used for preservation.

(iii) Use of Preservatives

Now let us learn about the chemicals which can be used to increase the shelf life of processed food products. These are called **preservatives**. Any substance that is added to food to make it last for a longer period is called a preservative. You have learnt that

increasing the concentration of salt, sugar or acid in a food prevents its spoilage. Therefore, salt, sugar or acid are substances which act as preservatives.

Types of preservatives:-

List some preservatives found in pickles. Some of them are salt, sugar, lemon juice, vinegar, oil and spices. These are natural preservatives.

Read the label of a jam/squash/ketchup/chips label. Write the preservatives mentioned on the label. Enter the information in the table below.

Name of the product:	*Pickle*	*Jam*	*Sauce*
Preservatives present:			

You may find names of some of the chemicals like, potassium metabisulphite, citric acid and sodium benzoate. These are called chemical preservatives.

Natural Preservatives

(a) Salt: When you make pickle at home, salt is one of the ingredients used. Do you think that salt is added only for taste? Besides adding taste, salt has a specific function, i.e., to act as a preservative. If the proportion of salt in pickles is less, it can get spoilt after sometime.

How does salt act as a preservative?

Increasing the quantity of salt in the food changes its composition. Due to the presence of salt in the food, osmosis takes place. As a result, water comes out of the food. When there is no or less water in the food, the microorganisms are not able to grow and the food becomes safe. Salt also reduces the activity of enzymes, thus preventing the food from getting spoilt. Salt is used as a preservative in pickle, chutney, sauce and canned food. Salt is rubbed on fish which helps to preserve it.

(b) Sugar: Can you think of some preserved foods where sugar is used as a preservative?

Yes, these are jams, jellies, murabbas and squashes. Like in pickle and chutney, sugar is added to these foods not only for taste but also as a preservative. The proportion of sugar has to be correct to protect such foods from spoiling. How does sugar prevent food spoilage? Sugar dissolves in the water in the food item. This results in less water being available for the growth of micro-. Hence the food becomes safe.

(c) Acids: Can you think of any sour food items used as preservatives? These are lemon juice, vinegar and citric acid. Vinegar is used to preserve onions and tomato ketchup; lemon juice is used in pickles; citric acid is used in squashes. Acids increase the acidic content of food items, thus preventing the growth and activity of micro-organisms.

(d) **Oils and spices:** These are used as preservatives in pickles. Can you think of spices which are commonly used as preservatives? Yes, mustard powder, turmeric and red chilies are a few of them. These prevent the growth of micro-organisms, thus preventing spoilage. When pickle is made at home, have you observed that oil is poured to cover the mango, lemon or other vegetables which are being pickled? The oil makes a protective covering and has two advantages-

(i) prevents contact of micro-organisms with the food, hence they can not spoil the food.

(ii) prevents contact of air with food, hence the micro organisms can not grow and spoil the food.

You have learnt about some of the common methods of food preservation. Generally, a combination of the principles of preservation is used. For example, in pickles you use large amounts of salt, spices and oil. In the same way, acids and a lot of sugar are used for making squashes. Thus, when the seasonal fruits and vegetables are available at a lesser price, they can be stored for future use and add variety to our meals.

Will you like to learn about the procedure of making a jam and a squash? Alright, let us first learn how to make apple jam.

Method of making apple jam

Ingredients:

Apples: 1 kg

Sugar: 750 gms

Citric Acid: 1 teaspoon

Water: 150 ml

Method:

Step 1: Select firm apples and wash them thoroughly.

Step 2: Cut them into small pieces. While cutting, remove the core and hard seeds.

Step 3: Cook in water till apple pieces are tender (you can also pressure cook them for 2 minutes.)

Step 4: Sieve the pulp carefully.

Step 5: Add sugar stir constantly and add citric acid.

Step 6: Cook till the mixture obtains thick consistency and do the plate test (refer to fig.5.6) to check that the consistency of the jam is gel like.

Step 7: Pour hot jam into wide mouthed, sterilized bottles and cool.

Step 8: Store in a cool place.

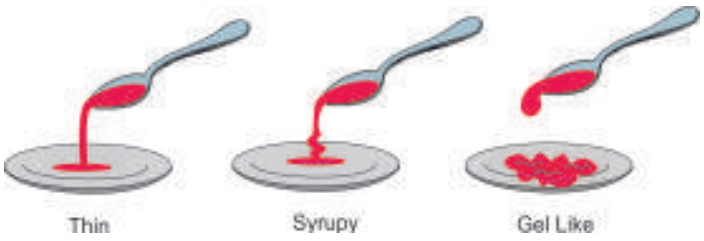


Fig.5.6

Test for Doneness: Drop Jam in ice cold water. If it disperses, it needs to be cooled further and if it solidifies in one place jam is ready.

Use of Chemical Preservatives

Orange Squash

Ingredients:

Orange juice: 1 litre

Sugar: 2 kgs.

Water: 1 litre

Potassium Metabisulphite (KMS): ½ teaspoon

Orange essence: 1 teaspoon

Citric acid: 30 gms

Method:

Step 1: Select juicy oranges and extract the juice.

Step 2 : Take water, sugar and citric and boil the mixture till the sugar is completely dissolved.

Step 3 : Add orange colour, essence and juice.

Step 4 : Dissolve the potassium metabisulphite in a little juice and mix it into the prepared squash.

Step 5 : Pour it into sterilized bottles. Allow to cool. Seal it or close the bottle tightly.

Step 6 : Store the bottles in a cool place away from the sun.

You can use the same procedure to make lemon squash too.

(iv) Dehydration

Can you name some dried food items that are stored in your kitchen for a period of one year or more? Are these potato chips, sevian (vermicelli), fenugreek (methi), cauliflower, papad or onion? These are food items which have been preserved by the

dehydration method. The word **dehydration means removing water or moisture from foods**. The home method of dehydration is sun drying. We will now discuss this method in detail.

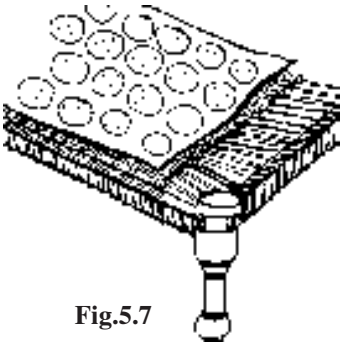


Fig.5.7

Some food items like green leafy vegetables (methi, pudina, coriander etc.) cauliflower, grapes, amla, onion and raw mango are dried. Some food are cooked and then dried. For example potato-chips, papad, banana-chips and wadis. The most appropriate weather to dry foods is when the air is dry and there is strong sunshine.

Method of dehydration

Step 1 Clean all tins, plates, etc, to be used to dry and store the food. Dry in the sun. Storage tins should have air tight lids.

Step 2 Wash the vegetables/fruits to be dehydrated. Cut, if required. Remove the stem, seeds and skin. Remove any decaying portions.

Step 3 Blanch vegetables, i.e. put them in boiling water. The time for blanching varies with hardness of fruit/vegetables. Remove when the food is soft (blanching reduces enzyme activity).

Step 4 Put vegetables in cold water containing salt and Potassium Metabisulphite (popularly known as KMS) for 5-10 minutes. This prevents blackening of foods. Green leafy vegetables and other dark vegetables should not be put in KMS solution as it will bleach the colour of vegetables.

Step 5 Spread the vegetables on a clean cloth in the sun. Cover it with a thin cloth to avoid dust and flies getting into the food.

Step 6 When the food is dry (test by looking at hardness) cool it to room temperature. Store in an air tight container. When you want to use dehydrated fruits and vegetables, wash and soak them in water for some time.

Now let us look at how you can use this method to preserve fenugreek (methi) and potato.

1. Dehydrating fenugreek (methi)

1. Remove the stems and wash fenugreek thoroughly.
2. Put on a cloth in the sun, cover it with muslin cloth.
3. Keep it in sun till it is dried.
4. Cool to room temperature and store in air tight containers.

Notes

2. Making Potato chips

1. Wash and peel potatoes. Cut in thin slices.
2. Put in boiling water for 3-4 minutes.
3. Make a solution in cold water with 5 tsp salt, 1 tsp potassium metabisulphite (for 5 kg potato).
4. Put the blanched potato chips in this solution for 10 minutes.
5. Spread each potato chip separately on a cloth in the sun. Cover with a thin cloth.
6. When dry, cool and store in air tight containers.

Remember, even if the basic principle of dehydration remains the same, you have to adapt the method depending on the food you are preserving.

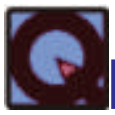
5.4 SOME USEFUL TIPS

Let us discuss some tips which will be useful for taking care of the preserved food items.

1. Take care of hygiene while preparing the food and storing it. The utensils and containers used to cook and store food items should be thoroughly cleaned and dried in sun. The containers should have air tight lids.
2. While preserving pickles take care that a layer of oil is above the vegetables, so that these do not come in contact with the air.
3. While using the preserved food items, take care to use clean spoons. Close the lid immediately after removing the required quantity.
4. For foods like sauces and squashes, the bottles should be sterilized and kept in hot water till they are needed. You could first put the preserved food in the bottles and then sterilize the bottles by heating them in water for 30-40 minutes.

ACTIVITY 5.3

With the help of your mother prepare apple jam and lemon squash in your kitchen. Follow each step carefully and take all the precautions. Get these tasted by two family members and friends and note their comments.



INTEXT QUESTIONS 5.3

1. Fill in the blanks using appropriate words.
   (1) Papad is an example of preservation by.....
   (2) Refrigeration reduces the activity of ..... and.....
   (3) Dehydration is based on the principle of removal of.....

2. Write True and False against the following statements:

   (i) Addition of spices to pickles allows the micro organisms to grow quickly.

   (ii) When making squashes, we make use of an acid and a lot of sugar for preservation.

   (iii) Sterilization increases the activity of enzymes and micro-organisms.

3. Write down the steps you will follow to preserve cauliflower by the dehydration method.

   _____
   _____
   _____
   _____

4. Match the following

i	Jam	a.	Spices
ii	Papad	b.	Sugar
iii	Pickle	c.	Citric acid
iv	Milk	d.	Removal of moisture
v	Dried-methi	e.	Pasteurization
vi	Squash	f.	Oil, salt
		g.	reducing temperature

5. In your garden you have plenty of lemons. List the products you can prepare to preserve them. Describe the process of preparing any one preserved product using lemons.

   _____
   _____
   _____
   _____

6. Match the following:

	Foods		**Preservatives**
i	Apple jam	a.	Citric acid
ii	Lemon pickle	b.	Potassium Metabisulphite
iii	Potato chips	c.	Sodium Benzoate
iv	Squash	d.	Salt
		e.	Sugar

5.5 HYGIENE IN HANDLING STORED FOOD

Your family members must be doing bulk purchase of food and storing it at home. You know that they need to be stored properly to be available in good form, when you need them. You have also learnt that food items have a limited shelf life.

ACTIVITY 5.2

Let us do an exercise about refilling your food store. What shall we do?

1. Remove all the bottles and tins to clean the space. Why do you do that?
2. You can wash all the bottles which are empty and dry them completely. You do not need to wash tins. Why? Wipe them with clean clothes.
3. Replace them on the shelf and clean the floor area. Throw anything which is very old and is spoilt or does not look fresh.
4. Make a list of supplies you need to buy and decide the quality you will buy.

Your store is now clean and you are ready to bring in new food supplies. You need to plan before you go to the market. What information do you need before buying? Yes, you will need to mention the name of the food item its quantity and quality. Where will you go to buy the listed food items? Why? How you will store each item after bringing it home?

WHAT YOU HAVE LEARNT

1. Food preservation adds variety in the diet, increases shelf life and helps to avoid wastage of food.
2. You can preserve fruits and vegetables by using salt, sugar, oil, spices by
3. dehydration.
4. Microorganisms, presence of enzymes and insects are causes of food spoilage.
5. Salt, sugar and oil are natural preservatives used for preparation of pickles, jams and
6. squashes.
7. Sodium benzoate, potassium metabisulphite, citric acid are chemical preservatives
8. used in products like tomato ketchup, potato chips and jams.

TERMINAL EXERCISE

1. Write whether the following statements are true (T) or false (F). Give reasons for your answer.
   (i) Oranges can be kept for a long time without getting spoilt.
   (ii) While dehydrating fenugreek (methi) leaves these should be put in potassium metabisulphite for 5-10 minutes.

2. Write down the steps in preserving pudina (mint) leaves by dehydration method.

3. Match the statements in Column A with those in Column B

Column A	Column B
(a) Natural preservative	(i) potassium metabisulphite
(b) Chemical preservative	(ii) sunlight
(c) Dehydration	(iii) removing microorganisms
(d) Increasing temperature	(iv) salt
	(v) citric acid
	(vi) vinegar

ANSWER TO INTEXT QUESTIONS

5.1 i) a ii) b iii) c iv) d v) a

5.2 1. (c)

2. (a) Do not remove the peel
   (b) Pack apple in polythene or aluminium foil
   (c) Keep in the refrigerator
   (d) Make jam

3. Refer text

5.3 1. (i) Dehydration
   (ii) enzymes and microorganisms
   (iii) moisture

2. (i) False (ii) True (iii) False

3. (i) Clean and dry the plates and tin for drying and storing cauliflower.
   (ii) Wash and cut cauliflower. Remove stems and any decaying portion.
   (iii) Put the cauliflower pieces in boiling water. Take off when they area little soft.
   (iv) Take out from water and spread on a clean cloth in the sun. Cover with a thin cloth.
   (v) When pieces are dry, cool and store in tins.

4. i) b ii) a iii) f iv) e v) d vi) c

6. i) e ii) d iii) b iv) a

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6

ENVIRONMENT

You must have noticed over the years that the places where there used to be trees, farms, water bodies, now there are bungalows, houses, industries and multiplexes. Trees are being cut to construct houses. The number of vehicles on road has increased. If you look around, you can see smoke and dust in air and these are increasing day by day. Apart from this, you must have smelt the peculiar foul odour from rotting garbage, high level of noise from vehicular traffic especially in cities. In small towns and villages too, the environment has degraded due to increase in number of vehicles and unsafe disposal of waste. Do you know all these cause a lot of health problems. How are you affected by them and can you do something about it? Yes you can, it is only a matter of thinking creatively and suggesting ideas to solve this problem. In this lesson let us try to find answers to these and many more similar questions.

Fig 6.1: After effects of pollution

OBJECTIVES

After reading this lesson you will be able to :

- define the terms pollution and pollutant;
- categorize pollution into different types based on its sources;

- state the effect of pollution on environment and health;
- suggest measures for controlling different types of pollution;
- understand the process of waste disposal and adopt an eco friendly waste disposal plan.

6.1 WHAT IS POLLUTION?

Pollution is the addition of any substance to the environment in excess to what is normally present, thereby, making the environment impure. River water gets polluted and become unsafe for human consumption. Air gets polluted due to smoke and fumes. All these make it difficult for us to breathe. You know that smoke is emitted by automobiles, factories and the chullahs. The atmosphere and the soil also get polluted due to industrial, human and animal waste. In addition to these, noise pollutes the atmosphere.

The term 'pollution' is derived from the Latin word 'Polluere', which means 'to contaminate any feature of the environment'.

What are Pollutants?

The substances which cause pollution are known as **pollutants**. It may also be defined as a constituent in the wrong amount, at a wrong place or at a wrong time. A pollutant is harmful to our health. When you wash clothes or bathe in the river, the dirt and soap are released into water and cause pollution. They make the water dirty or unsafe for drinking. Can you give some more examples of pollutants? Yes, you are right, dust, dirt, garbage, chemicals and industrial wastes are a few examples of pollutants. Can you tell how do they pollute?

These pollutants affect air, water and soil and therefore the pollution is categorized into:

- air pollution
- water pollution
- soil pollution
- noise pollution.

INTEXT QUESTIONS 6.1

What type of pollution is caused by the following? Tick (√) the correct option(s). You may tick more than one option wherever required.

i) vehicles air/ water/ soil/noise

ii) industry air/ water/ soil/noise

iii)	dust and dirt	air/ water/ soil /noise
iv)	chemical wastes	air/ water/ soil /noise
v)	washing clothes in river	air/ water/ soil /noise
vi)	garbage on road side	air/ water/ soil /noise

6.2 AIR POLLUTION

Simran was suffering from chronic cold and cough for the last one year. She had breathing problem. The doctor diagnosed that she has bronchial asthma due to smoke and dust. Simran was allergic to smoke and dust. She was living in a rented house in a congested industrial locality, doctor advised her to shift to a cleaner and pollution free environment. As she changed her living environment her health improved.

Fig 6.2: Oxygen Cycle

We know that oxygen is the most important component of air. All living beings are dependent on it for life. Human beings and animals breathe in oxygen and breathe out carbon di-oxide. During the day, plants take in this carbon-di-oxide and give out oxygen.

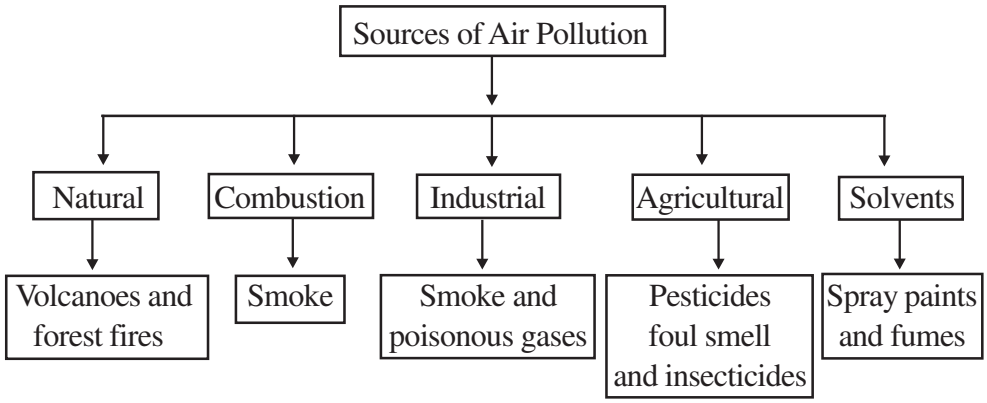
This helps in maintaining a balance in the composition of oxygen and carbon-dioxide in the air. If things remain this way there is no problem. Most of the time, especially in and around cities, the air that we breath in contains various pollutants.

6.2.1 Sources of Air Pollution

Various activities are worth examining because these are major causes of air pollution. The process of combustion causes smoke which may come from burning of household fuel, burning of coal in thermal power stations, exhaust from automobiles, bursting of crackers, smoke from factories, spraying of insecticides and pesticides through airplanes spreads the poisonous substance in a large area of the atmosphere. Use of solvents and spray paints also pollute environment. All these sources produce so much smoke that it is difficult to breathe. Smoke also affects our eyes and causes blindness.

Now, don't you think that human beings are the main culprits in causing pollution. Besides human beings there are some natural sources of pollution too. We don't have control over these pollutants. These include gases emitted from volcanoes, gases produced during forest fires and dust which spreads with the wind.

To sum up we can say:



6.2.2 Effects of Air Pollution

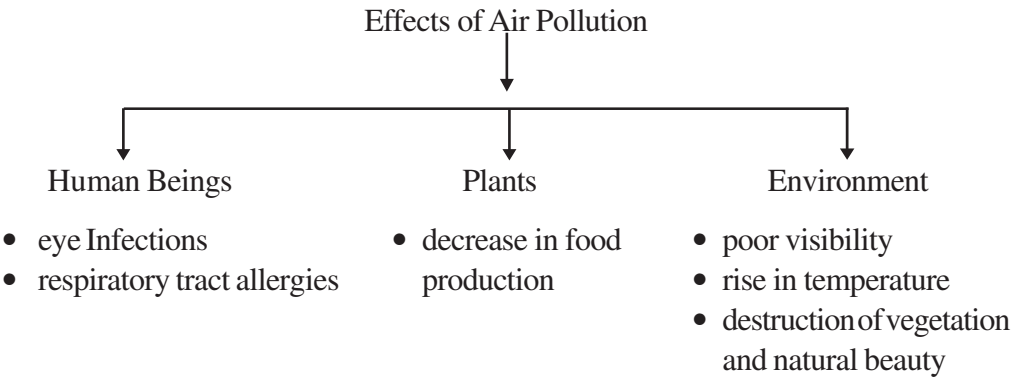
Let us now see some of the effects of air pollution.

Due to pollution, the plants get less sun light thereby affecting their food manufacturing process. This also blocks the pores of leaves and restricts plant respiration process.

You have already read that pollution affects the respiratory system of human beings. It leads to diseases like bronchitis and asthma. Certain types of skin and eyes allergies like rashes and redness are also common.

Pollution affects the environment in a dreadful manner. You must have heard that sometimes serious accidents are caused due to poor visibility due to fog also due to the presence of pollutants like smoke and dust in the air (this is called smog).

During gulf war in 1990-91, the smoke produced by burning of oil fields led to a rise in temperature of surrounding areas that in turn destroyed vegetation and spoilt the natural beauty of the surrounding regions.



6.2.3 Ways to control air pollution

Think of the ways to control air pollution. You can do it through the following:

i. Use a smokeless chulha at home. Provide a tall chimney to the chulha to carry the smoke away.

ii. Use biogas which is a smokeless fuel.

iii. Use a solar cooker at home which uses heat from the sunlight.

iv. Factories should have chimney filters. This will help in trapping the poisonous substances in the gases that are let out by the factories.

v. Factories emitting smoke must be located far away from the residential areas.

vi. Vehicles must be fitted with special devices to reduce air pollution.

vii. Use unleaded petrol and CNG (Compact Natural Gas) for private and public transport.

viii. Garbage should not be burnt. It should be disposed of hygienically, preferably through sanitary landfills.

ix. Roads must be pucca so that dust does not rise and mix with air.

x. Trees should be planted and cared for, so that these keep the air fresh and pure.

xi. Crops should be grown in the fields all the year round so that the soil is not exposed to erosion.

ACTIVITY 6.1

Visit your neighbourhood and note the measures adopted in the households and factories to control air pollution. Suggest some changes to control air pollution.

INTEXT QUESTIONS 6.2

1. State which of the following statements are True or False. Also correct the false statements.

   i) Wind decreases the amount of dust particles in the air.

   _____

   ii) Tall chimneys fitted with filters help to reduce air pollution.

   _____

   iii) Location of factories near residential areas reduces air pollution in cities.

   _____

iv) Adding a tall chimney to the chulha decreases air pollution.

_____

2. Unscramble the given alphabets to identify sources of air pollution.

i) TRIULAUGRCAL _____

ii) ESNLOSTV _____

iii) SRILADNUIT _____

iii) BTNOMOICUS _____

3. Suggest measures to control air pollution caused by the following pollutants:

Smoke _____

Poisonous gases _____

6.3 WATER POLLUTION

Many of us receive safe water for drinking from taps. It is sent to your houses after cleaning by the municipal authorities. It is also treated to kill the germs. Can you list the characteristics of this water? It is water which has no taste, smell, colour, dirt or germs. Therefore it is called safe water and is suitable for drinking.

Polluted water may be coloured, may have suspended particles, a foul smell and a bad taste.

Do you know that all water is not safe for drinking or even for performing other chores in the houses. Unfiltered water from a tap in a public park is muddy and smelly. Sometimes it also has solid particles. Water from well/hand pump/pond/river may also have some or all of these characteristics. You would not like to use this water for drinking, cooking or even for washing your clothes and utensils. This water is polluted.

6.3.1 Sources of Water Pollution

Water gets polluted when the following are thrown in.

i) **Domestic wastes:** Domestic waste is generated through various household activities. It causes pollution when it is disposed of in a nearby water source (river, lake or pond). Sources of water also get polluted when they are used for bathing animals, washing clothes and washing self after defecation. Very often garbage is also disposed of in this source of water. All these cause water pollution.

ii) **Industrial wastes:** Waste material that comes from factories contains many harmful and toxic substances. It flows into the rivers, ponds, and seas and causes water pollution.

iii) **Agricultural wastes:** Chemical fertilizers and pesticides are used in the agricultural farms. In case of rainfall, the runoffs from these agricultural fields gets mixed with water causing the water to pollute, which in turn pollutes the water sources such as rivers, streams and lakes.

iv) **Oil spills:** Some times oil from oil tankers spills over large areas of a sea. This also causes water pollution. It affects the plant and animal life present in water.

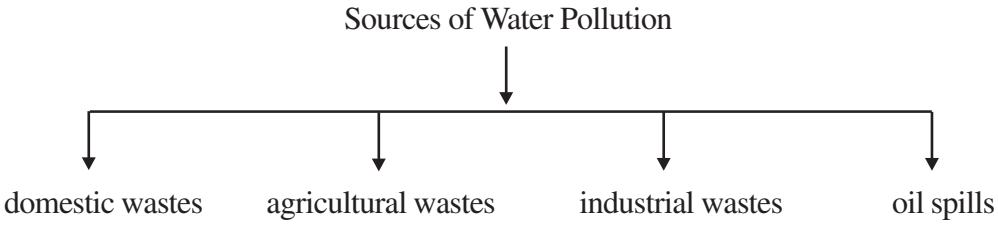


Fig 6.3: Water Pollutants

6.3.2 Effects of Water Pollution

Who gets affected by polluted water? Yes, all those who consume this water, i.e., human beings, animals and plants. You must have read in the newspaper, particularly in rainy season that in a particular locality, a large number of people have suffered from cholera or gastroenteritis. Often it is reported that the major cause of such epidemics is non- availability of clean water in that area. Drinking unsafe water causes diseases like cholera, typhoid, diarrhea and dysentery. Bathing in polluted water causes skin diseases and allergies.

Plants and animals such as fish, sea weeds and sea plants also get affected by polluted water. Do you know why? This is because pollution in water causes lesser availability of oxygen to them. They die because they cannot breathe without oxygen.

6.3.3 Ways to control water pollution

Can you suggest some remedies to prevent water pollution? Look at the following list.

i. Make sure that untreated sewage water is not thrown into the sources of water.

ii. Industries should not be allowed to throw untreated wastes into the river or pond.

iii. Defecation in open and near the water source should be discouraged. Use latrines for defecation.

iv. Latrines, soakage pits, dumping grounds and land fills should be far away from sources of water.

v. Bathing, washing clothes or bathing animals in or near the harvested water sources should be banned. Rain water in special ponds or wells should be used for washing clothes and bathing animals.

vi. Rivers and seas should not be used for disposal of garbage.

vii. If you are using a well or a pond as your source of water, see that it has a concrete wall or parapet and proper pucca or firm flooring around it.

viii. Water should be stored in clean containers which are kept covered. Use a ladle with a long handle to take water out from its container. Never dip your hand in the water.

ACTIVITY 6.2

Make a survey of ten houses to list the ways of storing drinking water or making water safe for drinking. Classify them into the correct and incorrect ways.

INTEXT QUESTIONS 6.3

1. Tick (√) mark the correct option:

   (i) Water is safe for human consumption only when it is free of

   a. floating substances

   b. unwanted smells

   c. micro organisms

   d. all the above.

(ii) Domestic waste causes water pollution by discharging

a. waste water through soil to underground

b. waste water from toilets, bathrooms, kitchens etc. into water sources such as river, lake and pond etc.

c. waste water from factories and power plants etc.

(iii) Washing clothes near a water source is harmful because the dirt and soap released

a. flow into the water

b. are absorbed by the soil to reach sub-soil water

c. are left behind to create slush

d. are responsible for doing all the above.

2. How do oil spills in water bodies affect the plant and animal life present in them?

6.4 SOIL POLLUTION

Soil pollution can be defined as change in the physical, chemical and biological nature of soil to the extent that it has a harmful effect on humans beings and other living beings. Soil becomes polluted when wastes from factories in the form of chemicals and metals are not disposed off properly. Some chemicals can make the soil totally infertile.

If insecticides, pesticides and fertilizers are added in excess, then they penetrate into the plants or fruits and vegetables growing near by. These chemicals then enter our digestive system and make us sick.

Last week Ramesh's son fell sick with stomach disorder. The doctor told him that it was due to his moving barefoot on the soil. When the garbage is left on the soil, it rots and becomes a breeding ground for insects, worms and germs. There may be disease germs already present in the garbage. When people defecate and urinate on the soil then dirt, germs and worms are generated. When somebody walks barefoot on this soil these germs and worms enter their system and cause stomach disorders. They enter into animal and plant systems also through food chain, thus infesting all living beings.

You must have observed that defecating and urinating in the open is a common practice in India. The urine and excreta may contain germs and worms which enter the soil and pollute it. If it rains, the dirt flows into the nearby source of water. Some people have a bad habit of spitting anywhere and everywhere. The sputum not only spoils the surroundings but may carry disease germs. It may dry up and disappear but the germs remain and pollute the soil.

6.4.1 Effects of Soil Pollution

You have read that improper disposal of domestic waste, defecating, urinating and spitting in the open are all sources of spread of disease germs and worms into the soil. You also know that when we walk barefoot on the soil these germs enter into our body and eventually make us sick. Very often industrial and agricultural wastes leave harmful chemicals in the soil. Plants and vegetables grown in such soil absorb these chemicals. Animals and human beings who consume these plants may fall ill.

6.4.2 Ways to control soil pollution

Let us learn about some of measures which can help us to control soil pollution:

Proper disposal of garbage: Garbage from homes should be properly disposed of so that it does not allow flies, mosquitoes and cockroaches to breed. At home, it must be collected in a bin which should be kept covered.

a) **Dump outside the city limits:** If dumping of domestic waste is done in pits which are covered with twigs and plants, the flies and mosquitoes cannot breed on it. After the pit is full, cover it with soil and let the garbage be buried.

b) **Land fills:** Quite often, especially in big cities, the garbage collected is so much in quantity that small pits are no answer. Low lying areas outside the city limits and away from the source of water are selected and garbage is dumped there every day. Biodegradable material can be recycled. It produces foul smells and attracts birds, animals and insects. But since it is outside the city, it does not affect the people very much except when they pass the ugly site, they get the foul smell.

c) **Composting:** The garbage from gardens is put into a pit in one corner of the garden. At the end of each day, it is covered with ash and leaves. Gradually the lower layers are converted into compost or manure. This manure can be used for gardening.

d) **Burning of refuse:** You must have seen gardeners burning leaves and grass which they have removed from gardens. Burning can produce a lot of smoke which causes air pollution. Burning of refuse is banned in metropolitan cities since they already have very high level of air pollution.

e) **Incineration:** The latest technology in garbage disposal is the use of an incinerator. An incinerator is a furnace in which the garbage is burnt. This is an expensive method because a lot of fuel is required to burn the rubbish. However, it is sterile and safe. The garbage is reduced to a relatively small heap of ash.

None of the methods of garbage disposal mentioned above is satisfactory. Each one has its own merits and demerits. But a lot can be achieved by keeping our surroundings clean if we educate ourselves and our neighbourhood about the proper disposal of garbage from our homes.

Some other measures to control soil pollution are:

- Use of sanitary latrines.
- Limited use of insecticides and fertilizers.
- Use of environment-friendly products.

You will study about the Eco-mark later. This mark is put on goods that are environment friendly. You must prefer to buy such goods.

ACTIVITY 6.3

Visit your neighbourhood and observe the sources which are polluting the soil in your area. Suggest some measures to reduce this soil pollution.

INTEXT QUESTIONS 6.4

1. Write two measures to control soil pollution.
2. List three methods of garbage disposal that you have seen or practiced.
3. Tick (√) the correct answer:-
   i) This is the latest technology in garbage disposal
      a. Composting
      b. Burning
      c. Incineration
      d. none of these
   ii) Harmful chemicals are left in the soil by
      a. Domestic waste
      b. Defecation
      c. Industrial and agricultural wastes
      d. Spitting
4. Match the following

A		B	
i)	Composting	a.	It becomes polluted when waste from factories is thrown on it.
ii)	Spitting	b.	Can be used as manure for gardening
iii)	Soil	c.	It may dry up and disappear but germs remain and pollute the soil.
		d.	It is banned in the metropolitan cities.

6.5 NOISE POLLUTION

You enjoy listening to music and chit-chat with friends but the running of machines, the roar of loudspeakers and moving traffic make sounds which are loud and unpleasant. Some sounds are pleasant while others are not. Any unpleasant sound is called **noise**.

6.5.1 Sources of noise pollution

Look around yourself and identify the sources of noise pollution. Some of them may be

i) automobiles, trains and airplanes

ii) loudspeakers, radios and televisions when played at full volume

iii) Industries and machines

Fig 6.4: Sources of Noise Pollution

6.5.2 Effects

What happens when you hear loud noises for a long period of time? They tend to disturb us, strain our nerves, cause headache and mental disturbance. They can also affect the hearing ability of an individual. You must have noticed that quite often factory workers, pilots and drivers who are exposed to very loud noise over a long period of time, gradually loose the ability to hear soft sounds properly. They become hard of hearing, their ear drums get damaged, sometimes leading to deafness. Exposure to noise pollution can also cause stress and mental instability.

6.5.3 Ways to control noise pollution

It is impossible to get rid of all noises completely, but we can definitely reduce them. Following are some of the suggestions for reducing noise pollution:

- Playing radio's and TV's at low volume.
- Avoiding the use of loudspeakers.
- Talking in low tones.
- Using your vehicle horns only when it is necessary.
- Getting silencers fitted in the engine of vehicles.
- Building factories away from residential areas.
- Building airports far away from city limits.

ACTIVITY 6.4

Stand at the gate of your house, close your eyes and listen to the various sounds produced in your environment. List down the pleasant and the unpleasant sounds. Suggest some ways to reduce sounds that you would call noise.

WHAT YOU HAVE LEARNT?

You have learnt about different types of pollution and their harmful effect on all living beings. You have also learnt about some measures to control different types of pollution. After reading the information, we can say that controlling pollution is almost completely in our hands. We have to reduce the production of smoke by using fuels that are smoke free, by keeping our vehicles in perfect order so that they do not emit smoke, by putting tall chimneys in the factory for smoke to go out in the sky and so on. These little efforts of ours will save people from going blind and suffering from diseases of respiratory tract. It is for us to see that we can reduce noise pollution to a minimum and thus save people from becoming deaf or mentally unstable. We alone can enforce stringent laws to avoid water pollution and thus save people from suffering from diarrhoea, dehydration and hepatitis.

Our world is beautiful. We must enjoy living here. We must not spoil the natural beauty by our foolish acts of defecating, urinating and spitting everywhere, cutting trees indiscriminately and littering our neighbourhood with materials and products which are not environment friendly.

Let us pass a resolution and make a promise to ourselves henceforth. I promise :

- to Plant trees and take care of them.
- not to let people cut trees.
- to use smokeless fuel in my kitchen.
- to protect water source from pollution.
- not to waste purified water.
- to play radio/TV at low volume.
- not to use loud speakers.
- to keep my vehicle pollution free.
- to dispose of garbage in a sanitary way.
- to use sanitary latrines.

- to treat factory waste and sewage before disposal.
- to promote rain water harvesting.
- to filter water for drinking purposes.
- to discriminate and minimise the use of fertilizers and insecticides.
- to use silencers to reduce noise.

TERMINAL EXERCISE

1. Define the terms pollution and pollutant.
2. What are the sources of air pollution?
3. How can you control soil pollution?
4. What are the effects of noise pollution?
5. Mention two pollutants which pollute both soil and water.
6. How can you reduce pollution caused by smoke in your neighbourhood?
7. Why should we not defecate, urinate and spit on soil?

ANSWERS TO INTEXT QUESTIONS

6.1 1. i) air pollution, noise pollution

ii) water pollution, air pollution

iii) air pollution

v) water pollution, air pollution

vi) water pollution

vii) soil pollution

6.2. 1 i false - Wind increases the amount of dust particles in the air .

ii. true

iii. false- factories should be located away from cities.

iv. true

Notes

2. i) agricultural

   ii) solvents

   iii) industrial

   iv) combustion

3. use of biogas, smoke less fuel. CNG should be encouraged.

6.3. 1 i) d ii) b iii) d

2 Refer text

6.4 1. Refer text.

2. Refer text.

3. i) c ii) c

4. i) b ii) c iii) a

Notes

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7

HEALTH

How did you feel the last time your sister fell sick? You must have observed that everyone in the family was worried and showed concern about her well-being. Your parents took her to the doctor. Your mother was concerned about her medicines and diet. Due to ill health she became irritable and didn't like to eat. She became very weak and was unable to perform her daily activities. Don't you agree that all the family members were affected due to her ill health? Do you realize how important health is for all of us?

Good health of an individual is important in order to ensure happiness and our ability to work. There are many factors which affect our health. Some of these factors like balanced diet, clean water and clean environment have a positive impact on health while others such as disease causing organisms and unhygienic conditions have a negative effect on our health.

In this lesson you will learn that good health implies both physical and mental well being and requires consistent efforts to maintain it at both personal and community levels. You will also realise that just as good personal health is a necessity, community health is of great importance too. In addition, after reading this lesson you will be able to appreciate how individual and community health reinforce each other.

This lesson aims at guiding you to live a healthy life.

OBJECTIVES

After studying this lesson you will be able to :

- understand health and its aspects;
- appreciate the importance of health;
- identify the indices of good health to assess health status;

- understand immunity and its importance in maintaining family and community health and
- motivate the community to follow the immunization schedule.

7.1 HEALTH

Health is of prime concern for all. You must be familiar with the famous saying "health is wealth". When you are healthy, you enjoy your work and life to the fullest. It is the solid foundation on which your happiness rests. To attain good health we need to make efforts and develop certain habits.

Health is a very commonly used term and can be interpreted in different ways by different people. What is your idea? Is it mere physical fitness or just absence of disease? Before proceeding further, Let us know your definition of health. Write it down.

Health is _____

_____

Definition of health: According to World Health Organization (WHO), health is a **"state of complete physical, mental and social well being and not merely the absence of disease."** It means proper functioning of both, the body and the mind.

World Health Organization

Fig.7.1

People enjoying good health are more cheerful, energetic, full of life, more efficient at work and therefore more productive.

ACTIVITY 7.1

List any two points of similarities and differences between your definition of health and that given by WHO.

Points that are similar a) _____

b) _____

Points that are different a) _____

b) _____

Try to recollect the last time you were sick or suffered from a major illness. Were you not irritable? An unwell person may lose temper for no reason and does not feel like working because his/her body becomes weak.

In contrast, when you are healthy and with your friends, you feel happy and enthusiastic and are likely to enjoy doing the work assigned to you.

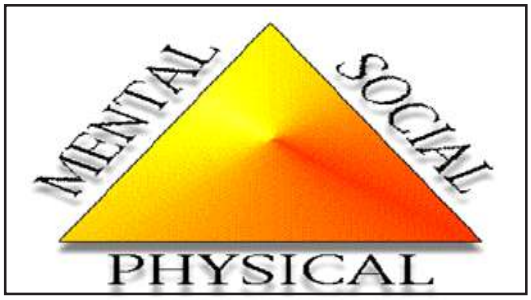

Fig.7.2: Health triangle showing three dimension of health

How do you feel during exams? Stress may cause rise in blood pressure or may lead to sleeplessness. However, some amount of stress also helps you to perform well. Overall health is achieved through a combination of physical, mental and social well being. The three different dimensions of health together are commonly referred to as **health triangle** as shown in figure 7.2.

7.1.1 Signs of good health:

Given below are some of the signs of good physical, mental and social health of a person. They help in assessing our state of health.

Fig.7.3

A. Signs of good physical health

When you are in good physical health you

- are energetic and alert;
- have normal weight for your age and height;
- have bright and shiny eyes;
- have clean and clear skin;
- have normally growing hair of natural colour and texture;
- have odourless breath;
- have good appetite and
- have sound sleep.

Such people are active, responsive and happy, can work hard and perform well.

B. Sign of good mental health

If you have good mental health, you shall have

- control over your emotions;
- balanced feelings, desires, ambitions and ideas;

- ability to accept the realities of life and face them;
- confidence in your abilities;
- ability to cope with day to day stress of life;
- helpful attitude towards others, and
- the ability to seek help when needed.

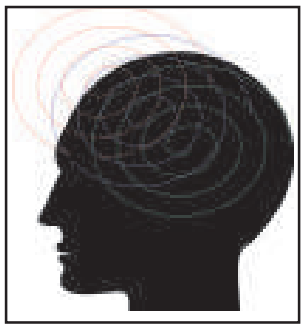

Fig.7.4

Such persons can work productively and can make a contribution to the society.

C. Signs of good social health

If you have good social health you shall

- have a positive attitude towards life;
- get along well with others;
- have a pleasant personality;
- fulfil responsibilities and duties towards others;
- have healthy interpersonal relationships and
- be able to accept disagreement positively.

Fig.7.5

ACTIVITY 7.2

Based on the WHO definition of health, complete the table given below. Provide three reasons for your conclusion. Two cases are done for you.

Name	Characteristics of the person	Do you consider the person healthy? Answer in 'Yes' or 'No'.
1 Reshma	cheerful, takes interest in work, helpful to others.	Yes
2 Kabir	lethargic, physically weak and does not want to go for work or play.	No
3 _____ (yourself)		
4 _____ (any friend or family member)		

7.1.2 Factors affecting personal health

Care of oneself to remain healthy and free from diseases constitutes personal health. Different aspects of personal health are given below:

A. Balanced Diet

As you have already studied, a balanced diet is one containing carbohydrates, proteins, fats, vitamins, minerals and fibers in correct proportion to meet the nutritional requirements of a person at a certain age. The energy requirement for an adolescent (teenage) boy is about 2400 to 2600 calories whereas for an adolescent girl, it is 2050 calories. The food pyramid depicts the different categories of food and the quantities that we need to include in our diet (refer to the food pyramid explained in Chapter 5 -Food Groups).

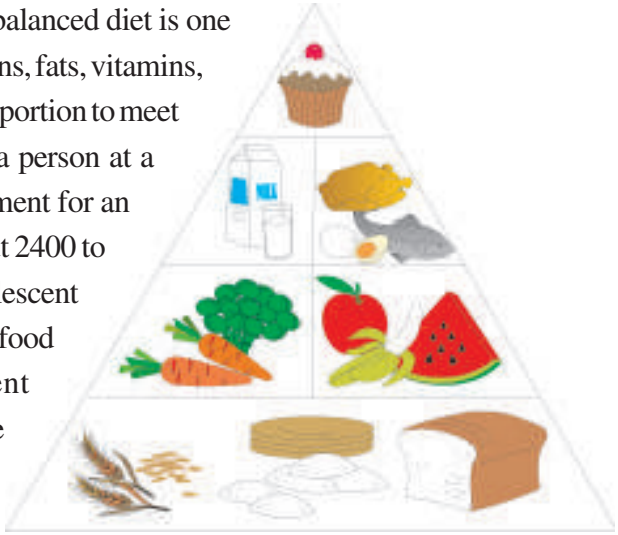

Fig.7.6 Food Pyramid

B. Personal Hygiene

Health and hygiene go together. To keep yourself free from diseases and to have good health you need to practise hygiene constantly. The various practices that help in maintaining health constitute hygiene. The word hygiene comes from a Greek word *hygiea* that means goddess of health. Adoption of hygienic practices prevents many diseases such as diarrhea, cholera, typhoid, worm infections, jaundice, skin diseases, tuberculosis and many more.

Maintaining good health is a desirable goal. It is important to know how we could possibly achieve good health. Elders in the family and community often advise you to remain healthy.

ACITVITY 7.3

In the table below, some of the 'healthy habits' commonly advised by adults have been listed. Write your ideas about healthy habits and list them according to your preference.

Common practices to remain healthy

Suggestions by adults	Your idea of healthy habits
1. Brush your teeth, cut your nails. 2. Take bath daily, wear clean clothes. 3. Eat nutritious food. 4. Have regular eating habits. 5. Exercise regularly.	

There are some simple activities in our day to day life that prevent infectious diseases. These activities are:

- **Regular toilet habits:** Regular bowel movement keeps you physically fit and healthy.
- **Washing hands before eating:** Hands may carry many disease causing germs and therefore must be washed before eating anything and after using the toilet. Washing hands with soap makes them germ free. Ash may be used for washing hands where soap is not available.
- **Bathing regularly and wearing clean clothes:** Dirt is a congenial place for germs to grow. Bathing regularly keeps your body free of dirt, body lice and germs.
- **Cleaning the teeth:** After having food, some food particles may remain stuck to our teeth which become a medium for the germs to grow. The germs harm our gums and teeth, and cause bad breath. Brushing teeth every day prevents germs to grow between the teeth. Brushing teeth before going to bed is a very good habit.

Fig.7.7 Brushing teeth twice a day is important to maintain good hygiene.

- **Washing hair, cleaning eyes, ears and nails:** Regular washing and combing of hair helps to prevent accumulation of dirt and dust and keeps germs away. Keep nails short and clean. Nail biting is unhygienic and must be avoided. Washing eyes with clean water keeps them free from dust and germs.

C. Domestic Hygiene

We dust and mop our house to keep it clean and free from dirt, flies and germs. Disposal of garbage in bins ensures that our immediate surrounding remains clean and do not become a breeding ground for disease causing organisms. Used sanitary napkins need to be wrapped in an old paper and put only in a dust-bin and not any where else as they too provide ground for germs to grow.

Fig.7.8 Materials you need to maintain a healthy environment at home

D. Food Hygiene

- Fruits and vegetables should be washed in clean water to make them free from germs and pesticides (chemicals sprayed on plants to keep them insect free) before cooking and consumption.
- Water used for drinking, cooking, washing utensils should be from a clean source such as tap, hand pump set up by the municipal corporation or panchayats and covered well.
- Food should be prepared in a clean kitchen and in a clean manner.
- While cooking food, it is important to heat it at high temperature to kill germs present in it.
- Cooked food should be eaten fresh or covered and stored in cool, dry and insect proof place.
- Milk should be stored either in the refrigerator or if kept outside, it should be boiled again before use to make it germ free.

E. Exercise

Regular walking and physical exercise have good effect on health. Outdoor games and sports keep the heart and circulatory system in good condition. Walking keeps the joints and bones healthy.

F. Regular sleep and relaxation

After the day's hard work you become tired. Your mind and body need rest. A little nap, regular sleep and relaxation for some time will make your body and mind fresh again. You are filled with energy again. These play an important role in maintaining good health. This also helps in the repair of body tissues.

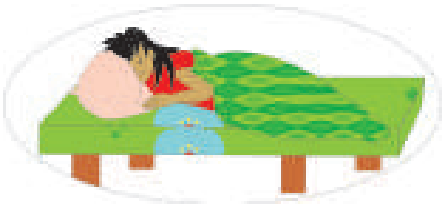

Fig.7.9

G. Avoid smoking, alcohol and drugs

To keep healthy, one should avoid smoking, chewing of betel nut, gutka and tobacco and drinking alcohol. Intake of these substances may lead to health problems such as liver damage, kidney failure, heart failure and cause damage to teeth, gums, and other tissues of the mouth. You may have noticed, spitting is quite common among people who chew betel nut, gutka and tobacco. Spitting in public places not only disfigures them, it creates an unhygienic conditions also. You must stay away from such habits and try to convince others also.

Say No to SMOKING

Say NO to DRINKING ALCOHOL

Say NO to chewing of BETELNUT, GUTKA and TOBACCO

Fig.7.10

ACTIVITY 7.4

Check list for your personal health status.

Given below are some characteristics commonly observed in healthy individuals. Read them carefully and mention whether these characteristics are present in you. Respond by putting a tick mark (√) against each feature in the space provided.

A. Characteristics of personal health	Yes	No
Are you energetic and alert?		
Do you play, work and study regularly?		
Do you have normal weight for your age? (refer to table 7.1)		
Do you bathe regularly and wear clean clothes?		
Do you have shiny, good textured hair?		
Do you have a clean skin without rashes?		
Do you have good appetite and eat well?		
Do you have regular toilet habits?		
Do you have a clean breath?		
Do you get sound sleep?		

B. Characteristics of social health	Yes	No
Whenever there is an argument with your friends or elders you listen to them and pay attention to their views.		
Irrespective of the time you go to bed, you are able to get up in the morning without feeling lazy and attend to your jobs or duties well.		
When facing a different situation or challenge that you are unable to meet, you feel bad and keep to yourself rather than seeking help from others as it would lower your self-esteem.		

Check your answers given in the "Answer to Intext Questions"

Table 7.1 Age wise weight and height (according to National Center for Health Statistics, NCHS)

Age	Boys		Girls	
	Weight (kg)	Height (cm)	Weight (kg)	Height (cm)
14 years	47.0	160.0	48.0	155.0
15 years	52.6	166.0	51.5	161.0
16 years	58.0	171.0	53.0	162.0
17 years	62.7	175.0	54.0	163.0
18 years	65.0	177.0	54.4	164.0

INTEXT QUESTIONS 7.1

1. Why do we need to be healthy? List three reasons.
2. In the table below, characteristics of a person are listed. Write the dimension of health (physical/mental/social) for each.

Characteristics of a person	Dimensions of health
has good appetite	
has ability to cope with stress	
has a pleasant personality	
has sound sleep	
has control over his emotions.	
has normal weight and height for his age	
has healthy interpersonal relationships	
is confident	
has a positive attitude towards life	

3. List two hygienic habits followed by you for each of the following:

Personal hygiene		
Domestic hygiene		
Food hygiene		

4. Identify one healthy habit. How will you motivate your younger brother to practise this habit?

5. Your mother has prepared lunch in the morning at 7 a.m. and it will be served at 2.00 p.m. List any two precautions you will take to store it to keep it healthy.

6. Which one of the following children is healthy and why?

I

II

III

7.1.3 Community Health

In the previous section you studied some of the ways that will help you to remain healthy. However can you remain healthy just based on your own efforts?

Consider the following situations:

1. In the absence of potable water your mother collects water from a hand pump or a covered well in the neighborhood.
2. Garbage is not collected for many days, bad odour emanates and mosquitoes and flies breed.
3. There is an outbreak of an infectious disease like dengue or malaria.
4. A natural calamity like Tsunami strikes certain part of your country.

How is the health of the population in such areas affected? Does it have both short term and long term effect? Try to find answers.

Community health is the practice of preventing disease and promoting health of a population through the organized efforts of society, public and private organizations, communities and individuals. It aims to improve the health of the entire population and focuses on preventing diseases rather than their treatment.

There are various activities and **programmes** undertaken by the government and or local organizations to maintain good health of the people and keep them free from diseases.

Some of these activities and programmes are listed below:

- Maintain cleanliness of the villages, towns and cities so that disease causing agents do not multiply. This helps in checking spread of diseases.

  It includes garbage disposal, supply of clean drinking water, waste collection etc. from the localities, thereby checking the spread of disease causing vectors (mosquitoes and flies).
- Ensure that standards in food stores, meat and milk outlets are strictly followed.
- Organize outreach services for health promotion and prevention of diseases, including.

a) Immunization programmes for infants and children.

b) Various awareness programmes against the spread of diseases like malaria, AIDS, polio, leprosy and hepatitis B.

Fig.7.11

- Organize mid day meals in schools to provide adequate nourishment to growing children.
- Undertake various health programmmes such as:
  a) The National Malaria Eradication programme
  b) The Tuberculosis (T.B) Eradication programme
  c) National Immunization programmme
  d) National Pulse polio programme.
- Set up hospitals and dispensaries to provide medical facilities to the general public. The government hospitals and health centres provide services either free of cost or at highly economical rates.

You can also contribute to keep your environment clean. For this you need to:

1. keep your house clean- a house should not only be swept and cleaned every day, it should also be whitewashed and fumigated at regular intervals to keep the insects and other disease causing agents away.
2. keep your neighborhood clean- managing the garbage and its proper disposal is also an important task. Garbage thrown anywhere other than the garbage bins makes the surroundings unclean and becomes a breeding ground for mosquitoes, flies and other insects besides allowing germs to grow. This is because the organic waste decomposes with the help of bacteria. Garbage bins should be covered and also be cleaned after emptying.

Fig.7.12

ACTIVITY 7.5

Have you heard of garbage bins with labels such as "Biodegradable wastes" and "Non degradable waste". Have you ever noticed the colour of those bins? Yes, they are blue and green. What do the colours blue and green signify? What kind of garbage would you throw in either of these bins? Some of the common garbage items generated in our homes are: waste paper, plastic carry bags, vegetable peels, used batteries, stale food items, used pens, old clothes and broken glass. Identify the garbage items you will put in each of these dust-bins. You may also refer to lesson no. 12 'Housing' about waste disposal.

Compare your answers with the correct answer given in the section "answers to intexts questions 7.2"

Biodegradable waste products typically originate from plant or animal sources and can be broken down by other living organisms. These include, green waste, food waste, human waste, sewage and others. These waste products are less polluting. In contrast, non-biodegradable waste products cannot be broken down by living organisms; for example, non-biodegradable plastic products. These waste products accumulate and are more damaging to our environment. In the interest of a cleaner environment, each one of us should decrease the use of items that lead to non-biodegradable waste. For example, decrease use of plastics, by carrying clothes or jute bags for shopping.

It is the government's responsibility to provide civic amenities like water, electricity, roads and garbage disposal facilities. However, every individual who uses these facilities has a responsibility of maintaining them. Taking this idea forward, the Government of Delhi has launched a unique scheme named "Bhagidari" which aims at involving people's participation, the Government Departments and citizens groups like Resident Welfare Associations (RWAs) and Market and Traders Associations (MTAs) in order to work out solutions for common civic problems.

INTEXT QUESTIONS 7.2

1. List some of the activities that are organised by the government in your locality to maintain public health.

   .....

   .....

   .....

   .....

2. Samina's family members are expert house keepers. Their bathrooms are as clean as the bedrooms and the kitchen. But when Samina steps out of her house, foul odour irritates her nostrils; her feet sink in garbage piles and pot holes. Neither the local government authorities nor anyone in Samina's neighborhood seems to care. She is very sad and wants to do something to change this situation.

Fig.7.13

Taking cue from the 'Bhagidari' initiative launched by the Government of Delhi, please make four suggestions for Samina's community to make their surroundings clean.

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7.1.4 Immunization: Protection against Certain Communicable Diseases

You are exposed to a large number of disease causing agents every day. Your body is able to ward off most of these foreign agents. This overall ability of the body to protect itself against the foreign agents including the disease causing organisms is called **immunity**. It is of two types:

a) Natural immunity

b) Acquired immunity

a) Natural immunity - It is present from the time of birth and provides a general protection against the entry of any foreign agents into our body. Even if pathogens (refer to lesson No. 32 – Health and Hygiene of Science and Technology at Secondary level) gain entry into the body, they are destroyed. Some of the components of natural immunity are the various types of barriers such as the skin and the mucous membranes that prevent entry of foreign agents into the body. Hydrochloric acid in the stomach kills the germs entering our body along with food. If a foreign agent enters the blood stream, special type of white blood cells (WBC) known as phagocytes destroy it. Phagocytes engulf the foreign particles and digest or destroy them.

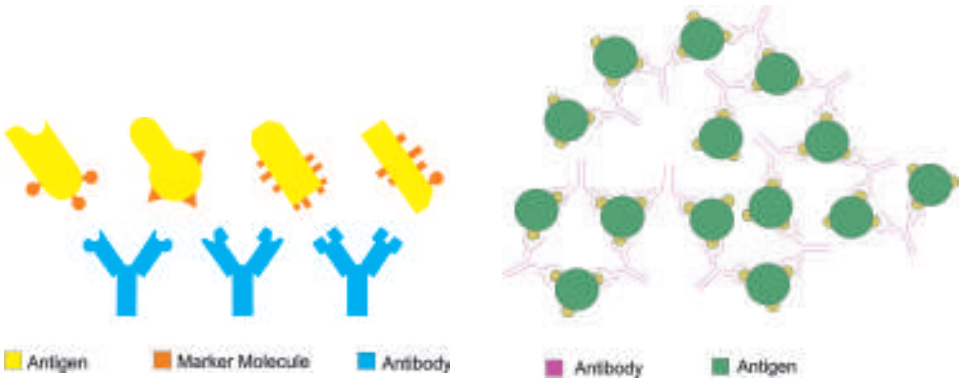

Fig.7.14

b) **Acquired immunity-** It develops during one's life time and is therefore known as acquired immunity. It works on the simple principle of producing antibodies in response to antigens (refer to lesson No. 22 – Life Process of Science and Technology at Secondary level). Any foreign particle or microorganism against which an antibody is generated is called an antigen. Antibodies are protein molecules produced by special defense cells of the body called **lymphocytes**. As you may recall, they are a type of WBC.

We can acquire immunity :

1) Through exposure: Any previous infection or exposure to a disease gives immunity against the disease. This is the **natural** way to acquire immunity e.g. if a person suffers from a disease such as mumps or measles, he/she develops life long immunity against the disease.

2) By vaccination: Vaccines are inactivated or weakened pathogens or their products that function as antigens or foreign agents. When vaccines are introduced in the body, they activate the immune system against the specific pathogen so that if the pathogen actually infects in the future, the immune system is equipped to provide protection against the infection. Vaccines are sufficiently inactivated or diluted so that they do not cause disease in the body. The duration of protection provided by the vaccines varies across different vaccines. In order to reinforce the immunity provided by the immunization, booster (repeat) doses of certain vaccines are recommended. For example, the immunization against diphtheria, pertussis and tetanus (DPT) requires booster dose for providing protection against infections. This forms the basis of our national immunization programme that seeks to control certain vaccine preventable diseases.

Fig.7.15

Immunization Schedule

You may be aware of various immunization programmes that are run by the government for the general public especially for pregnant women, infants and children. Table.7.2 below, illustrates the primary immunization programme for a new born baby and the subsequent booster doses. Immunization is given free of cost, at all government dispensaries and hospitals. Ask your parents about the vaccines given to you and your siblings during childhood.

Table.7.2 Immunization schedule

Vaccine	Age				
	Birth	**6 weeks**	**10 weeks**	**14 weeks**	**9-12 months**
Primary vaccination					
BCG	✓				
Oral Polio		✓	✓	✓	
DPT		✓	✓	✓	
Hepatitis B		✓	✓	✓	
Measles					✓
Booster Doses					
DPT + Oral Polio	16-24 months				
DT	5 years				
Tetanus toxoid (TT)	At 10 years and again at 16 years				
Vitamin A	9, 18, 27, 30 and 36 months				
Pregnant Women					
Tetanus toxoid: 1st dose	as early as possible during pregnancy				
2nd dose	1 month after 1st dose				
Booster	within 3 months				

Primary immunization is scheduled in the first year of life to provide optimal protection to the infant. Any delay in following the immunization schedule exposes the infant to the risk of these infections. Hence, the timing, sequence and frequency of the immunization should be followed as detailed in the chart above.

ACTIVITY 7.6

Find a child below the age of two years in your family or neighbourhood. Ask the parents of the child about the child's immunization status and compare it with the immunization schedule given in Table.7.2 and fill up the table below:

Name of the child:

Date of birth:

Age of the child record:

Vaccine	Age				
	Birth	1½ months (6 weeks)	2½ months (10 weeks)	3½ months (14 weeks)	9-12 months
BCG					
Polio					
DPT					
Hepatitis					
Measles					

Has the child received all the immunizations as per the schedule? Yes/ No (encircle the correct response)

If the child has received all the immunizations on time, congratulate the parents and find out from them at least two reasons for why they followed the schedule.

Fig.7.16. A child being given polio drops

S.No.	Reasons
1.	
2.	

If a child has incomplete or delayed immunization, give two important reasons to the child's parents to get their child immunized on time.

You must have seen posters on "Pulse- Polio Abhiyan" from time to time. What are they about? The Government is trying to eradicate this deadly disease from the country. All the children under the age of five years should receive polio drops in these immunization drives so polio can be eradicated and no child is ever crippled by this disease. For the convenience of the public, Pulse Polio abhiyan is usually organized on Sundays.

INTEXT QUESTIONS 7.3

1. Complete the table:

S.No.	*Preventive actions*	*Name of the diseases that are prevented*
i.	Set of mosquitoes net	
ii.	Sanitary condition and proper disposal of human excreta	
iii.	BCG vaccine	

2. Select the killer diseases that are targeted in the primary immunization programme of the Government of India.

   BCG, Polio, TT, Hepatitis B, DPT, Vitamin A, Measles

   _____

3. Fill in the correct option:

   i) Type of immunity provided to a newly born child by mother's milk _____ (natural immunity/ acquired immunity)

   ii) Vaccine against TB _____ (BCG/ DPT/TT)

   iii) Polio vaccine is first given at the age of _____ (10 weeks/ 6 weeks/ 1 year)

   iv) Day of week chosen for Pulse Polio _____ (Wednesday/ Sunday/ Friday)

WHAT YOU HAVE LEARNT

- Health is not mere physical fitness or absence of diseases. It is a "state of complete physical, mental and social well being."
- A person with good physical health is energetic, alert and is able to perform his/ her jobs well.
- Persons, who have good mental and social health have control over their emotions, do not worry unnecessarily and are confident. They take care of themselves and fulfil their duties towards others in the society.
- Hygiene deals with various practices, principles or habits that help in maintaining health. Hygiene deals both at personal as well as at community level.

- Balanced diet, personal hygiene, domestic hygiene, clean food, exercise, regular sleep habits and abstaining from drugs are some of the important prerequisites of personal health.
- Provision of clean environment, safe drinking water, health services and immunization against common infectious diseases is needed for a healthy community life.
- Vaccines are available against some seriously debilitating diseases such as TB, polio, tetanus, pertussis, diphtheria and hepatitis.
- The ability of the body to fight the disease causing organisms is known as immunity. It can be inborn or acquired during our life time.
- Acquired immunity develops either when we survive a disease or through vaccination. This is active immunity where we develop antibodies against a pathogen. In passive immunity, readymade antibodies are injected into the body.

TERMINAL EXERCISE

1. What role does vaccination play in control of diseases? Explain.
2. Define "health" according to WHO.
3. How is natural immunity different from acquired immunity?
4. List at least four steps essential to remain healthy.
5. How are personal health and community health related? Explain with the help of an example.
6. What precautions will you take while storing food to prevent it from becoming unhealthy?

ANSWERS TO INTEXT QUESTIONS

7.1

1. We need to be healthy because healthy persons are energetic, efficient, happy and productive.
2. Physical, mental, social, physical, mental, physical, social, mental, social
3.

Personal hygiene	washing hands before eating	bathing regularly
Domestic hygiene	regular dusting & mopping of the house	proper disposal of garbage
Food hygiene	food should be prepared in clean kitchen	fruits & vegetables should be washed before consumed

4. Brushing teeth regularly. Brushing teeth removes the food particles that get stuck to our teeth. These food particles allow germs to multiply and harm our teeth and gums and lead to bad breath. Thus brushing teeth daily is very important.
5. Food should be covered, stored in cool and insect proof place.
6. III, is happy, energetic and alert.

7.2

1. Cleanliness of the locality by removal of garbage, supply of clean drinking water, fumigation, organizing immunization programmers, ensuring food standards in food stores and milk outlets.
2. Discussions with neighbours convincing them about the association between healthy population and clean environment and therefore the need to keep their neighborhood clean; forming peer groups and distribution of hand bills to educate people around, making posters depicting the ways of keeping the place clean, arranging for cleaners to collect the garbage/contact the municipality for providing garbage bins and garbage collection, and also for repair of the roads.

7.3

1. (i) malaria, dengue (ii) hepatitis (iii) tuberculosis
2. BCG, Polio, DPT, Hepatitis, Measles
3. (i) Acquired (ii) BCG (iii) 6 weeks (iv) Sunday

Notes

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8

COMMUNICABLE AND LIFE STYLE DISEASES

You have learnt about the role of nutrition and environmental sanitization for maintaining goods. We all know that for happy living, it is necessary to remain healthy and free from diseases. However, you must have seen people suffering from diseases. A disease makes a person weak and vulnerable to more suffering. Do you know that a disease, if prolonged, may also result in disability or death? Diseases may be the result of infection in the body such as jaundice or diarrhea. They may be a result of faulty eating and living habits (life style) like diabetes and hypertension. Many of these diseases such as hypertension, heart disease and diabetes can only be controlled but not cured. In this lesson, you will study about diseases which occur because of infections and faulty life style. You would also learn about their prevention, cure and control in order to lead a productive life.

OBJECTIVES

After reading this lesson you will be able to

- explain the terms communicable and lifestyle diseases;
- identify the causes of communicable and lifestyle diseases;
- recognize the signs and symptoms of communicable diseases;
- suggest measures to protect yourself communicable and lifestyle diseases;
- list the factors causing life style diseases and
- adopt healthy practices to maintain good health.

8.1 WHAT IS A DISEASE?

Disease is a state of discomfort in which the normal functioning of the body is affected. The state of disease is the opposite to the state of health. Do you remember

how health has been defined? Go back and read Lesson 7. You must have noticed that when a person has a disease there are certain signs and symptoms. Each disease has associated signs and symptoms which are particular to that disease only. Try to recollect how you felt when you were suffering from common cold? You had a sore throat, a blocked nose, body ache and fever. However, when your grandmother had hypertension she was restless, disoriented, and fatigued. She was advised rest and asked to avoid physical and mental stress. You have seen that in both the cases the patient was uncomfortable. In this lesson we will discuss two types of diseases:

- Communicable diseases and
- Life style diseases

8.2 IMMUNITY

Sometimes it happens that your family members or friends may have viral fever but you do not catch it? Why do you think this happens? This happens because your body's defense system protects you from germs. In other words you had **immunity** to viral fever. Do you know how our defense system functions? Our body's defense system consists of white blood cells which act as soldiers to fight germs. The white blood cells produce a substance called **antibodies** to fight germs. In the fight between the antibodies and germs, if the antibodies are able to resist and destroy the germs then the infection is prevented and the person is said to be having immunity. However, if the germs manage to overpower the antibodies, the symptoms of disease appear. In other words, the person does not have immunity to the disease. **Immunity is the ability of the body to resist a particular disease.** You have learnt about immunity and immunization at length in Lesson 7.

8.3 COMMUNICABLE DISEASES

The diseases that spread from one person to the other are called **Communicable Diseases** or infectious diseases. These diseases are caused by infection which spreads or is communicated through the medium of touch, sharing towel, handkerchief etc. of the patient, air, food or water or through sexual contact with an infected person. Influenza, polio, typhoid, measles, mumps, chickenpox, tuberculosis (T.B.), sexually transmitted infections and AIDS (Acquired Immuno Deficiency Syndrome) are some of the communicable diseases.

8.3.1 What Causes Communicable Diseases?

Communicable diseases are caused by very tiny organisms called germs and parasites. These germs are present everywhere- in air, water, soil, etc. When germs enter a healthy body, they multiply and upset the normal functioning of the body. This produces symptoms of a disease. If a person consumes infected food or water the

symptoms of disease may not develop immediately. The germs take some time to grow in sufficient numbers to produce the symptoms of the disease in body. This gap of time between the entry of germs into our body and appearance of symptoms of the disease is called the **incubation period**.

A person suffering from typhoid, must have consumed food infected with typhoid germs about 2-3 weeks earlier, but the symptoms appear some time afterwards. Incubation period is different for different diseases. During this period, the person may remain perfectly healthy but is a carrier of the disease.

8.3.2 How Do Communicable Diseases Spread?

You know that germs are present everywhere around us and they can spread through four modes:

(i) Food and water

(ii) Air

(iii) Contact

(iv) Insects

Let us now study these in detail.

(i) Food and Water

You must have often being told to keep food and water covered. Can you say why you are told to do so? Yes, you are right. Uncovered food and water are likely to get contaminated with germs and spread diseases. Do you know how else food and water can get contaminated? It can get contaminated through:

i) unhygienic conditions of preparation, serving and storing

ii) dirty hands and utensils and

iii) houseflies which transfer germs from rubbish and garbage to food.

Drinking water should be taken from a safe source. Water which you get from the municipal taps is safe to drink. Can you tell why? This is because tap water is cleaned and treated by certain methods that kill germs before it is sent to our homes but water from wells, ponds, streams and even hand pumps is generally unsafe and may contain disease-causing germs. Diseases such as diarrhea, hepatitis, cholera and typhoid are spread in this way.

(ii) Air

Suppose a person suffering from influenza, conjunctivitis or mumps, coughs or speaks loudly or sneezes- what do you think can happen? Yes, you are right. The patient throws germs of that disease into the air which enter our body when we breathe in. So we are likely to catch the disease. The air in crowded places, poorly ventilated houses

and cinema halls is more likely to contain disease-causing germs. That is the reason why we should avoid visiting crowded places when we are suffering from communicable diseases.

(iii) Contact

A communicable disease may also spread through contact, which may be:

- Direct contact
- Indirect contact

Direct contact means you actually touch a person who has a disease or have sexual contact with him/her. Diseases like common cold, diphtheria, cholera, tuberculosis, pneumonia, measles and meningitis are caused through direct contact with the patient. Diseases like hepatitis B, genital warts, herpes, syphilis, gonorrhea and HIV/AIDS are caused by sexual contact with an infected person.

You are set to have indirect contact with a patient when you use anything that he/she may have used like a comb, towel, cup, etc. For example, suppose your brother is suffering from influenza. He covers his mouth with his hand when he coughs and then shakes hands with his friend. The disease germs are passed through direct contact from your brother to his friend. However, if he gives you a glass of water without washing his hands, then the germs are passed from his hand to the glass and from the glass to you. This is indirect contact. You may also contact diseases indirectly by touching objects in public place like hospital, cinema halls and buses. Can you think of more examples to explain direct and indirect contact as a mode of spread of disease?

(iv) Insects

Many diseases are spread through insects. Flies and cockroaches carry germs from rubbish and garbage on their bodies and infect the food on which they sit. This causes diseases like cholera. Mosquito bite causes malaria, dengue and Japanese encephalitis.

8.3.3 Preventive Measures

Now that you have studied how communicable diseases spread, can you think of some ways in which they can be prevented? Let us list some precautions that should generally be observed.

(1) The personal belongings of the person suffering from any communicable disease, that is, clothes, utensils, should be kept separately.

Fig 8.1

(2) Keep water at home in clean, covered containers. Drinking water should be boiled for 10 minutes to ensure that it becomes free of germs. Boil milk before using it.

(3) All food, even left–over scraps, vegetables, fruits, sweets, milk etc. should be kept covered.

(4) Avoid eating and buying cut fruits and vegetables from the market, especially if kept uncovered.

(5) Wash all utensils before using them for storing food, milk or water.

(6) Wash your hands thoroughly before cooking food, before eating food and after using the toilet.

(7) Keep the house and place of work well-ventilated in order to allow adequate amount of sunlight and air to come in.

Fig 8.2: Some Preventive measures

(8) Avoid crowded places such as cinema houses, especially during an epidemic.

(9) Maintain personal hygiene by having regular bath, keeping nails clean and cut short. Wash your hair regularly.

(10) Keep your house and surroundings clean**.** Do not let garbage accumulate. See that drains are clean and covered. See that all doors and windows have a wire mesh to prevent entry of flies and mosquitoes. Do not defecate in open, use a sanitary latrine.

(11) Do not spit anywhere and everywhere. If you must cough, use a handkerchief to cover your nose and mouth.

(12) All children should be given complete vaccination after birth in order to protect them from many diseases. Immunity and immunization schedule has been already discussed in lesson 7. Read them again.

8.4 LIFE STYLE DISEASES OR NON-COMMUNICABLE DISEASES

Some diseases do not get spread from one person to another through touch, air, food, water or sexual contacts. These diseases may develop in a person due to faulty eating and living habits e.g., obesity, diabetes and hypertension. These diseases are called **life style diseases**.

Rohit's mother is a 50 years old diabetic woman. She is quite fat and fond of fried foods and sweets. She depends on her maid for all household work. She does not like to exercise. One day, she felt pain in the chest for which she was immediately taken to the hospital. The doctors diagnosed her with heart problem. Her condition was complicated. She had to be hospitalized for one month for proper treatment and care. It was a large economic burden for the family and also left the family members emotionally and mentally drained.

These days we hear less about infectious diseases like typhoid or cholera. On the other hand, very often we hear about diseases like diabetes, hypertension (high blood pressure), obesity and heart disease. Have you wondered what causes these diseases? There is no infection in the body, yet these diseases occur. This happens because of the defective lifestyle that we follow.

What is a lifestyle? A lifestyle is the pattern of living that we follow - how we work, what and when we eat, how and when we sleep, how much physical activity we do and whether we smoke or consume alcohol. Lifestyle or non-communicable diseases are chronic (long term) in nature and do not result from an acute (short term) infection nor do they spread from one person to the other. These conditions cause dysfunctioning in the body and impair the quality of life. They may also lead to death. These diseases usually develop relatively over long periods. In the beginning there may not be any symptoms but after the disease sets in there may be a long period of impaired health.

Lifestyle diseases are now seen in developing countries like India and in the younger or productive age group. This leads to reduction in productivity and development of the country. As these are chronic conditions they are a financial burden for lifetime. Therefore, there is an increasing concern these days about lifestyle diseases that can be easily prevented but not cured.

The lifestyle factors associated with these diseases can be of two types-

i) Modifiable (those that can be changed) like food habits, physical activity level, addiction (smoking, drinking) and stress.

ii) Non-modifiable (those that cannot be changed) like age and heredity.

You may have observed that

i) More and more young people are seen smoking and drinking despite knowing the fact that these are harmful to health.

ii) Our nutritious and balanced meals are giving way to fast food and junk food, fresh fruits and vegetables are being rejected in favour of processed and packed food and soft drinks are replacing milk.

iii) We prefer to use a bus or car instead of walking even for short distances.

iv) More and more machines are being developed each day to reduce physical labour associated with our work.

All the above practices have led to our becoming overweight and obese. Obesity is excess body-weight than normal or ideal weight for your height. Obesity is the main underlying causes for other lifestyle diseases like diabetes, hypertension, obesity, heart disease, etc.

8.4.1 Prevention of life style diseases

People need to change their habits in the direction of healthier living. You can do a lot to prevent the occurrence of lifestyle diseases. Some healthy tips are:-

i) take up regular exercise like walking, yoga, dancing, aerobics and cycling.

ii) use stair-case instead of lift or escalator.

iii) take a balanced diet at proper meal times. Do not over-eat.

iv) avoid processed and packaged foods that are rich in sugar, fats, salt and calories and low in fiber, good quality protein, minerals (iron and calcium) and vitamins.

v) eat whole grains like cereals (wheat, whole wheat flour), millets (jowar, bajra) and avoid refined foods like maida.

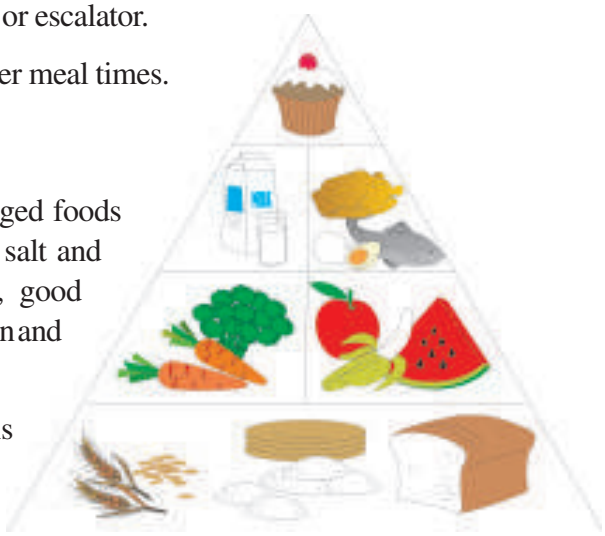

Fig 8.3: Food Pyramid

vi) eat 400 - 500 gms of seasonal fruits and vegetables in a day.

vii) drink plenty of water.

viii) practice yoga or meditation to avoid stress in life.

ix) keep away from smoking and drinking alcohol.

x) spend less time in sitting and watching television and pursue outdoor games and activities like gardening, playing a sport like football, cricket and badminton.

You can educate people around you regarding healthy lifestyle practices. It is possible to keep these diseases under control, if you make sensible alteration in your lifestyle.

ACTIVITY 8.1

In your neighbourhood and family, identify people suffering from lifestyle diseases; the age at which it occurred; underlying causes (modifiable and non-modifiable) and discuss with them the appropriate lifestyle modification for a healthy life.

INTEXT QUESTIONS 8.3

1. Why is there an increase in the occurrence of non-communicable or lifestyle diseases in countries like India? Who are the victims of these diseases?

2. Suggest three healthy eating practices that can prevent lifestyle diseases.

8.5 CARING FOR THE SICK AT HOME

You now know the measures you can take in order to prevent the spread of communicable diseases. But if someone in the family falls ill, what things are there that you will keep in mind so that the patient recovers as fast as possible. Some of the points you should consider are-

(1) consult the doctor immediately instead of waiting for the intensity of the disease to increase.

(2) follow the doctor's advice. Whatever medicines are prescribed should be given on time.

(3) give the patient a proper and balanced diet as advised by the doctor.

(4) see that the patient takes adequate rest.

(5) keep the patient's room clean. The patient's clothes should be changed everyday and he may be given a sponge bath, if possible.

Some of the common communicable diseases that can be managed at home are explained in the table:

Name of Disease	Mode of Spread	Symptoms	Incubation period	Management of the Patient
1. Cholera	Food and Water	• Sudden onset of severe, watery diarrhea. • The faeces look like rice water • Vomiting • Cramps in the legs • Patient feels very thirsty	1-5 days	• Dehydration can be dangerous, so give plenty of fluids. • Give Oral rehydration solution (ORS). • Give boiled water and fresh, easily digestible food.
2. Typhoid	Food and Water	• Severe headache • Fever with low pulse • Dry white coated tongue	14-21 days	• Blood culture and other tests should be done. • Give the prescribed medication to the patient.
3. Hepatitis (jaundice)	Food and Water	• Fever • Dark yellow urine • Yellowish tinge in eyes • General paleness • Loss of appetite • Abdominal discomfort	20-35 days	• Give a carbohydrate-rich diet. • Keep the patient in bed as long as there is fever and till appetite returns to normal.
4. Influenza (Flu)	Air	• Fever • Cold, cough, sneezing • Headache and body ache • Nausea	1-3 days	• Control the fever with medicines and cough with steam inhalation. • Treatment is likely to prolonged so constant monitoring by the doctor is essential.
5.Tubercu-losis (T.B)	Air	• Persistent cough • Loss of weight and appetite • Excessive weakness • Rapid pulse • Chest pain • Breath has peculiar odour	4-6 days	• Maintain hygienic conditions • A balanced diet rich in calcium should be given • Treatment should be strictly regulated for one year

6. Malaria	Mosquito bite	• Fever • Alternating chill and perspiration • Headache and body ache • Nausea • Vomiting days	10-14	• Get the blood test done to confirm malaria. • Give prescribed medicines.
7. Tetanus	Wound exposed to dust or rusted item	• Restlessness • Headache • Fever • Stiff neck • Difficulty in chewing and swallowing • Spasm of muscles of jaw and face • Bending of back in shape of bow • Severe pain	4 days to 2 weeks	• Put a ball of cotton between teeth to prevent biting of tongue. • Maintain hygiene. • All wounds should be thoroughly washed.
8. Pertussis (whooping cough)	Air	• Inflammation of mucus membrane • Severe bouts of cough accompanied by whoop like sound	7-12 days	• Complete isolation of the patient for a week • Should be kept in well-ventilated room

Steps to prepare an Oral Rehydration Salts Drink (ORS)

1. **Purchase ORS :** ORS packets are available in health centres or a chemist shop.
2. **Put the contents of the ORS packet in a clean container**
3. **Add water only.** Do not add ORS to milk, soup, fruit juice or any other liquid. **Do not add sugar**
4. **Stir well.** In case of infants, feed the solution from a clean cup with the help of a spoon. Do not use a bottle.

If you are unable to get an ORS, then,

1. **Add 8 teaspoons of sugar and 1 teaspoon of salt to 1 liter of clean drinking water.**
2. Allow the sugar and salt to dissolve.
3. Stir well

Notes

INTEXT QUESTIONS 8.1

1. What is a 'Disease'?

   .....

   .....

2. Fill in the blanks with appropriate word/words.

   a. Diseases spread through infected food and water are..... and.....(typhoid and hepatitis/typhoid and dengue)

   b. Malaria is spread through ..... (fly/ mosquito bite/ insects)

   c. If a patient suffers from dehydration he/she should be given plenty of..... (fruits/ vegetables/ fluid and ORS)

   d. A person suffering from tuberculosis should ..... while coughing or sneezing. (cover his/hermouth/isolate himself/herself)

3. Write two symptoms of the following diseases.

   a. Influenza

   b. Tetanus

   c. Hepatitis

   d. Cholera

4. Mohan had consumed infected food but is not showing any signs of the disease. Can he make his friend Abdul ill? How?

8.3 HIV/AIDS

Most of you must have heard of HIV. HIV stands for Human Immuno Deficiency Virus. It is caused by a virus that attacks the body's natural defense system. Do you remember what the body's defense system does? Yes, it defends the body against many infections. Can you guess what will happen if there is no defense system in the body? The germs will attack the body and the person's immunity is reduced. This makes him/her prone to catch many diseases. A person infected with HIV virus can transmit the disease to other people. When HIV virus has completely destroyed the person's defense system- AIDS sets in. AIDS stands for Acquired Immuno Deficiency Syndrome. HIV/AIDS is a highly communicable disease that is highly debilitating. It affects a person's productivity and has no cure. Therefore in order to protect ourselves we must know how this disease spreads.

The HIV/AIDS virus is spread by

(i) sexual contact with an infected person.

(ii) exchange of infected body fluids, e.g., blood transfusions.

(iii) use of infected needles

(iv) from infected mother to child during pregnancy or at birth.

Fig 8.4: Ways of transmission of HIV/AIDS

You must have seen roadside posters and banners and advertisements on television explaining how HIV/AIDS does not spread. Can you recall messages about how HIV/AIDS does not spread? HIV/AIDS cannot spread by:

- shaking hands
- kissing on the cheeks
- using the same toilet seat
- standing close to the infected person
- through the air, that is, sneezing, coughing, etc.
- through cups, glasses, plates
- Water or food

There is no cure for HIV/AIDS as yet, nor is there any vaccine to protect people. However, some preventive measures that can be taken are:

restrict the number of sex partners to one

- Use protection during sexual contact

- Always use only properly sterilized needles for injections
- Insist on getting properly tested blood from registered blood banks when in need of blood transfusion
- Seek medical advice for bearing a child if infected with HIV.

It is important to understand that HIV infection and AIDS are related terms but not the same. HIV infected person may not be suffering from AIDS i.e. an HIV infected person if takes nutritious diet and maintains healthy life style can deter the onset of AIDS and can lead a productive life for a number of years.

INTEXT QUESTIONS 8.2

1. The full form of AIDS is.....
2. Choose the correct alternative:
   (i) AIDS is spread by
      a) shaking hands
      b) playing together
      c) infected needles
      d) water or food
   (ii) AIDS cannot be spread by
      a) Sneezing
      b) Blood transfusion
      c) Sexual contact
      d) Infected needles

TERMINAL EXERCISE

1. Differentiate between communicable and non-communicable or life style diseases?
2. Shazia went to a fair and had food that was exposed to flies and dust. The next day she had vomiting, diarrhoea and cramps in her legs. What do these symptoms indicate? What steps will you take to manage the patient?
3. Life style diseases impose financial burden and slow down progress of the nation. Why?

4. Write a slogans for each of the following –

   a. Importance of safe drinking water

   b. Promotion of physical activity

ANSWER TO INTEXT QU1ESTIONS

8.1

2. a. Typhoid, Hepatitis

   b. mosquito

   c. Plenty of fluids and oral rehydration solution

   d. Cover his mouth

3. a. Fever, headache and body ache

   b. Fever and dry coated tongue

   c. Yellow eyes and dark yellow urine

   d. Watery diarrhea and cramps in the legs

8.2

1. Acquired Immuno Deficiency Syndrome

2. i. c

   ii a

Notes

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9

CARE AND MAINTENANCE OF FABRICS

A group of students were chatting during lunch break. Charles complimented Joseph for his favourite sparkling white shirt that they had brought together almost two years ago. Just then Purnima said that she was very unhappy about the condition of her silk blouse after one washing. Akbar said he too could not wear his expensive pure wool cardigan after the first wash. Then Kabir told them that he has acquired knowledge regarding care of different types of fabrics in a house keeping course. He told them that they should not wash all types of fabrics with one detergent. He further added that there are different methods of washing and finishing different types of clothes. He advised that a little care can keep their favourite dress as good as new.

Do you know that clothes speak volumes about the wearer's personality? It is good to select clothes carefully. But even more important is to wash and finish them regularly for a well groomed appearance. Let us learn how to take care of clothes so that we have no regrets later.

OBJECTIVES

After reading this lesson you will be able to do the following:

- explain the meaning and need of brushing, airing and laundering your clothes;
- remove stains using appropriate reagents and techniques;
- check care labels and colour fastness of your clothes before washing;
- launder different fabrics using appropriate cleaning methods and finishing agents and;
- store laundered clothes suitably.

9.1 ROLE OF SHAKING, BRUSHING, AIRING AND LAUNDERING CLOTHES IN CARE AND MAINTENANCE OF FABRICS

We all know that when we wear clothes they become dirty and need laundering. The dirt is due to stains, dust, grease and perspiration. When left on fabrics, these can lead to the following damages:

- Stains and dirt on clothes become medium for the growth of bacteria, fungus or other harmful organisms which may lead to skin problems and poor personal hygiene.
- Dirty clothes lose their freshness and smell unpleasant.
- Left on clothes the dirt and stains reduce the strength of the fabric.
- No one feels good wearing stained and dirty clothes.

Clothes need not be washed every time they are worn. It depends on the weather in which these have been worn and how much sweat they have absorbed. When the weather is good and you do not sweat, you can safely reuse your clothes. But before putting them away for reuse keep the following steps in mind to maintain your clothes.

9.1.1 Shaking, Brushing and Airing

'**Shaking**' helps in removing loose dust from the fabric. Hold the dress with both hands and shake it vigorously.

Have you seen materials like velvets, corduroy, chenille, blankets and carpets? They are thick and have a pile on their surface which holds dust easily. To remove it we need to gently brush the surface with a soft clothes-brush, in the direction of pile (fuzzy surface).

Fig. 9.1 Brushing

Thus **brushing** is for removing loose dirt from fabrics which have a pile on them suits and coats are also brushed.

'Airing' helps in drying and removing bad odours from fabrics. It is done preferably outdoors in the sun or in a well-ventilated room.

9.1.2 Laundering

Laundering of clothes does not mean only washing of clothes. It consists of the following three steps:

i. Washing or dry-cleaning garments to remove dirt, perspiration and smell, e.g. your school uniform is washed and your woolen coats and jackets etc. are dry cleaned.

ii. Finishing the garments with stiffening agents like starch and gum, brightening or bleaching agents, drying them then ironing or pressing, folding and hanging garments, e.g. cotton dupattas and sarees are starched.

iii. Storing the garments for a short or long time, e.g. when the winter season arrives you put away summer clothes and take out woolen shawls, sweaters, coats etc.

Remember, washing and dry cleaning are two different processes used for cleaning different types of clothes.

Washing	Dry-cleaning
Means removing dirt using soap/ detergent and water.	Means removing dirt using grease absorbents and solvents.
Colourfast fabrics can be easily washed.	Leather and fur, selected silks and woolens, zari and other costly fabrics are dry cleaned.

INTEXT QUESTIONS 9.1

1. Meena has a basket full of soiled clothes. These include her silk blouse, zari saree, cotton shirt, cotton payjama and woolen shawl. Which of these would you recommend her to wash at home and which clothes should she send for dry cleaning? Why?

_____

_____

2. Summer season has set; you have to put away the winter clothes. What steps would you suggest to your friend to ensure that his clothes are clean and ready to store till the next season?

_____

_____

9.2 GETTING READY TO LAUNDER CLOTHES AT HOME

Whenever you are ready to launder clothes at home remember that there are certain preparations required. What are these? Why are these preparations necessary? How and what we need to do, let us find out.

9.2.1 Collection of clothes and supplies:

If you have a set place to keep your dirty clothes and supplies for washing, then this step is already taken care of. If not then collect all the dirty clothes and supplies needed for washing, at one place. It helps to conserve energy while washing. Can you explain how?

9.2.2 Mending damaged garments

The old saying- 'a stitch in time saves nine' stands true in this case. If any garment has been damaged, its handling during washing may make the yarns come out from its torn areas and make the tear larger. It may become very difficult or impossible to mend them neatly. That is why it is advisable to mend (repair) all tears before the garments are washed.

Fig. 9.2 Mending

9.2.3 Sorting

It refers to separating the clothes on the basis of (i) the type of fabric (ii) colour (iii) size and weight (iv) amount of dirt (v) utility of the article (vi) soaking time (vii) amount of detergent and bleach required as these are all different for different fabrics.

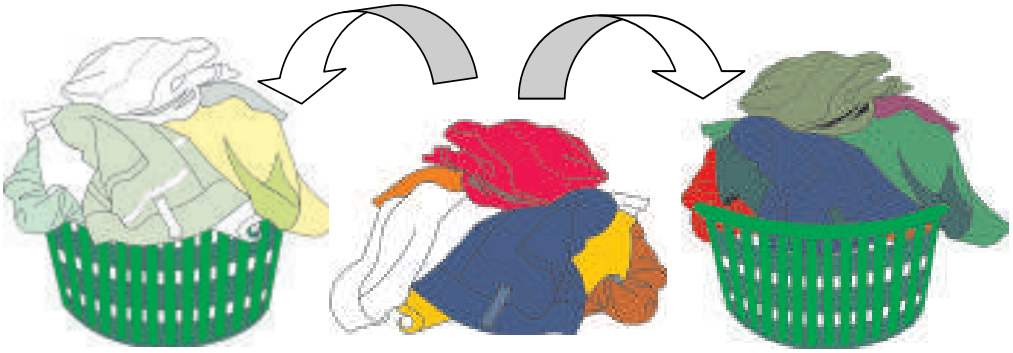


Fig. 9.3 Sorting

If you ignore this sorting, white fabrics may acquire colour stains if the colour of any other garment bleeds. For maintaining good hygiene dusters, kitchen towels and dish clothes, under garments, socks, need to be washed separately.

9.2.4 Read labels on the garments

Generally, all textiles and textile products carry labels which provide basic information about the product, for example, the contents of the product, its washing and ironing instructions, etc. These instructions are stamped at the beginning and end of the fabric roll or along its selvages. Reading these thoroughly will help you take better care of your fabrics. Following are some of the stitched and stamped labels on garments.

Fig. 9.4 Hanging and sewn tags on readymade garments

ACTIVITY 9.1

Collect and study 3-4 labels on textile items and fill the following table:

Item on which found	*Information contained*	*Meaning*
Cardigan	www.3sIndustries.com MADE IN INDIA 80% ACRYLIC 20% WOOL COLD WASH WASH DARK COLORS SEPARATELY RESHAPE DRY FLAT DO NOT BLEACH DO NOTWRING	Information about -contents -washing and drying

9.3 CHECK STAINS AND REMOVE THEM

Fig. 9.5 some common stains

Ink, lipstick, nail polish, grease, paint tea and coffee, are some marks that may spoil our clothes at one time or the other. A **stain** is an unwanted mark of discolouration on a fabric caused due to contact with another substance. Generally, a stain requires special treatment for removal. If you have ever accidentally spilled tea on your clothes and washed it off immediately you must have realized that the stain gets removed quickly. Old stains take long and also a lot of effort to remove, often with poor results. Hence, the best way to get rid of stains is to remove them as soon as possible. Do not allow these to penetrate deep into the fabric or get dry and set.

Remember stains must be removed before washing as some of them may become permanent when exposed to chemicals in soaps or detergents, hot water and ironing.

Different types of stains require specific stain removing techniques and agents, depending on the type of fabric. Use of incorrect stain removing agent can spoil the fabric or its colour. Hence always try to identify the stain and select appropriate techniques and stain removing agent.
Most of the stains can be identified by their colour, smell and feel. Let's find out more about them.

a) **Colour:** Every stain has a specific colour. For example, the colour of curry/pickle stain is yellow, a coffee/tea stain is brown, a grass stain is green and so on. Try and collect some more stains with colours.

b) **Smell:** Most stains have a peculiar smell. Recall the smell of egg or paint or shoe polish. The stain on a fabric will have the same smell.

c) **Feel:** Stains can also change the feel of the fabric and can thus be recognized on this basis. Have you ever observed that paint or sugar make the fabric hard and stiff to touch, whereas lipstick or shoe-polish make the fabric feel slippery.

ACTIVITYS 9.2

Take an old white cotton cloth and cut out 4 (5x5 cm) pieces. Stain each piece with a different stain and keep it to dry. Now observe the colour, feel and smell of each stain. Stick each stain on a big paper and write its description.

INTEXT QUESTIONS 9.2

1. State whether the following statements are true or false and justify with reasoning-

Statement	*True/False*	*Justification*
(a) Dirty clothes are harmful for personal hygiene		
(b) 'Laundering' is same as 'washing' clothes		
(c) Airing of clothes is useful when they are not to be washed immediately.		
(d) Stains should be removed from the fabrics before washing.		

9.3.1 Classification of stains

Stains can be grouped on the basis of their origin, e.g., tea and coffee and many oils, vanaspati and ghee come from vegetable source. While removing these stains you can use more or less the same removing agents and method. Let us classify all stains on the basis of their origin.

Category of stain	Stains
1. Vegetable stains	Tea, coffee, fruit
2. Grease stains	Butter, ghee, oil, curry, shoe polish, tar, oil paints
3. Animal stains	Blood, milk, egg
4. Mineral stains	Rust
5. Miscellaneous stains	Dye, ink, mildew, grass, perspiration

9.3.2 Techniques of stain removal

There are two methods of stain removal: (i) Sponging and (ii) Dipping. Let us learn how stains are removed by using these methods.

Sponging

- Place an absorbent paper or fabric under the stain so that the right side of the stain faces the absorbing surface. Sponging should always be done on the wrong side of the stain.

Fig. 9.6 Sponging

- Take a soft cloth, dip it in the stain-remover and gently rub the stain starting from its outer corner moving inwards, towards the centre.
- Use light, circular strokes as these prevent the stain from spreading.
- The absorbent paper or fabric (commonly known as blotter) must be changed as soon as it starts showing the stain.

Dipping

Dipping is the method in which the entire fabric can be immersed in the stain removing agent. It is suitable if there are many stains or a large stain on the fabric. We can choose the stain removing re-agent depending upon the type of stain.

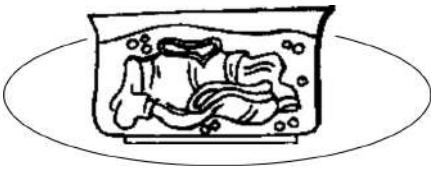


Fig. 9.7 Dipping

Some of the common reagents used for stain removal are borax powder, ammonia, hydrogen peroxide, oxalic acid and ready to use bleaches.

Type of stains and method of removal		
1. Vegetable stains	Tea, coffee, fruit, etc.	
Consideration for removal	Use alkaline reagents such as borax powder to remove stains as these are acidic in nature.	
Stains	**White Cottons**	**Coloured Cotton**
Fresh tea/coffee, chocolate, fruit	Pour boiling water on the stain ***Old*** Dip the stained portion in glycerin. Or spread borax powder over stain and pour boiling water while holding the stained portion on the mouth of a mug or pan.	Soak in warm water and borax (2 cups of water + ½ teaspoon of borax) Same as for white cottons

henna (*Menhdi*)	***fresh***	
	dip in warm milk for half an hour	same as for white cotton
	old	
	repeat the above two or three times	same as for white cotton

2. Animal stains	blood, milk, egg, etc.	
Consideration for removal	Avoid heat as these stains contain protein which gets fixed on heat treatment.	
Stains	**white cottons**	**coloured cotton**
blood, egg, meat	***fresh***	
	Wash with cold water and soap	same as for white cottons
	old	
	soak in salt water (2 table spoons of salt + ½ bucket of water), or in diluted ammonia	same as for white cottons

3.Grease stains	Butter, ghee, oil, curry, shoe polish, tar, oil paints, etc.	
Consideration for removal	Use grease absorbents and solvents like chalk, talcum powder to remove greasy matter and then, remove the colouring matter.	
Stains	**White Cottons**	**Coloured Cotton**
butter, ghee, oil, curry	***fresh***	
	wash with hot water, and soap. Dry on grass or shrub/ plant in the sunlight	same as for white cottons, but leave it in shade
	old	
	Make a paste of soap and water and apply it on the stain. Leave it wet in the sunlight until it is removed	same as for white cottons but leave in shade

Notes

paint, shoe polish, nail polish, lipstick, ball pen	***fresh*** Scrape all the excess stain (a) Sponge gently with methylated spirit or kerosene (b) Sponge with turpentine	same as for white cottons
	old Repeat the above method two or three times	same as for white cottons

4.Mineral stains	Rust and some medicines	
Consideration for removal	These stains contain metallic compounds and therefore, require treatment with mild acidic reagents followed by alkaline solutions to neutralise.	
Stains	**white Cottons**	**coloured cotton**
iron rust	***fresh*** rub lime juice and salt	same as for white cotton
	Old apply dilute oxalic acid and neutralize with dilute borax solution	same as for white cotton

5. Miscellaneous stains	dye, ink, mildew, grass, perspiration, etc.	
Consideration for removal	Give specific treatment to each of these stains.	
Stains	**white cottons**	**coloured cotton**
grass	***fresh*** Wash with soap and water	same as for white cotton
	old Sponge the stained portion with methylated spirit	same as for white same as for white

betal leaf (*paan*)	***fresh*** apply a paste of onions and leave in the sunlight	same as for white cottons but leave in shade
	Old repeat above method two or three times	same as for white cotton
ink	***Fresh*** wash with soap and cold water	same as for white cotton
	Old (a) soak in sour butter milk (lassi) for half an hour (b) apply lime juice and salt and leave in the sun (c) bleach the stain	same as for white cotton except do not leave in sun, put it in shade

9.3.3 Precautions while removing stains

- As far as possible, remove the stain when it is still fresh.
- For delicate and/or coloured fabrics, first try out the chemical on a small portion of the fabric on the inner side of the seam or some portion of the garment which is not visible when worn. In case the fabric or its colour gets damaged, do not use the chemical.
- Use dilute and mild reagents as these are less harmful, though it may take a little longer to remove the stain.
- Rinse the fabric several times after the removal of the stain, or the reagent may damage the fabric on drying.

ACTIVITY 9.3

Shyna wore a very beautiful white silk suit for an interview. She was very cautious about protecting it all through. After the interview she came home and changed her clothes. While she was folding her suit she noticed a big curry stain on it. She was very

tired hence she did not do anything about it. Next morning she dusted talcum powder on the stain and left it for a little while. Then, she soaked the suit in a strong hot detergent solution for an hour. She hung the suit on the line until it dried. The stain was still there though a little less prominent. She treated the stained portion with hydrogen peroxide. The stain had disappeared. She rinsed the suit many times to remove all traces of the chemical and then dried it in shade.

List each step that Shyna followed to handle the stain and comment if it was correct or incorrect. Give reason for your answer.

S.No.	Steps	Correct	Wrong	Reason
1				
2				
3				

INTEXT QUESTIONS 9.3

1. For removing each of the following stains, tick (√) the most appropriate option:

(i) Old tea stain on white cotton fabric:

(a) Use salt water

(b) Soak in glycerin

(c) Soak in lime juice

(d) Pour boiling water over borax

(ii) Old blood stains on coloured cotton fabric:

(a) Soak in salt water

(b) Soak in glycerin

(c) Soak in hot water

(d) Wash with soap and hot water

(iii) Lipstick stain:

(a) Use of salt water

(b) Soak in ammonia

(c) Sponge with methylated spirit

(d) Wash with hot water and soap

(iv) Rust stain:

(a) Use of salt water

(b) Use lime juice and salt

(c) Soak in methylated spirit

(d) Wash with soap and cold water

(v) Nail polish stain on polyester fabric:

(a) Sponge with methylated spirit

(b) Soak in warm borax water

(c) Rub lime juice and salt

(d) Soak in warm water and soap

After removing stains, the next step is laundering. General laundering is dealt with here while specific washing of different fabrics has been dealt with later in the lesson.

9.4 LAUNDERING

Laundering of clothes involves the following steps:

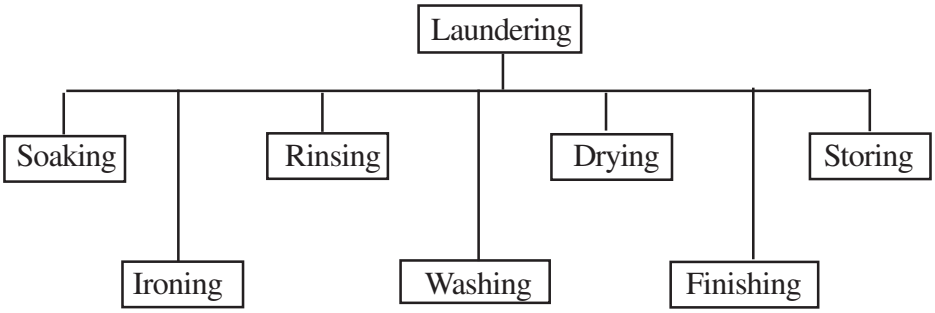


Fig. 9.8 Process of Laundering

9.4.1 Soaking

Soaking of fabric in water loosens the non-greasy dust particles because of up and down movement of water molecules. Fabrics which become weak when wet must not be soaked for long. Do not soak too many clothes in one bucket. There must be a room for dirt to disentangle from the fabric. Fabrics must not be soaked for longer than half an hour otherwise loosened dust will resettle on the fabrics.

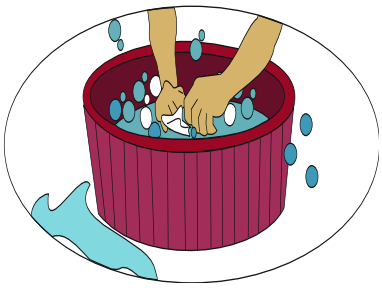


Fig. 9.9 Soaking

9.4.2 Washing

As said earlier, soaked clothes must be washed soon. The process of washing involves removal of dirt that has been loosened from fabrics by soaking. There are many ways to do this and the choice depends on the fabric being washed. You will now learn about these methods and their suitability to various types of fabrics.

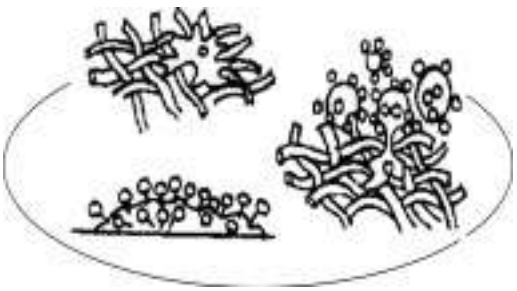


Fig. 9.10 Removal of Dirt by

Methods of Washing

i. **Friction method:** For washing strong fabrics like cotton and linen this is the right method. You can apply friction in any of the following three ways.

- **Hand friction:** This is the most common method of washing clothes. Rub dirty areas vigorously with the hand till the dirt is removed. It is suitable for cleaning very soiled small sized areas in the garment like cuffs, collar and bottom of the lower garments, handkerchief and lace.

- **Scrubbing brush:** While cleaning kitchen dusters which are very soiled use a brush to remove dirt, grease and stains. Remember to place the fabric on a flat hard surface before scrubbing. Hard scrubbing can clean the fabric well but wears it out. Have you noticed that if you use brush on shirt collars they get worn out? Therefore, scrubbing has to be used as per the nature of the fabric.

Fig. 9.11 Scrubbing

- **Beating stick:** While washing large clothes like bed sheets and towels use a wooden beating stick to provide friction. Remember that this is done only on a clean, flat and hard surface. Spread the fabric on the floor, apply soap and then beat it with the stick, constantly changing the surface of the fabric with the other hand.

ii. **Washing by kneading and squeezing:** This method is for delicate fabrics like silk, wool, rayon, etc. This does not damage the fabric or change its shape because only gentle pressure is applied repeatedly with hands. While it is still in the soapy solution. While using this method dip the cloth in soap solution, take it out and squeeze

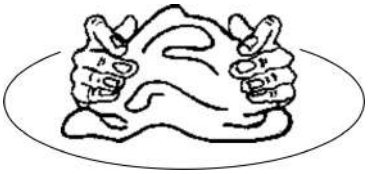


Fig. 9.12 Kneading and Squeezing

gently and again dip in the soap. In between rub the dirty areas gently between two hands. Repeat till clean.

iii. **Washing in machines:** 'Washing machine' a labour saving device and provides all the friction required for cleaning the clothes. The washing time varies with the type of fabrics and amount of soiling. For example, wool fabrics take less time for cleaning than cottons. Washing machines available in the market are automatic, semi-automatic and non-automatic. The advantage of using automatic washing machine is that it has a spinner which can wring the clothes after washing to the extent that these are almost dry. This is especially useful while washing large and heavy articles like bedcovers, curtains, etc. The instructions about using the machine should be read carefully before using it. One should be careful while loading clothes for washing in a machine as the colour of some fabrics may bleed and spoil the other clothes in the machine.

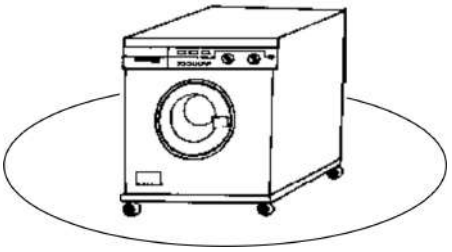


Fig. 9.13 Washing machine

9.4.3 Rinsing

Washed fabrics must be rinsed at least thrice or till they leave behind clear water. Why do we need to do that? If not rinsed well the contents of leftover detergent would harm the fabric.

Fig. 9.14 Rinsing

9.4.4 Finishing Agents

Some of your clothes require the application of a finishing agent before they are spread for drying. A finishing agent is nothing but something which helps to brighten and/or stiffen the fabric and give it a brighter and fresher look. You know what starch and/or blue your white cotton clothes need. Both these are finishing agents for cottons. For silks, a different starch is used. It is called 'gum arabic'. Similarly, there are 'blues' and brightening agents to brighten you white clothes. You will know more about these in the chapter on fabric finishes.

9.4.5 Drying

Clothes should preferably be dried outside in fresh air and sun. Use a clothes line and pegs or clips to hold the clothes or a clean stain free metal rack. Hang or spread the clothes and place the rack in the sun or shade depending on the type of clothes you have washed. Remember to

Fig. 9.15 Drying

turn clothes inside out if they are coloured. If you are using a clothes line, see that you spread your clothes on it in such a way that it allows air to pass through them. Not only do the clothes dry up much faster this way, it is an environment friendly method. Sunlight also kills some germs. Hence, it is recommended that under garments and the clothes used as sanitary napkins must be sun dried.

9.4.6 Ironing or steam pressing and folding

This process is applied on clothes to give them a smooth look. An electric or coal iron is used to carry out this job. There are various types of electric irons available in the market. Those with metal heating surface, Teflon (non-stick coated surface or steam irons) You can buy any of them and learn to use them from the instructions given along in the package.

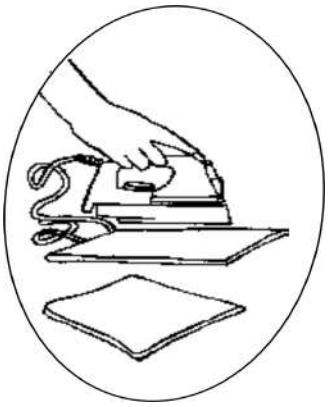


Fig. 9. 16 Ironing

9.4.7 Storing

Remember that clothes are stored back in a cupboard or box only after they are completely dry. Since you need to dampen the clothes for ironing, spread the clothes again in fresh air after ironing till they are completely dry. Put them back in the cupboard or box for final storage.

Moist clothes should not be stored because they will allow fungus and bacteria to grow on them.

ACTIVITY 9.4

One winter evening, Venkat wore a beautiful khadi kurta and went to a party. He enjoyed the party thoroughly. On the way back home it started raining suddenly and his kurta got damp. Since that was his favourite kurta, he immediately took it off, folded it and kept in the cupboard. When he took it out a few days later, he was shocked to see stains and a white powdery substance on the kurta. Besides, it smelt awful. Venkat was upset because he knew that his favourite kurta was totally spoilt.

Discuss the problem with your friends or other learners during the personal contact programme and answer the following questions:

1. What do you think, went wrong with Venkat's kurta?
2. If you were in his situation, what would you have done to save your khadi kurta?

9.5 LAUNDERING OF SPECIFIC FABRICS

You have learnt the basics of laundering clothes. Is this information sufficient to launder all types of clothes you use at home? Let us now use this knowledge for laundering dirty clothes at home and see what more we need to know.

Collect all the dirty clothes in your house and see what you have. Do you remember the pre-preparation you need to do before washing and finishing these clothes? Let us see. Here is a pile of dirty clothes. What is your first step? Yes you are right it is **sorting** out the clothes. So you make the following piles after sorting:

i) Cottons clothes consisting of white inner garments, payjama, salwar, petticoat, shirts, dusters from kitchen, bedsheets, pillow slips, and so on.

ii) Coloured cottons like saree, blouse, salwar suits and dupattas.

iii) Synthetics consisting of shirts, saree, blouse, dupatta and socks, etc.

iv) Silk saree, blouse, shirt, etc.

v) Woolen sweater, muffler and a shawl.

Separate very dirty clothes from less dirty ones, see if there are any repairs to be done and then see if there are any stains to be removed. If there is a care label attached, read it because it will tell you about the "do's" and "don'ts" while washing the item. You are now ready for the next step. Let us handle each pile you have separated, one by one.

Laundering of cottons

i) Soaking: How and why will you soak your cotton items? Only white cottons are soaked to loosen the dirt settled or stuck to the fabric. They are soaked preferably in warm or hot water for half an hour depending on how dirty they are. Soak very dirty clothes separately. Yes, for two reasons, one because these are soaked for longer duration and in hot water and soap/detergent. Secondly, the loosened dirt from very dirty clothes will settle on the less dirty ones and make them dirtier. It is much easier to clean soaked fabrics. Do not put too many clothes together. Do you know why?

ii) Washing: Dip all white clothes in soap/detergent solution. Apply extra soap on the heavily soiled areas and rub. Wash the light weight and lightly soiled cotton fabrics by using knead and squeeze method and big and heavy clothes using a stick. Rub areas which are very dirty with hands or with a brush. Do you remember why?

iii) Rinsing: Why should we rinse clothes after washing? You have already learnt about it earlier in the lesson. If you do not remember go back and refer to it.

Cottons require application of a **whitening agent** in the last rinse. Why? What could you use for whitening? Yes you are right. You use blue which is available

as powder or liquid. These days you get chemicals like optical brighteners in the market. These are colourless florescent dyes which turn pale fabrics white and make then look brighter temporarily.

iv) **Starching:** Putting starch on the white clothes is another procedure which must be carried out before they are spread for drying. It is done to give cottons a smooth and shining fresh look. Also, starched articles do not get dirty that easily.

2 table spoons of starch mixed in 5 liters of water is sufficient for starching 4-5 clothes

You can prepare your own starch using arrowroot.

- Dissolve arrowroot in a little cold water to prepare a thick batter. Add boiling hot water to this batter stirring all the time till it changes colour to transparent. Your starch is ready.
- Now add some of this starch paste that you have made in a basin of water and mix well. The strength of starch depends on the thickness of fabric and stiffness required. To make the fabric very stiff, dilute the full strength starch with 2-3 times water. But add 4-6 times water to get reasonably good stiffness.
- Before starching a garment turn it inside out, open and dip it in water for even spread of starch in it. Wring out the excess water and then dip it in the starch solution.
- Squeeze the fabric well and hang it in the sun to dry.

Note:

i) The amount of stiffness is a matter of personal preference. Generally, we starch table linens like mats, tray cloths and napkins, heavily and inner wear garments lightly.

ii) Do not starch under garments and those garments which are close fitting like a blouse, as the starch it may cut into your skin and make you uncomfortable.

iii) If the articles have to be starched as well as blued, do it together in one solution, by adding blue to the diluted starch and water solution.

Remember: If the article gets over blued, dip it in plain water with a few drops of white vinegar or lime juice. The extra blue will get removed.

iv) **Drying:** After rinsing, starching and bluing the clothes are dried. Hang the clothes by their strongest part along the clothes line. Articles dried in the sun should be removed as soon as they dry. Over exposure to sunlight can weaken the fabric and cause yellowness.

v) **Ironing:** Cotton clothes are ironed best when they are evenly damp. But if they are starched they must dry completely before they are brought in. Sprinkle water evenly on them, role them tightly and leave them for some time. Now open them one by one and iron with a hot iron. Leave them for some time to dry before storing.

vi) **Storing:** Remember, fungus grows quickly on cotton fabrics. Hence, while storing cottons make sure that they are completely dry.

Laundering of coloured cottons

- Do not soak cottons, especially when their colour bleeds.
- Use mild or neutral soap for washing.
- Wash using kneading and squeezing method.
- Rinse thoroughly and apply starch after turning clothes inside out in the last rinse.
- Dry in shade.
- Iron clothes after making then evenly damp.
- Store clothes when completely dry.

INTEXT QUESTIONS 9.4

Fill in the blanks with the most appropriate word from those given in brackets:

i. Soaking clothes for some time helps to _____ dirt. (loosen, fix, settle).

ii. Starching is done to give cotton clothes a _____ look. (dull, crisp, shinning).

iii. _____ should not be starched. (table linen, saris, undergarments).

iv. Coloured cotton articles should be dried in the _____ (sun, shade, daylight).

v. Long exposure to sunlight makes fabrics _____ (bright, weak, dull).

vi. _____ should be used to wash very dirty white articles (hot water, boiling water, luke-warm).

vii. When cotton articles are stored moist, they develop _____ (dullness, brightness, mildew).

viii. Fabric that is not properly rinsed becomes _____ (weak, yellow, bright).

ix. Clothes must be _____ before washing. (blued, repaired , ironed).

x. _____ articles should not be soaked before washing. (coloured, white, dirty).

Notes

Laundering of Synthetics

Nylon, polyester and acrylic are synthetic fibers. Hence laundering synthetics is slightly different.

- Use luke-warm or cold water. Do not use hot water as synthetics will wrinkle very badly. Do you remember why? Yes, they soften and melt easily.
- Use any good soap, light pressure and light rubbing while washing.
- Rinse well in cold water to remove soap completely.
- To avoid wrinkles, do not squeeze tightly.
- Preferably dry on a hanger. It will help to maintain the original shape.
- When dry, if necessary, iron with a warm iron and not a hot one (Refer to ironing temperature chart given later in the lesson). Do you recall why?
- Store when completely dry.

Remember: While washing you can treat terrycot as synthetic fabrics.

Laundering of silks

- Use luke-warm or cold water, a good neutral soap, light pressure and light rubbing while washing. There is no need to soak silks.
- Rinse well in cold water to remove soap completely.
- Apply starch (gum arabic) and dry in shade.
- Pick up the clothes when evenly damp and iron with a warm iron. Do can you remember why? Yes you are right, silk gets stained if water is sprinkled on dry clothes.
- Store preferably on hangers when completely dry.

Laundering of Woolen Clothes

Woolens are more delicate than any of the fabrics used in the house. Wool has hairy surface which causes felting if handled roughly. Hence woolens need utmost care while washing.

Knitted woolen clothes lose shape when wet hence these need to be put back to shape after washing and need to be dried on a flat surface. Following steps should be followed for washing woolens:

- Take outline of the knitted dress on a paper before washing.
- Use mild alkaline soap/detergent dissolved in luke warm water all through.
- Use kneading and squeezing method to wash.

- Rinse thoroughly.
- Knitted items must be brought back into shape by putting them back on the paper draft taken earlier and dried on flat surface in shade.
- Steam press if necessary.
- Store them when completely dry in a dry place either on a hanger or on a flat surface and along with naphthalene balls or odonil tablets.

9.6 HANDY HINTS FOR IRONING

Prepare an ironing table. Cover it with an old blanket and then with a white cotton sheet. Keep the height of the table comfortable so that you need not bend or stretch while ironing. Usually, an 80 cm high table is very comfortable.

- Keep some water handy. Spraying water on cotton and linen produces good results.
- Sleeves, collars, laces, etc., should be ironed first.
- Iron laces, buttons, hooks, embroidered and embossed clothes from the wrong side. The embroidery will stand out and look more beautiful. It will also not break or melt due to high temperature.
- Iron the fabric along the length as the yarns are stronger in this direction.

Important: Follow ironing instructions on the **labels,** if any. Otherwise follow the ironing temperature chart given below.

Temperature		**Fibre**
Warm	150^0C	Wool, silk, polyester and nylon
Hot	180^0C	Cotton and rayon
Extra hot	200^0C	Cotton and linen

INTEXT QUESTIONS 9.5

1. Tick mark the statements that are true. Correct the false statements.

   i. Neutral liquid soaps should be used for washing silks. True/False

   _____

   ii. Cold water should be used while washing woolen articles. True/False

   _____

Notes

iii. Wool articles should be soaked in water. True/False

iv. Wool articles can be cleaned with any detergent solution. True/False

v. Friction cannot be applied to clean woolen articles. True/False

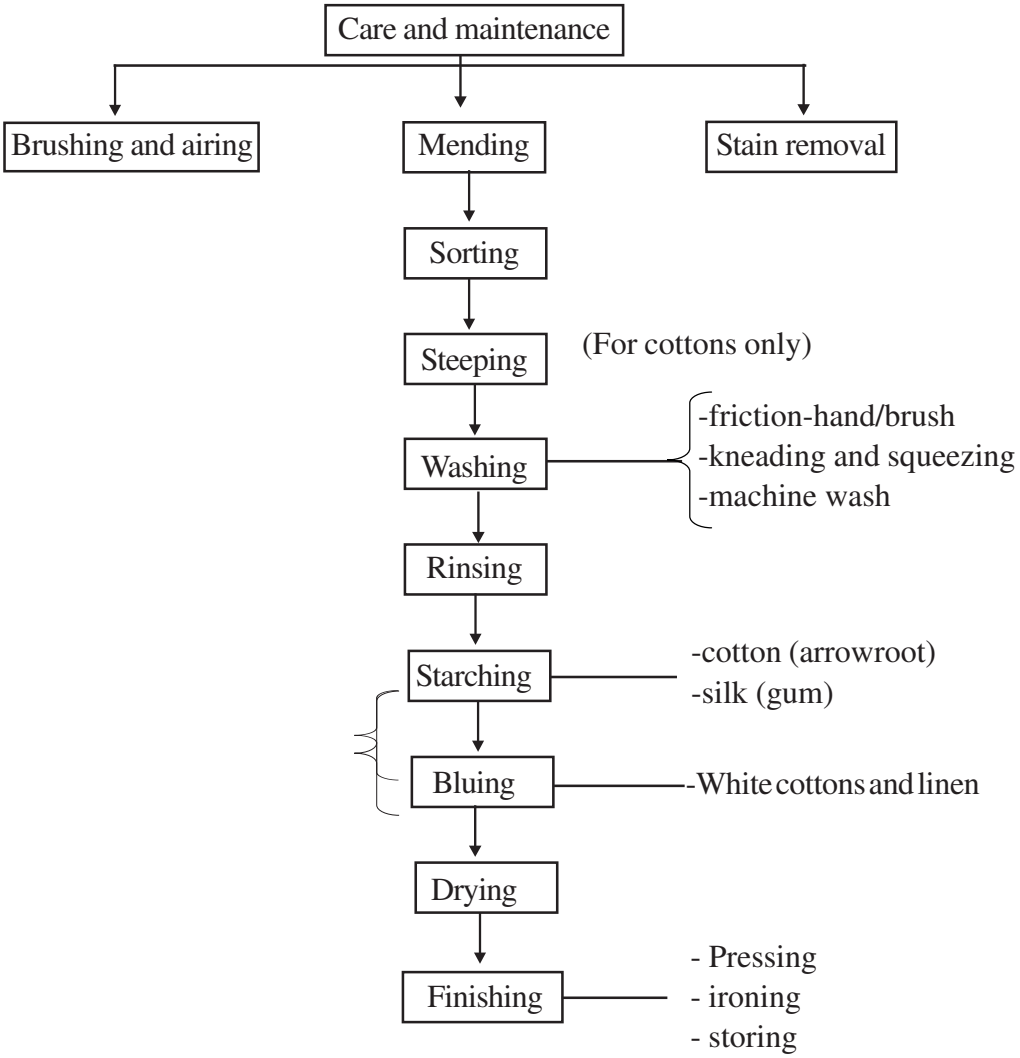
vi. Synthetics are squeezed well before drying True/False

vii. Synthetics are ironed, if necessary, with a warm iron. True/False

1. Match the columns:

	Column A		Column B	Ans.
1	Wet silk or wool	a	Strength decreases	
2	Wet cotton	b	Neutral detergents	
3	Coloured cottons	c	Detergent powders/cake	
4	Silk	d	No effect on strength	
5	Wet viscose rayon	e	Strength increases	
6	White cotton	f	Liquid detergent	
		g	Alkaline detergent	

WHAT YOU HAVE LEARNT



TERMINAL QUESTIONS

1. Explain the meaning of the word 'laundering'.
2. What is a stain? How would you classify stains?
3. Describe the steps for removing the following stains from a cotton fabric. (i) Ghee (ii) Nail polish (iii) Red ink (iv) Grass (v) *Paan* (Betal leaf)
4. How will you wash a white cotton garment? Explain with reasons
5. How does the laundering of synthetics differ from laundering of cottons?

6. Shelly bought a white woolen cardigan. After wearing it twice she washed it together with other clothes in a washing machine. Predict the effect on the cardigan and the reasons for it.

7. Rehman wants to wash his brightly printed silk scarf at home. Tell him the correct procedure.

ANSWER TO INTEXT QUESTIONS

9.1 1. wash at home- cotton shirt, cotton payjama
dry clean- silk blouse, zari saree, woolen shawl

2. Refer text

9.2 1. (a) true, dirty clothes become medium for growth of bacteria or fungus
(b) false, laundering consists of washing or dry cleaning, finishing and storing

(c) true, airing helps in drying and removing bad odours.

(d) true, stains may become permanent when exposed to chemicals in soaps or detergents

9.3 1. (i) d (ii) a (iii) c (iv) b (v) d

9.4 (i) loosen (ii) shining (iii) under garments (iv) shade (v) weak (vi) hot water (vii) mildew (viii) yellow (ix) mended (x) coloured.

9.5 1. (i) True (ii) False – Luke warm water should be used for washing woolen articles (iii) True (iv) False – woolen articles can be cleaned with mild alkaline detergent solution (v) True (vi) False – synthetics should not be squeezed and dried on a hanger. (vii) True

2.

	Column A		Column B	Ans.
1	Wet silk or wool	a	Strength decreases	2
2	Wet cotton	b	Neutral detergents	5
3	Coloured cottons	c	Detergent powders/cake	6
4	Silk	d	No effect on strength	3
5	Wet viscose rayon	e	Strength increases	1
6	White cotton	f	Liquid detergent	4
		g	Alkaline detergent	

Notes

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10

FIBRE TO FABRIC

You know that fibres are what fabrics are made of. Just look at the fabric of the dress you are wearing. It is made of the thread prepared from small fibres. Just pull out a thread from a piece of fabric and open it up by untwisting. You will see those small fibres. You do know that there are a large number of fibres available to us and from which a variety of fabrics are made. This is why in any cloth shop you find such a variety of fabrics on the shelves of cloth shops in the market.

In this lesson we want you to get all the knowledge and acquire skills needed to recognize the fabric you want to buy by associating it with its specific properties and assessing its suitability to specific uses. You are familiar with the variety of uses various fabrics have in our daily life. The study of fibres and fabrics gives us the complete knowledge of properties and uses of various fabrics available in the market. This knowledge will help us to choose wisely the fabric we require and make the best use of it after purchase.

OBJECTIVES

After studying this lesson, you will be able to :

- discuss the functions of clothing and other household uses of fabrics;
- explain that the basic unit of a fabric is fibre which can be obtained from many sources;
- state typical characteristics of different fabrics;
- identify fibres and fabrics on the basis of visual examination and non technical tests;
- elaborate the process of yarn making and fabric construction;
- differentiate fabrics made from different yarns and tell their end uses;
- select fabrics for personal and household use.

10.1 FUNCTION OF CLOTHING AND HOUSEHOLD USES OF FABRICS

Why do we wear clothes? Our clothes are rightly recognized as "the second skin." At every stage of life and in every ceremony, clothes play an important role. They cover our body and protect it from adverse climatic conditions.

Clothes enhance our personality. These are made from various kinds of materials and sewn in several forms called **dresses or garments.** A well-fitted dress, worn according to the occasion and time speaks a lot about the person's habits, taste, social status, behaviour and many other traits. Generally, men, women and children dress up differently and they also have sets of dresses for different purposes and occasions, for example, dresses for formal, casual occasions, sports and nightwear.

Colour of our clothing, in our country, is decided according to season, climate, age, occasion, marital status, gender, community, happiness and sorrow. The religion and occupation of a person can also be judged by the clothes a person wears. Lastly and most importantly, clothes also tell us about the habits of the wearer and his / her approach to hygiene. If the clothes are dirty and crushed we tend to think the person is careless, shabby and poor. Crisp, freshly washed and well ironed clothes lend a well groomed appearance to the wearer.

You have just learnt about the functions of clothes. Two examples are given below. List three more functions of clothes.

I	To look smart.
ii.	To show individuality.
iii	
iv	
v	

Other Uses of Fabrics

Think and write some of the other uses of fabrics in your house. Besides clothing, you are using fabrics in the house for bed linen, curtains, upholstery, cushion covers, etc. In the kitchen, you need dusters, mops, covers, etc. which are also produced from fibres. You use old cloth for dusting, wiping and covering, etc. So you see you have varied uses of fabrics in the house. Generally cotton fabric is suitable for most of the purposes. Once you learn about the properties of various fibres available, you will know why cotton is preferred to other fibres.

10.2 FIBRES AND THEIR SOURCES

We have talked about fibre as the basic unit of fabric. Do you know what a fibre looks like? To understand, this take a small amount of cotton and pull out the smallest part from it. Study carefully. These may be long or short strands with a smooth structure that looks like white hair. Actually, these are fibres. A single fibre of cotton is difficult to locate but can be easily recognized in a mass of cotton.

Now, consider the structure of wool fibres. You know these are hair of animals like sheep, goat, rabbit, camel etc. Sweaters, socks, gloves, scarves, shawls and coats etc., are made from these hair/fibres. You can check this by opening a thread pulled out from a pure woolen fabric, or knitting wool. What do you see?

Similarly, there are many other fibres available to us, which can be used to make cloth and we will learn about these in the next section. A fibre is a fine hair like strand and is the basic unit of textiles from which we make yarns and then the fabric.

ACTIVITY 10.1

Take out some of your garments, pull out a yarn from the inner side of each and try to take out fibres. Study the similarities and differences among fibres in respect to their length and feeling.

The actual widthwise and lengthwise structure of fibres cannot be seen with naked eyes but can be recognized easily under the high power microscope. Here is the longitudinal (lengthwise) shape of some of the common fibres as visible under the high power microscope. Fig. 10.1 shows the longitudinal view of some fibres.

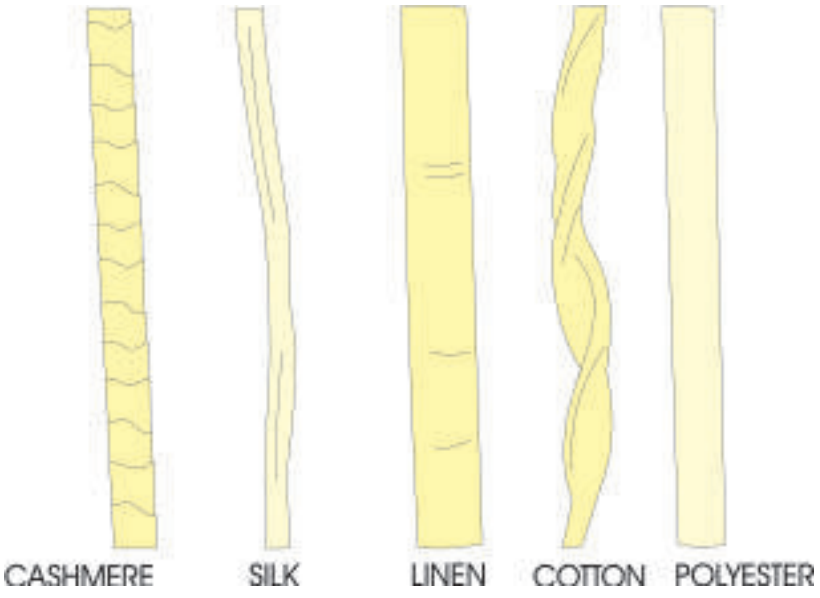


Fig. 10.1 The longitudinal view of cotton, wool, silk and polyester fibres.

10.2.1 Sources of Fibres and their Classification

There are many different sources from which we can obtain fibres and therefore, we classify them accordingly.

i) **Fibres from Natural Sources:** All the fibres obtained from nature, i.e., plants or animals, are known as **natural fibres**. e.g. cotton, wool, linen, silk, etc. Fibres obtained from plant source are called **cellulosic fibre** e.g., cotton and linen. The fibres that come from **animal sources** are also known as **protein fibres**, e.g., wool and silk.

Sources of commonly used natural fibres are shown below in Fig. 10.2.

		
Cotton pods and ball	Sheep	Silkworm
Cotton	**Wool**	**Silk**

Fig. 10.2: Sources of natural fibres – Cotton, Wool and Silk

ii) Man-Made fibres: The fibres which are made in laboratories using chemicals are known as man-made fibres and these are of following two types:

a) Regenerated fibres – These fibres are made from extremely small cotton fibres or any other fibre source such as wood pulp, milk protein, etc. Chemicals are used to dissolve these and the solution is then converted into solid fibres. Examples are rayon (cellulose out of viscose/acetate/triacetate) of different types, casein fibre (from milk) and soya bean fibre.

b) Synthetic fibres - These are made using various petrochemical products. Nylon, acrylic and polyester are all synthetic fibres.

It is advisable to use garments made of natural fibres which are eco-friendly in nature. Sometimes synthetic fibres may cause allergies if worn next to skin. Sources of commonly used natural and man made fibres are presented in Table 10.1.

Table 10.1 Commonly used natural and man-made fibres

Type of fibres	Name of fibre	Sources
NATURAL FIBRES		
Plants (cellulosic)	cotton	cotton ball
	linen	bark of flax stalk
Animal (protein)	wool	hair of sheep, goat, rabbit, llama etc.
	silk	silk worm
MAN-MADE FIBRES / MANUFACTURED		
Regenerated	rayon (viscose, acetate)	cotton linters or wood pulp + chemicals
Synthetic	nylon	chemicals
	polyester	chemicals
	acrylic	chemicals

10.2.2 Classification according to the Length of Fibres

The fibres we have listed above are short or long. The short length fibres are called **staple fibres** and are measured in inches or centimeters, e.g., cotton, wool and linen. The long fibres are known as **filaments** and are measured in yards / meters, e.g., silk and all man-made fibres.

	Length of fibre	Class	Appearance	Unit of measurement
FIBRE LENGTH	long	filament fibres		yards / meters
	short	staple fibres		inches/ centimeters

10.3 COMMON CHARACTERISTICS OF DIFFERENT FIBRES

i) **Cotton**: Cotton fibre is the smallest of all the textile fibres. They are white, cream or light brown in colour and fine and strong. These are absorbent, porous and cool and allow the body heat to go out. Hence, fabrics made out of it are used as summer wear as cotton wrinkles very easily. Fabrics made from cotton are strong, durable and easy to wash and are used to make towels, sheets, pillow covers, etc., that require frequent washing.

ii) **Flax**: It is a 'bast fibre' and fabric made from it is called linen. It is a staple fibre though its length (20-30 inches) is more than the other staple fibres available. Linen fabric is shiny, smooth, durable and easy to wash. Like cotton, it wrinkles very easily, is cool, absorbent and is suitable for summer wear.

iii) **Jute**: Like flax jute is also a bast fibre. Maximum production of jute is in India. The fibres are short and lusturous but weaker than flax. The fibres are hairy and generally rough. It is used for making gunny bags and cords.

> **Jute Garments**
>
> As jute is a rough fibre, so these days jute is mixed with other soft fibres for fabric construction. Also increasingly these days accessories like slippers and bags made out of Jute are in popular demand.

iv) **Wool**: It is obtained from the fleece of domestic goats, sheep, rabbits, etc. The colour of wool fibres may vary from off-white to light cream. Fabrics made from wool are soft, smooth, absorbent and do not wrinkle easily. These do not allow the body heat to go out and act as insulators. This is why the fabric made out of these fibres is used as winter wear. Wool is a weak fibre and is easily affected by common washing soaps, powders and friction.

v) **Silk**: Silk is a natural, protein filament produced by silk worm. Fabrics made from silk are soft, fine, smooth, lustrous, warm and stronger than wool. It is called 'Queen of the Fibres' and is used for formal wear.

vi) **Rayon:** It is a man-made filament fibre which is lusturous, smooth, cool and absorbent but is weak in nature. It wrinkles very easily. Because of its close resemblance to silk, rayon is also called 'artificial silk' or 'art silk.' It is used as a summer wear. These fibres are **thermoplastic** in nature i.e., they are heat sensitive and soften and melt on application of heat.

vii) **Synthetic fibres**: Synthetic fibres are made from petroleum products. Nylon, polyester, acrylic, etc., are the examples of synthetic fibres. Like rayon these are also thermoplastic fibres. Since these fibres catch fire easily and can stick to the body, they should not be worn while working in kitchen and near a flame. Synthetics do not wrinkle and can be made dull or shiny. They have good strength and are easy to wash and dry quickly. In other words, these fabrics are easy to care and maintain.

INTEXT QUESTIONS 10.1

1. Match column A with column B and fill in the given blanks-

A		B	
_____	i) Jute	a)	Plant fibres
_____	ii) Cotton	b)	Man-made fibres

_____	iii) Wool	c)	Bast fibre
_____	iv) Rayon	d)	Regenerated fibre
_____	v) Silk	e)	Natural fibre
_____	vi) Nylon	f)	Animal fibre
_____	vii) Cellulosic fibres	g)	Silkworm
		h)	Flax

10.4 IDENTIFICATION OF FIBRE THROUGH NON–TECHNICAL TEST

10.4.1 Identification of fibres by visual test and feel of the fabric

By now, you know the names and some basic properties of fibres obtained from different sources. On the basis of this knowledge can you identify the fabric you are buying? Yes, to some extent you can. If you remember the characteristics of a fibre then you will also know the properties of the fabric made out of it because the fabric will have the same properties. Look for these properties in the fabric and add to this your personal experiences like touch, feel and visual inspection of the fabric. Chances are that you will be able to name the fabric.

In the following Table 10.2 we are presenting to you some of the typical characteristics of different fabrics. If you examine visually, these will help you to recognize the fabric/ fibres.

Table 10.2: Characteristics of Different Fabrics which help Identification

Fibres	*Appearance*	*Touch*	*Feel*	*Care required*
Cotton	dull in appearance but lustrous when starched	feels smooth and soft to touch	gives a cool feeling	wrinkles easily more if it is starched
Linen	low to medium luster	soft and smooth texture	gives a warm feeling	wrinkles easily
Jute	dull	Rough and hairy texture	gives a warm and rough feeling	does not wrinkle easily
Wool	medium to low luster; poor quality has no luster	soft, smooth and absorbent; also bulky to look at.	warm to touch	does not wrinkle easily

Silk	delicate looking and lustrous	smooth, soft and light	warm to touch	does not wrinkle easily
Rayon	can be lustrous or without it	soft and shiny but heavier than silk	gives cool feeling	wrinkles easily
Synthetic fibres	can be dull or semi dull or lustrous acrylic fibres look like wool	heat sensitive soften and melt on application of heat	most fabrics feel warm	able to withstand friction and do not wrinkle hence easy to care.

To test the information given in table 10.2, select various items of clothing you are using and observe the nature of the fibre in terms of appearance, touch and feel.

10.4.2 Identification of fibres using Burning Test

Burning test tells us about the composition of fibres. i.e., whether the fibres of a fabric are from a plant / animal source or are man-made. Follow the steps mentioned below to conduct the burning test:

Take out a few strands of fibres from a yarn or a fabric and then burn them with the help of a candle flame or a match stick. Observe the following points and record your observations :

- The behaviour of the fibres **on approaching the flame, in the flame, on burning, and the residue left after burning.** Since different types of fibres have specific burning pattern, one can recognize them accordingly.

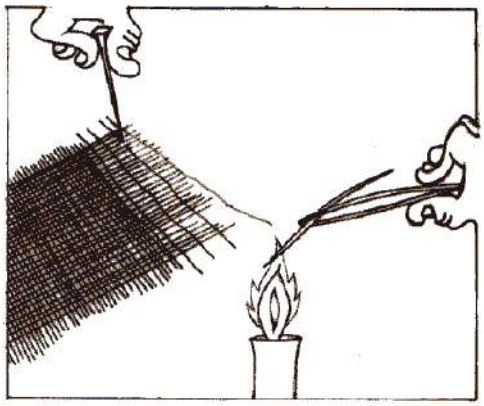


Fig. 10.3 Burning Test

Table 10.3 Describes the Burning tests for identification of fibres

Fibre	*Near flame*	*Type of burning / flame*	*Odour of burning*	*Residue*
cellulosic fibres – cotton, linen, jute, rayon, etc.	catches fire easily	continue to burn with a bright flame; have an afterglow	burning paper like smell	light, feathery, grayish /black smooth ash
protein fibres – wool, silk	smolder and burn	slow flickering flame; sizzle and curl	Burning hair or feathers like smell	silk-crisp dark ash; wool- dark, irregular, crushable bead

synthetic fibres –nylon, polyester, acrylic, etc.	shrink on approaching flame	soften, melt and burn	mixed smell of chemicals	hard, black uncrushable bead

Limitations of the burning test - The result of the burning can be confusing if the fabric is made by mixing two or more types of fibres or yarns.

ACTIVITY 10.2

Identify yarns made from different fibres by breaking test – Collect samples of fabrics made from different fibres. Take out yarns from each of these and keep each one separately. One by one, hold each yarn in both the hands and break it. You will observe the following:

1. cotton - breaks easily, has brush like tips and slightly curled fibres.
2. flex - stronger then cotton, needs more strength to break.
3. jute - yarn breaks easily.
4. wool - yarn stretches and breaks with a brush like tip.
6. silk - yarn breaks with a jerk.
7. rayon - yarn breaks easily and does not have brush like tip.
8. synthetics - yarn stretches and does not break easily.

INTEXT QUESTION 10.2

1. One evening, Geet was busy cooking dinner and her father was in the garden. Suddenly, Geet saw her *dupatta* had caught fire. She shouted loudly and ran out of the kitchen. Her father saw flames and rushed towards her with a cotton sheet. He quickly wrapped it around Geet to put off the flames.

   He immediately took her to hospital. Doctor said Geet had received burns because the *dupatta*, made from polyester, had melted and stuck to her skin. Her father had received only a few scalds while wrapping Geet with cotton sheet and putting off the flames. Since he was wearing cotton *kurta, pyajama* he was saved.

   The doctor appreciated her father's presence of mind in wrapping a sheet that helped in extinguishing the fire immediately. Fortunately the burns were not very severe and Geet recovered soon.

Notes

Answer the following questions:

i) Why did the *dupatta* catch fire?

ii) Why did the *dupatta* get stuck to the body after catching fire?

iii) Why was Geet's father relatively safe from burns?

iv) What type of fabric should you prefer to wear while working in the kitchen?

v) List three other fabrics which can be worn while working near fire.

vi) People know that synthetic fabrics catch fire easily yet most of them wear these clothes while working in the kitchen. Convince them in about 30 words about merits of changing into cotton clothes before working in the kitchen.

2. Fill in the blanks -

i) If wool: winter, then _____ : summer

ii) If bark: flax, then _____: wool

iii) If cotton: king of fibres, then silk : _____

iv) If regenerated fibres : wood pulp, then synthetic fibres: _____

v) If linen: cotton, then acrylic : _____

3. Put a tick mark on the right option. Justify the chosen option.

True/False a) Cotton is a filament fibre.

_____

True/False b) Length of staple fibres is measured in inches.

_____

True/False c) Acetate is a man made fibre.

_____

True/False d) Natural fibres can be made from chemicals.

_____

True/False e) Wool is a plant fibre.

_____

4. Search names of fibres in Wonder box. Hints are given below.

a. I am soft and look like silk.

b. I become lustrous by starching.

c. I look like wool.

d. I am smooth and lustrous.

e. I am rough to touch.

f. I give warmth in winters.

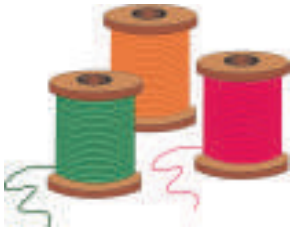
g. I am easily washable.

h. I wrinkle easily.

WONDER BOX

R	A	Y	O	N	F	S	D
M	A	C	R	Y	L	I	C
N	W	Y	C	G	H	L	L
Y	T	W	O	O	L	K	I
L	Y	U	T	N	I	O	N
O	J	K	T	B	N	M	E
N	L	Z	O	Q	W	E	N
X	C	V	N	J	U	T	E

10.5 YARNS, YARN MAKING AND FABRIC CONSTRUCTION



A **yarn** is a long continuous length of interlocked fibres. Strands of fibres are brought closer to each other by twisting. Twists impart strength to the fibre strand which is then termed as a yarn. It is suitable for the production of fabrics, thread for sewing, crocheting, knitting, embroidery and/or rope making. A **thread** is a highly twisted and smooth strand of fibre. It is used for sewing, embroidery, etc.

10.5.1 Process of yarn making

a) Spinning of yarns

Do you know how a yarn is made? Yes, you guessed it right, a yarn is spun. Spinning is the process by which a group of fibres is pulled, drawn and twisted together to make a yarn. Do you remember Mahatma Gandhi and his *charkha* or the spinning wheel? Mahatma Gandhi, would daily take a hand full of cotton and spin it into a yarn on his *charkha*. He promoted *charkha* during India's freedom struggle as a symbol of self-reliance and a source of income.

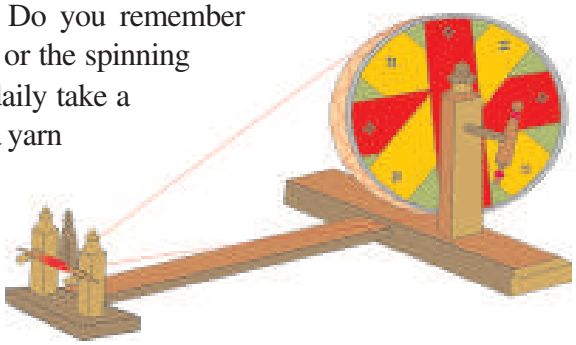


Fig. 10.4: A traditional spinning wheel *(charkha)*

A *charkha* is for hand spinning. The yarn spun on a *charkha* can have different thickness. Thick yarn is used for floor coverings, medium thickness for upholstery items and fine quality yarn is used for making dress material. Different types of fibres - cotton, wool, hemp and silk are spun on *charkha* in the villages in many states of India.

Twists given to fibre strands for formation of a yarn can be either **'S-twist'** (clockwise) or **'Z-twist'** (anticlockwise). The quality and strength of yarn is affected by the number of twists in inch. Lesser the number of twists per inch, bulkier and less strong is the yarn and more the number of twists, finer and stronger is the yarn. Figure 10.5 shows S and Z twists and Figure 10.6 shows number of turns in a yarn.

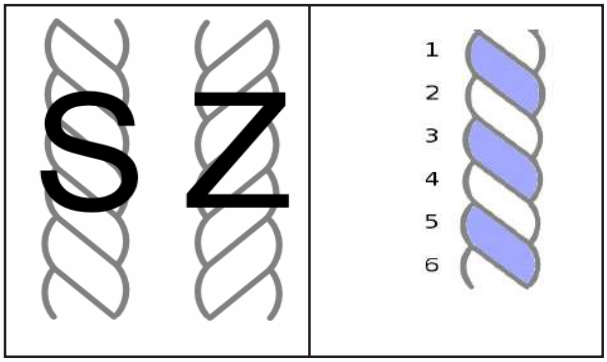


Fig. 10.5 S and Z twists

Fig. 10.6 Number of turns in a yarn

b) Spinning by Machine

Both, the fibres as well as filaments are spun into yarns that are then used for different end uses. Fibres available in the filament form are first cut into short lengths and then made into yarns called spun yarns. Various steps followed for making yarns are :

i) **Cleaning:** When the natural fibres are harvested or collected, these contain dry leaves, stems, seeds, dirt and unwanted materials that are removed during cleaning.

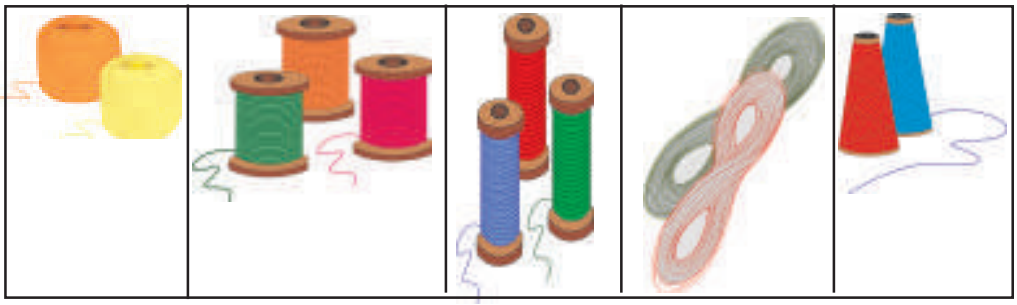
ii) **Carding:** The fibres sometimes get matted and stick to each other. Carding machine opens and arranges the fibres in a parallel manner. The carded web of fibres is turned into a soft rope called **sliver**.

iii) **Combing:** It is an optional step used for making fine quality yarn. Carded slivers are combed to separate long and short fibres with the help of series of combs.

Cleaning, carding and combing steps are omitted while making spun yarns from cut filaments of synthetic fibres. For these synthetic fibres only spinning and winding is done.

iv) **Spinning:** Carded and combed slivers are further drawn and spun into yarns. The yarn is a single strand but may be plied into several strands:

v) **Winding:** The yarn is wound into various packages according to the weight or length of the yarn and its end use. Some of the common yarn packages for fabric construction are- ball (yarns for hand knitting), reels or bobbins for sewing; embroidery and hanks, cones, etc. Figure 10.4 shows some packages of yarns.



balls | reels of sewing thread | reels of embroidery thread | yarn hanks | cone

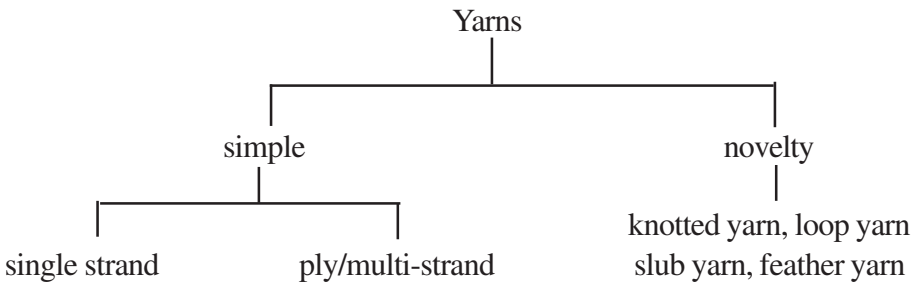
Fig. 10.7: Packaging of yarn in balls, reels, hank and cone

After spinning, a specific length of yarn is wound in the form of packages called balls, reels, hanks, cones, etc., depending on the weight or length of yarn and its end use.

ACTIVITY 10.3

Collect some sewing thread reels and knitting yarn balls lying at home. Check the length of the yarn printed on sewing thread reel. You can also collect reels and balls of yarn of different lengths and weights. Are some reels available with 50, 100 and 200 meters thread? You may observe that knitting yarn balls are available with the weight of 25 and 50 grams.

10.5.2 Classification of Yarns



The yarns may be classified into two groups: i) simple yarns and ii) novelty yarns

i) **Simple yarns:** A simple yarn has uniform thickness, smooth surface and equal number of twists per inch along its length. Most standard fabrics for clothing and household use are made with these yarns.

- **Single strand:** fine quality single strand is used for constructing light weight and fine fabrics. Thick and rough quality single strand is used for making thick fabrics

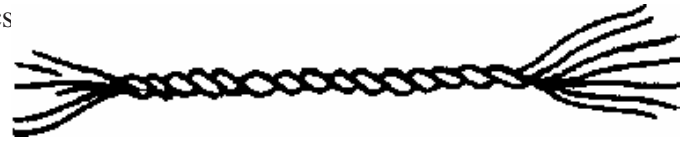


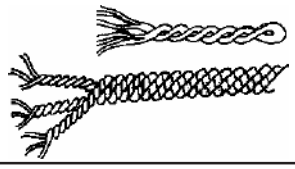
Fig – 10. 8 Simple single yarn

- **Ply yarn:** Two or more than two simple yarns are twisted together to form a ply yarn. These yarns are also known as multiple strand yarns. These can be termed as two-ply, three ply, and so on according to the number of strands used in the construction. These are more durable than simple yarns and are used for making fabrics for suiting, knitting, floor coverings, etc.

ACTIVITY 10.4

Lets make ply yarns

Follow the steps described below. Paste sample of ply yarns in the space provided.

Pictures of ply yarn	Method	Sample of ply yarn
Fig – 10.9 Double or Two ply yarn 	**Two ply** or double ply yarn can be made by knotting two separate single yarns at both the ends or one long single strand plied by holding both ends together.	
Fig – 10.10 Three ply yarn 	**Three ply** can be produced by twisting a long single strand yarn. Fold it twice to get three parallel strands. Twist these together and put small knots at both the ends.	
Fig – 10.11: Four ply yarn 	**Four ply** are also known as cable yarns. These are usually made by plying two strands of two-ply yarns together.	
Fig –10.12 Cord yarn 	**Cord yarn** is a multiple strand yarn. Take 3/4/5 ply yarns and twist together and knot both the ends to get cord yarn. These are generally used for making ropes.	

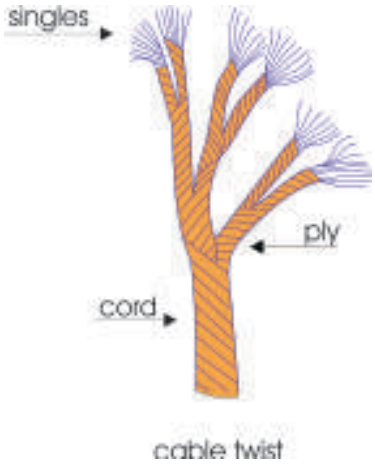
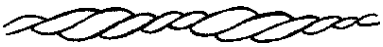


Fig –10.13 Types of yarns

ii) **Novelty yarns:** Carefully observe the curtains, upholstery (sofa) material or sweaters. Take out the yarns from these and study the construction of an individual yarn. You will see that these are of a complex nature and have unusual appearance and texture which are produced during spinning.

Depending upon their appearance, these are given different names like: loop yarn, knot yarn, slub yarn, feather yarn, etc. different types of novelty yarns are shown in figure 10.4 – 10.7

Types of Novelty Yarns

Yarn	Diagram
Loop yarn has loops, placed continuously along its length. Example- woolens	**Fig. 10.14** 
Knots/knops are made along the length of a yarn. Example- woolen and scarves	**Fig. 10.15** 
Slub yarns have ornamental effects in the form of soft untwisted (thick and thin) and twisted areas at frequent intervals throughout the length. Example- curtains	**Fig.10.16** 
Feather yarn also called chenille yarns, these have soft and fuzzy surface. Example- rugs	**Fig.10.17** 

Fabrics made from novelty yarns are bulkier, softer to touch and have beautiful unusual textures but are not as durable as fabrics made from simple yarns.

INTEXT QUESTION 10.3

1. State whether the following statements are true or false. Encircle the right answer.

   True / Flase i) Silk yarn breaks easily.

   True / Flase ii) Bulky yarns need less number of twists in one inch length.

   True / Flase iii) Slub yarns have thick and thin places.

   True / Flase iv) Cord yarn is made from single yarn.

2. Fill in the blanks with appropriate words. Choose the words from the box given along.

   i) A simple yarn has uniform _____in per inch length.

   ii) Cord yarn is a _____.

   iii) Flex is stronger than _____ .

   iv) Synthetic yarns stretch and _____.

cotton
multiple strand yarn
fibres
do not break easily
thickness
synthetic

10.6 FABRIC

Fabric is a pliable, strong sheet made from fibres or yarns. You must have heard names such as poplin, *khadder*, *mulmul*, denim, rubia, terricot, etc. All these are fabrics are prepared by weaving the yarn. Human beings learnt to weave by taking inspiration from nature by observing the nests of birds and entangled branches of trees.

Fabrics are manufactured by many techniques such as weaving, knitting, felting, nets, etc. However, **weaving and knitting, the two most popular methods of fabric construction** have been discussed in detail here.

10.6.1 Weaving

Weaving is interlacing of two sets of yarns –warp and weft at 90° angles to each other. Straight yarns in fabric are known as **warp** yarns. Horizontal yarns are known as **weft** yarns. Along the length of the woven fabric, on both sides, end yarns are woven very densely and the portion is named as **selvedge**. It does not allow the fabric yarns to come out from the lengthwise edge. The portion between the two selvedges is the body of the fabric.

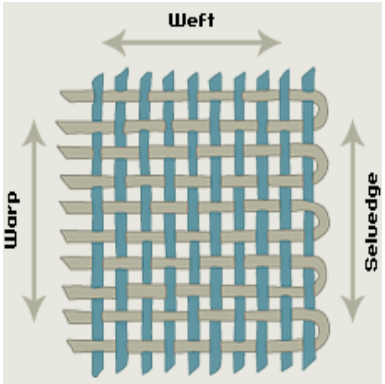


Fig. 10.18 Woven fabric

Merits of weaving

– Weaving gives a firm fabric.

– Woven fabrics do not stretch and are thus easy to handle.

– Woven fabrics are easy to print and embroider.

– Weaving is most commonly used method of fabric construction.

10.6.1 i) Basic Weaves

Weaves are broadly classified as **basic and novelty weaves.** Most of fabrics are produced in **basic weaves**, which are of three types- **plain, twill and satin weave.** Their construction is explained in figure 10.19

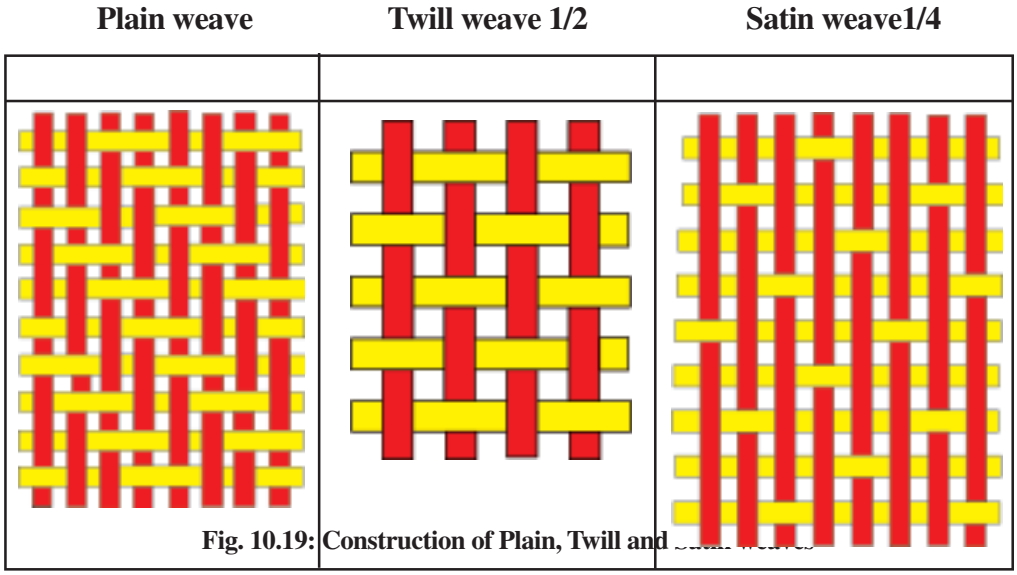


Fig. 10.19: Construction of Plain, Twill and

a) Plain weave - Plain weave is also known as homespun, tabby or taffeta weave. It is the easiest to weave where one weft yarn alternatively moves over one and under another warp yarn. Maximum production of fabric is done in plain weave. It is inexpensive weave, most suitable for printing and embroideries. To see the variations of the weave, note the fabrics like muslin, cambric, hand spun and hand woven khaddar, organdy, poplin, voile, etc.

b) **Twill weave -** It is woven on three to four harness loom. In this, one weft yarn moves over two and under one warp yarn. Twill woven fabric is distinguished by a continuous diagonal line called wale. Variation in diagonal lines produces various designs of twill. Twill weave is woven tightly, that is why it is suitable for work clothes and for men's clothes. Examples of Twill woven fabrics are gabardine, tweed, denim, jean, etc.

c) Satin weave - It is woven on five to twelve harness loom. If woven on a five harness loom, one weft yarn passes under 4 warp yarns and goes over one warp

yarn. It differs from Twill weave as it has long yarns floating on the surface. There is no design visible on the face of the fabric but it has a smooth and shiny surface. Satin fabric is an example of satin weave. Fabrics woven in this weave are suitable for making formal wear garments.

Handlooms are the second largest employer of the rural population in India, next only to agriculture. Handloom fabrics are made from either hand spun or mill spun yarn that has been woven on a handloom. In India, do you know *khadi* is a term given to a fabric which is made from hand spun yarn and is woven on a handloom. *Khadi* has a coarse texture and rough feel. However, many varieties of *khadi* like *khadi* cotton, *khadi* wool, khadi silk, heavy and light weight *khadi* are available on retail outlets of *khadi*. These fabrics always remain in fashion with consumers and have a large export market. *Khadi* movement in India was started by Mahatma Gandhi during the freedom struggle primarily as a symbol of self-reliance and a means of livelihood for the unemployed rural population.

ACTIVITY 10.4

Interview the weavers in your area to know how do they weave and what do they weave? What type of yarns do they use? What is their average daily/monthly income? Where do they sell their products? Are they able to sell their products easily?

OR

Visit a tailor in your area and ask which type of fabrics does he or she stitch most often? Which fabric is easy to handle while stitching and why? How does he or she decide on the type of needle and thread to be used for stitching? How does he decide on the cost of stitching a garment (salwar kurta/blouse/shirt/trousers)?

10.6.2 Knitting

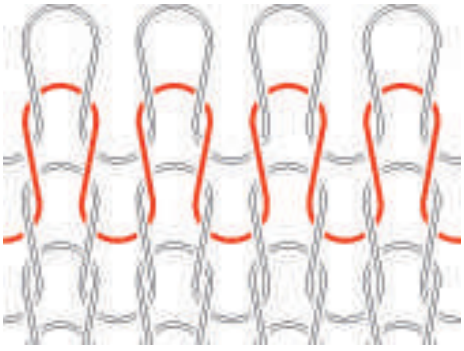


Fig.10.20 Formation of loops

Knitting is the process of formation of loops of yarns and drawing of new loops through those formed previously (interlooping). Depending on the types of knitting, it either moves right to left or left to right (weft knitting) or the yarns run lengthwise (warp knitting). Hand knitting is the most common example of weft knitting, though it is also done on machines to make many types of sweaters, T-shirts, and socks, etc. Warp knitting is only possible on machines. Knitted fabrics are

Fig. 10.21 Knitted fabric

used to make casual wear, party wear, sportswear, undergarments as well as household articles such as bed sheets, bed covers, blankets, etc. See figure 10.20 which shows the formation of loops while knitting. Figure 10.21 shows a knitted fabric.

Knitted fabrics are well known for their fit, comfort, stretchability, warmth, absorbency, and wrinkle resistance.

INTEXT QUESTIONS 10.4

1. Fill in the blanks with appropriate words.
   1. Hand knitting is known as _____ (warp knitting / weft knitting)
   2. *Khadi* Movement in India was started by _____ (Mahatma Gandhi / Jawaharlal Nehru)
   3. Selvedge refers to _____ (width / length of fabric)
   4. Woven fabrics _____ (stretch / do not stretch)
2. Unscramble the following jumbled words to identify the names of some fabrics–
   i) _____ niemd
   ii) _____ bargadine
   iii) _____ ydnaorg
   iv) _____ twelo

10.7 END USES OF DIFFERENT FABRICS

When you go to a shop, you give specification of the fabric you want, to the salesperson. Often you go to different shops to buy fabric or ready made garments. In other words, shops usually specialize in the type of items they sell. This way it is easy for you to find what you want and the shop can also stock good variety of related products.

Since you have already studied about the properties of various types of fibres, yarns, fabrics and weaves, it will be easy for you to use this knowledge to recognize fabrics and choose them for the end use in your mind.

Cotton fabrics are available in the form of muslin, khadi, poplin, rubia, organdy lawn and denim. Similarly, wool is available in the form of felt, knits and woven fabric silk fabric is available as raw silk, crepe and satin silk.

INTEXT QUESTIONS 10.5

Choose the correct answer of the four given at the end of each statement

1. 1. Muslin is a fabric which is _____.

   (a) light weight and loosely woven

   (b) transparent and crisp

   (c) heavy weight and thick

   (d) medium weight and plain

2. Denim is a fabric which is _____.

   (a) light weight and loosely woven

   (b) transparent and crisp

   (c) heavy weight and thick

   (d) medium weight and plain

3. Organdy is a fabric which is _____.

   (a) light weight and loosely woven

   (b) transparent and crisp

   (c) heavy weight and thick

   (d) medium weight and plain

4. Poplin is a fabric which is _____.

   (a) light weight and loosely woven

   (b) transparent and crisp

   (c) heavy weight and thick

   (d) medium weight and plain

WHAT YOU HAVE LEARNT

- Clothes → Their functions and importance
- Fibre → Yarn → Fabric
- Textile Fibres

Classification of fibres

– On the basis of origin → Natural fibres – Cotton, Wool, Silk
→ Man-made fibres-Nylon, Polyester

– On the basis of fibre length → Staple – Cotton, Wool
→ Filament – Silk, Man-made

– Identification of fibres → Visual inspection and touch
→ Burning Test

- Yarns

– Process of spinning → Cleaning, Carding, Combing, Spinning, Winding

Classification of Yarns

Simple, Novelty

Single, Ply, Cord, Loop, Knot, Slub, Feather

- Fabric

Weaving	Basic weaves – Plain, Twill and Satin
Knitting	Warp and Weft knitting

- End uses of different fabrics

TERMINAL EXERCISE

1. Give one difference between the following-

   i) Coarse and fine yarn

   ii) S and Z twist

   iii) Four ply and cord yarn

   iv) Spun and filament yarns

2. Why do Nylon, Polyester and Acrylic catch fire easily?

3. Read the case study given below and answer the questions given at the end:

Ginni was extremely unhappy because a red rash was spreading all over her body and was very painful. She had tried many local applications to get rid of them, but nothing helped. The rash was causing irritation and made her feel uncomfortable.

She discussed her problem with her friend Shyama who suggested her to consult a doctor in the village dispensary. In the dispensary the doctor looked at her skin problem and noticed the fabric of her dress. She asked Ginny if she wore the same dress often. Ginni said yes because she liked the dress very much. It was a fashionable dress, easy to wear, carry and maintain.

The doctor advised Ginni not to wear the dress again for sometime. In warm climate it did not allow the skin to breathe fresh air, caused sweating which led the skin to become irritable and cause the red rash.

But Ginny was not convinced. She thought, everybody wore dresses made from similar material and had no complaints. If nobody else had any problem in wearing such clothes why she should have any. Surely she thought that her problem could not be due to the clothes she wore. So she did not stop wearing her favourite dress.

Some questions to ponder (if possible discuss with peer group or with people at home)

If you were Ginni's friend what would you advise her to do? How would you convince her?

ANSWER TO INTEXT QUESTIONS

10.1 1. i) c ii) a iii) f iv) d

v) g vi) b vii) e.

10.2 2. i) Cotton ii) Fleece iii) Queen of fibres iv) Petroleum products v) Wool.

3. a) False – Cotton is a staple fibre

b) True

c) False – Acetate is a Regenerated fibre

d) False – wool is a protein fibre

e) True.

3. Wonder box -

R	A	Y	O	N	F	S	D
M	A	C	R	Y	L	I	C
N	W	Y	C	G	H	L	L
Y	T	W	O	O	L	K	I
L	Y	U	T	N	I	O	N
O	J	K	T	B	N	M	E
N	L	Z	O	Q	W	E	N
X	C	V	N	J	U	T	E

(a) RAYON
(b) COTTON
(c) ACRYLIC
(d) SILK
(e) JUTE
(f) WOOL
(g) NYLON
(h) LINEN

10.3

1. i) False - Silk yarn breaks with a jerk.

ii) True

iii) True

iv) False - Cord yarn is made from 3/4/5 ply yarns. It is multiple strand yarn.

2. i) Thickness ii) Multiple strand yarn
iii) Cotton iv) Do not break easily.

10.4

1. i) Weft knitting ii) Mahatma Gandhi
iii) length of fabric vi) do not stretch
2. i) Denim ii) Gabardine
iii) Organdy iv) Towel

10.5

1. a 2. c 3.b 4. d

11

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FABRIC FINISHES

Marie-Ann and some of her friends had joined a hobby class to learn fabric painting. While evaluating individual articles, they noticed that the colours of some of the articles were not uniform despite the fact the same colour had been used to paint all of them. When they asked the instructor about it, they were told that the cotton fabrics with uneven colour-spread had been given some finish which needed to be washed before using fabric painting colours. What does this mean? Do colours behave differently on different types of materials? You have learnt about starching and heard terms like dyeing, printing, mercerization, etc. What are these processes and how do these influence the functions of fabric? In this lesson we will try to answer these and many similar questions.

OBJECTIVES

After studying this lesson you will be able to do the following:

- explain the meaning and importance of finishes given to fabrics;
- classify various finishes according to their properties;
- describe the effect of the application of basic finishes on fabrics;
- enumerate special finishes and explain the ways of employing them;
- elaborate the methods of dyeing and printing;
- evaluate different techniques of decorative dyeing and block printing on fabrics.

11.1 TEXTILE FINISHES

You know that the word "textile" means the complete study of fibres, yarns and fabric. Certain treatments are applied to improve the look and qualities of textile goods. These treatments are called finishes. **A finish is a treatment given to a fabric, to change its appearance, handling /touch or performance. Its purpose is to make the fabric more suitable for its end use.**

A series of treatments are given in mills to finish textiles goods, for example: a fabric is washed, bleached, dyed or printed, starched and ironed before it is sent to the market.

When a fabric is given a finish, it is known as a finished textile. But it is not a must that all the textile-products are finished before use. When no finish is applied on the textiles, these are termed as **gray goods or unfinished textiles**. This does not mean that the fabric is gray in colour. It implies that no finishing treatment has been given to it.

Gray goods lack customer appeal and you will not like to buy these for your dress or shirt. Can you say why? Yes, you are right. It is because in the absence of any finish, fabrics has dull and shabby appearance.

Different colours or prints on fabrics are also finishes and these make fabrics look attractive.

Gray goods are the term used for fabrics that come directly from the loom and are used as such. These are not actually gray in colour but are 'unfinished'.

Finish includes any general treatment given to clean and iron fabrics and create exclusive variations of them by using chemical treatments, dyeing, printing, etc. to make fabric attractive and appealing.

Some major differences between 'Unfinished and finished fabrics' are as follows:

Unfinished / Gray fabric	Finished fabric
Dull looking, available only in natural colours- off white, brown, black, etc.	Lusterous, attractive, available in different tints and shades of colours, prints, etc.
Wrinkled, stained, with broken threads, uneven in width, etc.	Smooth and wrinkle-free, no defects on the surface, even width, free from stains, etc.
Relatively less expensive.	Cost of fabric depends upon the type of the fibre along with the number and type of finishes applied.
Lack customer appeal, are purchased only for rough work, backing, packaging, etc.	Customers get attracted and buy.

11.1.1 Importance of Textile Finishes

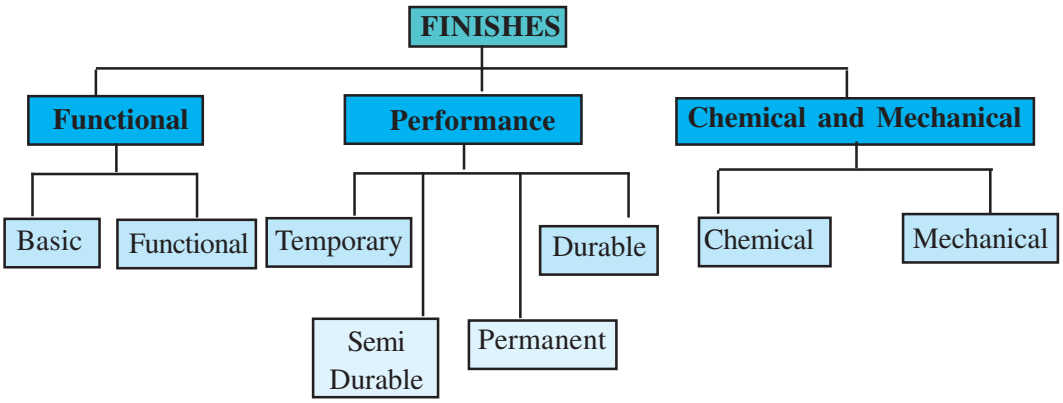
Textile finishes are important because of the following reasons. The finishes help to:

- improve the appearance of fabric and enhance its looks;
- produce variety in fabrics through dyeing and printing;
- improve the feel or touch of fabric;

- make the fabric more useful;
- improve the draping ability of light weight fabrics;
- make fabric suitable for an end (specific) use.

11.2. CLASSIFICATION OF FINISHES

Finishes can be classified in several ways depending upon their functions, performance and nature.



11.2.1 On the basis of function

The finishes may be basic or functional

i **Basic** or common finishes are applied to almost all the fabrics, with an aim to improve their appearance, feel and body. Pale white cotton fabrics may be bleached to improve their whiteness. For better look of a thin cotton fabric, starch is applied to increase its weight and shine. Steam Ironing, Calendaring (industrial ironing) is a basic finish. These are also known as aesthetic finishes.

Dyeing and printing are also considered as finishes as they enhance the aesthetic appearance of fabrics.

ii **Functional** or special finishes are applied to improve the performance of a fabric for some specific purpose, for example-

- fireproof finish prevents the burning of fabrics used by fire brigade personnel,
- waterproof finish makes fabrics water repellent for making umbrellas and raincoats,
- bulletproof finish on fabric saves the people from bullets and is generally used by defence and police personnel for their safety, and
- crease-resistant finish makes cotton / wool fabric wrinkle resistant.

11.2.2 On the basis of degree of performance

On the basis of performance, finishes are temporary, semi durable, durable and permanent.

i **Temporary** finishes are not durable and run off after first washing or dry-cleaning. Many of these are renewable and can be reapplied at home, e.g. starching and blueing of white fabrics.

ii **Semi durable** finishes stay on the fabric surface for several washings, e.g. bleaching and certain dyes used on cotton.

iii **Durable** finishes last through out the life of a fabric or a garment but may lose its effectiveness after many washes, e.g. permanent pleats, wrinkle resistant, etc.

iv **Permanent** finishes are is usually given by a chemical treatment. It changes the fibre structure and remains as such on the fabric for the entire life of a fabric, e.g. waterproofing, fire proofing, etc.

11.2.3 Chemical and Mechanical Finishes / Wet and dry finishes

On the basis of processes involved in application of finish, there are two types – chemical (wet) and mechanical (dry) finishes.

i **Chemical finishes:** These are also known as wet finishes. In these, chemical treatment is given to fabric, either to change its appearance or basic properties. These finishes are usually durable and permanent or wet finishes. Examples are: fire proof, crease resistance, etc.

ii **Mechanical finishes**: These are also known as dry finishes. Here the process consists of application of moisture, pressure and heat or a mechanical device to finish a fabric. Beating, brushing, calendaring, filling, etc. are some of the finishes included in this group. These finishes are either temporary or semi durable and do not last long.

We will learn more about these finishes further in the chapter.

INTEXT QUESTIONS 11.1

1. Fill in the blanks after unscrambling the clues in the brackets:
   i. The treatment given to fabrics to enhance their appearance, performance or handling is known as _____ (N I F S I H E).
   ii. When no finish is applied on a fabric's surface, it is known as _____ fabric (R A Y G).
   iii. _____ and _____ produce variety in fabric (Y E D I N G, N I N G P R I T).
   v. A chemical finish is also known as _____ (E T W - I S H F I N).
   vi. Waterproof finish is a_____ finish. (N C F U T I O N A L).

11.3. BASIC FINISHES AND THEIR TYPES

Now that you know about different types of finishes, lets us learn a little more about basic finishes. Different types of basic finishes are –

(i) Scouring / Cleaning

Fabric, as it comes from the loom, is dull in appearance. It may have stains of oils as well as starches, waxes, etc., that are applied to yarns to make weaving easier. Once the fabric is woven, the presence of these additives hinders further finishing processes such as bleaching, dyeing, printing, etc. Therefore, these need to be removed before sending the fabric for further processing. Scouring is the process of washing fabric with soap solution. **Scouring is the process of industrial cleaning of fabrics with the help of warm water and soap solution. It cleans the fabric and makes them more absorbent.** The method of washing a fabric is chosen according to the nature of fibre. Cottons are boiled in soap solution for cleaning. Silks are boiled to remove silk gum (degumming) while the wool fibres are boiled with soap solution to remove grease and oils. Fabrics made from man-made fibres are given normal washing. After cleaning, the fabric becomes smooth, neat and more absorbent.

ACTIVITY 11.1

Carry out this experiment and note your observations

Take two fabric pieces of 4// x 4// size of white colour, one of theses should be new and the other old and washed. Put both the pieces of fabric in water. What do you observe? The old one will sink faster because it is more absorbent as it has no finishes or starch on the surface. The new fabric will first float on the water. Gradually water penetrates through the starch applied on the fabric surface, and the fabric sinks.

(ii) Bleaching

At home you use lemon, milk, curd and facial bleach to remove sun-tan. A similar treatment is also given to fibres. Many a times natural fibres like cotton, silk and wool are available in pale / light brown colour. Suppose you have to paint some thing in light pink colour, unfortunately the brush was not washed properly and had remains of brown in it. What do you think will happen? You will not get the pink you wanted. This becomes a problem as light shades of dyes do not come out well on such fibre colours. To get exact light shade of the colour, the existing colour has to be removed. **Bleaching is a chemical treatment given to fibres, yarns or fabric to remove paleness or colour and make them white.** Suitable bleaching agents such as hydrogen peroxide for protein fibres and sodium hypochlorite for cottons, are used. Man-made fibres do not need bleaching. Fabrics have to be carefully bleached as bleach can harm the fabric if used in high concentration.

(iii) Starching / Stiffening

Starch is generally applied to fabric of fine quality and light weight or loosely woven fibres. Starching makes the fabric heavier, stiff, and crisp. It also adds shine and smoothness to the fabric. Cottons – muslin, poplin, cambric and thin silks are generally starched.

Sometimes the loosely woven cotton fabric is starched heavily so that their quality looks better but the starch comes out with the first wash and the basic loosely woven structure of the fabric becomes prominent. Therefore, starched fabric should be examined properly before purchasing.

ACTIVITY 11.2

- Take the starched cotton fabric. Try to look through it. You will notice that light can not pass through the fabric surface.
- Place a black sheet of paper on table. Hold the starched fabric in your hands and rub it.

Starch particles will fall on the black paper in the form of white powder. Now hold this fabric against light. Yes, you can see light through the open spaces in the weave.

Based on your experience above, answer the questions given below. Give reason.

– Will you use this fabric as a fall for a saree?

– Will you use this fabric to make a shirt?

– Will you use this fabric as a backing for a blouse?

(iv) Calendering

Why do you iron the garments at home? It is to remove wrinkles and make them look better. This is the simplest and the common finish used to improve the looks of any gray or finished fabric. Similarly, through the process of **Calendering or industrial ironing a fabric is passed through a series of smooth hot rollers to remove wrinkles and to make it smooth.** It makes the fabric smooth and lustrous, thereby improving its appearance.

11.4. SPECIAL FINISHES

(i) Pre-shrinking

You must have heard your mother saying that the cotton kurta that she bought has shrunk and become smaller after the first wash. **Shrinkage** is the reduction of a fabric or a garment in size (length and width) after it is washed or dipped in water**.** A marked

reduction in size takes place after washing certain cottons, linens and woollens. It is all due to shrinkage. Good quality cottons, linens and wools are pre-shrunk before marketing them. This pre-shrinking is called sanfronisation. Fabrics that are treated for pre-shrinking are labeled as 'sanfronised' or 'anti-shrink' or 'shrink-proof.' All these mean that the fabrics have received a finish for shrinkage control and will not shrink on washing. **Sanforisation is the pre-shrinking treatment given to certain fabrics made from natural fibres to prevent further shrinkage after washing.**

ACTIVITY 11.3

Sujata was very angry and disappointed because a printed cotton suit she had bought so fondly had shrunk so much that it did not fit her at all. Before buying she had asked the shopkeeper repeatedly if the material was shrink proof. The shopkeeper had assured her that it was

Let us see if the same happens in this experiment

Take a gray cotton fabric of 10″ x10″. Dip it in water for at least 3-4 hours. Dry and iron it. Measure all sides of the sample again. You will notice a change i.e. reduction in the measurements because the fabric has shrunk.

Discuss the following in a Personal Contact Programme or with friends:

- Best way to ensure that the material of the suit is shrinkproof.
- What else does one need to check about the quality before buying the material?
- Where can one look for such information?

(ii) Mercerization

Cotton is basically a dull fibre. The fabric made from cotton wrinkles easily and is difficult to dye. It is, therefore, treated with sodium hydroxide to make it strong, lustrous and absorbent. This process is called mercerization. It also improves the dye uptake of fabrics. Now-a-days this finish has become a routine finish for all cottons. Even sewing threads which are used for stitching are mercerized. You will find the word 'mercerized' on the labels of cotton fabrics and reels of sewing threads denoting that the goods have been mercerized.

(iii) Parchmentization

Have you heard of a fabric called organdie? Take a piece of organdie fabric and carefully observe it. The fabric is different from other cotton fabrics. Yes, it is a thin, transparent, light weight and stiff fabric and seems to be heavily starched. But unlike starched fabric, its stiffness remains intact even after washing. It is not due to a starch but because of application of a finish called parchmentization. In parchmentization, the

cotton fabric is treated with a mild acid that partially eats away the fabric, resulting in a transparent and stiff fabric called organdy. You don't need to apply starch to organdy fabric.

(iv) Wash 'n' Wear

Bhanwari works as a security guard in a school in Bikaner, Rajasthan. The temperature goes as high as 40-42 degrees C. She does not get enough time to maintain her uniform which comprises of cotton clothes that are most comfortable to wear specially in summers. You must have noticed that all the cotton fabrics get crushed very easily. What should Bhanwari do? There is a finish called wash 'n' wear which when applied on cotton fabrics completely changes its nature. The fabric thus treated does not wrinkle too much and becomes easy to maintain. If dried and stored properly, wash 'n' wear fabrics can be worn without ironing or with a little ironing. So, Bhanwari should select a wash 'n' wear fabric for her uniform. Besides cotton, wash 'n' wear finish is also given to linen and wool.

(v) Dyeing and Printing

In the market you see a number of fabrics in plain colours or having colourful designs on them. The process of producing colours and designs on a fabric is called dyeing and printing, respectively. Dyeing gives a solid colour to the fabric whereas printing is the application of dye on specified areas to create designs. It is very important for the dyed and printed fabric to be 'colourfast', i.e. the colour should not come out or fade easily. If the colour runs on washing, rubbing or ironing, the fabric looks shabby and old and its design becomes dull or smudged. The colour may also spoil other fabrics during washing. Has this ever happened to you?

INTEXT QUESTIONS 11.2

1. State True or False and explain if the answer is false.

(True / False) (i) Scouring is a finish used to clean the fabric.

_____

(True / False) (ii) Bleaching has no damaging effect on fabric.

_____

(True / False) (iii) Shrinkage control can be done at home also.

_____

(True / False) (iv) Organdy is a permanently stiff fabric.

_____

(True / False) (v) Mercerized thread should be used for stitching.

_____

Notes

2. Fill the blanks with the suitable word given at the end of each sentence

(i) Mercerisation is a _____ finish. (renewable / durable).

(ii) Shrinkage control is indicated as _____ on the label. (sanforised / parchmentisation)

(iii) Wash n wear is a _____ finish. (routine / special)

(iv) If the colour does not bleed on washing, it means fabric is _____ _____. (water proof / colour fast)

11.5. DYEING AND PRINTING OF FABRIC

Can you imagine wearing a plain white dress or one having same print every day? No, never, even the very thought is unwelcome. It is very difficult to think of fabric without variation in colours, prints or designs.

In the market, you will find fabric in all tints and shades of colours, small and big prints, woven in colourful designs. All these are possible because of dyeing and printing. Dyeing and printing improve appearance of fabric and add diversity to our dresses through colours and designs. We usually distinguish one fabric from another by its colour, print and texture.

11.5.1 Types of Dyes Used for Textiles Finishing

Dyes are used for dyeing and printing of textiles. Dyes are divided into two major categories – natural and synthetic dyes.

(i) Natural Dyes – These were the first dyes known to mankind. These are obtained from natural sources – vegetables, animals or minerals. These are eco-friendly and do not pollute water or land. The residue of these dyes can be safely used as fertilizer in the fields. But the process of dyeing with natural dyes is slow, difficult and expensive. Major natural dyes obtained from plants are turmeric (*haldi*), henna (*mehndi*), madder (*manjishta*) and indigo (*neel*). While tyrian purple and lac dyes are obtained from animal sources. *Khakhi* dye comes from a mineral source.

(ii) Synthetic Dyes – These dyes are prepared synthetically with the help of different chemicals. These differ in their chemical composition and behaviour. Popular classes of synthetic dyes are – direct, basic, acid, disperse, azo, vat and reactive dyes. These dyes cause a lot of pollution and skin allergies etc. Some of these dyes such as azo are very harmful for human health and their use has been banned. Synthetic dyes are very easy to use and have better fastness than natural dyes. These also give a brighter and larger colour range.

11.5.2 Application of Dyes

In the market, we find it is not only fabrics, which are colourful, but sewing threads, knitting yarns and cords, etc. are also available in various colours. Therefore, the process of dyeing is carried out on textiles at the fibre, yarn or at fabric stage. Different stages at which textiles are dyed include –

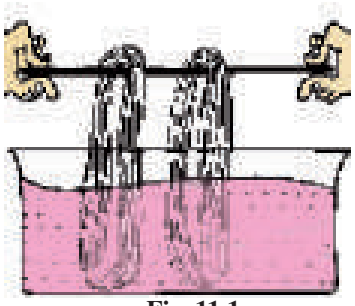


Fig. 11.1

(i) **Fibre Stage** – Though all types of fibres can be dyed at this stage, the method is more popular for dyeing man made fibres. It gives uniform dyeing and it is colourfast. There is a lot of wastage of coloured fibres during subsequent processing.

(ii) **Yarn Stage** – Colour can be applied or rendered (popular term used in textile dyeing) on fibres after spinning into yarns, especially when they have to be sold as such. Knitting yarns and all types of threads – sewing, embroidery, crocheting, etc. are dyed at this stage.

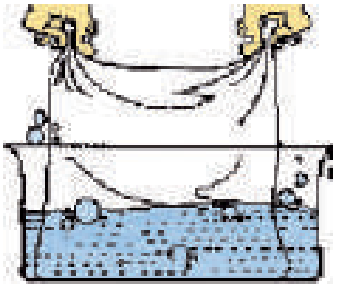


Fig. 11.2

(iii) **Fabric Stage** – Most of the dyeing in the textile industry is done at this stage, and fabrics are dyed in one solid colour. It gives uniform colouring. Colour matching becomes easier at this stage. This method is also suitable for dyeing blended fabric. Blends are made by mixing two fibres together and then made into a yarn and fabric.

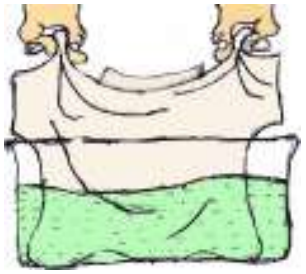


Fig. 11.3

(iv) **Garment Dyeing –** Sometimes dyeing is done at this stage i.e. after the garments have been stitched. This is also known as piece dyeing. Since a garment is dyed, there is no fabric wastage. But the colour may not be uniform, especially around seams, pleats and gathers. If you have a garment which has been dyed just now, open one pleat or seam. You will find that fabric inside the seam will be lighter or darker depending on the time and exposure of fabric to the dyeing medium.

11.5.3 Decorative Dyeing

You already know about simple dyeing. When the process of dyeing is carried out in a selective way to get different designs, it is called decorative or resist dyeing. The term resist dyeing is used because in these techniques, some resist materials (threads, yarns or wax) are used on specific areas to prevent them from being dyed. A number of beautiful designs can be created in this manner. The two most popular techniques of

decorative or resist dyeing are –

(i) Tie and Dye

(ii) Batik

(i) Tie and Dye

In tie and dye, threads are used as a resist material to stop the dye from entering the selected areas of the fabric. Tying of the fabric is done according to the design to be made. There are many ways in which you can create designs using tie and dye technique. These are –

a) **Marbling**: Take the fabric and crumble it to form a ball. Tie it with a thread at different areas, randomly. Then dye the fabric. Open it and dry. The dyed fabric will have a marble effect.

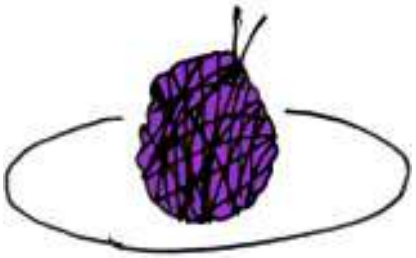


Fig.11.4 : Marbling

b) **Binding**: Pick up the fabric (*Duptatta*, table cloth or bed sheets) from one point and tie with a thread at intervals and dye it.

Fig.11.5 : Binding

c) **Knotting** : Put knots on the fabrics wherever desired and dye it.

Fig.11.6: Knotting

d) **Folding :** Put the fabric flat on a table. Pleat and fold it uniformly in lengthwise direction. Tie it with a yarn at regular intervals, to get widthwise lines after dyeing. For horizontal lines, pleat and fold the fabric widthwise. Roll the fabric from one corner to the diagonally opposite corner and tie at regular intervals to get diagonal lines.

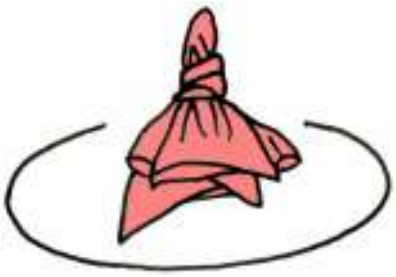


Fig.11.7 Folding

e) **Peg Tying**: You can also use cloth pegs or clamps as resist materials. Fold the fabric and put pegs at regular interval.

f) **Tritik** : Make a design of your choice on the fabric with running stitch, pull the thread tightly and tie it.

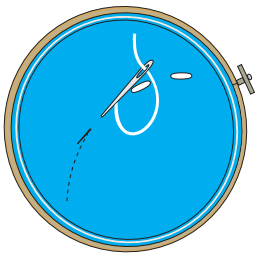


Fig.11.8 Tritik

Tied and Dyed Fabrics

Patola fabrics of Gujarat and **bandhani** of Rajasthan are two famous traditional textiles of India made by tie and dye technique. Both are usually dyed in two or more dyes by resist dyeing techniques. But there is a difference between the stages at which they are tied and dyed.

In Patola the yarn is tied and dyed according to the design before weaving and are then woven to form intricate multi-coloured designs.

On the other hand, woven fabric is tied and dyed to have innumerable dots and lines (*laheria* -wavy pattern) in Bandhni.

ACTIVITY 11.4

Dipti was happy as she was finally able to buy a saree with beautiful tie and dye design on it. She was happy also because her saree was much cheaper than her friend Nidhi's saree. She proudly exhibited her possession to everybody at home and she also bragged that it is so inexpensive. However her mother asked her to think about the possible reason for her saree being priced so low.

Discuss the following:

– What could be the reasons for Nidhi's saree being more expensive?

– How can you differentiate between a genuine and a fake piece of tie and dye?

– Could the place of production and/or sale outlet also influence the price of Dipti's saree?

(ii) Batik

Batik is also a method of resist dyeing. Here, wax is used as a resist material to prevent the dye from colouring certain areas. On selected areas of the fabric, a mixture of Bees' wax and paraffin wax is filled with a brush or a block, according to

Fig. 11.9

the design. These areas do not get coloured when dyed giving a patterned effect. The wax is later removed.

11.5.4 Printing

Let's us see and understand how printing of fabrics is carried out? Keep two fabrics side by side, one a red coloured fabric and the other a fabric having red print. Observe the difference between the two carefully. Though both the fabrics have red colour, but the dyed fabric is red all over while in the printed one, only certain areas are of red colour. This clearly shows the difference between dyeing and printing. You already know that dyeing is the process of colouring the fabric. Printing is also a process of colouring the fabric but here colour is applied only in selected areas, to create designs which decorate the fabric surface.

The major difference between dyeing and printing is that dyeing is carried out in fibre, yarn or at fabric stage but printing is done only on the fabric surface. This is also known as selective dyeing.

Popular methods or techniques of printing are –

- Block printing
- Screen printing
- Roller printing
- Stencil printing

Block printing and batik are two traditional printing methods. Here, we will learn the details of only one type of printing i.e. Block Printing.

Sanganer in Rajasthan (near Jaipur) is famous for Block Printing.

Shantinektan in West Bengal is known for Batik.

Block Printing

Have you ever gone to a post office and observed letters or parcels being stamped. The stamp is first pressed into an ink pad and then onto the letter or parcel. Block printing is similar to this. Here a wooden block, which has a design engraved on it, is pressed into a thick dye paste and then stamped onto the fabric. Do not worry if you do not have a wooden block.

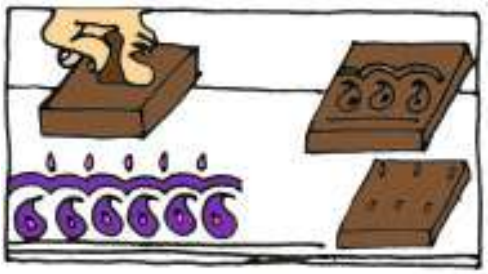


Fig. 11.10

You can follow the same procedure for printing at home using easily available objects in place of a blocks. Take any vegetable like ladies' finger or onion or gourd (*torai*),

cut and use it as a block. Even bowl, glasses leaves and flowers can also be used for printing.

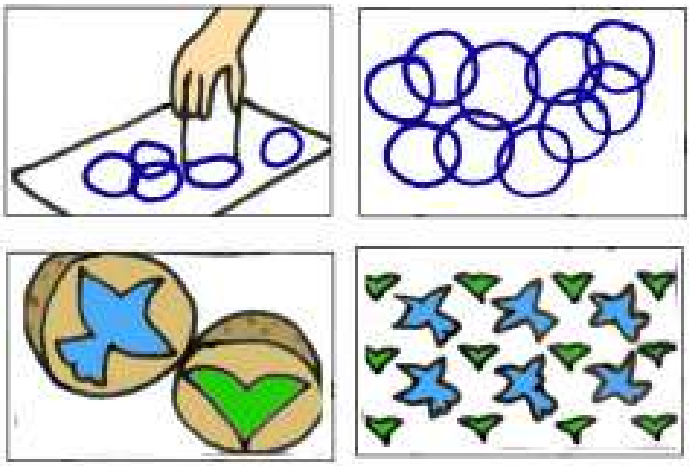


Fig. 11.11

ACTIVITY 11.4

To make a block printed article at home, take a few pieces of ladies' finger, onion and a few leaves to be used as blocks. Spread a 10″ x 10″ fabric on a flat and padded surface. Pour fabric paints in a small flat container. Dip your home made blocks in paint and press them on the fabrics. You can make different designs with the same block by changing its placement.

INTEXT QUESTIONS 11.3

1. Fill in the blanks :

   (i) Vegetables and animal dyes are known as _____.(natural/ artificial)

   (ii) Tyrian purple dye is obtained from _____ source. (natural/animal)

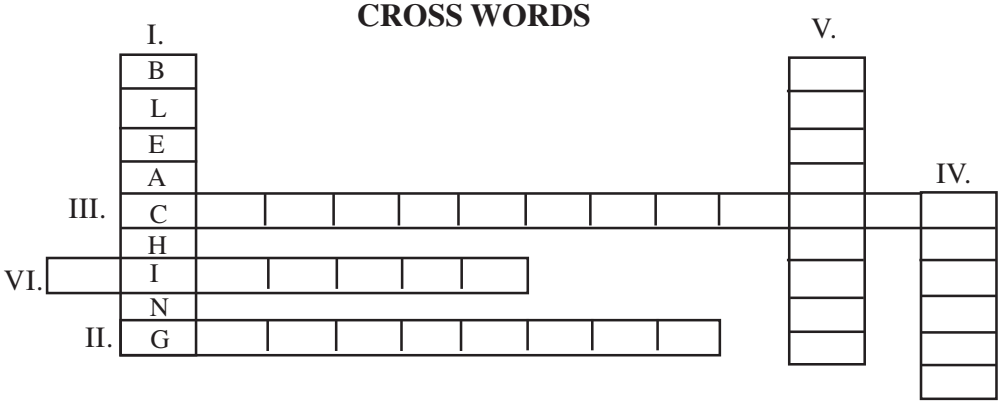
   (iii) Fibre dyeing is more popular in _____ fibres. (man-made/synthetic)

   (iv) Tie and dye is _____ dyeing. (resist/discharge)

   (v) At home fabric can be decorated easily by _____ printing. (bolck/ roller)

2. Look at the grid given below, followed by statements. The answer to each statement is in a single word. Fill the word in the grid at its respective number. The first one is done for you.

CROSS WORDS



I. It is a chemical treatment given to a fibre, yarn or fabric to remove yellowing.
II. The term used for fabrics that come directly from loom.
III. Also known as wet finishes.
IV. It makes fabric heavier, stiff and crisp.
V. It makes cotton fabrics easy to maintain.
VI. It is one of the tie and dye technique.

WHAT HAVE YOU LEARNT

For your convenience, here are the main points of the lesson:-

Textile Finishes ⟶ -Meaning
-Importance in relation to textiles
-Classification of finishes on the basis of their-
- Basic functions
- Degree of performance
- Nature (wet and dry)

Basic finishes:-
i) Scouring
ii) Bleaching
iii) Starching
iv) Calendering

Special finishes:-
i) Pre-shrinking
ii) Mercerization
iii) Parchmentisation
iv) Wash 'n' wear
v) Dyeing and printing
- Natural and synthetic dyes
- Stages of dye application
- Decorative dyeing
- Printing

TERMINAL EXERCISE

1. What is a textile finish? Why is it necessary to apply on fabric?
2. How does a gray fabric differ from a finished fabric?
3. Describe any two basic finishes and their application.
4. The sewing thread Ritu brought had the label mercerized? Give the advantages of 'mercerization' and explain the process of mercerization to Ritu.
5. "Dyeing is finishing with colour". Explain.
6. Differentiate between natural and synthetic dyes.
7. You have just brought a shirt that has a label "Piece dyed". What do you understand from it? What are the other methods of dyeing textiles?
8. Describe batik and block printing.

ANSWERS TO INTEXT QUESTIONS

11.1 i) Finishes ii) Gray iii) Dyeing and printing
iv) Wet finish v) Functional

11.2

1. i) True, scouring is washing fabric with soap and chemicals to remove all impurities
   ii) False, Bleaching has to be done very carefully. It destroys the colour. Strong bleach can damage the fabric to some extent.
   iii) True, soaking the fabric overnight and drying it causes shinkage.
   iv) True, this is due to a permanent finish called Parchmentisation.
   v) True, mercerization makes cotton smooth, shiny and strong.
2. i) Durable ii) Sanforised iii) Special iv) Colourfast

11.3

1. i) Natural dyes ii) Animal iii) Man-made
   iv) Resist v) Block.
2. i) Bleaching ii) Gray goods iii) Chemical finish
   iv) Starch v) Wash 'N' Wear vi) Binding