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**CONSTITUTION OF INDIA**

**Preamble**

**WE, THE PEOPLE OF INDIA**, having solemnly resolved to constitute India into a **SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC** and to secure to all its citizen :

**JUSTICE**, social, economic and political;

**LIBERTY** of thought, expression, belief, faith and worship;

**EQUALITY** of status and of opportunity; and to promote among them all

**FRATERNITY** assuring the dignity of the individual and the unity and integrity of the Nation;

**IN OUR CONSTITUENT ASSEMBLY** this twenty-sixth day of November, 1949, do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**



## UNIT- I

### CHAPTER -1

#### 1.1 CONCEPT OF HOME SCIENCE AND ITS SCOPE

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##### Introduction

Many people believe that Home-Science is related to the various household works only and meant for girls. But in reality, it is a wrong concept. Do you have such concept about Home-Science in your mind?

In this lesson we will discuss about the following:

- ◆ Concept of Home Science.
- ◆ Objectives and philosophy of Home-Science.
- ◆ Scope and different branches of Home-Science.

Generally, Home Science means the Co-relation between home and science. Thus it helps in the proper utilization of the family's resources more scientifically, thereby helps to fulfill the aims and objectives of the

family. As a result, each and every family member gets satisfaction and can lead a happy family life.

In a society, 'family' is the primary unit. After marriage, both man and woman make a family. As the family expands, the duty and responsibility also increase, specially for the housewife. Home - Science prepares a housewife to undertake the duties and responsibilities of a house.

Until recently, the home was the place for a man to live in. On the other hand, it is a factory for a woman, where she has to perform a number of duties. Now the concept has changed. The women have come out for their livelihood and at the same time, men take part in different household works.

Home-Science education puts more stress on sharing of household duties, responsibilities, happiness, sorrow etc. among every member of the family. The purpose of Home-Science education is the creation of an united effort by parents and children for the improvement of different goods and services which will enable them to live richer and more purposeful lives.

Home-Science is a combination of arts and science. The subjects in arts and science are included in Home Science so that they can use them in their practical life for the well being of the families. It includes different subjects such as- food, nutrition, clothing, home, money, child care, home management, art and culture, social service, economics, social studies etc. The term "Home Science" is given to the subject as most of the matters related to it is based on scientific examination.

On the basis of the above discussion we can define Home-Science as follows- "Home-Science is a field of study in combination with arts and science, which enables every individual to get acquainted with the different scientific inventions and by using these one can manage a house efficiently".

### PHILOSOPHY OF HOME SCIENCE:

The philosophy of Home-Science should be in harmony with the Indian home life. The philosophy of home and family is the philosophy of Home-Science education. Every home is identified with the woman of the house. Therefore, the philosophy of Home Science is based on the philosophy of Indian woman, their ambition and spiritual values. Home is a place, where both man and woman develop by acquiring equal opportunities. Thus, the philosophy of Home Science puts stress on proper development of every individual. Because, every member of a family has an important role in proper development of a society or a nation.

Every member of a family is a part of a society. If they develop properly, there will be changes in the society. Therefore family is the basis of a society. Home-Science education gives more importance on the scientific methods and inventions for bringing about changes in individuals, so that by using these one can make a happy family life.

### OBJECTIVES OF HOME SCIENCE EDUCATION

The objective of Home-Science education is to give knowledge about home to every

individual of different classes and ages : to appreciate the importance of areas like nutrition, home-management, garments stitching etc and to acquire knowledge about these.

Broadly, the objectives of Home Science are

- (1) Help the housewife for all round development.
- (2) Help her in proper use of different resources, necessary for solving different day to day problems.
- (3) Improve the standard of living by proper utilization of different scientific resources.
- (4) Develop different human resources that the housewife possess. These can be done by different methods. For example –
  - a) Improve the skills in technologies and other aspects.
  - b) Brings about a change in knowledge regarding the responsibilities of the housewife towards education, national development, home management etc.

Apart from these objectives, Spafford and Amidon stated the following objectives of home-science –

- (i) Establish values which make personal, family and community living meaningful.
- (ii) Create a home and community environment conducive to the healthy growth and development of all.
- (iii) Achieve wholesome inter-personal relationship.
- (iv) Use resources to satisfy needs.
- (v) Develop mutual understanding and appreciation of multiple cultures and ways of life.

American home economists Dr. Ellan H. Richards gives the objectives of Home-Science as under –

- 1) The ideal home life of today not to be hampered in any way by the tradition of the past.
- 2) The freedom of home from the dominance of things and their due subordination to ideals.
- 3) The use of various resources made available by modern science, for improvement of home-life.
- 4) The simplicity in material surroundings which will free the spirit for the more important and permanent interests of the home and the society.

From the above discussion, we can conclude that Home-Science education helps in the development of human resources and provides equal opportunities to both

man and woman. Thus every one can lead a happy life.

### SCOPE OF HOME SCIENCE AND ITS DIFFERENT BRANCHES:

Home Science helps in all round development of an individual. The scope of Home – Science is very wide. It has five different branches. These are shown in the following diagram.

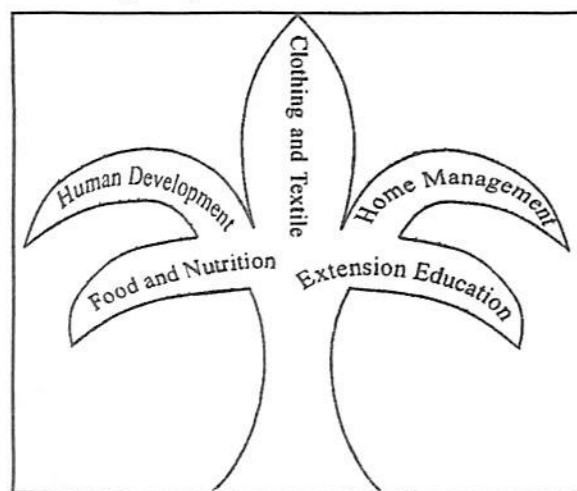


Fig-1 Different branches of Home Science

- 1) **Foods and Nutrition:** Through this area, the students are taught about the proper selection of food, food habits etc. The knowledge about different nutrients available in different foods, different diseases, causes and their prevention, and care of the sick are also included in the curriculum.

- 2) **Human Development:** Stages of life, their characteristics, different development etc. are included in this area.
- 3) **Clothing and Textile:** The study of different fibres, fibre identification, textile designing, care of fabrics. Properties of textile fibre are included in this area.
- 4) **Home Management:** In this area, the management of different resources, their use, management of different activities in the house, management of time and energy etc. are included.
- 5) **Extension Education:** With the help of different teaching aids, the people of rural area are taught about food, nutrition, health, child care, use of resources, care of fabrics etc., through which they can improve their standards of living.

### JOBS AND VOCATIONS RELATED TO HOME SCIENCE EDUCATION:

Different jobs and vocations related to Home Science are as follows –

- 1) Teachers in school, colleges, poly techniques, hotel management institutions.

- 2) Dietitians in hospitals, nursing homes, health club and guest houses.
- 3) Chefs, housekeepers and public relation personnel in hotel industry.
- 4) Trainers in homes and hotels.
- 5) Designers in garment industry.
- 6) Entrepreneurial opportunities in baking industry, food service institutions.
- 7) Crèches can be opened, working in child and family welfare organizations.
- 8) As trainer, supervisor in Anganwadi Centre, Integrated Child Development Schemes, under Indian Council of Child Welfare.

### SUMMARY

- ☐ Home Science is a field of proper development of education.
- ☐ It is a basic need of an individual, family and community.
- ☐ The aim of Home-Science is to improve the standard of living.
- ☐ It is a multidisciplinary subject in combination with arts and science.
- ☐ It has five different areas.
- ☐ The scope of Home-Science is vast with different career opportunities.

### QUESTIONS

#### A. Very short answer questions:

1. Why do you think that Home-Science is a combined study of Science and Arts?

#### B. Short answer questions:

1. What do you mean by the term "Home-Science"?
2. Why do you think Home-Science education is equally important for boys and girls?
3. List any three areas about Home-Science.

#### C. Long answer questions:

1. What is the role of Home-Science in the proper development of an individual?
2. Write about the scope of Home-Science education.
3. Write about the jobs and vocations related to Home-Science.

Human life begins with the birth of a child and ends with its death. During his lifetime man passes through different stages. Every stage has its own distinctive characteristics. You have reached this stage of adolescence, after passing through various stages of growth and development. Therefore, it is essential to know what is growth and development, its principles, stages of development and the factors affecting growth and development.

In this chapter, we shall deal with the following topics –

- ◆ Meaning of growth and development
- ◆ Principles of growth and development
- ◆ Factors affecting growth and development

- ◆ Various stages of development
- ◆ Meaning of adolescence
- ◆ Characteristics of adolescence

#### MEANING OF GROWTH AND DEVELOPMENT:

The word “growth” and “development” are used synonymously by most people. But both have different meanings. Generally speaking, growth implies change in measure i.e. quantitative changes. In other words change in a person’s weight, height, size, shape etc, is growth. Growth does not mean the external physical changes alone. Various internal organs of the human body and the brain also grows simultaneously. Due to the growth of the brain, a human being develops knowledge, memory and reasoning power.

#### LET US KNOW ABOUT OUR SELF

In short, a human being grows physically as well as mentally.

On the other hand, development means qualitative changes in a human being. In other word, developmental changes occur as a result of experience and maturity. Development can also be defined as a process of coherent, systematic and gradual changes. In human being, development always follows an upward direction and never follows backward direction. There is a specific relationship of one stage of development with other. Once the physical and mental growth occurs in human beings the process of development also starts.

#### PRINCIPLES OF GROWTH AND DEVELOPMENT:

The growth and development from childhood to adulthood follows a set of rules. There is a close relationship between the growth and development of a child. The psychological or emotional development cannot be well understood without knowing its physical growth. For example- a child may not be able to perform well at school due to some physical reasons. The child may be physically weak or may get frequently

affected by diseases. Sometimes, when the parents show more love and affection towards his brother or sister, the child might become malicious. Therefore, in order to know all these factors, it is essential to understand the main principles of growth and development. These are as follows –

**a) Individual differences:** The growth and development of a child can never be similar to that of another child of the same age. Every child grows and develops in his own way. Differences in growth and development are seen among the children of the same parents, same religion, community, family and even between twins. Due to these differences among all individuals, children of the same age or same family cannot show equal performance in every aspects. As a result, the personality of every child also varies from one another.

**b) Rate of growth:** The growth of a child occurs at a definite rate. Growth is a continuous process. One stage of which influences another. The rate of growth becomes rapid at some particular age and at some other times becomes slow. From birth, till the age of six years, the rate of

growth in a child is very rapid. Although from six to twelve years of age, the rate of growth decreases, but after that till the age of eighteen years, the growth rate of the child becomes again more than before. At this stage, the child experiences growth spurt. From this stage onwards in the remaining period, the growth rate again decreases. Generally, during the growth period, the weight of a male child is more than that of a girl child. Moreover, differences are evident at the time of attaining maturity in girls.

**c) Pattern of development:** Different organs of the human body grow at different proportions. At the initial stage, the sexual organs of a child do not grow in the same way as his nervous system develops. Therefore, it is seen that there is differences between the pattern of growth and rate of growth in a child.

**d) Pattern of growth:** The growth of a child follows some definite rules and patterns. After birth, a child can never sit or run. At first, he learns to lie upside down and then on his back, after that he tries to sit and stand upright and only after that he starts to walk. During the first month, i.e. infancy, the child assesses his every need

simply by crying. From the second month onwards, he can lift his head, smile and slowly can make some sound. In this way, as the age advances, his growth and development occur equally.

**e) Different stages of growth:** From the time of conception till the child reaches adulthood – this whole period can be defined in term of different stages. The period between the times of conception, till the birth of the child is termed as pre-natal stage. From birth to two and half years is infancy; from two and half years to six years is pre-school stage; six to eleven years is primary school stage; eleven to eighteen years is termed as adolescence period. In this way, after twenty years of age, a child reaches adulthood. In every stage, the pattern of growth of the child is different. The rate of growth is rapid from birth to six years of age. Again during adolescence period, growth spurt occurs. As a result, some behavioural changes are seen in the child.

## 2.1 FACTORS AFFECTING GROWTH AND DEVELOPMENT:

The growth and development of a child is influenced by different factors. They are

heredity, environment, maturation and learning. In addition to these, there are some other external factors which indirectly influence growth and development of a child. These factors are – food and nutrition, love and care, exercise, rest etc.

**Heredity:** From a single cell, a child grows and develops to a complete human being. The child attains its parental characteristics through chromosome. In other words, a child inherits the physical features and work efficiency of his parents. Moreover, the child acquires his physique, height, complexion, appearance etc, through genes. For this reason, it is seen that the physique, height, complexion etc. of a child resembles those of his parents to some extent. If the mother or father of a child is tall and well built, then he may also be of similar type. In addition to this, the physical and skeletal structure, colour of hair, skin and eyes, type of blood etc. are also acquired by the child from his parents hereditarily. Other psychological factors that are influenced by heredity are – intelligence, emotional make-up, some specific behavior and some psychological disorders.

**Environment:** Environment also influences growth and development of a child. A healthy environment not only influences the psychological behavior, but also the physical growth of a child. Different environment like – home, school and social environment play a very important role in a child's physical, psychological, emotional, social and moral development. A child's social life begins at his home. His personality depends upon the behavior, habits, customs, discipline etc. of the family members. Moreover love and affection, mutual trust among the members of the family influence the child's psychological development. Similarly, a child feels secured and his physical needs are fulfilled in a healthy atmosphere of the house. Like home, a child learns discipline and punctuality from the controlled environment of a school. Moreover, there is exchange of feelings, among children of the same age group and with that, there exists a feeling of cooperation among them. The social environment in which the child lives in, is also important for the child. Because a child dwelling in a healthy society, experience proper development in different fields. On the other hand, if a child lives in an unhealthy



society with constant quarrels, fights, malice, jealousy etc. his psychological, social and moral development will not complete.

**Maturation:** Another factor which influences a child's growth and development is maturity. Every child can accomplish different activities like – crawling, squatting, walking etc., when the nerve tissues are matured enough. In other words, when a child attains physical maturity according to his age, only then he can squat on his own and at that age, if he is taught to walk, he can never do so. A child at a particular age can learn to walk on his own without any training. Maturity is attained in case of his psychological traits also. For eg. – children can express their feelings, can engage themselves constantly in any activity and they want to know about people around them. As a result of maturity, proper language development is seen. Soon after birth, every child expresses his needs by crying. In other words, a child cries if he is hungry, thirsty, or when he wets his cloth etc. With the advancement of age and increment in growth, a child can speak one or two words and later on the whole sentence.

**Learning:** Learning plays a vital role in all round development of a child. Through learning, a child develops his skills, abilities, feelings and behavior. It is through learning that every child can be specialized in certain activities. Learning brings about a permanent change on the behavior of a child and such changes can be acquired through training or experience. To show good results in examinations or to gain expertise in dance, music or sports etc., a child should learn through proper training. In the same way, in order to develop socially and morally and to become a member of a society, learning is essential.

**Food and Nutrition:** For proper growth and development of a child, nutritious food is also essential. Because a nutritious diet can supply all the essential nutrients to the body. Therefore, the foods given to a child must contain enough of proteins, minerals and vitamins. If the child is not provided with proper food as per his requirements, his growth and development will be hampered.

**Love and affection:** Love and affections also influences the growth and development of a child. The children, who are deprived of the love and affection of their parents,

may not have proper psychological development. In addition to this, due to the strict disciplinary measures of the school teachers, sometimes a child's physical, psychological and emotional development gets interrupted.

**Exercise:** Exercise helps in physical growth of a child. Different games and sports, jogging, swimming etc. help a child in developing strong and healthy muscles. Moreover, playing with friends also helps in the development of social skill of a child.

#### 2.1.4 STAGES OF DEVELOPMENT

The stages of development can be divided broadly under two groups. They are -

**(A) Pre-natal stage:** From the time of conception, prior to child birth – this period is known as prenatal stage.

**(B) Post-natal stage:** The period after the birth of a child is known as post-natal stage. This stage is again sub-divided under the following heads-

- (1) Infancy – (From birth to 2 ½ years of age).
- (2) Early childhood – (From 2 ½ years to 6 years).

- (3) Late childhood – (6 years to 11 years).
- (4) Adolescence – (12 years to 18/19 years).
- (5) Adulthood – (After 20 years).

From the above discussion, you must have understood how growth and development take place in one's life and how the child passes through various stages for attainment of adulthood. All these stages has their own characteristics. In this chapter we shall deal with the adolescent stage only. Before discussing the stages of adolescence, let us know about what is adolescence.

#### 2.1.5 MEANING OF ADOLESCENCE

Adolescence is a transition period from childhood to adulthood, because this stages starts just after childhood.

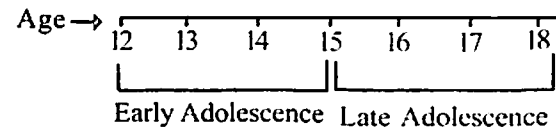
The term 'adolescence' is a Latin word which means "to grow into maturity". In the past, boys and girls, who have gained reproductivity were mostly termed as adult rather than youths. At present, the period of adolescence is used in a broader sense. Thus it is a combination of physical,

psychological, emotional and social maturity. Therefore, the adolescence can also be defined in the following way –

“Adolescence is the period between childhood and adulthood, which can also be termed as the period of preparation for complete development of a person”.

Some psychologists have divided the period of adolescence in two phases. They are – early adolescence (From 12 years to 15 years) and late adolescence (From 16 years to 18 years). Early adolescence is also known as “teen age”. Generally, the biochemical changes in girls is rapid as compared to those in boys. Therefore, a girl attains puberty earlier than a boy of the same age group. The period of adolescence in boys is shorter than in girls. In addition to this, changes in behaviour, expression, values etc. among boys and girls are more rapid during early adolescence than in late adolescence.

Sometimes, it becomes very difficult for the adolescents to adjust themselves with the physical changes that take place during late adolescence period. Because of their physical maturity, they tend to seek more independence.



Due to the physical growth and development of the sex organs during adolescence, the characteristic features of both the stages of adolescence differ from each other. These changes do not take place continuously and it is important to note that – these changes are inter-related.

#### 2.1.6 CHARACTERISTICS OF ADOLESCENCE:

The characteristics of adolescence are such that the adolescence can differentiate between their past days and about the days to come. These are –

1. Adolescence is a significant and important period of development. Because during this period, changes in values also take place together with physical and psychological changes.
2. Adolescence is a transitional period or the period of successive changes in development from one stage to the other. This means it is a period of conditional change. During this period, both boys and girls learn new and matured behavior. Moreover, at this

age, the adolescents are more confused about their behavior, as to whether they should behave like a child or as an adult.

3. Adolescence is a period of change. Physical and psychological changes take place equally during this period.
4. Adolescence is a problem afflicted age. The adolescence have to face different problems at this age and they are incapable of compromising with them. The main reason for this is that during childhood, their parents or teachers used to assist them in solving their problems. Hence, many adolescents are inexperienced in solving problems on their own. On the other hand, they tend to be self dependent and try to solve their problems by themselves. In this way, at many times, they create some other problems.
5. Adolescence is a period of search for self identity. At this age, boys and girls form a group and imitate the dressing style, way of conversation, behavior etc. from other members of the group. Slowly, they become conscious of their own identity and do not like to imitate

their friends. Sometimes, they also suffer from identity crisis.

6. Adolescence is a dreaded and complicated period of life. If their physical and psychological needs are not satisfied or not considered sympathetically by the elders, the problems become more complicated. Because, the parents, guardians or other elder people of the society cannot easily accept the physical and psychological changes of the adolescents. As a result, conflict arises in fulfilling their needs and desires.
7. Adolescence is the time of unrealism or period of imagination and day dreaming. At this age, boys and girls look at life through colourful glasses. They want to see the reflections of their imagination, hopes and aspirations within themselves and other members of their family. When they cannot turn their imaginations into reality and fail to reach their aim, they tend to lose temper and feel depressed.

With age or during late adolescence, self and social experience increases. As a result, they are able to justify every

matter logically and can determine the right direction of the family, friends and their own life. Therefore, at this stage, they become very happy.

8. Adolescence is the threshold of adulthood. During adolescence, they are legally matured in age. Therefore,

they behave like adults and dress up like adults. In addition to this, they even do not hesitate to take alcohol, smoking, drugs and indulge in sex etc. They believe that – such behavior would create a special feeling, a special image in them.

### SUMMARY

- ☞ Growth is a quantitative change and development is a qualitative change.
- ☞ Principles of growth and development are – individual differences, rate of growth, rate of development, type of growth, different stages of growth etc.
- ☞ Factors affecting growth and development are – heredity, environment, maturation, learning, food and nutrition, love and affection, exercise.
- ☞ Two stages of development are – Pre-natal stage and post natal stage.
- ☞ The postnatal stage is divided into the following stages – infancy, early childhood, late childhood, adolescence and adulthood.
- ☞ Adolescence is the period between childhood and adulthood.
- ☞ There are some special characteristics of adolescence.

### QUESTIONS

#### A. Very short answer questions

1. What do you mean by growth?
2. What is development?
3. Define adolescence.

4. What are the different stages of development?

5. What is “teen age”?

#### B. Short answer questions.

1. Describe any two principles of growth and development.

2. How does environment influence growth and development?

3. Are food and nutrition, love and affection necessary for the healthy growth and development of a child? Explain

#### C. Long answer questions.

1. What are the characteristics of adolescence?

2. Describe the factors affecting growth and development of a Child.

CHAPTER – III

PHYSICAL DEVELOPMENT IN ADOLESCENCE:

Generally, physical development means increase in height and weight of the body. But in case of development during adolescence, certain changes in internal organs as well as development in some other aspects are also seen. So, in this chapter, we shall discuss the following topics –

- ◆ Physical development and development of sex organs, growth spurt.
- ◆ Cognitive development, changes from concrete operational stage to formal operational thoughts.
- ◆ Social and emotional development, importance of peer group, interest

towards opposite sex, varied and changing interests.

- ◆ Concern for future, adolescence as a period of stress and strain.

**2.2. Physical Development during Adolescence):**

The physical development during adolescence indicates noticeable increase in height and weight. Moreover, during this period, both boys and girls attain puberty. As a result, production of seminal fluid and on set of first menstruation occurs among boys and girls respectively. Have you ever kept record of your height and weight? For this purpose, you may use a health card. Now can you fill up the following table?

Table-I

Age in years	Height in (Cms)	Height in (Kgs)	Increase in height in (Cms)	Increase in Weight in (Kgs)
Early adolescence { 12 13 14				
Late adolescence { 15 16 17 18				

What have you seen after filling up the above table? You must have observed that – there has been a sudden increase in your height and weight within 12 to 18 years. In this period, the physical changes in boys and girls are also different. In case of boys, the increase in height is approximately 20 cm. On the other hand, height gain in girls during this period is about 8 cm. During adolescence, the muscles and bones of boys becomes strong and well built, but in case of girls, the muscles become soft and smooth. Changes in voice is also seen during this period, which is strong and deep in boys and soft and smooth in girls.

**GROWTH SPURT:**

Generally, growth spurt means the accelerated increase in height and weight of an individual and through this process, a child turns into an adolescent. This increase in height and weight varies from person to person. If you compare the above growth chart with that of your friend, then you will find that – your rate of growth specially in height and weight is not similar to that of your friend. In addition to this, the age at which growth spurt occurs also varies. This generally occurs in case of boys and girls, who attains late maturity. It is seen that – such variations in height and weight, at many times becomes the subject for concern of their parents also.

Growth spurt among adolescent boys and girls lasts for four to five years. In the pubertal periods also, variations are seen with specific differences in sex. Generally in boys, increase in height and weight occurs two years later than that in girls. Growth spurt occurs in girls at the age of 11 to 13 years and in boys from 13 to 15 years. From this, it is understood that – on the average, girls gain height at the age of 12 years and boys at the age of 15 years. Another remarkable point is that – before 11 years of age boys become taller than the girls. But from 11 to 13 years of age, due to early growth spurt, the height and weight of girls are more than that of boys of the same age group. On the

other hand, in case of boys, growth spurt mostly occurs during late adolescence period. As a result, they are taller than the girls.

**CHANGES IN SIZE OF THE BODY:**

Growth spurt is accompanied with the changes in the size of the body and also in body proportions. Initially, the head, hands and legs acquire the size and shape of adults. The size of the shoulders and calf of the legs increases more in comparison to the other parts of the body. The size and shape of the body is not proportionate. As a result, the shape of their body looks somewhat ugly. This creates a feeling of tension and anxiety

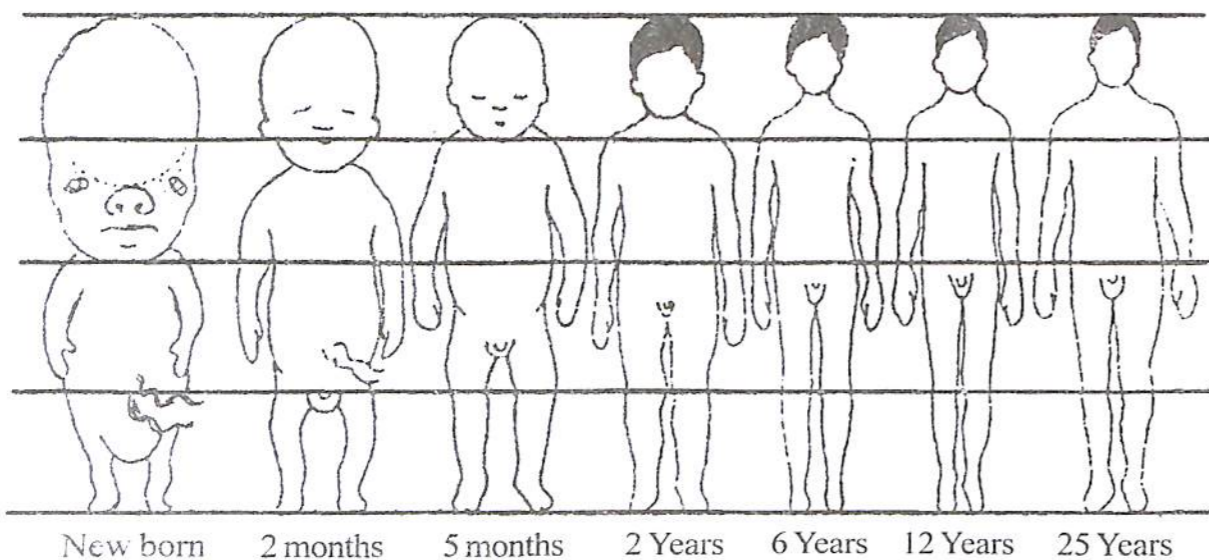


Fig-2 Changes in body proportions from Prenatal Period to adulthood

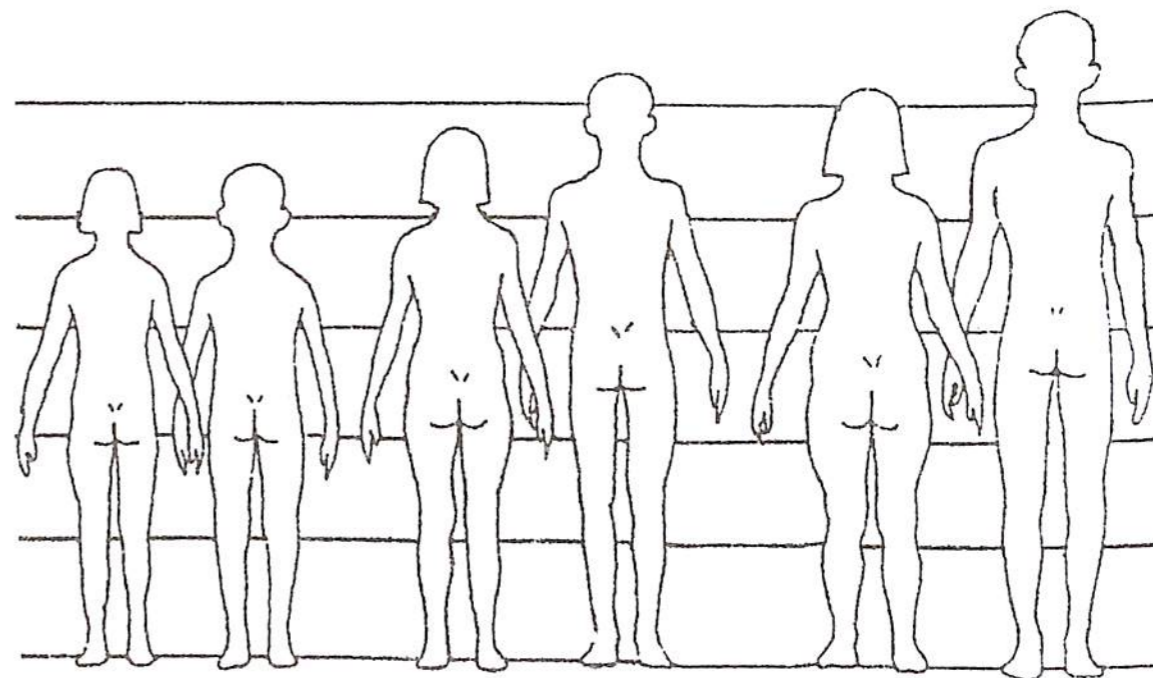


Fig-3 Adolescents become taller and changes in their figure.

among adolescents. With the completion of the growth process, such problems disappear. In boys, chest and shoulder become wide and hips become small. On the other hand, in girls, the hips becomes wide and the body takes a curvature shape.

**CHANGES IN HEART AND LUNG SIZE :**

During adolescence, in addition to physical changes, changes in the internal organs also takes place. During this period, the weight and diameter of the heart increases to twice

and a half respectively. Simultaneously, the strength of the veins and capillaries of the heart also increase. As a result, there is significant increase in blood pressure occurs among boys than in girls. The intestinal function increases, for which their digestive power also increases. Therefore their appetite increases during this period among boys. There is little growth in the size of the brain. Boys have larger and stronger bones, more of muscle tissues, larger heart and lungs as compared to those in girls.

**SEXUAL DEVELOPMENT:**

The physical and sexual development takes place simultaneously during adolescence. Development of reproductive

organs takes place in both boys as well as in girls. Changes in sex organs occur at the onset of Puberty. The word 'Puberty' means the "age of manhood".

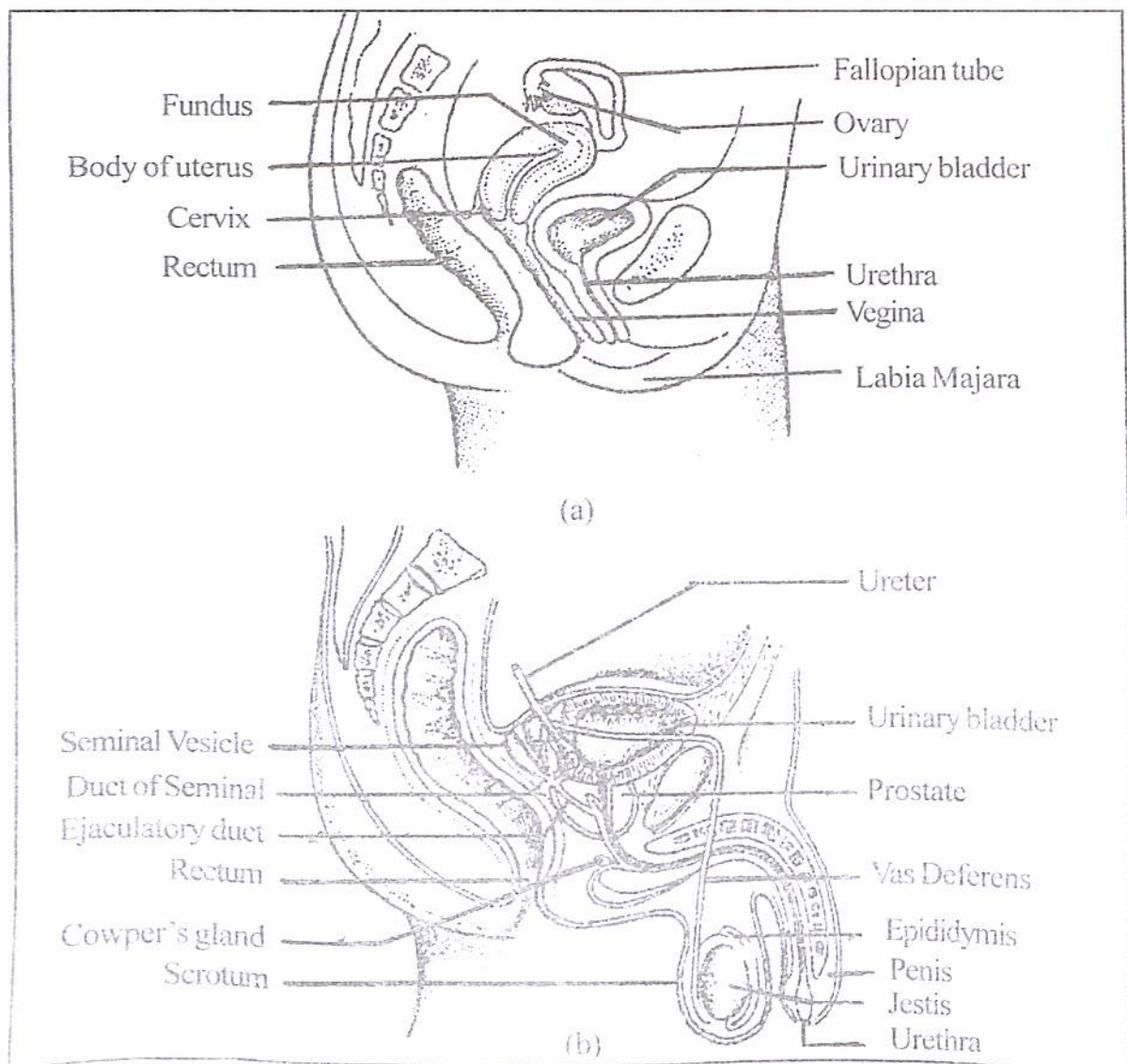


Fig-4: (a) Female reproduction organ  
(b) Male reproduction organ

Development of reproductive organs are referred to as primary sex characteristics. In case of girls, enlargement of external as well as internal sex organs take place, onset of first menstruation occurs, which is known as Menarche. The size of the breast also changes during this period.

In boys, the enlargement of the sex organs, growth of testicles and prostate glands takes place. Because of this growth and development of sex organs, production of seminal fluid occurs, which is followed by Nocturnal Emission among adolescence boys. This is known as 'Spermarche'.

In both boys and girls, hair grows in underarm and pubic regions. Due to activation of sweat glands, small pimples or acne appears on the face. Beard and moustache grow in boys. Through these changes, a boy and a girl attains manhood and womanhood respectively and a feeling

of physical self consciousness arouses in their mind. This kind of changes are known as secondary sex characteristics.

**COGNITIVE DEVELOPMENT:**

Adapting oneself to the physical change and maturity of the sex organs occurring during adolescence period is an important features of this age. Together with this, another characteristics feature of adolescence period is the development of thinking power. You all can perhaps solve complex problems by yourself perfectly. Because, with the advancement of age, boys and girls are able to find solutions to all the problems.

Now, let us see-what is Cognition? It is a process of learning or sorting out a matter. In other words, cognition is the development of the thinking power together with organizing different parts of the brain.

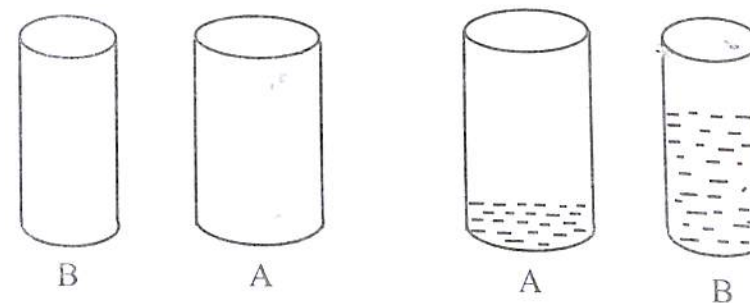


Fig. 5: Mastering Conservation (Concrete operational stage)

Famous psychologists Piaget described the different stages of cognitive development. According to him, the way of thinking amongst children changes from 7 years to 12 years of age. At this age, children consider all matters very minutely. Moreover, they are able to investigate all matters using self concept and judgement. This stage is called concrete operation stage. You will be able to understand concrete operation with the help of the following example –

Let us consider Seema and Reema of 5 years and 7 years of age respectively. They are given two containers A and B. The area of the container A is wide while the container B is narrow. Now let us fill half of the container A with water and ask both the girls to pour the water into container B. The area of the container B being narrow, the water level will go up than the container A.

If the girls are asked, whether the water in the container 'B' is 'much more', 'more' or 'less', the 5 years old Seema will say 'more'. But 8 years old Reema will be able to understand that although the height of the container B is more than A, its area is less and the amount of water will remain the same

in both the containers. In this way, the children develops the ability to think with their age. Similarly, if they are given some wooden blocks of different sizes and shapes to make a house, they will be able to make it perfectly. In concrete operational stage the children can understand the relationship between things. For eg. – Banana is a fruit, fruit are called as food etc. They also develops the ability of comparisons between two things such as – dark, light, thick, thin etc. But some of their feelings are confined to concrete experiences only.

#### FORMAL THOUGHT:

Generally, children above 12 years of age are included in this stage. The adolescences are capable of imagining all the possible alternative for solving a given problem. They consider all possible aspects before coming to a conclusion. For example – if the following question is asked to the students of class seven and ten, what type of answers can be expected from them?

“A lady has been found dead in the kitchen. A hot electric heater is lying near her, what is the cause of her death?”

#### OPERATIONAL

A student of class seven will conclude that – the lady died of an electric shock. On the other hand, a student of class ten shall consider all possible reasons like heart attack, murder or death due to electric shock.

In addition to this, the adolescents acquire the ability to think systematically and in an organized manner. For example – if they are asked to form words with an alphabet like 'A' or 'B', they will first form words using two alphabets, then three, four and more than that respectively in a well organized way. On the other hand younger children will form words without systematic way and will get a few words which might be correct or wrong.

A formal operational adolescent can reason about imaginary situations and can take decisions. They will even be able to solve unreal problems. For example – “Spider man can fly in the air. If I dress up like Spiderman I can also fly”. A child shall answer the sentence without any logic. But the adolescents will examine the situation logically and answer in negative.

Thus the intellectual process of adolescents can be separated from that of

the younger child in three different ways. They are – quantitative, qualitative and affective or changing aspect. Quantitatively, the judgment of the concrete operational child remains restricted to one or two factors. Qualitatively, the adolescent possess higher ability to think and reason out logically any situation in novel ways. Moreover, the children below 12 years of age is less certain of the thought process than the adolescent.

#### **SOCIAL DEVELOPMENT:**

Social development is necessary for proper adjustment in a society. The foundation of social development in a family is laid by the parents. During adolescence they enter to a new field of social responsibility and the feeling of social awareness also increases. Simultaneously they feel like a responsible person of the society. Adolescents are more conscious about their rights in a society and they try to take up responsibilities with great care. Taking active part in social functions, standing unitedly against any social injustice or evils, exhibiting leadership in solving social problems etc. show social consciousness and responsibility of the adolescents. They desire to achieve social recognition and admiration

through different social activities. In this way, a sense of patriotism also grows in them.

The adolescents learn to consider the problems of their friends or others as their own problem. As far as possible, they extend their help, assistance and support in solving such problems. Thus their feeling of empathy towards others grows up. They want to express such feelings through social service in educational institutions. Social development has a relation with physical development. If a girl is not good looking or her physical development is not proper, then she would try to avoid social functions. In case of a physically disabled boy or a girl, social adjustment does not take place properly.

#### IMPORTANCE OF PEER GROUP IN SOCIAL DEVELOPMENT:

A speciality of the social development during adolescence is the increased influence of peer group. They spend most of their time with friends outside the home. The peer group influence their thoughts, speech, attitudes, expressions, interests, values, behaviours more than the family does. Most of the adolescents feel that – if they wear

similar clothes like others of the group, then they can easily become a member of that peer group. If the other members of the group are in the habit of taking drugs, smoking or drinking, they also become addicted to these, just to remain as a member of that group. They not only want to get acceptance by their friends, but also they expect respect from them. For this, they tend to obey all rules and regulations of the peer group.

As the adolescence period progresses, the influence of the peer group decreases. The reason for this might be that – they want to live like individuals with their own rights or they want self identity. No longer are they interested in large group and they select few friends of their choice and thus narrow down their friendship to smaller groups.

#### ATTRACTION TOWARDS OPPOSITE SEX :

During adolescence, the attraction towards opposite sex increases with age. During childhood, boys love to play with boys and girls with girls. In adolescence, boys and girls having similar interest, attitude form a group. Generally, adolescents make

friendship with those of their choice having similar standard of living and personality. Gradually, they select proper friend. Thus their number of friends decreases. Adolescents normally select their own friends and do not want any interference from their parents or other members of their family. Many a times, due to their immature decision, adolescents are deceived. Generally friendship at this age becomes permanent.

#### EMOTIONAL DEVELOPMENT

Adolescence is generally termed as a period of storm and stress. The physical and psychological changes at this period make them more emotional. Initially emotions of the adolescents are very intense, uncontrolled and irrational. As the age advances, their emotional behaviour can be controlled. The emotions of the adolescence period are similar with the childhood period but of different nature. For example- if they are treated like small children, they would show anger by refusing to talk, sulking, criticizing the person who angered them in front of others. The love and affection during adolescence have relation with sexual

inclination. Due to this, they get attracted towards some special persons.

During adolescence, their physical condition becomes the source of happiness. Adolescence's successful achievements of goals with their own ability brings them joy and pleasure. Moreover, when they are able to achieve excellence in something like securing first position in examination, becoming the best in sports or any competition etc, there is a feeling of happiness, pleasure among them.

The anxiety of the adolescence period is an imaginary fear. When they are unable to perform school tasks, class works, examinations, absence of understanding between parents and wards, parents ill health, financial problem etc. brings a feeling of anxiety among the adolescents. Similarly, fear is a negative emotion. They learn to fear their own environment. Generally, adolescents are afraid of snakes, dogs, other animals, sudden uproar etc. These emotions disappear with advancement of age.



## DIFFERENT INTERESTS OF ADOLESCENCE :

### 1. Interest in leisure hour:/

**Recreational Interests :** The interest of playing together in groups during childhood decreases in adolescence. During adolescence due to the load of class work, home work and other extracurricular activities, adolescents do not get sufficient time to play or to spend leisure hours. Therefore, they like to play the role of audience at this time. They select the type of activities sports, music, dance etc. in which they excel. Most of the adolescents are interested in different subjects. For example – boys are interested in reading scientific fiction, adventurous stories, watching movies, television programmes and songs. Girls are also interested in stories which would satisfy their emotional life, poetry, novels, dance and music.

**2. Social Interest :** Social interest depend on the opportunities they have *gained during adolescence and their popularity among peer groups*. An adolescent from the lower middle class family gets less opportunity to develop their interest. During adolescence, the social circle

extends from home, and school to the society. They are able to express their own views by discussing different matters with their friends. In addition to this, adolescents shows interest in varied works by associating themselves with many different social organizations. They show social responsibility by extending help and sympathy towards the poor class of the society.

**3. Personal Interest :** Among all other interests, personal interests have great influence in adolescents. Because they feel that—physical attraction, self respect, social recognition etc. are the required qualities they must possess for their approval in society. They become self conscious at this period and try to make themselves attractive by taking care of their hair, beard, lips, nails, teeth, skin etc. By using different perfumes, facial cream etc. they want to make themselves bright and attractive.

They give special attention to shape themselves in an attractive way. To shape *themselves as an adult, they try to wear outfits like that of adults and seek peer approval*. At this age, they select colourful dresses with new design. They try to exhibit their body with dresses of the latest fashion.

During adolescence, both boys and girls become conscious about self respect and demand independence. They dislike any interference from their parents and school teachers. This leads to clashes and some undesirable situation. Generally, parents try to keep the girls rather than boys under their control, therefore girls become more concerned of their own freedom. Another reason for their dependence on parent is that – adolescents are economically depended on their parents. For this, adolescent boys and girls show interest in gaining economic independence.

**4. Religious Interests :** Today's adolescents are more interested in religion and feel that religion can greatly influence their lives. With their knowledge and experience, they show interest in learning the doctrines of religion. Most of the boys and girls ask different questions to adults on their religious concepts, beliefs of their childhood. Therefore the adolescence period is also *termed as the spiritually doubtful period*. The *change in religious interest during adolescence is more than the change in the professional interest*. At this period, instead of nurturing some unrealistic faith in religion,

they consider it as a guide in social and psychological development.

**5. Vocational Interest :** During this period boys and girls become conscious of their own economic life. They think seriously about their future. Generally, boys are more interested in occupations, which will bring them more money, glamour, power etc. Boys are more conscious about their occupation than girls. Boys from the lower middle class families desire to achieve higher social status through their occupation. On the other hand, girls are seen to pay more attention to their security. Therefore they become interested in the profession of teaching, nursing etc.

## VARIED AND CHANGING INTEREST OF ADOLESCENCE :

Due to the physical and psychological changes during adolescence, different interests develop in them. During childhood, boys and girls do not have any permanent *interest on any particular subjects and their interest changes frequently*. During adolescence, as age advances, *their interests in different subjects becomes permanent*. At this period, due to the difference in their

needs, boys and girls have different interests. As they experience more, the adolescents, span of attention, interest and concepts also increases and extends to the national and international level. Their intellectual and mental ability, educational achievement, qualification etc. help them in developing interest towards these areas. Adolescents' interests mostly depend upon their social and economic environment, situation etc. The state of being associated with such situations gives a permanency of interest in their minds.

#### CONCERN ABOUT FUTURE :

During Adolescence, specially at high school level, boys and girls become conscious of their own future. Boys are generally more interested than girls. During late adolescence, apart from their consciousness about their future life, boys and girls shows interest in choosing their future occupations. In deciding their future occupation, adolescents' interest remain in the exploratory stage. Therefore, at this stage they cannot decide what they should do and what they are capable of doing. During childhood and early adolescence, boys and girls judge different area of work by

watching television, reading magazines, newspapers etc. But during late adolescence they judge them in terms of their abilities, facilities provided for the work, training etc. needed for these areas of work. They are more concerned about areas like money, security, autonomy, authority etc. that the occupation will give.

#### ADOLESCENCE IS A PERIOD OF STRESS AND STRAIN :

The most complicated period in human life is the adolescent period. American psychologist Stanley Hall has termed adolescence as a period of storm and stress. At this age, the rate of physical, psychological and emotional development becomes very rapid. Adolescents find it difficult to maintain psychological balance due to physical changes and growth during the pubertal stage. Attainment of puberty brings about abnormal sexual excitement among them. Attraction towards the opposite sex increases. As a result many questions arise in them. For example – Are the change taking place in their body normal? Do they occur in all boys and girls? Will the society accept their changed behaviour? etc.

Adolescents become more emotional for which, they cannot face any problem, They achieve a healthy social adjustment and emotional maturity if their physical, psychological and sexual needs are fulfilled according to their expectation. If not, they suffer from depression, anxiety, dejection etc.

Boys and girls at this stage become more conscious of their self identity. When they fail to fulfill their aim, they come under severe stress and strain. In the present competitive scenario, if they cannot cope or if they cannot adjust themselves, a feeling of stress, strain and storm occur in them.

#### SUMMARY

- ☞ Physical development during adolescence is change in height, weight, growth spurt, change in size and shape of the body and change in internal organs.
- ☞ Different change in sex organs are observed after attainment of puberty.
- ☞ Physical and sexual development is different among boys and girls.
- ☞ Psychologist Piaget described intellectual development in different stages. Among these, concrete operational stage and formal operational thought have impact on the intellectual development of adolescents.
- ☞ Social development is greatly essential for proper social adjustment during adolescence.
- ☞ During adolescence, interest in opposite sex increases.
- ☞ Physical and psychological changes during adolescence make them more emotional. The adolescence period is known as the period of storm and stress.
- ☞ Adolescents have varied and changing interest.
- ☞ Adolescence is the period of stress and strain also.

## QUESTION

## A. Very short answer questions.

1. What do you mean by growth spurt?
2. What is intelligence?
3. Name two emotions of the adolescence period?
4. What is primary sexual characteristic?
5. What is spermarche?
6. How can you differentiate the intellectual development of childhood from the adolescence period?

## B. Short answer questions :

1. Describe the sexual development during adolescence.
2. Is there any difference between concrete operation and formal operational stage?
3. Write about the effect of peer group in social development during adolescence.
4. What type of personal interest does adolescence have?

## C. Long answer questions :

1. Write about your own experience of achieving puberty. Could you cope up with the situation?
2. Write about different interests during the adolescence period.
3. "Adolescence is the period of stress and strain" explain with judgments.

## CHAPTER-IV

## IMPORTANT DEVELOPMENTAL TASKS IN ADOLESCENCE

Do you know, what is developmental task? Have you studied about this? Obviously not. Before discussing the developmental tasks of adolescence, it is important to know what development task itself is.

According to Havighurst- "Developmental task is a task which arises at or about a certain period in the life of an individual, successful achievement of which leads to happiness and success with later tasks, while failure leads to unhappiness and difficulty with later tasks". Some of these tasks arise mainly due to physical maturation, some other due to the pressures of society and there are some tasks which grow out of personal values and aspirations of the individual. However, most of these developmental tasks arise from the three forces above, working together.

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

- ◇ Meaning of developmental tasks.
- ◇ Developmental tasks of adolescence.
- ◇ Preparing for one's own career.
- ◇ Reproductive health during adolescence.
- ◇ Prevention of anemia during adolescence.

## DEVELOPMENTAL TASKS OF ADOLESCENCE :

The developmental tasks of adolescence are the change pattern of childish attitude and behaviour. These tasks can be expected to be mastered by few boys and girls of early adolescence. Late adolescence can master them properly. These tasks also help to know the extent of

the changes that must be made and some problems arise from these changes. Different developmental tasks of adolescence are as follows-

1. **Accepting one's own physique.** Sometimes adolescents find it difficult to accept their own physique. If they have an imaginary or glamorized concept from childhood about their looks, and when they grown up, then it takes time to revise the concept and ways to change their appearance.
2. **Achieving new and more matured relations with age mates of both sexes.** Generally, during late childhood and puberty, antagonism towards opposite sex develops. Thus learning new relationships with members of the opposite sex means to discover what they are like and how to get along with them. Because during adolescence, developing more matured relationship with age mates of same sex is not very easy.
3. **Achieving a general masculine feminine social role.** In case of boys it is not very difficult to undertake different roles in the society as an adult, because from

childhood, they are encouraged to do any social works as an adult. On the other hand, girls are allowed to perform stereo typed role. Thus, in case of girls, it becomes difficult to understand adult recommended roles of women and to undertake these roles. It takes sometime to adjust themselves with socially approved roles.

4. **Achieving emotional independence from parents.** For, those adolescents who are conscious about independence, this is an easy developmental task for them. Moreover, there is a difference between emotional independence and independence of behaviour. Most of the adolescents who want to be independent require security and emotional dependence on their parents. This is seen in adolescent, who lack good relationship with the members of the peer group or whose status in the peer group is insecure.

#### **PREPARING FOR A CAREER :**

One of the important and very difficult tasks during adolescence is the choice and

preparation for a career. At this stage, adolescents are occupied with two questions – “What shall I be? And “What shall I do when I grow up?” In the past, a son would follow his father's occupation. That means – if the father was a doctor, the son also would want to become a doctor. On the other hand daughters would equip themselves to be good housewives. But now the scenario has changed and girls along with boys have come forward to engage themselves in different vocations.

During childhood, boys and girls want to take up a vocation of the person whom they like most. With the advancement of age, their mindsets also change. During adolescence, they choose any occupation according to their interests, abilities and educational level. Adolescents also feels that – to get a secured and glamorous job, they must face tough competitions.

#### **FACTORS THAT HELP IN MAKING THE CHOICE OF CAREER**

To become successful in one's life, self concept and interest are most essential. Other aspects are abilities, job satisfaction, success in life etc. It is also important to

know what one wants from one's profession. If one desires power, money, status and life style, one should be prepared for challenges.

#### **FACTORS INFLUENCING CAREER CHOICE**

The factors which influence in choosing a career in adolescence are as follows-

1. Parents.
2. School.
3. Societal expectations.
4. Personal traits.
5. Job opportunities.
6. Socio economic status.
7. Prestige. etc.

The adolescents should critically explore all the avenues available to them by collecting necessary information. To prepare a career plan, one must work out the following exercises.

Prepare a list of your strengths and weaknesses.

Prepare a list of varied jobs and evaluate them, Examine if you possess the required and desirable qualifications for them.

To gain wider knowledge, listen to career talks, lectures related to 'Career guidance' and take suggestions from experienced persons of that field.

## REPRODUCTIVE HEALTH AND PREVENTION OF ANAEMIA

During adolescence along with the physical changes, changes in the reproductive organs also take place. This has been discussed in chapter two. At this age, the linings of uterus and vagina are strengthened in girls. This follows the onset of the first menstruation, which is known as menarche. In boys, there is enlargement of the sex organs. This is responsible for production of semen and nocturnal emission. This is known as spermarche.

Adolescents must be very careful about their reproductive health and should take proper care. Most of the adolescents collect wrong and misleading information about sex because of their growing interest and curiosity in it. Sometimes, they indulge in unauthorized and unhealthy sexual behaviour. These type of behaviour have ill-effects in their reproductive health. Therefore, it is essential to educate them

about reproductive health, health and hygiene, AIDS, secured sex life, importance of spacing between two child, proper age for marriage etc. Information regarding the impact of reproductive health on human development, its relation with balanced diet etc. should be provided to them. If their reproductive health is safe and sound, then they can give birth to a healthy baby in future.

One of the most common deficiency diseases among adolescent girls is anaemia. The main causes are wrong food habits, improper food intake etc. During menstruation about 1 mg of iron is lost and they suffer from anaemia. To prevent anaemia, they must change their food habits. Elder people should encourage them to consume a balanced diet with fresh fruits and vegetables and other foods. They should be made aware about the proper amount of food they must eat and their usefulness on health.

### SUMMARY

- ☞ Developmental tasks are based on social expectations, which arise in the life of an individual and some people can master them very easily.
- ☞ Developmental tasks during adolescence are- accepting one's physique, achieving new and more matured relations with age mates of both sexes, achieving a general masculine/feminine social role, achieving emotional independence from parents; preparing for a career etc.
- ☞ During adolescence, care must be taken for sound reproductive health. Anaemia is most common among adolescent girls. To prevent it, changes in food habits and selections of proper food is essential.

### QUESTIONS

#### A. Very short answer question :

1. What is developmental task?
2. What is menarche?
3. What is spermarche?
4. Name the factors affecting choice of a career?

#### B. Short answer questions :

1. What are the developmental tasks during adolescence?
2. What are the factors that help in selection of a career?
3. How can you prevent anaemia during adolescence?

#### C. Long answer questions :

1. What do you understand by "developmental task"? Write in detail about two developmental tasks during adolescence.
2. Why should we take care of reproductive health during adolescence? What are the causes of anaemia in adolescence?

## CHAPTER – V

### INDIVIDUAL DIFFERENCES

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Perhaps you have noticed that there are differences of among siblings.

These differences may be in the pattern of growth and development, physical structure, facial appearance etc. No child will grow or develop equally as others.

Differences in various areas are seen between children of the same mother, same community and same religion, same family, even in twins. Due to these differences, children from the same age or family may not excel in different fields. Therefore their personality also differs.

You will be able to know the following after reading this lesson –

- ◆ Differences between same sex.
- ◆ Difference between opposite sex.
- ◆ Differences in early and late maturers.
- ◆ Role of heredity and environment.

#### DIFFERENCES BETWEEN SAME SEX :

Adolescents have differences in the same sex. Sometimes, boys and girls of the same age group may differ in their growth and development. The special quality of the early adolescence is not the same as that of late adolescence. The reason for this is the difference in the rate of physical and sexual development.

Due to the growth spurt during adolescence, the growth rate of height and weight is increased. But differences in height and weight increment is observed between same sex. That means – the rate of growth spurt among children is also not the same. Some children are very tall, others are very short while some are fat and some are thin etc. The age at which puberty attained is also different among children.

#### INDIVIDUAL DIFFERENCES

##### DIFFERENCES IN THE TWO SEXES:

There are differences among children of opposite sex. It has been mentioned earlier that girls at the age of 11 and boys at 13 gain maximum height and weight. In case of sexual development also, body hair grows under armpits and in pubic region among adolescent boys and girls. The voice of boys cracks deepens and matures. In case of girls, the breasts are enlarged, hips become broader and develop more fatty tissues. Boys develop a lot of muscles.

Apart from these, certain differences in physical development among adolescent boys and girls are observed. They are –

1. The growth spurt starts and ends among girls two years earlier than boys. Therefore girls attain their adult height and weight two years earlier than boys.
2. Girls gain pubertal maturity earlier than boys.
3. Girls develop broader and more round hips than boys.
4. Boys have strong and larger bones, more of muscle tissues, broader and strong shoulders than girls. Therefore boys are stronger as compared to girls.

5. Boys are more interested in doing physical work than girls.

##### DIFFERENCES BETWEEN EARLY AND LATE MATURERS :

Some children of the same age and sex grow and develop earlier than others. They are known as early maturers. Some others grow and develop towards the end of the adolescent years. They are called late maturers. Generally at the age of 14 or 15 years, children gain early maturation. They look as if they are 17 or 18 years old. Due to this physical change society too expects more matured behavior from them. There are less differences in height between early maturing boys and girls, because of the early growth spurt among girls. Moreover, they are capable of developing better relationship among themselves. Adolescents with smaller physical body structure gain less advantage in many fields as compared to boys with better physical development. Late maturity boys lack the physical growth of early maturers. Their gain in height and weight is slow and attain puberty lately. They find it difficult in forming strong boy girl relationship. Late maturing boys are restless,

have lower self-esteem and assertiveness. They are bothered by feeling of inadequacy.

Among females, effects of early and late maturation are more varied. For example- if a girl in the fifth or sixth class becomes more matured than others it is usually to a disadvantage. Girls who attain puberty in eighth or ninth classes are able to become leaders, friendly and have a sense of humour. This difference more among boys than girls. Because, society too favours maturity among adolescent boys more apparently and unambiguously than in girls. In young boys, early maturity means greater strength after getting more physical power. In the Indian socio-cultural pattern, these qualities will not help girls. Even if girls have more strength, they are useless. Parents, teachers and other members of the society can minimize the anxiety and tension due to late maturing. For this, they should avoid treating a late maturer as a child and should try to provide proper guidance in his/her physical and sexual needs.

#### ROLE OF HEREDITY AND ENVIRONMENT :

Have you heard or studied about heredity? Heredity is the process of passing

on characteristics from parents to their children. Every child acquires the qualities of their parents through chromosomes. The process of heredity occurs among all living organism like, human beings, animals, plants, bacteria and other microorganisms. All people have a kind of resemblance due to heredity. For example- All people have one mouth, two eyes, two ears, one nose. Heredity greatly influences the physical feature. i.e.- shape of the eyes, ears, nose and the body proportion etc. A child may resemble its parents or either one or both, or even its grand parents. This is due to heredity. If your mother or father can sing, play the drum, you can acquire that quality from your mother or father to some extent. Even an adopted child resembles its the foster parents after a couple of years. Why? In this case environment influences the child to acquire the special qualities, values etc. These children can mould themselves with the mental traits of their parents. The upper and lower class systems our society are also the effect of heredity.

Sometimes children from the same family differs in their height, colour of the skin, eye, hair etc. due to heredity. Every

person inherits certain basic mental traits from heredity, For example – ability to learn and remember. To develop these mental traits, one needs to have a suitable environment. These mental abilities vary among the people of the same family, for which, one person may be better in Mathematics or English than others in the same family. There are some people who can show special talents in music, dance, drawing etc. Environment plays an important role in the development of these fields. Identical twins may be expert in sport, music etc. But the one who practices regularly will become the better player or musician.

Environment too, helps in shaping up the personality of an individual. Generally children of highly qualified parents differ from those of illiterate labour's children in different fields. The reasons for this is the environment where they live in. There is also differences in the level of intelligence among them. If the children of unskilled or illiterate labour are put in a better environment, then there will be improvement in intelligence of those children.

The children who receive better maternal attention show better results in all

areas. The reasons for this might be that the mother provides appropriate learning and play materials to them. Books and toys generally provide enriching experiences to growing children. These materials also help to develop their mental abilities. The families who can not provide proper learning and play materials to their children have lower mental abilities, intelligence etc. Children of the same age group living in different environments have differences in various fields. As in the home, the children can acquire proper education in the controlled environment of a school. It affects their personality development also. In school they can exchange their feelings with their age mates. The roles and regulations, disciplines, punctuality etc. may vary in different schools. Thus the personality of the children will be different in different schools.

Neighborhoods too, have some effect in the all round development of children. If the neighbours of the children are highly educated and live in a better environment, the rate of mental development and intelligence of those children will be more. Children who live near uneducated neighbours, in an unhealthy environment,

their all round development are adversely affected in.

From the above discussion, we can say that – good schools, dedicated teachers, happy families and homes, educated people of the society, good socio cultural and

economic environments are the required basic needs for proper development of every child. For the all round development of a child, people should try to create a rich environment with full of opportunities. Because, environmental influences are most important for present day children.

### SUMMARY

- ☞ No child will grow and develop as others children of the same age group.
- ☞ Every child has a different personality.
- ☞ Due to the difference in physical and sexual development, the typical traits of early adolescence are not the same as the traits of late adolescence.
- ☞ There are differences between the same sex in the rate of height and weight increment, due to growth spurt.
- ☞ Differences in physical development are seen among children of adolescence.
- ☞ Early maturing boys and girls have early growth and development.
- ☞ Growth spurt in girls occurs earlier than in boys.
- ☞ Late maturing children become restless, and have lower self esteem and assertiveness.
- ☞ Parents and teachers can minimize the anxiety of adolescents while they are in the stage of getting matured.
- ☞ Heredity and environment play an important role in the all round development of children.

### QUESTIONS

#### A. Very short answer questions :

1. Why are the typical characteristics of early adolescence not the same as with late adolescence?
2. What is early maturation?
3. What is heredity?
4. Write about two areas in which you resemble your parents physically.

#### B. Short answer questions :

1. What type of differences are seen among children of the same age and sex?



## CHAPTER –VI

### INTERPERSONAL SKILLS

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Interpersonal relations means the relationship that exists between different people. These relations are necessary to be a part of society. Man is a social being. No one can live alone. Everyone needs friends and relations to socialize with, to express their emotions, feelings, to love them and to trust them.

During adolescence, some problem may arise while making relationship with different individuals, family and friends. Therefore it is essential to have an impression about the individual before making any relationship. It is also important to know the individual's social image and social relationship. While making relationships with other people, it is necessary to ponder over the following questions.

1. Why are people attracted to one another?

2. Why do we like some people more than others?
3. Why do we avoid some individuals whom we dislike?
4. Are there any ways to shape up stronger relations?

It has been said earlier that- to live in a society every one needs friends and relations

It is also important to love them and trust them. Adolescence is the best period to make friends, increase the number of friends and to search good friends.

In this chapter, you will study the following—

- ◆ Relationship with family during adolescence.
- ◆ Importance of peers.
- ◆ Relations with the other members of the community.

## INTERPERSONAL SKILLS

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### 2.5. (1) RELATIONS WITH THE FAMILY :

You have already passed through almost half of the adolescent period. Now you can view different relationships. When and where does it start? What does the family consist of? Parents, grandparents, siblings etc. Is n't it?

Generally, nuclear families consist of parents and their children. Joint families consists of grandparents, parents, uncles, aunts, siblings and cousins. Now, can you tell which family you belong to?

The family teaches you a set of values, to speak the truth and to be honest. In the first stage of life, the relationship between mother and child is unique. As the child grows, he gets initiated socially with the father and other members of the family. Thus in a family, children are secured in all respects. You see in yourself, during childhood your brother and sister is always with you to give you security during play, to love you when you hurt. Your father brought for you toys, your mother prepares good food that you like. Do you remember all these? Once you are passing through adolescence, why the distance and the

conflicts with the family? The reason is the higher expectations of parents from you. If parents want their children to become a doctor or engineer and the latter do not show any interests towards this, conflict arises. Moreover, if the desired scholastic environment is missing and expectations of high achievements are there and if the adolescent feel that – the standard of behaviour of their parents is old fashioned, more conflict may occur. The causes of sour relationships or not having good relationship between adolescents and family members are adolescents not finding convincing answers to their questions, authoritative approach of the parents, over-emphasis on discipline and social manners, no freedom to choose activities, friends, vocations as they desire etc. Boys conflict more with their parents, because they want power and authority, use of scooters and cars very frequently. In case of girls, parents want to provide more security. Girls have more cause to rebel because of lack of freedom, free movements, restrictions on free movements at late night etc., which is available to their brothers.

The differences and conflicts between adolescents and parents gradually decrease

as the adolescence progress. Love and affection between them is established. The reason for this is— Firstly, parents realized that – their sons and daughter are no longer children and that they should be provided with freedom and power. At the same time parents still expect their children to become responsible persons. Secondly, parents try to understand adolescents and become more conscious about their cultural and social values. In this way parent adolescent relationship becomes easy. Parents should also understand that – the world in which the adolescents are living is different from the one in which they grew up. When parents realises and make adjustment changes with these the parent and adolescent relationship will be more relaxed and the home will become the most pleasant place for both.

### RELATIONS WITH PEERS

The adolescents spend a lot of time together with their peers. They discuss different subjects such as music, dance, art, sports, academics, politics, global problem etc. In fact they discuss everything with their peers. They communicate with each other, support them and thus have a better understanding between them. Some

adolescents observe the activities of their peer group properly. Only then they want to become the member of that group. An intelligent adolescent can pick good friends also. The adolescents of the same group like to do the same kind of work, wear the same type of clothes and speak the way their friends do.

During the course of adolescence, the size and structure of peer group go through changes. In early adolescence, the group consist of about five to six members of the same sex, which is know as unisex clique. As time passes, both boys and girls combine and form a group called mixed sex clique. By late adolescence the peer group unity weakens and they are attracted towards the opposite sex. They become conscious about their identity. Thus in due course, the adolescents enter into the adult stage. They communicate with friends and try to collect more information about the values of life.

### RELATIONS WITH MEMBERS OF THE COMMUNITY

During adolescence, the social circle extends from home and school to the greater society. As a result, adolescents have to interact with different individuals. When

adolescents live in a large family they interact with their grand parents, uncle, aunts, brothers and sisters. Thus it becomes easy for them to make a good relation with other members of the community.

Do you live with you grand parents? If not, you will not understand that older people have a need to love and to be loved in return. Whenever you hurt, when your parents refuse to provide you with the things you need, your grandmother makes a lot of noises and gives you whatever you need. Do you spend some time with your

grandmother? If so, both of you have communicated your love and concern for each other. Apart from this, most of the values such as – honesty, humility, helpfulness, consideration, humaneness etc. are learnt from the family and apply these in the society. Adolescents acquire these qualities from their, families and apply them in the society. They try to make good relationship with all members of the society irrespective of age, caste, religion, social and economic status. They become members of different social organizations, NGO's and show interest to do social work.

### SUMMARY

- \* Interpersonal relation means the relationship between different people.
- \* During adolescence, some problems may arise, while making relations with different individual.
- \* Family teaches adolescents the set of values of life.
- \* At the beginning of adolescence, conflict with the family starts.
- \* There are some reasons for not having good relations with the family.
- \* Relations with peers plays an important role during adolescence.
- \* Adolescents living in a joint or large family have good relations with members of the society, as compound to a nuclear family.
- \* During late adolescence, conflict with the family decreases.

### QUESTIONS

#### A. Very short answer questions :

1. What is interpersonal relationship?
2. What is a nuclear family?
3. What do you mean by joint family?
4. What type of education does a family provides to the children?

#### B. Short answer questions :

1. What type of relations are established with peers during adolescence?
2. What role does a family have in establishing relations with other members of the community?
3. What are the factors that one should consider while making relations with an individual?

#### C. Long answer questions :

1. What are the reasons for not having good relations with the family members during adolescence?
2. Describe your relationship with your parents.
3. Why do conflicts with the family decreases during late adolescence?

## CHAPTER – VII

### SPECIAL NEEDS OF ADOLESCENCE

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Think about yourself! Your needs are different from the needs during childhood, is n't it? Why so? Because after attaining puberty, different problems arise among adolescent. Thus, their physical and psychological needs also vary. The adult should understand the needs of adolescence and discuss them in detail. Once these needs are fulfilled according to their expectations, a healthy pubertal development will possible. Adolescent's feelings, behaviour, activities etc. are largely dependent on and controlled by their needs.

After reading this chapter, you will understand the following –

- \* Quantitative and qualitative nutritional requirements during adolescence.
- \* Needs of exercise and entertainment.
- \* Importance of physical activity in social development and prevention of obesity.
- \* Understanding from parents.

#### 2.6.(1) QUANTITATIVE AND QUALITATIVE REQUIREMENT OF NUTRITION

After passing through the period of childhood when a child enters adolescence period, rapid physical changes occur among them. These changes take place in both internal and external organs. The pulse rate and the activity of stomach increases. They can digest food easily, therefore hunger increases. As a result they require a diet, which is qualitatively and quantitatively adequate. They need body building and energy giving foods in excess quantities, because of their rapid growth. Physical and mental changes lead to stress and depression among them. Therefore their concept towards food is very low. Adolescent boys wants to be tall and healthy to look handsome and to eats tasty and good foods.

Girls are generally conscious about their figure and try to lose body weight. As such they reject most essential foods. During this period, adolescents require a balanced diet with protein, iron and other nutrients in adequate amounts. If the amount of food intake is less, proper growth and development will not take place. Foods with appropriate quantity and quality are also essential for adolescent enjoyment in physical activity, sports etc. and can prevent different deficiency diseases.

#### **2.6.(2) EXERCISE AND ENTERTAINMENT**

Exercise, during adolescence is helpful for proper development of muscles and tissues. Normal physical changes during this period make adolescent more conscious about their looks, for which they take special care. Adolescent boys undertake different exercise, practice yoga etc. to become physically fit and active. Girls too want to become slim and attractive with the help of health clubs, gym etc. and by using different cosmetics. They feel that – if they are too fat or thin, tall or short, their friends will laugh at them. Therefore, they visit the health clubs or do exercises.

Adolescence is the period of imagination. Adolescents like to dream and need recreation. At this age, they like listen in to music, going for movies, or spend in their time in front of the television. Mass media plays an important role in shaping up their behaviour in a society. Adolescents imitate the heroes heroines that appear on cinema or as television. Such outlets of recreation also bring about changes in the life styles values, cultural and social beliefs that exists in a society. For proper and healthy development of an adolescent, these things are most essential.

#### **2.6. (3) IMPORTANCE OF PHYSICAL ACTIVITY IN SOCIAL DEVELOPMENT AND PREVENTION OF OBESITY**

Everybody likes to live in a society. Adolescents are also not exceptional. They want to become a responsible member of the society and likes to undertake social activities. Their interest in social leadership also increases. Adolescents feel that – they should possess some qualities to become a social leader. At first – they should have beautiful, healthy figure, free from any

diseases. They should be strong enough and have ability and interest to do any work. In this aspect educational qualification, intelligence, stage of maturity should also be taken into account. Thus it is seen that – for social development or to acquire a higher position in a society, one must work for the society, only then he will be an indispensable part of that society. To become popular in a society, apart from intelligence, education etc., importance is given to physical activity, skills and abilities.

It has been mentioned earlier that growth is very rapid during adolescence. As a result internal changes also occur. Due to increased internal activities they feel hungry. The amount of food intake is more and leads to obesity. In early adolescence period, they are not conscious about obesity. During late adolescence, they are more conscious about their physique and tries to prevent obesity. During late adolescence balanced diet must be supplied. Adolescents are more interested in fast foods. These foods supply only calories. As a result, they become obese. These foods if consumed in large quantities during adolescence, may cause hypertension and different heart diseases.

#### **2.6 (4) UNDERSTANDING FORM PARENTS.**

During adolescence both boys and girls want independence from their parents or they do not want to obey the rules set by their parents. Thus creates problem in proper understanding between parents and adolescents. In our society, parents control their children in different ways. There are parents, who are very strict and play the role of an authority figure. This is known as autocratic control. They do not allow the adolescents to take any decision on their own and thus hampers the adolescent's ability to be independent. These adolescent lacks of self confidence and stay away from doing any social work.

Parents who give more freedom to the adolescents as they grow and behave as friends and at the same time take interest and responsibility for their decisions and problems, encourage the adolescents to become more independent and socially responsible to undertake any social work. This is known as democratic control. On the other hand, some parents are indifferent. They provide full freedom to their children. They leave the adolescents with their

problem and do not interact with them. These children lose self control and engaged in anti-social activities. They do not respect their elders, disobey social rules and regulation and wrong grow up with attitude.

Thus it is seen that – adolescents should have respect for and mutual understanding, with their parents. Both the parents and adolescents should value each

other's opinions, realize their needs and share feelings through friendly interactions. The children of strict parents will stand against them. If parents give full freedom to their children will lose they control over them. Therefore parents should understand their adolescents, their needs, take interest in fulfilling their hopes and aspirations and help them to become self reliant, independent and socially well adjusted.

#### SUMMARY

- \* The physical and psychological needs during adolescence, are different.
- \* During adolescence, the requirement for nutrition both in quality and quantity increases.
- \* Exercise and recreation are the most important aspect during adolescence. They help to keep them happy and useful for proper social development.
- \* Obesity can be prevented with exercises.
- \* During adolescence, the children of the strict parents rebel against them. Parents who give full freedom to their children do not do the wise thing. There is a need for better understanding between parents and adolescents.

#### QUESTIONS

##### A. Very short answer questions :

1. What are the special needs during adolescence?
2. What type of food should be given to adolescents?
3. What are the reasons for obesity?
4. What is autocratic control?

##### B. Short answer questions :

1. Write briefly about the importance of exercise and entertainment during adolescence.
2. Is physical activity essential for social development?
3. Why does the nutritional requirement increases during adolescence?

##### C. Long answers question

1. Explain in details about special needs during adolescence.
2. What type of understanding should adolescent have will their parents.

## CHAPTER – VIII

### 2.7. PROBLEMS OF ADOLESCENCE

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Adolescence is a period with varied, problems. Some of these problems are out of control, some are due to strains in adjusting to social environment. When the adolescents can not adjust with different situations or are not able to satisfy their needs, problems arise. From this lesson you will understand the reasons for these problems during adolescence. They are –

- \* Sudden growth spurt during the growth stage.
- \* Depression due to limited ability of the adolescents to cope with accelerated growth.
- \* Sudden sexual growth.
- \* Inadequate knowledge and increased curiosity.
- \* Abuse of substances like alcohol, drug, smoking etc.

#### 2.7 (1) AWKWARDNESS DUE TO GROWTH SPURT :

In early adolescence period, physical growth becomes very rapid and growth spurt occurs among adolescents. Most of them adolescents cannot adjust with their sudden changes in both internal and external organs of the body. As a result, difficulties occur, which lead to storm and stress among them. The adolescents cannot take part in sports or any other social activities, if the rate of physical development is not similar to their peers. This creates problems among the adolescents.

Have you ever been referred as to 'crane'? Adolescents, whose upper torso or thighs are long, may be nicknamed as crane by their peers. Some adolescents with round faces are called as 'moon' or 'potato'. The appearance of pimples are

## PROBLEMS OF ADOLESCENCE

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referred to as 'pimplex'. They become conscious for the newly formed physique. They spend a lot of time in front of the mirror and imagine what they were, what they are and what they would like to be. But the adolescents need not worry about his/her appearance. As the ugly duckling changes into a beautiful swan, adolescents too, look beautiful, once their physical growth has been completed.

#### 2.7 (2) FREEDOM AND CONTROL

Adolescents want freedom in all aspects. They do not like any interference from parents, family members, teachers and elder people of the society. They want freedom in different areas such as – food, clothing, movements etc. When parents want to control them, adolescents rebel, which leads to a tussle between the parents and adolescents.

#### 2.7 (3) DEPRESSION

Once the adolescence period is attained, adolescents gear up to face the responsibilities and duties of an adult. When they cannot handle the situations, they feel depress. Generally depression leads to a feeling of sadness or loss of pleasure, loss

of energy, loss of interest and moodswings and finally leads to suicidal tendencies. Depression may occur due to unnatural physical growth. Sometimes they do not want to eat the required amount of food for fear of becoming fat. As a result, they suffer from 'Anorexia Nervosa', (a condition due to extreme starvation). Cultural and social pressure often leads to depression. Success leads to happiness and when their academic performance is low or they are unsuccessful, depression occurs. Most of the parents set a series of goals in adolescents. If the latter cannot achieve these goals they end up with depression.

Adolescents can adjust to any situations properly, if their physical, psychological and sexual needs are satisfied normally as expected. Dissatisfaction may cause depression, sadness etc. If their interests and needs are not fulfilled, then too they may end up in a state of depression.

#### 2.7 (4) ADDICTION TO ALCOHOL, DRUGS AND SMOKING

Adolescents are addicted to alcohol, drugs and smoking for many reasons. According to them, smoking is a sign of attaining maturity in personality development. They indulge in alcoholism, smoking and

take drugs under peer pressure. They spend their free time with their peers by chatting or smoking, drinking or by taking drugs in hotels or in restaurants. Adolescents spend a lot of time with their peers. They are more interested in following the activities of their peers. If their peers are addicted to alcohol, drugs and smoking, they too get addicted to these without realizing its effects.

### 2.7 (5) DELINQUENCY

Delinquency is an anti-social behaviour or work, in which an individual is involved with violent actions. The individual who shows such behaviour is punished by law. When adolescents are unable to solve their problem, they resort to anti-social behaviour. In other words, this act or delinquency is a "loud cry for help". If they do not get help in time, they engage in antisocial work. For example a student who runs away from school during school hours is called as truant. This is a kind of delinquency. Such children fight with others and engage in anti social activities such as damaging property etc.

The causes of delinquency among adolescents may be for various reasons. Firstly when they are addicted to alcohol, drugs etc. delinquency occurs. They take

drugs, alcohol, without the knowledge of their parents. Whenever they need money to buy these, they steal things from home and sell, pick pocket or fight with mothers for money. Secondly, if the home environment is not proper, it creates many problems during adolescence. Lack of understanding love and affection among family members affect adolescents.

Poverty is another reason of delinquency. In adolescence, the need for food and clothing increases. When these needs cannot be fulfilled by their parents, adolescents resort to some antisocial activities like- pick pocketing, stealing etc.

Quarrels among parents, strict or lax discipline at home, lack of recreation facilities may lead to delinquency. Generally, adolescents at this age are attracted towards the opposite sex. Many adolescents even engage in socially unapproved sex. They also indulge in eve-teasing, lying etc.

### 2.7 (6) PROBLEMS RELATED TO SEX :

One of the most harmful problems during adolescence is the problem related to sex. Adolescents find it difficult to adjust

themselves with their rapid physical growth. During this period, adolescents being inexperienced and owing to sudden biochemical changes in their bodies develop some unnatural feelings – shyness, fear, delinquency etc. They become confused and have bitter experience when they practised sex secretly.

In our society, Sex is a taboo and secret matter. Parents and teachers never discuss it openly with their children and neglect it. On the other hand, adolescents are completely dependent upon these two agencies for concrete learning. Being eager to know more about sex, they resort to cheap literature, books, magazines etc. to find answers to their questions. Most adolescents suffer from Sexually Transmitted Diseases (STD). Girls become pregnant due to premarital relations and go for abortion, which result in a negative impact on their health. Therefore, parents, teachers and social agencies can join hands in helping adolescents acquire healthy sexual development. Adolescents should be encouraged to perform constructive group activities. This gives them the opportunity to interact among boys and girls of their age and to learn how to adjust in the society.

### 2.7 (7) IGNORANCE AND INCREASED CURIOSITY :

Adolescents are not aware about sex education, sexual behaviour etc. They are not able to discuss freely with others the physical changes that occur during puberty. Their sexual urge increases with increased absorption of hormones. Therefore they want to learn more about sex by reading stories, novels, magazines, watching cinema, television, blue films and posters etc. related to sex. Generally in television and in cinema, free and unrealistic relations are shown among adolescents. They look for an expression of these in their real life and thus problem arises.

### 2.7 (8) PREVENTION OF HIV/AIDS AND OTHER SEXUALLY TRANSMITTED DISEASES :

During early adolescence, due to their inquisitiveness towards sex, most adolescents are engaged in some unsocial sexual behaviour. It causes a major damage to their physical and mental health and they suffer from AIDS and other sexually transmitted diseases, which brings about darkness to their lives. Sometimes they may

die. Therefore one must abstain from these acts and should take preventive measures.

Now-a-days, along with the society at large the NGO's and the government are all aware of the dreaded disease—AIDS and there is an all out attempt to the increase awareness among the common people. Law has been enacted against the unprotected sexual work and its ill effects. Invention of different birth control methods by application of advanced medical science and new technology have come about.

Parents, teachers and other members of the society has an important role in preventing AIDS and sexually transmitted diseases among adolescents. They should be given proper education about how to lead a healthy, controlled and secured sex life.

To make the students aware about sex, sex education is now included as a subject in the school curriculum.

The adolescents must be advised to stay away from taking drugs and from contacts with AIDS patients. They should be taught about how AIDS spreads from person to person through blood transfusion from unknown person, injections etc.

The government has under taken several preventive measures for AIDS and their publicity through different mass media such as radio, television. etc. has reached out to the common people in a way that they can understand them easily. Different voluntary organizations NGO's and have come forward and imparted education to prevent AIDS through popular tele films, demonstration etc.

#### SUMMARY

- \* Problem arise among adolescents due to growth spurt.
- \* During adolescence, girls want freedom and do not like the authority to control them.
- \* Depression arises due to awkwardness in physical growth, failures in achieving good results, and in fulfilling their aim.

- \* Addiction towards alcohol, drugs and smoking increases which leads to delinquency.
- \* Sudden changes during puberty creates problems and their curiosity grows to know more about these changes.
- \* Parents, Teachers should provide proper information about sex to help the adolescents.
- \* The adolescents must be taught about the dangers of AIDS and sexually transmitted diseases and its preventive measures.

#### QUESTIONS

##### A. Very short answer questions :

1. What are the problems that arise due to growth spurt?
2. When does storm and stress occur during adolescence?
3. What are the diseases that may occur due to unprotected sex?

##### B. Short answer questions :

1. What is depression? What are the reasons for depression among adolescents?
2. What are the problems adolescents faced by adolescents due to growth spurt?
3. What are the effects of addiction to alcohol, drugs and smoking?

##### C. Long answer questions :

1. What delinquency? Write in detail about the causes of delinquency.
2. What role should parents and teacher have in solving different problems during adolescence?



## CHAPTER – IX

### POPULATION EDUCATION

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While going out, you must have seen people hanging from the doors of city buses? Similar crowds are observed in railway booking counters and transport booking counters, market places, haats etc. During festivals, melas crowds of people are a common sight. The main reason is increasing population. Are there any ways to overcome the ever increasing population?

In this chapter you will learn about the following :

- ◆ Meaning of 'population explosion'.
- ◆ Definition of 'population education'.
- ◆ Objectives of population education.
- ◆ Problems of population explosion.
- ◆ Neglect of the girl child, causes and prevention.
- ◆ Importance of small family norms.

#### What is Population Explosion?

Generally, 'Population' is a dynamic phenomenon. Any increase or decrease in its size has a major impact on the socio-economic development of a country. Thus rapid and unprecedented growth of population is known as "population explosion". Population explosion creates a lot of problem and hinders the path of development.

In India, population explosion has become a major problem to day. Although, India is progressing in some areas, population explosion, is major hundred to wards all out the benefit and thus prevents it from becoming a developed country. In the world's population list, India is numbered at the seemed place, if the population explosion cannot be prevented, it will occupy the first place within a few years. As a result, number of problems will arise and the situation will be very critical.

According to sociologists and economists, the main reason for population explosion is illiteracy and ignorance. To prevent it, people should be educated and create awareness about population education. In 1960, population education first became a matter of concern and from then onwards, specialists have organized different workshop, research areas, discussions etc. to bring out a meaningful definition of population education. In 1970, UNESCO organized a workshop in Asia where population education is defined as – "an educational programme, which provides for a study of the population situation in family, community, nation and world." The purpose of this is to develop in student rationale and responsible attitude and behaviour towards the situation.

According to Herold Hawli. An educationist, "population education is a process of education, through which changes regarding the concept of family size can make." From these definitions, it is seen that – population education is an education for creating awareness about population, through which increase in population can be prevented, thus making people aware about the need for reduction on the family size.

#### Objective of Population Education: The objective are -

To create an awareness of demographic concepts and processes.

To make people aware about the main reasons of population explosion.

Developing an understanding about the crisis due to over-population.

To acquire knowledge about the influence of population explosion on various aspects of human life such as social, economical, political and cultural aspects.

Developing appreciation of the relationship between the standard of living of a family and its size.

Developing an appreciation for the "small family" size and its relationship with the overall progress and welfare of the society.

Creating an awareness about the principles of population of the country and its functions.

#### REASONS OF POPULATION EXPLOSION :

Many problems arise due to population explosion. Suppose, a family comprising four members reside in a two roomed house.

What will happen if another three persons stay permanently with them and share the family resource? Can you think of the situation? Will you be able to cope with the situation? Certainly not for a long time, will you? Presently, the same situation is prevalent in our country. Population explosion has blocked the economic development and the ways of rapid developments. It interferes with the welfare activities for the well being of people. Over population is an obstruction in the path of progress. Due to increase in population, the resource diminish. On the other hand, production of a country can be increased with proper use of these resources. Hence if the per capita and national income increase then economic development is possible. Over population thus creates imbalance and causes the following problems-

**a) Standard of living decreases :** The standard of living mainly depends on the per capita income, which affects in increase of per capita income. The resources must be increased to improve the standard of living. For example – in a lower income family, consisting of seven members with a single

earning member, the standard of living will be low.

**b) Inadequate or decreased standard of public health and education :** Public health and education are two important subjects related to human resources. Over population increases the cost of these resources. The resources in our country are limited. With these limited resources, it is impossible to spend more money for some improved community facilities such as – school, facilities for play, rural hospital with improved treatment, medicines and other facilities. As a result, many health related problems occurs and the death rate increases.

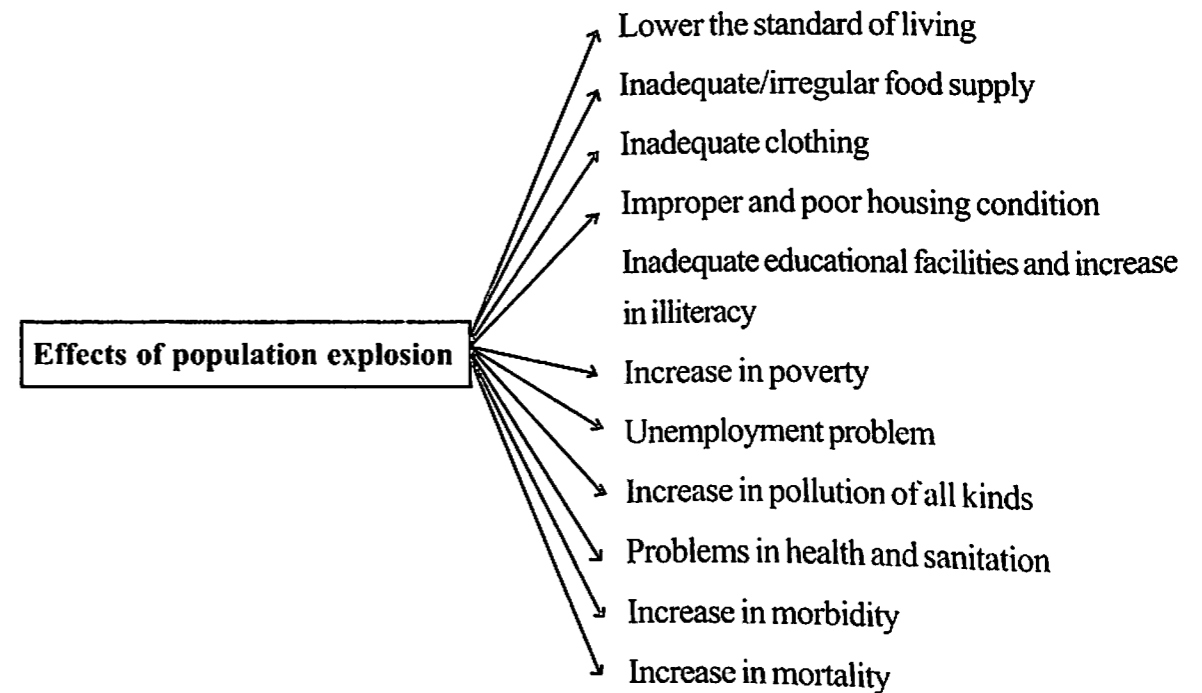
**c) Irregular and inadequate food supply and malnutrition:** With the increase in population, food production should increase. In India, about 70 percent of the population are connected with agriculture. Yet, in the beginning of the seventh plan, about 38 percent people have not received the minimum calories. The percentage of people suffering from malnutrition have increased and more and more people are found to be below the poverty line. At the time of India's independence, only 22 percent of the population was living below

poverty line. But today, more than 50 percent of the population is living below the poverty line.

**d) Increasing unemployment problems :** With the ever increasing population, there is a lack of opportunities for different jobs and vocation which causes unemployment. During the seventh plan, the total number of unemployed was 13.10 millions. If the rate increases in this manner, many people will die due to starvation. Unemployed may cause dissatisfaction and frustration among

the youth. Sometimes they may have the tendency for suicide.

**e) Problems in capital formation :** It has been mentioned earlier that in India, the per Capita income is low. In a large family, the number of earning members is less and the number of dependent is more. These families, saving capacity is also low. One can save from one's income. Without any capital amount, one cannot invest in any developmental work and without investment economic development is not possible.



Therefore, over population creates problems in the formation of capital.

**f) Environmental pollution:** Over population is a great threat to environmental pollution which lowers the standard of living. Increase in population leads to the requirement for more space for housing, communication, transport, drainage, market, haat and more open space. A large population means more household waste and resultant pollution. Lack of proper arrangements for these may create slum areas which in turn results in unhygienic conditions and environmental pollution. People may not even get potable water.

**Neglect of the girl child :** You must have studied how the girl child since the ancient times has been uncared for and in the news papers also you must have read about sexual harassments on girls. The woman who gave birth to a girl child was looked down by the family members, even by her husband. She did not get proper post natal care. Restrictions were imposed on their dresses, free movements, education, health care etc. Many times the girls child did not get adequate amount of foods. She was not allowed to go to school; instead, she had to help her mother in the household chores.

The girl child was not allowed to take part in family decisions.

**Causes :** The main causes for discrimination against the girl child are illiteracy, parents ignorance, wrong beliefs, superstitions, social taboos, rules and regulation etc. Sometimes, parents feel that their money will be wasted if a girl is educated. They feel that after marriage, she will go to another house. Therefore, she is required to know the household chores rather than get school education. Moreover, they feel that only the son can continue the family name. According to Hindu beliefs, the son is required to perform the last rites of the parents. In many families, the girl child is used for household tasks and as a machine to give birth to children.

**Prevention :** In our country, every year, about 12 million girls are born and 3 million die before the age of fifteen because of poor nutritional status. Another half a million girls die because of neglected upbringing. Many of the girl child do not even see the light of the day because of female infanticide. As a result, the ratio of boys and girls have decreased. In the year 1901, the male female ratio was 912:1000. According to 2001 census the ratio is 933:1000.

To prevent negligence against the girl child, it is most important to educate girls at a proper age. Once the girl is educated, she can solve the problems around her. An educated girl becomes an educated mother tomorrow, who can help her children in their studies and in their development of good habits. An educated woman is capable of building a society, a nation. Moreover, parents should know the importance of education for a girl. Parents should try to eradicate the wrong beliefs and superstitions and try to remove discrimination among the male and female child. According to the national sample survey it has been proved that – education is of prime importance for the girl child. This survey reports that a college going female produces on an average of 2 children, a matriculate gives birth to 4-5 children and women with lower educational level give birth to six or more children.

**Legal and social laws :** With the advancement of science and technology, the social scenario of the world has changed. Equal status is given to boys and girls. People have come to realize that – today's girl child is the mother of the future generation. As a result, the status of the girl child has improved and social restrictions

imposed on girls have been relaxed. A few years ago, Raja Ram Mohan Ray took the initiative for widow remarriage and this is an important step in social reform. Now girls too have the right to perform the last right of their parents. They can take decision on family matters, and a law has been passed for equal rights over the family property.

**Governments incentives to improve the status of the girl child :**

Today, government has enacted different laws for the safety of the girl child. The government has taken steps to convict the persons involved in female infanticides. According to the latest education Bill (TO1-15-02-02) free and compulsory education for children aged between 6 and 15 years has become a fundamental right with parliament amending the constitution. (Ninety Third Amendment Bill, 2001). The appropriate age for marriage of a girl should not be below 18 years. The government of Assam has under taken many schemes for the welfare of the girl child of poor families. They are- free distribution of bicycles to school going girls, educational tours, free education up to the 12<sup>th</sup> standard, safety and security through “Janani Suraksha Achari”

etc. They have provided equal opportunities and rights for girls and boys. These steps help them to improve their standards and in population control.

### Desire for male child

There is a strong desire for a male child among literate, illiterate, poor, rich families in all communities. The size of the family increases in the hope of a male child. They believe that the son will look after them and will carry forward the family name. Many people feel that – lack of a son means the end of the family name, which is not acceptable in Indian society. However, with the changing scenario of the society and educational enlightenment, most couples are now favouring small families. They have realized that through a small family, good quality education to their children is possible. Due to this feeling incidences of female infanticides, and determination of sex have reduced. Many young couples now favour one or two healthy children irrespective of their sex.

### SMALL FAMILY NORMS

In many advertisement, you may have seen the tag “small family happy family”

What does it mean? It means – an appeal to the people of different classes to have a small family. Now people, irrespective of all classes have realized the benefits of small families and tries to have a small family. Population education teaches the importance of a small family. People from a small family can come forward to many areas in society without any problem. Thus the benefits of small families are –

- ◆ It checks over population.
- ◆ Improves the standard of living of every family member.
- ◆ Strong bonds of love, affection and cooperation develops among the members of the family.
- ◆ There is peace and happiness at home with small families.
- ◆ Children of a small family are physically and mentally healthy.

Opportunity for good quality education and personal attention for total development of all individual. Moreover, proper physical, social, mental and emotional development of the children is possible.

All needs of children in a small family can be fulfilled adequately.

### SUMMARY

- \* There is a high rate of growth of population in India, which results in population explosion.
- \* Population explosion affects in the use resources.
- ◆ Over population creates different problems.
- \* There is a need to step up the status of girl child.
- \* Education improves the standards of living. Therefore, the girl child should be allowed to take up education at the proper age.
- \* Everyone should try to adopt small family norms.

### QUESTIONS

#### A. Very short answer questions :

1. What is population explosion?
2. Define population education
3. Name two problems caused by over population.

#### B. Short answer questions :

1. What are the objectives of population education?
2. Should population education be taught in school?
3. What are the causes of neglecting the girl child in our society?

#### C. Long answer questions :

1. Discuss the problems of over population.
2. Write in detail about the importance of small family norms in relation to population control.
3. What is the importances of population education?

**INTRODUCTION :**

From the time immemorial, the importance of good health for the individual and the members of the family has been recognized.

Good health is essential for a sound mind. There is a saying in Latin, “Mens sara corpore sara ,” means a sound mind is present only in a physically and mentally healthy body. i.e. if an individual is physically and mentally healthy, his mind will also be safe and sound.

According to Sanskrit saying – शारीर मांघ खलु It means that to perform any duty the primary component is the healthy body. Thus a sound physical health is the first and the most important requisite for the performance of one’s duty in life.

To have a good health for you and your family, what things are needed?

After reading this chapter, you will be able to know about the following :-

- ◆ Definition of health and its different dimensions.
- ◆ Health and diseases.
- ◆ Definition of food, nutrients, nutrition and the nutritional status.
- ◆ Food and health.
- ◆ Classification of food
- ◆ Nutritional and Calorie intake as a basis of poverty line.

(1) Health - Its definition and different dimensions.

Generally, human body is compared with a machine. If the machine is looked after well, it will provide good service. Similarly, if the human body is looked after properly it can last longer and will be able to perform many productive work. One can not donate his

health, but can be bestowed by an individual with his own effort. According to WHO, “health is a state of complete physical, mental and social well being and not merely the absence of diseases or infirmity”.

We can define health as – “The experiences of success acquired by an individual in its effort, to adjust to the environmental challenges,” Man is living in constant competition with other living organisms present in his environment and is working hard to control the harmful effects of insects, pathogens, chemical and physical substances.

**DIMENSIONS OF HEALTH :**

According to WHO, health has three dimensions. They are – physical, social and mental dimension.

- a) Physical Dimension: It includes proper height and weight of a particular person and their strength, stamina and capacity to carry out day to day activities.
- b) Mental Dimension: It refers to a conditions, where the individual is free from mental tension, worry and mental ailments. One should be capable of having good comprehension,

understanding and ability to apply these in their day to day life. Everyone knows that human body and mind is closely related. For a healthy body, healthy mind is essential.

- c) Social Dimension: It means, how easily an individual gets along with people from different classes and his ability to adjust in a group. A socially healthy person has many qualities such as – tolerance, patience, caring, helpfulness, affectionate, humane etc. Such person are always ready to share what they have. These qualities help them to adjust in any social environment and enable them to maintain good social relationship.

**3.1 (2) HEALTH AND DISEASE**

Disease is completely opposite to the normal condition of the body. It hinders in normal as well as in recreational activities. In case of small children, it prevents their normal growth and development.

Disease causes irreparable losses in physical, mental and social aspects of human life. A person who is suffering from any disease will not be able to do any work,

unable to think and due to mental anxiety, cannot concentrate in any work.

On the other hand, a healthy person is able to do any work for their own family, society and for the country as well. These persons can be considered as an asset for the society and for the nation.

### 3.1 (3) (A) FOOD, NUTRIENTS, NUTRITION AND NUTRITIONAL STATUS

a) **Food:** Food is one of the important basic needs of human life. Without food people cannot live. Food is anything solid or liquid, that our body absorbs and it perform different activities like – body building, energy yielding, tissue repairing and controls different processes inside the body.

According to an eminent nutritionists Dr. Rajammal P. Devdas – “Food is defined as anything solid, semi-solid or liquid substances, which when ingested into the mouth, digested, metabolized and nourishes the body.”

We can also define food as – : “It is a substance, derived from plant or animal sources which can supply energy, form different tissues, repair them and helps in proper growth and development of the

body.” Thus different people have defined food in different way.

(b) **NUTRIENTS :** Food are composed of some small chemical substances. These chemical substances performs different activities in our body. They are known as nutrients.

Generally, nutrients are the complex organic and inorganic substances. Foods that we obtain from our surroundings are composed of different chemical components. These chemical components are called as nutrients. We can define nutrients as – the chemical substance present in food, which helps in formation of tissue and supplies energy.

Nutrients are also defined as – the components of foods needs for living a healthy and normal life and for performing different activities.

Foods contain different nutrients and they perform different work in the body. They are – protein, carbohydrate, fat, vitamins, minerals and water. Among these, protein helps in growth and in the formation of different cells and tissues. Other nutrients also have different role in the body.

(c) **Nutrition :** There is a direct relation of food with nutrition. Nutrition is the activities

performed by different nutrients in the body. The food that we eat, and its utilization in the body – all these activities are known as nutrition.

Levoisiar – a scientist described nutrition as a branch of science. According to Tuenu D.F. – Nutrition is a process of uses and utilization of different substances required for the well being of living organism and for doing different activities.

From the above definitions, we can say that – nutrition is the study of different nutrients, their sources, functions, utilizations and their effect in the body. Nutrition is the science of food values or the effect of food on our body.

Human nutrition is governed by many factors such as – food production, income of the family, food habits, food beliefs, religions and sociological factors etc. Nutrition are of three types –

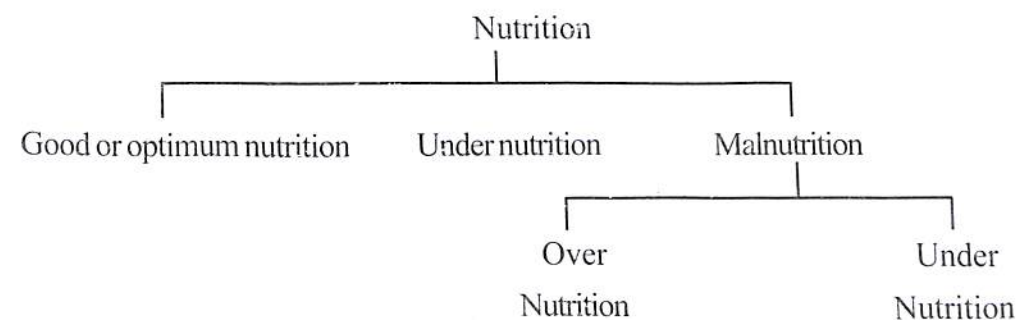
1. Good or optimum nutrition.

2. Under nutrition
3. Malnutrition.

**1. Good or optimum nutrition :** When all the essential nutrients are present in correct proportions as needed by our body, it is known as good or optimum nutrition. Good nutrition helps in maintaining good health. For example – height and weight for age, healthy teeth, skin, hair etc.

**2. Under nutrition :** It is just opposite to good nutrition. i.e. the amount nutrients present in the body are below the requirements. An undernourished person becomes weak, susceptible to infections and deficiency diseases.

**3. Malnutrition :** When one or two nutrients are less or more in the body, that condition is known as malnutrition. Malnutrition affects both physical and mental health and makes one suffers from deficiency diseases. Malnutrition may occur due to less or excess nutrition.

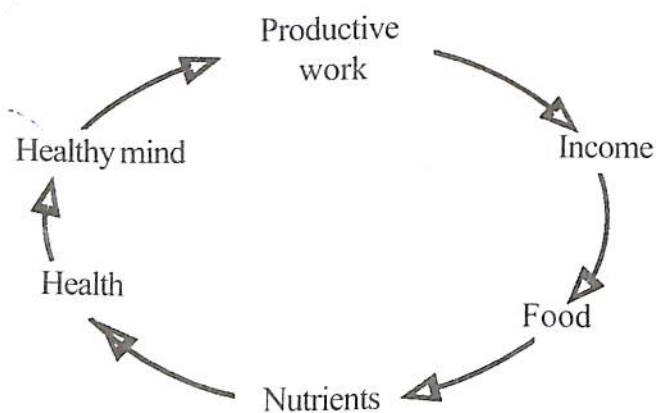


**Malnutrition is divided into under nutrition and over nutrition.**

- Under Nutrition : When our body gets less than the required amount of food for long time, the nutrition level becomes low which leads to death due to starvation.
- Over Nutrition : When one individual eats more food than his requirements, he will get more nutrition and this will make him over weight. He may also suffer different diseases such as – diabetes, joint pain etc.

### 3.1 (4) FOOD AND HEALTH :

There is a direct relationship of food with health. Because, food supplies all the essential nutrients for health. We have



Nutritional Status

defined health earlier. Generally health means the normal condition of the body. We must eat nutritious food daily, to keep ourselves healthy. Good nutritious food supplies all the required nutrients to the body and each of these nutrients performs different activities in the body. We will discuss about these later.

On the other hand, if the nutrients are not supplied or supplied in less amount, we may suffer from under nutrition or deficiency diseases. It is said earlier that healthy body is a boon for a healthy mind. Thus we can say that – for a healthy mind, for a healthy body proper amount of nutrients and for nutrients, food is essential. There is a close relationship in between them, which is shown below –

### 3.1 (5) CLASSIFICATION OF FOOD:

You have learnt earlier about the definition of food. Now let us see how food is classified. Generally foods are classified based on their food sources, chemical composition and on the basis of their functions.

(A) The first classification of food is based on their function. They are –

- Energy yielding foods.
- Body building foods.
- Protective foods.
- Regulatory foods.

1. **Energy yielding foods:** The foods which supplies energy to the body are included in this category. One needs energy to carry out different activities, for recreation, for rest and to perform different involuntary work such as – respiration, digestion, absorption etc. Carbohydrate, fats are the nutrients furnishing most of the energy to the body. For example – different cereals, potato, sweet potato, colocasia, sugar, banana, honey, ghee, oil etc.

2. **Body building foods :** The foods under this group supplies nutrients for

building and repairing of different organs such as – muscles, bones, tissues etc. The example of these foods are – milk and milk products, meat, fish, egg, soybeans etc., which contains protein, calcium, phosphorus and iron.

3. **Protective foods :** The foods under this category supplies nutrients needed for different activities of the body, such as for growth, proper eye sight, skin, tooth structure, digestion etc. Different vitamins and minerals are the examples of this group, which is present in different vegetables, green leafy vegetables, fruits, meat, fish, egg, liver etc.

4. **Regulatory foods :** Water and roughages or fibers are the examples of these foods. These foods regulates the various activities of the body such as – digestion, absorption, regulation of heat inside the body etc.

B. **Second classification of food is based on their chemical composition and are grouped into six different groups.**

They are -

- Carbohydrate.

2. Protein.
3. Fats on lipids.
4. Vitamins.
5. Minerals.
6. Water.

We will discuss about these in the Chapter 3.3

**C. Thirdly, food is classified on the basis of their source as –**

(a) Animal foods and (b) Vegetable foods.

The foods which we obtain from vegetable origin is known as vegetable foods. Examples - Cereals, pulses, vegetable and fruits.

Animal foods are obtained from animal sources. Example : milk and milk products, meat, fish, egg etc.

**3.1(6) NUTRITIONAL AND CALORIE INTAKE AS A BASIS OF POVERTY LINE :**

Nutritional status and calorie intake depend on an individuals or family's income or their capacity to buy food items. People, who have regular or sufficient income, do not have any problem. But, those who have

no income or not sufficient money to support their family, their buying capacity is low. They are known as poor people.

Let us see what is poverty line. Poverty line has been drawn depending on individual's minimum investment capacity. It means how much food he can buy and how much calorie from the food that he has bought will supply, based on this poverty line has been drawn. Generally, poverty line is drawn on the basis of minimum desirable calorie intake. According to this line, an intake of 2100 calorie and 2400 calorie per day is required by people living in urban and rural area. People who cannot consume this amount is considered as living below poverty line. In India, about 50 percent of the population is living below this line. Therefore number of people suffering from malnutrition is more.

In 1984-85, it has considered that – poverty line and is family income has a close relations and is said that the people in rural area, whose monthly income is Rs. 107/- and people in urban area is Rs. 121 per month, they are living below poverty line.

People living below poverty line cannot have their daily food, suffer from different

diseases, and died due to starvation. As a result, the mortality rate increases. Their foods are lacking in bodybuilding, heat and energy giving and protective foods. Their calorie intake is less than the required amount and the nutritional status is also very low. The people living below poverty line do not get the required nutrition due to ignorance, lack of nutritional knowledge, poor hygiene and sanitation, multiple child birth etc.

From the above discussion, we can say that – nutritional status is directly related to the poverty line.

**NUTRITIONAL STATUS :**

Nutritional status is a condition, which indicates physical and mental well being of a person along with proper growth and development, tissue repair and free from diseases.

**ASSESSMENT OF NUTRITIONAL STATUS :**

For good health, good nutrition is required. We can assess the nutritional status of a person in various ways. For example – increment in height and weight, ability to do hard work etc.

**PHYSICAL MEASUREMENT :**

While assessing the nutritional status of an individual, the rate of weight gain is considered as an important medium.

**Weight :** The weight of an individual can be measured by using a scale or machine. While taking weight, the machine should be kept flat on the floor. In case of new born infants a special scale called "infantometer" is used. Generally the weight of a child at birth is 2.5 to 3.5 kg. The weight of a child should be measured every month up to one year. Based on this weight increment, nutritional status can be assessed.

**Height :** Nutritional status can be assessed from the rate of increment in height. Height of an infant is measured with the help of a special scale.

**Measurement of head and chest circumference:** The size of head is more in childhood as compared to the measurement of their body. Both head and chest circumference is measured with the help of measuring scale. During the first three years of life in childhood, measurement and proportion of head and chest circumference is almost similar. If the rate of measurement is not similar as given in the table, it proves that nutritional status is poor or not proper.



**Measurement of arm circumference:** While measuring the arm, it is necessary to keep the arms parallel to the body. The measuring tape should be kept in between arm and elbow, and thus mid-arm circumference is measured. is more, it shows wasting of muscles. Poor nutritional status results in oedema. If a child is suffering from oedema, it cannot indicate proper nutritional status from the measurement of head and arm circumference.

**Measurement of Head and Chest circumference of children from birth to 5 years.**

Age (month)	Head (cms)	Chest (cms)
At birth	35.0	35
3	40.4	40
6	43.4	44
12	46.0	47
18	47.4	48
24	49.0	50
36	50.0	52
58	50.5	53
60	50.8	55

Growth and development of children By E.H. Watson and G.H. Lowery (Year book N.P. 1962)

Measurement of head and arm is closely related. If the measurement of arm circumference is 8 cm, the measurement of head circumference should be 25.8 cm. If this measurement, i.e. head circumference

**Skinfold measurement:** Nutritional status can be assessed from the amount of fats deposited in different parts of the body like in arm, belly, waist etc. To measure this, a special instrument is required.

There is a close relationship between nutritional status and mental health.

**Mental health:** Nutritional status is proper, when a person grow and develop normally according to his age and sex. Heredity also plays some role in this aspect.

Such a person is free from any physical and mental diseases, can control the environment where he lives, adjust mentally and emotionally to any situations and makes their life easy.

**SUMMARY**

- \* Health is an important aspect for every people in a family.
- \* It means persons physical, psychological, emotional and social well being.
- \* Foods can be of solid or liquid, through which our body acquires nutrients.
- \* Foods are classified based on their functions and their chemical composition.
- \* There is a direct relationship between the nutritional status and poverty line.

**QUESTIONS**

**A. Very short answer questions :**

1. What do you mean by health?
2. What is food?
3. What is called nutrition?
4. What do you understand by nutritional status?
5. What is called poverty line?

**B. Short answer questions :**

1. What are nutrients? What are its types?
2. Write short notes – good nutrition, under nutrition, malnutrition.

3. What is the first classification of food?
4. Classify foods based on their chemical compositions.

**C. Long answer questions :**

1. According to WHO, what are the three different aspects of health? Explain.
2. Explain about the relationship between food and health.
3. What are the methods of assessment of nutritional status? Explain.
4. Write about the relationship between the poverty line and calorie intake.

## CHAPTER - XI

### 3.2. FUNCTIONS OF FOOD

#### INTRODUCTION

In the previous lesson we have discussed about the relations of food and health and the nutritional status. Now we will discuss about the functions of food in the body.

After studying this chapter, you will be able to know the following –

- ◆ Physical functions of food.
- ◆ Psychological and sociological functions of food.
- ◆ Signs of good health.
- ◆ Mortality and longevity.

#### 3.2 (1) FUNCTIONS OF FOOD IN HUMAN BODY :

★ Food is the basis for human health. It performs various activities in physical, mental and social aspects of life. Different functions of food are as follows –

#### A. PHYSIOLOGICAL FUNCTIONS OF FOOD :

1. Food supplies energy for different physical activities such as walking, running, playing, to think etc. Food also supplies energy to perform different internal activities. Even during rest, some processes such as – beating of the heart, blood circulation, digestion of food are going on continuously. For these processes energy is required. The energy is obtained from foods such as – starch, sugar and from fats.

2. **Body building and repairing functions:** Human body is made up of different cells, tissues, bones and blood. The necessary components for the formation of these are obtained from foods. The protein, minerals such as calcium, phosphorus and iron performs these activities. Protein is also required for the growth and development

of a child, for repairing any tissues when cut or burnt. Protein is supplied through foods.

**3. Protective functions :** Another important function of food is to protect our body from various diseases. Generally, vitamin and minerals perform this function. For example – Vitamin A is essential for proper vision. If there is deficiency of vitamin A, different diseases of the eye may occur. Deficiency of vitamin-C and Iodine produces scurvy and goiter respectively. All these vitamins and minerals are supplied to our body through different foods.

**4. Regulatory functions :** Water and cellulose are needed for various body activities such as – digestion, absorption and metabolism, excretion, regulation of heat etc. Water and cellulose are supplied through food. Thus food performs different activities in the body and helps in making psychological and social relations among individuals.

**3.1. PSYCHOLOGICAL FUNCTIONS OF FOOD:** Food can satisfy our psychological and emotional needs. One cannot eat, even a delicious and nutritious meal, if he is in tense. One tends to eat more when in a happy mood, without any tension.

You too have such experiences during the time of examination and declaration of result, the desire of eating is totally lost. You can eat more, when you are satisfy with your result.

It is seen that – food has a close relation with the mental condition of an individual.

**2. SOCIOLOGICAL FUNCTIONS OF FOOD:** Food plays an important role in social aspect. Man likes to live in a society. To be in a society, various social events such as – puja's, naam, feast during bihu, tithi of religious gurus, Idd, Medammefi, birth anniversary, death anniversary of reknowned persons are observed in groups and foods are served. Through these, the relations between different people and their social bonding become strong. People too personally observ different events like-birthday, marriage, Puja etc. Food play an important role in such festivals. Thus food performs different activities.

### 3.2. (2) SIGNS OF GOOD HEALTH

In the previous chapter, we have discussed about what is health, relations between food and health, health and diseases, different aspects of health etc.

Now let us see what are the signs of good health.

A person can be in good health, if he is physically, mentally and socially fit and can lead a happy life. The person getting balanced nutrition is healthy and his nutritional status is also normal. The signs of good health are –

1. Healthy and smooth skin.
2. Eyes and face are bright.
3. Strong and healthy tooth structure.
4. Shiny, soft and glossy hair.
5. Well developed and strong muscles.
6. Mentally energetic and strong.
7. Good digestive system.
8. Good body posture, stand erect, can walk properly.
9. Ability to combat diseases, such as resisting infections.
10. Well developed and bright nails. (both hands and feet)
11. Regular bowel habits.
12. Mentally healthy, strong and able to think properly.

A healthy person can balance in different aspects i.e.- physical, mental and

social aspects and maintain the normal standard.

**(i) PHYSICAL STATUS :** Every individual requires appropriate amounts of food with proper nutrients to maintain physical status. Good physical health is necessary to do any work perfectly with enthusiasm and will become energetic. Hard work brings success to the life of an individual.

The bones, muscles and nerves of an individual must be strong and healthy for doing any hard labour. For physical strength and status, food is essential. Thus the physical health is the normal and healthy condition of a person. It means when a person is free from any diseases, bodily activities are performed normally and that condition is known as good physical health.

**(ii) PSYCHOLOGICAL STATUS:** There is a close relationship between body and mind. Therefore both body and mind must be healthy. Person who is physically healthy has a healthy mind. A healthy mind is required for doing any work efficiently and one can progress in his work. We cannot say that a person is healthy even if he is physically fit but mentally ill. Thus our brain has a direct relationship with the physical

health. A Person who is mentally ill will not be able to use his intelligence, cannot solve problems, and at times makes any situation more complex. Mentally healthy people can solve any problem by using their skills, intelligence etc. Thus for a healthy body, healthy brain and mind is needed and for this, good nutrition is essential.

**(iii) MENTAL ABILITY :** Mental ability means the capacity to do some functions mentally such as – imagination, desires inter relations, explanations, comparison, understanding, communication of feelings, evaluation etc.

Food is essential for proper physical and mental health and to acquire mental ability proper food is needed. Mentally healthy people are able to attain success, can fulfill their aim in life, solve problems with patience and courage and can do any work with better understandings. Those people get a special place in the society, respect, love and affection from the people in the society. Mental ability is a kind of good health.

### 3.2.(3) MORTALITY AND LONGEVITY :

Longevity means living for longer period without any ailments by any

individual. The average life span of an Indian born in 1901 was 25 years. In 1980, the life span of an Indian male was 57 years. In case of Assam also, now-a-day, the life span for male and female is 61 years and 62 years respectively. It shows that the life expectancy or the longevity has increased thereby improves the standard of living.

Longevity can be increased only when the increase in population controlled. When the population is decreases, amount of food supply will increase and people will get the required amount of nutrition.

There is a close relations between food supply and mortality. Before discussing about it, it is important to know about what is mortality? Mortality is the ratio of every thousand people alive to that of the number of people died. Presently the mortality rate has decreased due to health awareness, habits of taking nutritious foods among masses. The pregnant women are benefited the most. As a result the child mortality rate has lowered. In case of Assam, if we see the maternal and child mortality rate, it has seen that – about 490 mothers died per lakh of woman, 66 children per thousand live children, 85 children under five years died.

According to UNICEF, 2009 world child health report, in India, the rate of child mortality under five years is about 50 percent. (1990-2007). The reasons for the reduction rate is the use of proper

immunization schedule, improved health service schemes for mother and child, delivery of child in any health centre, hospital made compulsory by providing incentives etc.

#### SUMMARY

- ☞ Food performs various activities in the body. For example – physical, psychological and social functions.
- ☞ Some specific signs of health are necessary for every person to become healthy.
- ☞ There is a close relationship between longevity and mortality.

#### QUESTIONS

- A. Very short answer questions :**
1. What do you mean by protective functions of food?
  2. What is longevity?
  3. What is mortality?
- B. Short answer questions :**
1. What do you mean by psychological status of food?
  2. What are social functions of food?
  3. What is mental ability?
  4. What are the reasons of reducing mortality rate?
- A. Long answer questions :**
1. Write in detail about the physical functions of food.
  2. Explain about the psychological and social functions of food.
  3. What are the signs of good health?
  4. Co-relate the longevity and mortality rate.

## CHAPTER – XII

## SELECTION OF FOOD FOR OPTIMUM NUTRITION AND HEALTH

## 3.3. A. INTRODUCTION

From the previous chapter, you have come to know that – food and health is closely related. Every individual should know about what is food, when and how one eat food. Food should be selected properly if you want to be in good health.

Now-a-day, many junk foods such as chocolates, candies, chips, soft drinks are available in the market and you can survive on these for sometime but will not be healthy. These foods have adverse affect on your health and will lower the nutritional status. If you want to stay healthy and fit, for example – want to have clear, smooth skin, good vision, healthy teeth, and capacity to do any work, then you need different nutrients and knowledge of nutrients is also essential. This chapter includes all these subjects.

After reading this chapter, you will be able to know the following –

- ◆ Different nutrients- proteins, carbohydrates, fats – their sources, composition, functions, deficiency and prevention.
- ◆ Vitamins, their classification, fat soluble vitamins- vit-A, vit-D, sources, functions, deficiency.
- ◆ Water soluble vitamins – vit-B complex and vit-C, functions, sources, deficiency and prevention.
- ◆ Different minerals – calcium, phosphorus, iron, iodine – functions, sources, deficiency diseases.

## A. THE NUTRIENTS NEEDED BY OUR BODY :

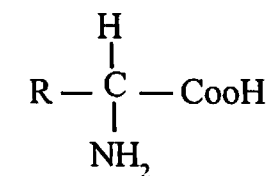
We have discussed about nutrients earlier. The different nutrients present in foods are – protein, carbohydrate, fats, vitamins, minerals and water.

**1. PROTEIN :** Protein is the chief nutrients, which has a major role in the body. The word ‘Protein’ comes from the Greek word proteos meaning “to take the first place”. It is present in all living cells.

**CHEMICAL COMPOSITION :** It is a complex compound consisting of carbon, hydrogen, oxygen, nitrogen sulphur and phosphorus. Some of them contain iron, copper and iodine. On hydrolysis, amino acids are formed. These amino acids are divided into two groups – essential amino and non-essential amino acids.

Essential amino acids cannot be synthesized by the body but they are most essential for our body. These are to be supplied by means of diet. Among these, eight are required during adult life. They are – iso-leucine, lysine, leucine, methionine, phenylalanine, threonine, tryptophan and valine. Another amino acid histidine, which is essential for infants.

Our body can manufacture some amino acids. These are known as non-essential amino acids. For example – glycine, cystine, alanine, tyrosine, serene, cysteine, aspartic acid etc. The chemical formula of protein is as such –



Here R is an alkyl group, H – A Hydrogen ion. One amine group (NH<sub>2</sub>) and one carboxyls

group (CooH) are joined in long chains as shown in the above figure.

**FUNCTIONS OF PROTEINS :** Protein performs most important functions in the body. They are –

**(a) As body building materials:** Protein helps in the formation of muscles, bones, plasma, nails, hair etc. of the body. Therefore it is also known as building blocks.

**(b) Regulatory Functions :** Protein helps in regulating different processes inside the body. Protein also regulates water balance, acid base balance in blood plasma and in cells.

**(c) Formation of hormones, antibodies:** The antibodies providing immunity are protein in nature. Hormones are necessary

for various vital activities of the body such as – thyroxine, which controls the Basal Metabolic Rate (B. M.R.) and helps in growth and development of the body. These hormones are also protein in nature.

**(d) Production of enzymes:** Enzymes are responsible for digestion of food. They are protein in origin.

**(e) Energy supply:** The main function of protein is to build our body. But sometimes it supplies energy, when the diet is deficient in carbohydrate and fats. Each gram of protein gives 4 kilo calories.

**(f) Milk formation:** The main food for the new born baby is the mother's milk. Mother's milk contains about 1.2 gms.

Protein. The mammary gland synthesized milk protein from the protein present in food and in tissues. Therefore pregnant and lactating mother should eat foods which contains more protein so that, they can supply more protein for the formation of milk.

**SOURCES :** The rich sources of protein are animal sources like meat, fish, poultry, eggs, milk and milk products such as – curd, butter, ghee, paneer etc. Pulses, different dals, nuts, soyabean also contains some amount of protein. Protein from animal sources are known as first class proteins and vegetable proteins are known as second class proteins.



Fig : Food Sources of Protein

### DEFICIENCY DISEASES

Deficiency of protein results in different diseases. In case of small children, during their growth period, deficiency of protein leads to growth retardation, loss of weight and anaemia. Kwashiorkor and Marasmus are the two characteristic diseases of children caused by protein deficiency. In Kwashiorkor, there is loss of weight, fatigue, reduced resistance to infection, wasting of muscles, swelling of feet and cracks in the skin occur. The symptoms of marasmus are loss of appetite, loss of weight, dehydration, diarrhoea, dysentery etc.

**PREVENTION :** Protein deficiency can be prevented by supplying foods rich in protein. The foods such as meat, fish, eggs,

milk, soyabean etc. should be included in sufficient amounts to the diet of small children.

**2. CARBOHYDRATE:** Carbohydrate is another important nutrient which is produced by plants through the process of photo synthesis with the help of sunrays, water and carbon-di-oxide. Carbohydrate is stored in various parts of plants like leaves, stems, fruits, seeds and roots as starch and sugar.

**CHEMICAL COMPOSITION:** It is an organic compound which contain carbon, hydrogen and oxygen. Hydrogen and oxygen are present in the proportion as 2:1 which is – two parts of hydrogen and one part of oxygen.

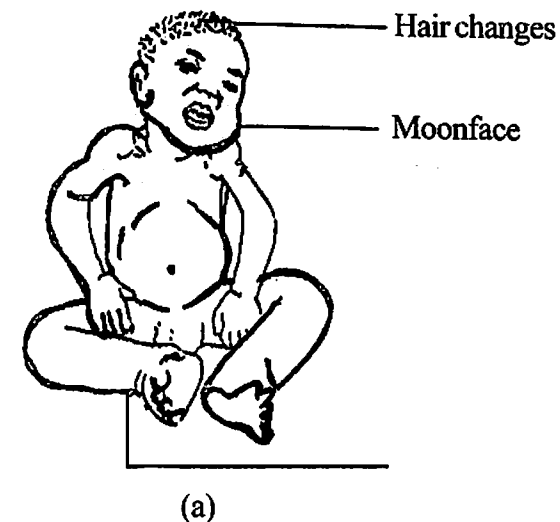
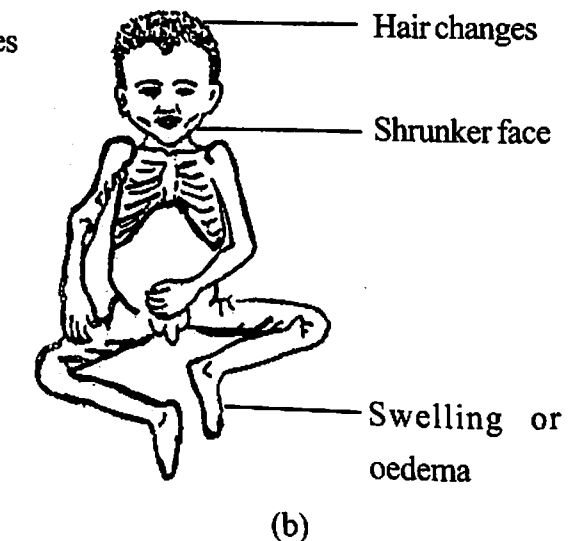


Fig : 6 (a) Kwashiorkor



(b) Marasmus

**CLASSIFICATION OF CARBOHYDRATE :** Carbohydrates are classified on the basis of the number of sugar present in it. For example – monosaccharides, disaccharides and polysaccharides.

**MONOSACCHARIDES :** They are the simplest form of carbohydrate, which contain only one saccharide and are soluble in water. Examples are – glucose, fructose and galactose.

**DISACCHARIDES :** They contain two saccharides and like monosaccharide, they are also soluble in water. Example – Sucrose, lactose and maltose.

**POLYSACCHARIDES:** Polysaccharides are composed of many molecules of monosaccharides. They are tasteless and insoluble in water. Some of the

polysaccharides are – starches, glycogen, cellulose etc.

**Functions of carbohydrate :** The functions of carbohydrate are –

**(a) ENERGY SUPPLY :** The most important function of carbohydrate is to supply energy to the body. Energy from carbohydrate is utilized by body for immediate use. Un utilized energy is stored as glycogen in the body.

**(b) CARBOHYDRATE AND THE LIVER:** Carbohydrate helps to protect our liver by producing glycuronic acid and thus protect the liver from bacterial toxins. These toxins are excreted through kidneys with glycuronic acid. Glycogen is used for this function. Thus, carbohydrate helps to remove toxic substance from the liver.

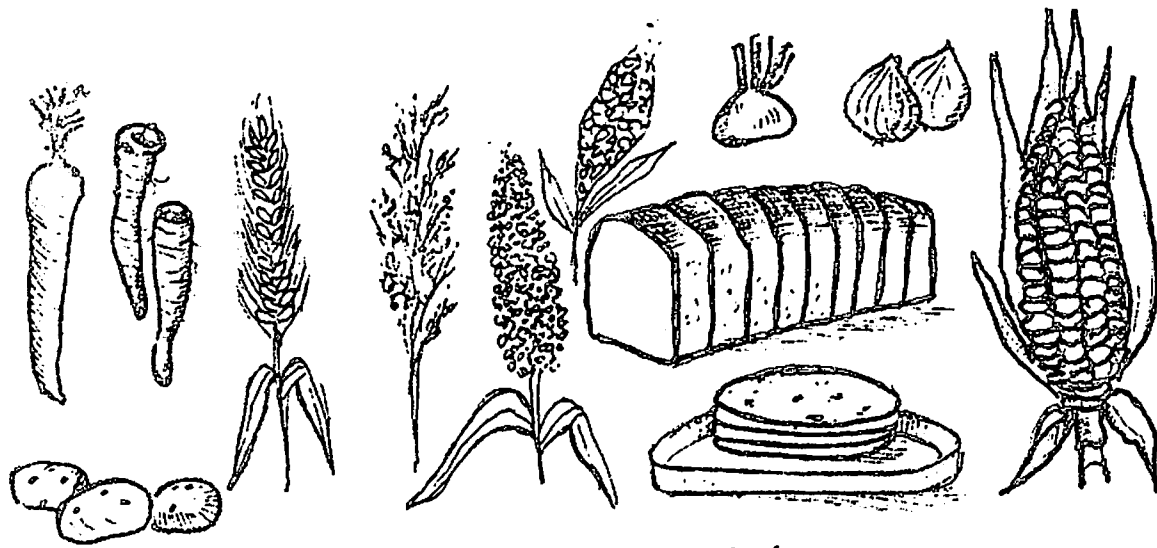


Fig-7 : Food sources of carbohydrate

**(c) SYNTHESIS OF VITAMIN-B COMPLEX :** Carbohydrate, specially lactose, help the growth of certain bacteria in the small intestine and helps the synthesis of B-complex vitamins in presence of these bacteria i.e. it supplies energy to the bacteria for the synthesis of B-complex vitamins.

**(d) REGULATION OF FAT METABOLISM :** Carbohydrate is essential for the metabolism of fats. In carbohydrate metabolism, pyruvic acid is produced and for complete fat metabolism, pyruvic acid is needed.

**(e) CARBOHYDRATE AND THE CENTRAL NERVOUS SYSTEM :** The nerve tissue function continuously and for this purpose continuous supply of carbohydrate is essential.

**(f) PROTEIN SPARING EFFECT:** Both carbohydrate and protein can supply energy. Protein is also essential for body building, repairing of tissues etc. Therefore protein is spared for these functions and energy is supplied by carbohydrate from the diet. This effect of carbohydrate is known as protein sparing effect.

Apart from the above functions. Carbohydrate makes our food tasty, palatable and adds variety to our diet. Polysaccharides like cellulose helps to prevent constipation.

**SOURCE :** The best sources of carbohydrate are – cereals, like rice, wheat, ragi, maize, potato, sweet potato, tapioca, sugar, jaggery, honey etc. Vegetable and fruits like banana, apple also contains some amount of carbohydrate.

**DEFICIENCY DISEASES:** Generally no deficiency of carbohydrate is seen as our staple food rice contains carbohydrate. When our diet contains less amount of carbohydrate, oxidation of fat is not completed and ketone bodies are formed.

**3. FATS OR LIPIDS:** Fat is another important nutrients, composed of carbon, hydrogen and oxygen. The amount of carbon and hydrogen is more in fats as compared to the amount of oxygen. Thus they differ from carbohydrate. They are insoluble in water but soluble in organic solvents like ether, benzene or chloroform.

**CLASSIFICATION :** Lipids or fats are classified as simple lipid, compound lipid and derived lipids.

**1. Simple lipids :** They are the esters of fatty acids with glycerol. Eg- Triglycerides.

**2. Compound lipids :** These are the simple lipids combine with other organic compounds. eg – phospholipids, lipoprotein etc.

**3. Derived lipids :** Substances derived from one fat on hydrolysis or by enzyme activities are known as derived fats. eg – cholesterol, stearic acid, glycerol.

Fats are also classified as saturated fatty acid and unsaturated fatty acid, depending on their chemical structure.

In saturated fatty acids, the carbon atoms in the molecule are combined with single bonds. eg – butyric acid, stearic acid etc.

When a double bond is present between two carbon atoms, it is known as unsaturated fatty acids. Eg – oleic acid, linoleic acid.

Fats are again classified into two groups depending on their sources. Such as animal fat and vegetable fat.

The animal fats are obtained from animal origin, such as cod liver oil, shark liver oil, ghee, butter etc. The vegetable fats are obtained from the flower, seed of some plants, e.g. coconut oil, mustard oil, sesame oil etc.

There are some differences between fats and oils. They are –

Oil	Fats
1. Oils are liquid at room temperature	1. Fats are solid at room temperature
2. Oils contain small amount of unsaturated fatty acids.	2. Fats contain more amount of saturated fatty acids.

#### FUNCTIONS OF FATS :

- The first and foremost function of fat is the supply of energy. One gram of fat provides nine kilo calories.
- Fats help in the transport and absorption of fat soluble vitamins like – A,D,E and K.
- It supplies the most essential fatty acids to the body, which is needed for growth and proper formation of skin in children.
- Fats are stored in the adipose tissue and serves as an insulating material. Thus, the vital organs of the body are protected.
- Fats are stored in the body beneath the skin which prevents the loss of heat.

Thus it maintains a balance between the internal and external body temperature.

- Fats help in the synthesis of phospholipids in the body. These phospholipids are necessary for digestion and absorption of fats.

**SOURCE OF FATS :** Various oils such as – groundnut oil, coconut oil, mustard oil, ghee, butter, nuts, meat, some fishes are the common sources of fats.

**DEFICIENCY OF FATS :** Deficiency of fats results in dryness of the skin, other skin changes such as – cracks, wrinkles, loss of lustre, roughness of skin occur. The fat

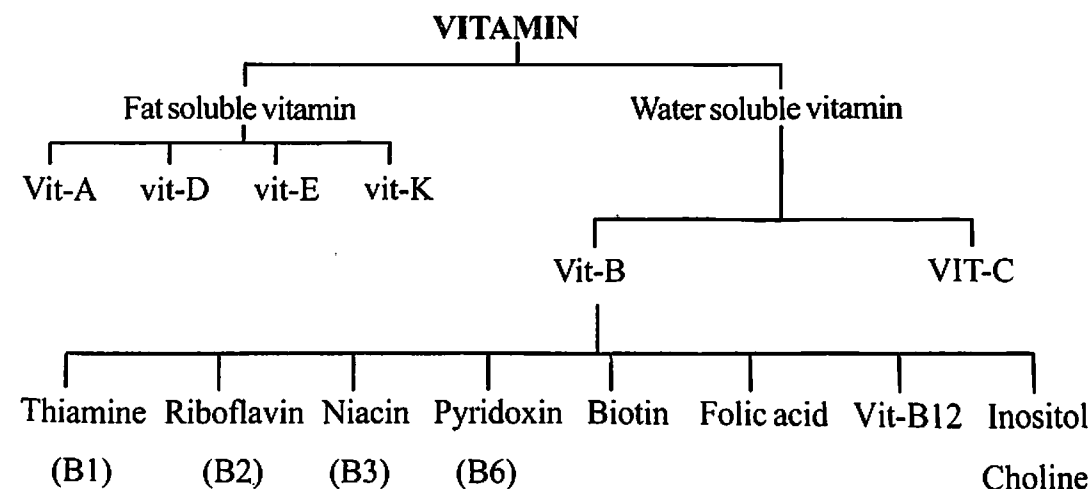
soluble vitamins are not absorbed properly and they are not able to prevent any diseases.

#### DIETARY FIBRE :

Dietary fibres are not considered as nutrients, but they are most essential for our body. The fibres are obtained from plants and are formed from cellulose. Cellulose are polysaccharides, which cannot be digested by human being. They remain in the large intestine.

#### FUNCTIONS :

- Fibres control the movement of food in the stomach.





- b. It absorb water and combine with other food waste and help in the formation of stool.
- c. Fibre can prevent constipation.
- d. It is known from research that fibre rich food can prevent colon cancer, diabetes, heart diseases.
- e. Food rich in fibre satisfies our hunger.

**SOURCES :** Starchy foods specially cellulose food, whole pulses, peas, bean, lotus stem, cabbage, methi leaves, mustard leaves, pineapples, jackfruit, ripe mangoes, guava are the richest sources of fibres.

**Deficiency diseases :** In its deficiency stool cannot be formed and results in constipation.

**Vitamin :** Most of the scientists discovered carbohydrate, fats and protein as the most essential elements for human being. Afterwards, they found out that – apart from these three elements, one more substance is required for good health. In 1911, Funk, a chemist named this substance as ‘vitamin’.

Vitamins are the organic compounds, which are necessary for good health and vitality. They are required in minute quantities but their deficiency can prevent growth and affects various organs of the body.

**Classification :** Vitamins are classified into two groups based on their solubility. They are – fat soluble vitamin and water soluble vitamin.

**Fat soluble vitamin :** The vitamins under this category are-

Vit –A, Vit-D, Vit-E and Vit-K

**Vitamin A :** It was the first fat soluble vitamin which was discovered in 1913. This vitamin was initially obtained from butter and plant foods. Commercially, vitamin-A was synthesized from lemon grass oil.

In animal foods, vitamin –A is present as retinol and it is generally accepted chemical name for vitamin-A. In vegetable foods it is present as carotenoids, also known as beta-carotene. In plant, vit-A is present as orange, yellow pigments which can be converted to vit-A by chemical reactions.

#### FUNCTIONS OF VITAMIN – A

- (a) Vitamin A is essential for the growth of different cells and for smooth and shiny skin.
- (b) Vitamin A is required for the normal functioning of the eye. Vitamin A combines with protein to form a

pigment called rhodopsin, which is present in the retina of the eye. This rhodopsin gets bleached in the presence of light and due to this bleaching one sees at night. Vitamin A is also essential for normal vision in dim light.

- (c) Vitamin A is needed for proper tooth structure and for the integrity of the epithelial tissues, alimentary canal, respiratory tracts etc.
- (d) Vitamin –A can prevent the risk of cancer.
- (e) This vitamin can provide the resistance power to the body against different infectious diseases. Therefore it is also known as anti-infective vitamin.

**Sources of Vitamin A :** Vitamin – A is found in two forms such as – retinol and carotenoids. The richest sources of vitamin-A i.e. – retinol is – cod liver oil, shark liver oil, halibut liver oil, liver of animals like goat, sheep etc. Butter, ghee, green leafy vegetables, yellow vegetables like pumpkin, carrot and yellow fruits like papaya, mangoes etc. contains vitamin –A as carotinoids.

**Deficiency of vitamin –A :** In vitamin- A deficiency, the skin becomes rough. This condition is known as follicular keratosis or toad skin.

Deficiency of vitamin A produces changes in the eyes. Due to the deficiency of this vitamin, rhodopsin is not formed and vision in dim light is not possible. This condition is known as night blindness. As the deficiency advances, the conjunctiva becomes dry and lusterless. This condition is known as Xerophthalmia. When xerophthalmia is not treated, it may develop into a condition known as keratomalacia. The cornea becomes dull, infected and ulcerated. The eye becomes grey and opaque.

This is a serious condition of the eye which results in blindness.

Grey coloured triangular spot are seen in the conjunction of the eye. These spots are known as bitot’s spot. The mucous membrane of nose, throat, trachea, alimentary canal, respiratory tract becomes rough and dry and resulting in bacterial infections.

**Prevention :** Vitamin A deficiency can be prevented by including sufficient amount of

foods rich in vitamin A. Vitamin A tablets should be taken in consultation with physician in severe cases. Government have under taken certain programmes to reduce the incidence of vitamin-A deficiency among small children. The vitamin A prophylactic programme at National level is carried on through health centres and ICDS centres. 20,000 IU of this vitamin are administered orally once in every six months till the age of five years to prevent vitamin A deficiency.

## (ii) VITAMIN -D :

In 1930, vitamin D was isolated in pure form and was named as anti ricketic vitamin. It is also known as sunshine vitamin. It is a complex component of alcohol. They are vitamin D, vitamin, D<sub>2</sub> and vitamin D<sub>3</sub>. Among these vitamins, D<sub>2</sub> or calciferol and vitamin D<sub>3</sub> or cholecalciferol are most important for human being.

### Functions :

- Vitamin D promotes growth and makes our bones strong and healthy
- Vitamin D promotes the absorption of calcium and phosphorus from the small intestine.

- It maintains the concentration of calcium and phosphorus in the blood.
- Vitamin D increases the activity of phytate enzymes, thus it maximizes the utilization of calcium and phosphorus.

**Sources of vitamin-D:** The excellent sources of vitamin D are fish liver oil, egg yolk, milk, butter, ghee etc. Morning sunlight is the best natural source of vitamin-D. Now a days, different foods such as butter, ghee etc. are fortified with vitamin-D.

**Deficiency of vitamin-D:** Vitamin-D deficiency results in rickets among small children and osteomalacia in adults. In rickets, the quantity of calcium and phosphorus in blood is decreased and the bones do not get these substances. Thus they become weak and fragile. Sweating and irritability are the early symptoms of rickets. The long bones of the legs bend with the body weight. They bend outward and this condition is known as bowed legs. Sometimes the legs bent inwards and with each step the knees knock with each other. This is named as knock-knees. The ribs of the chest bulge out and it resembles the breast of pigeon and named as pigeon breast.

Osteomalacia is most common among women having repeated pregnancies with low nutritional status. The other symptoms are- Pain in the spinal cord or backbone and in the legs which results in difficulty in walking. The fingers starts trembling and calcium and phosphorus is excreted by the kidney. Spasm on face, hands and feet are seen which leads to a condition called tetany.

**Prevention:** Vitamin-D deficiency can be prevented by feeding cod liver oil or halibut liver oil regularly to small children. Exposure to morning sunshine helps to get vitamin-D. The foods rich in vitamin D should be included regularly in daily diet of both children and adults.

**2. WATER SOLUBLE VITAMINS:** There are a group of vitamins soluble in water only. They are- vitamin B complex and vitamin C. The B complex vitamin consists of thiamin, riboflavin, niacin, folic acid, vitamin B<sub>12</sub> etc. Most of these vitamins cannot stored in our body.

(i) **Thiamin or B<sub>1</sub>:** Thiamin was the first vitamin of this group isolated in the year 1926. This vitamin is easily destroyed when exposure to heat and alkali and only a minute quantity can be stored in our body. Therefore a regular supply of this vitamin is necessary.

**Functions:** Thiamine takes part in carbohydrate metabolism. They get



Fig-8 : Food Sources of Thiamins

combined with pyrophosphate and forms thiamine pyrophosphate and participate in the metabolism of carbohydrate.

Thiamine promotes appetite and digestion. Thus helps to maintain normal weight of the body. Thiamine is necessary for the normal functioning of the heart. An enzyme which is active in blood metabolism, requires thiamine for proper functioning of red blood cells. Thiamine is required for the well being of nerves. They helps the transmission of nerve impulses and maintains the stability of nerves. Therefore they are known as "morale vitamin".

**Sources of Thiamine:** Rice polishing, unmilled rice, parboiled rice, dried yeast are the rich sources of thiamine. Wheat, oats, legumes and nuts are good sources. Milled cereals, green leafy vegetables, fruits, milk, meat, fish are fair sources of thiamine.

**Deficiency of Thiamine:** In mild deficiency, there is loss of appetite, irritability, fatigue, weakness, palpitation constipation occur. Severe deficiency of thiamine causes a disease- Beriberi. They are of two types- dry beriberi and wet beriberi. In dry beriberi, the muscles becomes tender, numbness in the toes and ankles takes place. The

numbness of the legs and hands results in difficulty in walking. All the symptoms of dry beriberi are seen in wet beriberi also. There is Oedema in the legs and in between cardiac muscle fibers. These changes in the heart muscles causes enlargement of the heart. Palpitation, breathlessness, heart weak occur and pulse rate increases.

Deficiency of thiamine among infant causes infantile beriberi. The symptoms are- restlessness, cries while passing urine, enlargement of heart and liver, vomiting, green coloured diarrhoea, oedema etc.

**Prevention:** Regular use of thiamine rich foods should be included in the diet, thereby supply of thiamine is increased and deficiency can be prevented.

**Riboflavin or B<sub>2</sub>:** Riboflavin is a yellow crystalline substance, soluble in water. It is stable to acid and heat. But gets destroyed easily in alkaline medium and in bright light.

**Functions:** Riboflavin plays an important role in protein metabolism. It is also a fundamental constituents of all living tissues. In its absence, new tissues cannot be formed or damaged tissues cannot be repaired. Riboflavin is essential for the metabolism of lipids especially fatty acids. This vitamin is

needed for the metabolism of tryptophan, (an amine acid) which is essential for growth of infants and for proper nitrogen balance in adults. Riboflavin is also essential for the health of skin, alimentary canal, and for normal vision.

**Sources of riboflavin:** Eggs, liver, milk and milk products are the richest sources of riboflavin. Meat, fish, whole cereals, oilseeds, legumes, soyabeans, leafy vegetables are good sources of riboflavin.

**Deficiency of riboflavin** in mild deficiency of riboflavin, weakness, burning at the angles of mouth, skin and eyes occur. Riboflavin deficiency symptoms are know as 'Ariboflavinosis', which is characterized by angular stomatitis with glossitis and cheilosis. The angles of the mouth becomes pale and crust is formed in the corners. Which is know as cheilosis. The crust which is formed on the surface of the lips becomes red in colour. The tongue becomes red and shiny which is know as glossitis. The lips crack at the corners and are inflamed. This condition is called angular stomatities. In case of eyes, there is itching, watering and burning of eyes and sensitivity to light, dimness of vision take place. Scaly lesion may develop around the

nose, cheeks, chin, sometimes on the lobes of the ears.

**Prevention:** Riboflavin deficiency can be prevented by providing riboflavin rich foods in the diet regularly, so that the required amount of riboflavin can be supplied.

(iii) **Niacin or nicotinic acid:** It is a white crystalline compound, soluble in water and stable to heat, light, acid and alkalis.

**Functions of niacin:** Niacin takes part as a co-enzyme in the metabolism of carbohydrate, protein and fats. It is also essential for the normal functioning of skin, intestinal and nervous system. Niacin takes part in the oxidation of tissues.

**Sources of niacin:** Meat, fish, dried yeast, liver, nuts, cereals, legumes are good sources of niacin. It is also present in small amount in foods like milk, eggs, vegetables and fruits.

**Deficiency of niacin:** In mild deficiency of niacin, loss of appetite, weakness, fatigue, burning tongue occur. Severe deficiency of niacin results in pellagra. It is otherwise know as 4D's disease Dermatitis (skin problem), diarrhoea, dementia (failure to maintain normal mental state) and death. In the beginning there is tiredness, headache, loss of weight, loss of appetite, poor health,

muscle pain etc. In dermatitis, there are skin lesions on exposed part of the body. Later on, the skin becomes dry, rough, scaly and ulcerated. There is pain in the stomach, loose motions and ulcers are formed on the underside of the tongue. In severe cases, the liver gets damaged. Due to dementia, the central nervous system is affected. Depression, fear, confusion, dizziness occur. Muscular coordination is lost, which results in damage in nervous system, paralysis and death.

**Prevention:** As a preventive measure, niacin rich foods should be included in daily diet.

(iv) **Folic acid:** This vitamin is also known as folacin. The word 'folic' is derived from the Latin word 'folium' means leaf. Because this vitamin is found abundantly in green vegetables. It is a yellow crystalline compound, slightly soluble in water and unstable to heat and light.

**Functions:** It is necessary for the metabolism of proteins. It helps in the formation of blood cells. Folic acid gets converted to folinic acid and helps in the regeneration of red blood cells, thus it prevents anaemia.

Folic acid is also essential for the normal functioning of the gastro intestinal tract. It is readily absorbed in the gastro intestinal tract and is stored in the liver for future use.

**Sources of folic acid:** Liver, kidney, yeast, dark green leafy vegetables, soyabean, groundnuts are the excellent sources of folic acid. Carrots, other vegetables, eggs, apples, oranges also contain some amount of folic acid.

**Deficiency of folic acid:** Prolonged deficiency of folic acid results in megaloblastic anemia where the number of red blood cells produced in the bone marrow is reduced.

**Prevention:** Administration of folic acid tablets readily responds to anaemia. Apart from this, foods rich in folic acid such as dark green leafy vegetables, liver, soyabean etc. should be included in daily diet.

v) **Vitamin B<sub>12</sub> or Cyanocobalamin:** Vitamin B<sub>12</sub> contains a mineral-cobalt. Therefore it is dark red in colour. It is soluble in water and can be stored in the liver.

**Functions of Vitamin B<sub>12</sub>:** Vitamin B<sub>12</sub> helps in the formation and maturation of red blood cells. It acts as a coenzyme and helps in the metabolism of carbohydrate, protein and fat.

**Sources of vitamin B<sub>12</sub>:** Animal foods specially liver, kidney, eggs, fish, meat, milk are good sources of vitamin B<sub>12</sub>. Vegetable foods do not contain B<sub>12</sub>.

**Deficiency of vitamin B<sub>12</sub>:** The deficiency of vitamin B<sub>12</sub> results in pernicious anemia. In pernicious anemia, the life span of red blood cells is reduced to 60 days instead of normal 120 days and their size and shape is also changed.

**Vitamin C:** This vitamin also known as ascorbic acid. It is a white crystalline substance, soluble in water. It is easily destroyed by heat, air and alkalis. Vitamin C food cooked in iron and copper vessel increases the loss of this vitamin.

#### Functions of vitamin C:

- Ascorbic acid helps in the formation of collagen present between cells. Collagen is otherwise known as the

cementing material as it holds different cells.

- It is also essential for cholesterol metabolism.
- Vitamin C is needed for the absorption of Calcium and iron.
- For the maturation of red blood cells and their normal functioning, vitamin-C is most essential.
- It is also essential for rapid healing of wounds because it helps in the formation of connective tissues.

**Source of vitamin C:** Citrus fruits like orange, lemon, amla, pineapple, guava, musambi, tomato are rich in vitamin C. Green leafy vegetables such as drumstick leaves, methi leaves, radish leaves, cabbage are good sources of vitamin C. Cereals and pulses are devoid of vitamin C. Germination of pulses increases double the amount of this vitamin.



Fig-9 : Food sources of vitamin-C

**Deficiency of vitamins C:** In mild deficiency, weakness, fatigue, infection occur. Joint pain is also most common. Spongy bleeding gums, loose teeth, haemorrhages are other symptoms. Prolonged deficiency of vitamin C produces scurvy. The symptoms of scurvy are painful and bleeding gums, infection in the gums and pus is formed. It gives a foul smell in the mouth.

The scurvy among infant are known as infantile scurvy. The infants suffering from scurvy becomes restless and cannot sleep. They cry on moving their hands and legs due to pain in the thighs and in arms.

**Prevention:** Vitamin-C deficiency can be prevented by eating vitamin C rich foods daily. Apart from this, proper cooking method should be used and alkalis should not be used while cooking vitamins C rich foods. As far as possible Vitamin C rich foods should be eaten as raw.

#### 5. MINERALS:

Minerals are needed for the growth and well being. They constitute about 4% to 6% of the total body weight. There are more than 19 minerals in the body which are obtained from foods.

Some of these are required in large amounts. For example, calcium, phosphorus, iron, potassium, Sodium, magnesium and chlorine. They are known as major elements. There are some minerals such as. Copper, Manganese, iodine, cobalt etc. which is needed in small quantities These are called trace elements.

#### The functions of minerals are –

1. They help to maintain acid base balance of the body fluids.
2. They control the water balance.
3. They help in muscle contraction.
4. Some minerals such as calcium helps in the clotting of blood.

#### Calcium:

Calcium occurs abundantly in human body. In an adult, about 1.5 to 2 percent body weight is made up of calcium. A healthy adult body contains about 1200gms of calcium. Out of this amount nearly 98% of the calcium is present in bones and remaining amount is present in blood and other parts.

#### Functions:

- (a) Calcium helps in the formation of bones and teeth.

- (b) It is also essential for contraction of heart and muscles.
- (c) Calcium plays an essential role in the clotting of blood.
- (d) It helps to absorb vitamin B<sub>12</sub> from the intestine.
- (e) It activates some enzymes in the body.
- (f) Calcium along with phosphorus makes our bones and teeth strong and healthy and gives permanency to them.

**Sources of Calcium:** Milk and milk products contains large amounts of calcium. Small fish, sesame, ragi, nuts, green leafy vegetables, peas, beans, dried fruits, pulses and jaggery are rich source of Calcium.

**Deficiency of Calcium:** The deficiency of calcium and its symptoms are accompanied by the deficiency of phosphorus and vitamin D. Pure calcium deficiency results in Osteoporosis. The symptoms are- pores in the bones, improper bone growth, weakness, back pain, loss of weight, fracture of bones for no reason, loss of teeth etc. In case of children, deficiency of calcium and vitamin D leads to rickets and osteomalacia in adults.

**Phosphorus:** Like calcium, phosphorus is also important for our body. It is present in every cells and tissues. Phosphorus constitutes about 1 percent of total body weight. In bones the proportion of calcium and phosphorus is 2:1, but the tissue contain high amount of phosphorus as compound to calcium.

#### Functions:

- a) Phosphorus is essential for the formation of bones and teeth. It gets combine with calcium to form calcium phosphate and thus gives strength to bones and teeth.
- b) Phosphorus takes part in carbohydrate metabolism and is an essential constituent of co-enzyme- I which is required for the oxidation of carbohydrate, protein and fat metabolism.
- c) Phosphorus is essential for maintaining balance between acid and alkali.
- d) It is also needed for growth and takes part in different activities of the nerves.

**Sources:** Eggs, milk, meat and fish are excellent sources of phosphorus. Whole grain cereals, nuts, cashew nuts, sesame,

rajmah, colocasia, drumstick, soyabean etc. also contain phosphorus.

**Deficiency of phosphorus:** A deficiency of the element prevent the formation of strong bones and teeth, muscles alkalinity of blood decreased. The joint of the bones becomes stiff, fragile and break easily.

**Iron:** It is one of the most important minerals of our body. It is of great significance in the upkeep of good health. There is about 3 to 4 gms of iron present in an adult human body. Of this 60 to 70 percent is present in blood and the remaining amount is present in liver, kidney, muscles and in bone marrow.

**Functional of Iron:** Iron performs different activities in the body. They are –

- 1) Hemoglobin is an important constituent of blood. For formation of hemoglobin, iron is required.
- 2) Iron is also essential for the formation of different enzymes needed for performing different activities in the body.
- 3) Iron in the form of haemoglobin acts as a carrier of oxygen from the lungs to the tissues. Myoglobin is an iron-protein complex found in muscles

which stores some oxygen for immediate use.

- 4) It is required for muscular contractions. Iron can prevent anemia.

**Source of iron:** The excellent sources of iron are the organ meats like liver, kidney and heart. Egg, milk, meat, fish are good sources. Vegetable foods such as – cereals, beans, lentils, green leafy vegetables like amaranth, spinach, mint, dried peach, apricots, pomegranate, jaggery contain some amount of iron.

**Deficiency of Iron:** Iron deficiency causes anemia, where the concentration of haemoglobin in the blood falls below the normal level. The symptoms of anemia are fatigue, headache, palpitation, loss of appetite, nausea, giddiness, pallor of the skin, spoon shaped nails (Koilonychias) hearthurn, blurred vision, oedema over feet, feeling of tiredness etc.

**Prevention:** Iron deficiency anemia can be prevented by giving sufficient amount of foods rich in iron such as meat, fish, egg, liver, kidney, fresh fruits and vegetables in daily diet. Regular supply of vitamin C with iron is needed as vitamin C helps in proper absorption of iron.

**Iodine:** Iodine is an essential trace element for our body. Although the requirement of iodine is less, yet it has vital importance to the body. Iodine is a component of thyroxin hormone. A normal adult has about 35 to 50 mgs of iodine in the body. Out of this, 10mg is present in thyroid gland.

**Functions:**

- 1) Iodine helps in the synthesis of hormone thyroxine, by the thyroid gland. This hormone controls the basal metabolic rate and helps in the growth and development of the body.
- 2) Thyroxin helps in carbohydrate metabolism.
- 3) Iodine helps the tissues in its oxygen consumption.
- 4) It controls the functions of nerves in the body.
- 5) Conversion of glycogen to glucose occurs only in presence of iodine.

- 6) Iodine helps in increasing heart rate.

**Source of iodine:** The iodine content of foods depends on the iodine content of the soil. Seafood such as fish, crabs, lobsters and sea salt are rich sources of iodine. Carrot, peas, and fish liver oil also contains some iodine.

**Deficiency of iodine:** Deficiency of iodine results in a disease known as goitre. It is the enlargement of the thyroid gland. The normal weight of thyroid gland is about 25gm. In goitre, it enlarges from 200 to 500 gms. In case of small children, the deficiency disease is known as cretinism. The symptoms of cretinism are growth retardation, weakness, dry skin, rough hair, mental retardation etc.

**Prevention:** Goiter can be prevented by regular use of iodized salt. Other foods rich in iodine such as cod-liver oil, Shark liver oil, Sea fish, egg yolk, vegetables, onion etc. should be include regularly in the diet.

**SUMMARY**

- ☞ Proteins are essential for our body and are composed of amino acids.
- ☞ Proteins helps in growth and development of the body and for the formation of tissues, it is essential.
- ☞ Carbohydrate and fats supplies energy to our body.
- ☞ Carbohydrate are classified as monosaccharide, disacchavide and polysaccharide.
- ☞ Only a small amount of vitamin is needed for our body. They perform the most important functions in the body.
- ☞ Among all minerals, Calcium, iron and iodine are necessary for our health.

**QUESTIONS****A. Very short answer questions**

1. What do you understand by Protein? Write its chemical composition.
2. Name two deficiency diseases of protein.
3. What is dietary fibre?
4. What is Vitamin?
5. Name fat soluble vitamins.
6. Write some food sources of Vitamin-A.
7. Write two deficiency disease of Vitamin-A.
8. Name the deficiency disease of Vitamin-D.
9. Name the deficiency disease of Vitamin-D in adults.

**B. Short answer questions**

1. What are essential amino acids? Name them.
2. What do you mean by the protein sparing effect of carbohydrate?
3. What are the effects of fat deficiency in the body?
4. How can you prevent vitamin A deficiency?

5. What are the preventive measures of vitamin-D deficiency?
  6. What are the food sources of thiamine?
  7. What are the major and minor elements or minerals?
  8. What measures will you take to prevent anaemia?
- C. Long answer questions**
1. What are the functions of protein? Explain.
  2. Enumerate the functions of carbohydrate in the body.
  3. Write about the functions of fats.
  4. Write about the importance of dietary fibre.
  5. What are the functions of Vitamin-C?
  6. Write the functions of minerals.
  7. Mention the effects of iodine deficiency in growth and development of children.

## CHAPTER-XIII

## BASIC FOOD GROUPS AND BALANCED DIET

In earlier chapter, we have discussed about different nutrients and their role in our body, deficiency disease etc. But it is also necessary to know about the sources of supply of these nutrients. In our surroundings, plenty of vegetable and animal foods are available. They vary in looks, taste, colour and flavour. Food scientists have divided all these foods into five different groups and each food is included in any one of these groups. Now we will discuss about these food groups.

After reading this chapter, you will be able to know the following.

- Different food groups recommended by ICMR (India council of Medical Research).
- Concept of balanced diet.
- Recommended dietary allowances and nutrition for various age groups.

**Food groups:** It has said earlier that good nutrition has a direct relationship with health. Balanced diet is required for good nutrition and to get a balanced diet, foods from all food groups must be included in the diet. Therefore we must have some knowledge regarding different food groups, what are food groups? etc. Depending on their food value, foods are grouped in different groups such as Basic-3, 4,5,7,9 and 11. Different foods have included in different groups. The person who plans the diet can choose any food groups according to their choice and needs.

Among all the food groups, the Indian Council of Medical Research (ICMR) have recommended Basic-5 food group. The foods included in this group are as follows—

**Group-1:** The foods included here are cereals, roots and tuber for example rice,

atta, jowar, bajra, ragi, potato, sweet potato, colocasia, tapioca etc. From these food calorie Protein iron, thiamine and niacin are obtained.

**Groups-II :** Foods containing proteins are included in this group. E.g.: different pulses, beans, peas, nuts, cashew nuts, coconuts, milk and milk products, meat, fish, eggs etc. This food supply protein. Milk and milk products supply calcium and riboflavin along with protein. Meat and fish also supply iron and niacin.

**Group-III :** This group contains foods like sugar and jaggery, fats and oils. These foods supplies calories. About  $1/6^{\text{th}}$  of the energy.

**Group-IV :** This group consists of foods rich in minerals and vitamins. These include green leafy vegetables such as – spinach, amaranth, methi leaves, drumstick, mustard leaves, mint, coriander leaves, Vegetables like pumpkin, carrots, fruits like mango, ripe papaya, tomato, banana, guava, orange, citrus fruits such as lime, lemon etc. They supply vitamin-A, C and minerals like iron.

**Group-V :** The foods included in this group provides vitamins, minerals fibres and water to the diet. These include fruits, stems, leaves and flowers of plants, ladies fingers, brinjals,

bitter gourds, other gourds, cauliflower, green bananas, cucumber, banana flower etc.

From the above, it has seen that all foods from different group are included in Basic-5 food groups and we get most of the nutrients from any one of these groups according to our requirements.

## BALANCED DIET

You have studied about food, nutrients and health and their relationship with each other. We all know that food and health are closely related. Balanced diet is required to obtain good nutrition. Now let us see what is balanced diet? Balanced diet is a type of diet, which contains all the essential nutrients required by the body in correct proportions. We can define Balanced diet with the following figure also.

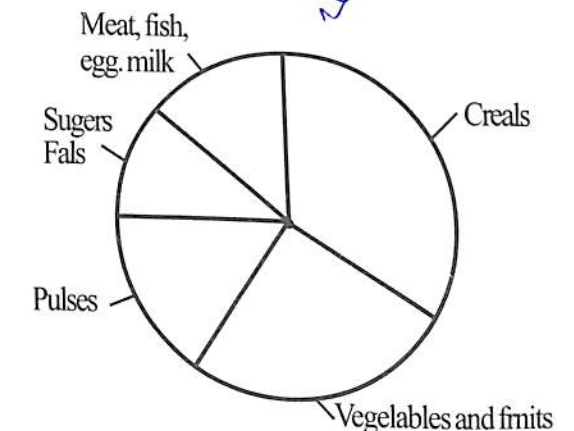


Fig 10: Balanced diet



The above figure shows the amount of foods that should be taken by an individual. In the figure, a major portion is occupied by cereals i.e. more calories are obtained from cereals. Sugar and fats occupy a small portion, which means that the amount of these food should be minimum in the diet.

The nutritional requirement vary depending on certain factors such as age, sex, physical activity, physiological conditions i.e. Pregnancy, lactation, climate,

income, food habits etc. While selecting foods for balanced diet, it is better to know the daily nutritional requirement. The requirement of nutrition depends on the above factors.

The following are the tables of the nutritional requirements and balanced diet recommended by Indian Council of Medical Research (ICMR, 1992) according to the age, sex and physical activity.

**Table -I**  
**Balanced Diet for Children**

Foods	Pre-School Childrens				School Childrens			
	1-3 years		4-6years		7-9years		10-12years	
	vege (gm)	non-veg (gm)	veg (gm)	non-veg (gm)	vege (gm)	non-veg (gm)	vege (gm)	non-veg (gm)
Cereals	150	150	200	200	250	250	320	320
Pulses	50	40	60	70	60	70	70	60
Green leafy vegetables	50	50	75	75	75	75	100	100
Other vegetable								
Roots and tubers	30	30	50	50	50	50	75	75
Fruits	50	50	50	50	50	50	50	50
Milk	300	200	250	200	250	200	250	200
Fats and oils	20	20	25	25	30	30	35	35
Meat, Fish and eggs	–	30	–	30	–	30	–	30
Sugar and Jaggery	30	30	40	40	50	50	50	50

**Table -II**  
**Balanced Diet for adolescent Boys and Girls**

Foods	Boys				Girls			
	13-15 years		16- 18 years		13-18 years		16-18 years	
	vege (gm)	non-veg (gm)	veg (gm)	non-veg (gm)	vege (gm)	non-veg (gm)	veg (gm)	non-veg (gm)
Cereals	430	430	450	450	350	350		
Pulses	70	50	70	50	70	70		
Green leafy vegetables	100	100	100	100	150	150		
Other vegetable	75	75	75	75	75	75		
Roots and tubers	75	75	100	100	75	75		
Fruits	30	30	30	30	30	30		
Milk	250	150	250	150	250	150		
Fats and oils	35	40	45	50	35	40		
Meat, Fish	–	30	–	30	–	30		
Eeggs	–	30	–	30	–	30		
Sugar and Jaggery	30	30	40	40	30	30		
Groundnuts	–	–	50*	50*	–	–		

\* an additional 30 gm of fats and oils can be included in the diet in place of groundnuts.

**Table-III**  
**Balanced Diet for Adult woman**

Foods	Sedentary work		Moderate work		Heavy work		Additional allowances during	
	vege (gm)	non-veg (gm)	veg (gm)	non-veg (gm)	veg (gm)	non-veg (gm)	vege (gm)	non-veg (gm)
Cereals	300	300	350	350	475	475	50	100
Pulses	60	45	70	55	70	55	-	10
Green leafy vegetables	125	45	125	125	125	125	25	25
Other vegetable	75	75	75	75	100	100	-	-
Roots and tubers	50	50	75	75	100	100	-	-
Fruits	30	30	30	30	30	30	-	-
Milk	200	100	200	100	200	100	125	125
Fats and oils	30	35	35	40	40	45	-	-
Meat, Fish	-	30	-	30	-	30	-	-
Eggs	-	30	-	30	-	30	-	-
Sugar and Jaggery	30	30	30	30	40	40	10	20
Groundnuts	-	-	-	-	40*	40*	-	-

\* An additional 25 gm of fats and oils can be included in place of groundnuts.

**Table-IV**  
**Balanced Diet for Adult man**

Foods	Sedentary work		Moderate work		Heavy work	
	vege (gm)	non-veg (gm)	veg (gm)	non-veg (gm)	veg (gm)	non-veg (gm)
Cereals	400	400	475	475	650	650
Pulses	70	55	80	65	80	65
Green leafy vegetables	100	100	125	125	125	125
Other vegetable	75	75	75	75	100	100
Roots and tubers	75	75	100	100	100	100
Fruits	30	30	30	30	30	30
Milk	200	100	200	100	200	100
Fats and oils	35	40	40	40	50	50
Meat, Fish	-	30	-	30	-	30
Eggs	-	30	-	30	-	30
Sugar and Jaggery	30	30	40	40	55	55
Groundnuts	-	-	-	-	50*	50*

\* An additional 30 gm of fats and oils can be included in place of groundnuts.

**Table - V**  
**Balanced Diet for Adult man**  
Recommended Dietary allowances for Indians (ICMR, 1995)

Groups	Particular	Body (kg)	Energy (K/day)	Protein (g/day)	Fat (g/day)	Calcium (mg/day)	Iron (mg/day)	VitA/Mg Retinal/B-carotene	Thimius mg/day	Riboflavin mg/day	Niacin mg/day	Pyridox in mg/day	Ascorbic acid mg/day	Vit-B12 mg/day	
Man	sedentary	60	2,425	60	20	400	28	600	1.2	1.4	.16	2.0	40	100	1
	moderate		2,875					2,400	1.4	1.6	.18	2.0	40	100	
	heave		3,800						1.6	1.9	21				
Woman	sedentary	50	1,875	50	20	400	30	600	0.9	1.1	12	2.0	40	100	1
	moderate		2,225					2,400	1.1	1.3	14	2.0	40	100	
	heavy		2,925						1.2	1.5	16				
Infants	Pregnet Lactation(0-6)	50	+300	+15	30	1,000	38	600	+0.2	+0.2	+2	2.5	40	400	1
	Lactation(0-6)	50	+550	+25	35	1,000	30	950	+0.3	+0.3	+4	80	150	150	1.5
	6-12 months		+400	+18				3,800	+0.2	+0.2	+3				
Children	0-6 months	5.4	108	2.05		500	350	1,200	55	65	710	0.1	25	25	0.2
	6-12 months	8.6	98	1.65		500	350	1,200	50	60	650	0.4	25	25	0.2
Boys	1-3years	12.2	1240	22	25	400	12	400	1600	0.6	0.7	0.8	0.9	30	0.2-1.0
	4-6years	19.0	1690	30	25	400	18	400	2400	0.9	1.0	1.1	1.6	40	40
	7-9 years	26.9	1950	41	25	400	26	600	1.0	1.2	13		60		
Girls	10-12 years	35.4	2190	54	22	600	34	600	2400	1.1	1.3	1.5	1.6	40	70
	10-12 years	31.5	1970	57			19		1.0	1.2	14				
Boys	13-15years	47.5	2450	70	22	600	41	600	2400	1.2	1.5	1.6	2.0	40	100
	13-15 years	46.7	2360	65			28		1.0	1.2	14				
Girls	16-18 years	57.1	2640	78	22	600	50	600	2400	1.3	1.6	1.7	2.0	40	100
	16-18years	49.9	2060	63			30		1.0	1.2	14				

### Factors influencing selection of food:

The foods that we eat affect in our body as well as in our mind. You have already studied about the daily requirements of foods and nutrients. Now we must know about the selection of foods and factors that influence the choice of foods. The factors are – culture, family food practices, media, peers, easy availability of foods.

**1. Culture:** Culture has a direct influence on the selection of food. It has a great role in identifying a community, a race or a nation through their food. For example Assamese people prefer fish with sour taste and prepare food using alkali(khar) which is not found in any other parts of the country. In contrast, people of west Bengal prefer their dishes with more spice and oil. In south India, people use more of coconut oil in preparing their dishes i.e. - dosas, uttapam etc. In some culture the pregnant and lactating mother are not allowed to eat fresh fruits, vegetables pulses etc. These habits lowers their nutritional status. Thus culture influences in selection of foods.

**2. Family food practice:** In some families, meat, fish, eggs and milk etc. are considered as most nutritious foods, hence uses these abundantly in every meal. They put less

emphasis on vegetarian foods. Green leafy vegetables are considered as 'grass'. But vegetables provide plenty of vitamins and minerals besides the fibre that helps in the regulation of body processes.

**3. Media:** Media has changed the whole world into a small village. Through media people know about the food of different places. The food manufacturers spend a lot of money on publicity of their products. You are aware of many of the advertisement that you listen, see and read is radio, television, newspaper and magazines. The food products are in prepared attractively and advertised through different media and attract the public. These advertisements greatly influences the selection of foods. But the study of foods and nutrition enhances our knowledge. It enables one to discriminate between healthy and not so healthy foods.

**4. Peers:** Peers have a great influence in selecting foods. The peer group influence is strong enough to make an individual eat the foods that he dislikes in the company of his friends. You like some fast foods such as Pizzas, Chips, Burger, cold drinks. Even if you do not like, you take it out of peer pressure. Do you know how nutritious these food? You have gained nutritional knowledge

and use these in selecting foods. In case of girls, the peer influence is more. They tend to change their food habits like their friend, who have black hair, smooth skin, thin body structure.

**5. Easy availability of food:** While selecting foods, two factors namely easy

availability and seasonal foods are considered. The price of these foods are less and can be collected in large amounts. Foods which are not easily available costs more and we cannot buy in bulk. Thus we should consider different factors while selecting foods.

#### SUMMARY

- ☞ Balanced diet is essential for good health
- ☞ Balanced diet can be obtained from basic-5 food groups
- ☞ We get different nutrients from every food group and should include these food in our daily diet.
- ☞ Some factors influence in selection of foods. They are – culture, family and practice, media, peers and easy availability of foods.

#### QUESTION

- A. Very short answer questions
1. Define balanced diet
  2. What do you mean by food groups?
- B. Short answer questions
1. How peers influence in selecting foods?
  2. Write about the influence of media in the selection of food
- C. Long answer questions
1. Write in detail about basic-5 food groups.
  2. Give a brief account of the factors that influence the selection of food.

## CHAPTER – XIV

### SELECTION AND STORAGE OF FOOD

#### Introduction

The selection of food for each family depends on their needs, taste and the storage capacity. All foods have their shelf life. It means each food stuff has a specific period after which it begins to spoil. Depending on their shelf life, we must select our food. In this chapter, we will discuss about this.

After reading this chapter, you will understand the following –

- a) Perishable, semi perishable, non-perishable and convenience foods.
- b) Selection of food depending on their storage.
- c) Reasons of food spoilage.
- d) Methods of food preservation.

The keeping quality of foods consumed daily varies with different food stuff. Based on their keeping quality foods are classified into three groups. They are

- a) Perishable foods
  - b) Semi perishable foods
  - c) Non-perishable foods.
- a) **Perishable foods:** These foods have a relatively shorter life span i.e. they have a shelf life of 1 or 2 days. After that physical and chemical changes start taking place. They have higher moisture content. Some of the perishable foods are - milk, paneer, cream, meat, fish etc.
- b) **Semi -Perishable foods:** Semi perishable foods lasts a little longer. They can be kept for a couple of weeks or even a month or two. They have a longer shelf life than perishable food. Examples are – potato, onion, beet root, garlic, ginger, turnip etc.
- c) **Non- Perishable foods:** Foods having low moisture content can be stored for longer period. They retain nutrients for longer time. Some non-perishable foods are – cereals,

pulses, sugar, honey, oilseeds, salt, dry fruits etc.

There is another type of food known as convenience food-

**Convenience Food:** These foods make the preparation process easy for the housewife thereby saving time and energy. These foods are pre-cooked; semi cooked or fully cooked and kept in packets. The manufacturer uses different scientific methods in preparing these foods.

Generally, perishable foods are cleaned, trimmed, prepared and cooled to make convenience foods. These are – canned fruits and vegetables, jam, jellies, pickles, sauce, Chutney, fruit juice, tinned fish, meat etc. Milk powder, coffee powder, soup powder, dosa mix, gulab jamun mix also known as convenience food.

Some vegetables such as – peas, carrot, ladies finger, cauliflower are frozen and stored in tins. Now-a-days, ready to use frozen foods are also available. Examples are Kabab, cutlets, salami, ham, sausages, etc. Different snack items like-cake, biscuits, bread, buns, wafers, different mixtures, laddus, pithas, puffed rice, and rice flakes and they are available in beautiful packets.

The convenience foods are expensive as compared to home made foods. Their nutritive value is good, because of the use of improved scientific method during preparation.

Now will discuss about the process of selection and storage of the above mentioned foods.

**1. Perishable foods:** The foods under this group are milk, meat, fish, egg and vegetables.

**Milk:** Milk spoils easily as it contains 'Lacto-bacillus' Bacteria, therefore it should be boiled properly, cooled, covered and stored in a cool place preferably in a fridge. Milk should be purchased daily. If possible a mixture of full cream milk and toned milk should be bought.

**Eggs:** While selecting eggs, it should be put in water. Fresh egg will sink and stale or old one will float. The freshness of egg can be tested by holding the egg against bright light. Fresh egg will be clean while the stale one will be cloudy and spotted. The eggs should be stored in cool dry place or in fridge. But eggs should not be washed.

**Meat:** The meat should be fresh with firm tissues and pink in colours. It should not have

any foul odour. It should be stored in cool place, preferably in fridge, cover meat with foil or use container with tight fitting lid. Meat should be selected according to the need of the family.

**Fish:** While buying fish, one should ensure their freshness and their gills should be bright and red in colour. The scales should be shiny and clinging firmly to the body, should leave no depression when pressed with fingers. Stale fish is soft, slippery and have an unpleasant odour.

Fish should be washed properly, fried lightly in oil, cooled, kept in a covered container and stored in the fridge.

**Fruits and vegetables:** Fruits and vegetables should be fresh. Fruits with thin outer coverings are better than other fruits. Green leafy vegetables should be clean and cover with wet, clean cloth. Cauliflower, reddish etc. should be stored with their leaves. Cabbage, cauliflower etc. should be covered with newspaper, brown paper or cloth.

Other vegetables should be cleaned and put in poly bags with air holes and stored in the vegetable tray in the fridge.

**2. Semi-Perishable foods:** The foods under this group are - potato, onion, ginger, garlic etc. Sprouted potato, green coloured potatoes should not be bought for consumption. The outer covering of onion should be dry. While buying garlic, the matured flake should be selected, Potato, onion and garlic must be stored in wire basket separately. Ginger remains fresh in wet sand.

**3. Non-Perishable food:** Rice, dals etc. should be healthy, shiny grains, dry and free of discoloration, Sugar, jaggery, coffee, salt etc should be clean, dry with proper colour. All the spices, ghee, oil should have proper colour and flavor.

Rice, dal, ghee, oil, and spices should be stored in air tight tins or container, Suji should be roasted, cooled and stored in air tight containers. Dry neem leaves, Salt and turmeric powder helps to keep some food item fresh for long time.

**Convenience foods:** While buying convenience foods, the label on the packet should be checked properly for the date of manufacture, weight, price, ingredients used, flavouring agents used, manufacturer's address, expiry date and standardised mark. In some foods, the process of preparation

and name of preservatives used are also written on the label.

**3.4.(3). Reasons for spoilage:** All the food items remain well for a specific period of time. After that period, many undesirable changes take place and make them unfit for consumption. The main causes of food spoilage are –

1. By microorganisms
2. By enzymes
3. Infestation by insects, rodents etc.

**1. Food spoilage by micro organisms:**

Micro organisms are tiny organisms, which cannot be seen by naked eyes. They are present in soil, water, air etc. These microorganisms are bacteria, yeast and moulds or fungi. They grow in foods and spoil them. In some cases, this micro organism brings about changes to foods and improve the quality of nutrition. For example – Curd is formed from milk for the action of lactobacillus bacteria.

**Moulds/Fungi:** They are multi cellular, grey, green or orange in colour. Moulds develop in warm, damp and dark places. The growth is very rapid between 25<sup>o</sup>-35<sup>o</sup>c. Some can grow at lower temperature, even at refrigeration temperature. You have seen

some fuzzy or cottony growth on chapatti, bread, cooked rice, fruits etc. This is mould growth, which makes the food unfit to eat.

**B. Yeast:** They are unicellular, round shaped organisms, can grow best in acid medium in presence of oxygen. Their growth is rapid between 25<sup>o</sup> -30<sup>o</sup>. They can cause spoilage by conversion of the sugar present in foods to alcohol and carbon di oxide. Foods such as fruit juices, honey, jaggery, jellies, syrups, jams etc. are spoiled by yeast. In preparation of some foods like bread, buns etc. it is used.

**C. Bacteria:** They are unicellular organisms with different sizes. They may classified into different groups based on their sizes. They are cylindrical shapes known as bacillus, spheroidals are coccus etc. Bacterias usually causes spoilage in foods such as vegetable, milk, meat, fish, egg etc. and makes then harmful to human beings.

**2. Enzymes:** Enzymes are organic catalyst and are protein in nature. It takes part in many reactions in plant and animal tissues. Their action on food can be inactivated by using high temperature as they can act from 0<sup>o</sup>c to 60<sup>o</sup>c. Some green leafy vegetables and fruits like apples turns to brown in colour

after cutting. This is because of enzymatic reaction. Enzyme helps in the process of ripening of fruits. Enzymes cannot act at the temperature of refrigeration. Therefore foods should be kept in the refrigerator.

**3. Insects and others:** Different insects such as ants, mosquitoes, flies, worm, rodents etc. may damage foods and make it unfit for consumption. These insects bore into fruits and vegetables and makes it easy for microorganisms to grow quickly.

**3.4(4). FOOD PRESERVATION:**

We have already mentioned that food can be kept well for a certain period. After that, they get spoil. Milk, meat, fish and eggs are perishable foods and can be kept fresh for few days. Once these foods spoiled by the action of above mentioned factors and becomes unfit for consumption. Therefore requires preservation. Food preservation can be defined as the science, which deals with the process of prevention of decay or spoilage of food thus allowing it to be stored in a fit condition for future use.

**Importance of food preservation:**

The demand for food increases along with the increase in population. If demand exceed supply many problems like

malnutrition, starvation may occur. The demands and supply will be regular, if the produce food stuff can be preserved properly. Foods can be preserved at household level and at commercial level. On commercial level, large quantities of foods are preserved in well equipped factories, where lots of people get employment. Preservation of foods has the following benefits –

- a) Regular supply of food is possible.
- b) Foods can be stored for long duration without spoilage.
- c) Easy availability of foods all throughout the year.
- d) Preserved foods add variety to meals.
- e) It improves the nutritional status of people.
- f) Checks the wastage of foods.

**Principles of food preservation:** The principles of food preservation are –

1. Prevention or delay of microbial decomposition. We can do this in three different ways.
  - a) By keeping out micro organisms (asepsis)
  - b) By removal of micro organisms (eg. By filtration)

- c) By hindering the growth and activity of micro organisms eg. By use of low temperatures, drying or by the use of chemicals.
2. By killing the micro organisms eg.-by heat or radiations.
3. Prevention or delay of self decomposition of the food. This can be done by the following ways-
  - a) By destruction or inactivation of food enzymes, eg.by boiling.
  - b) By prevention or delay of purely chemical reactions.
4. Prevention of damage by insects, animals etc.

**Methods of food preservation:** The method of food preservation is different for different food stuff. The food preservation methods can be broadly divided into two categories-

1. Bacteriostatic method in which micro organisms are unable to grow in the food. eg-drying, smoking, use of chemicals, spices and oils etc.
2. Bactericidal method in which most of the micro organisms present in food are killed. Eg. Canning, freezing etc.

Household method of food preservation:  
The methods are –

- a) Dehydration
  - b) Refrigeration
  - c) Use of chemicals
  - d) Use of oil and spices.
- a) **Dehydration:** Micro organisms present in food need moisture to grow. When the water present in food is removed or the water content in food is brought below a certain level, they are unable to grow and spoil the food. This can be done by two way – sun drying and smoking .
- i) **Sundrying:** When foods are kept in direct sun rays, the evaporation of water takes place and dries up. Vegetables and fruits are washed, peeled, cut and placed on flat bottom trays under the sun. Rice powder, papad can be preserved after drying in the seen.
- ii) **Smoking:** Foods can be dried by exposing them to smoke by burning special kind of wood. In this way the heat from the smoke helps to remove the moisture content of food thus makes it unsuitable for micro organisms to grow and prevents the spoilage of food. Smoked food imparts a good

flavour and improves the taste of food. Meat, fish, chillies etc. are smoked by keeping them in a special structure above the chullah.

3. **Use of low temperature:** All the micro organisms, enzymes requires a specific temperature for their growth and activity. They cannot grow, becomes active below this temperature. Foods can be preserved by using low temperature. In homes, foods are preserved in fridge or under the ground.

a) **Cellar storage:** Generally in many villages, foods are stored in cellars (under the ground). The temperature of these cellars should be about 15°C. Thus the action of micro-organisms, enzymes can be lowered or prevented. Potato, coloasia, onions,

ginger, turmeric etc. can be preserved in this way.

b) **Refrigeration:** Foods are preserved at a temperature below room temperature. The action of micro organisms, enzymes are prevented as the temperature is maintained between 0°C to 5°C, hence foods can be preserved for several days. Vegetables, fruits, meat, fish, eggs, milk and milk products are stored from two days to a week, without any spoilage, when held at this temperature.

4. **Use of chemicals:** Foods can be preserved using different chemicals. These chemicals prevents the growth of micro organisms and food spoilage. These chemicals are vinegar, citric acid, lactic acid,

Following are the chemicals used in different foods

Serial No.	Food items	Chemicals
1.	Jams, jellies, fruits, juices, squashes.	Citric acid
2.	Jam, Sauces	Potassium metabisulphatic
3.	Tomato, Puree, fruit juices	Sodeium benzoate
4.	Paneer, meat, fish, sausages	Sodium fluoride
5.	Vegetable, pikles	Acetic acid (vinegar)
6.	Meat pickle	Nitrate and nitrite

## CHAPTER - XV

## 3.6. PREPARATION OF FOOD

From the previous chapter, you have come to know about selection and preservation of food. We all know that one cannot eat raw food unless it is being processed. Food preparation is an important step after which one can accept the raw food. In this chapter, we will discuss about the methods of food preparation.

After reading this chapter, you will be able to understand the following-

- a) Food preparation.
- b) Reasons and principles of food preparation.
- c) Methods of cooking
- d) Effect of cooking on nutritive value of food.
- e) Methods of enhancing nutritive value of food.

a) **Preparation of food:** Foods bought from the market are acceptable, only when

they are processed. The preliminary treatment of food are washing, cleaning, peeling, cutting, soaking, roasting, grinding, etc. These are known as preparation of food. After that food is cooked by applying heat.

Foods such as rice, dal, vegetables are cleaned and washed properly. In case of meat and fish, the scale and unwanted parts are removed and washed with salt water. After that it is cut into pieces. Different spices, nuts, requires grinding before cooking. Flours for breads, chapatis, roti etc. should be kneaded before frying. These are the preliminary treatments given to food. The utensils needed for preparation and cooking of foods should be washed properly before and after use.

**Cooking:** Cooking is a process, where raw food stuffs are changed into an acceptable form by applying heat. It is an art, which

has come a long way and today suitable method based on scientific principles are used to get palatable food with maximum nutritive value with minimum loss. Therefore, we can say that- cooking is a combination of art and science.

**Reasons of cooking food:** It has mentioned earlier that most of the foods cannot be eaten as raw and they require cooking. The reasons of cooking are –

1. Foods are cooked for physical and chemical changes. For example potato, meat undergo changes after cooking and improves its acceptability.
2. Cooking improves digestibility. Food becomes soft after cooking. The digestive juices reacts with soft foods and aids in digestion. eg. Rice, dal, beans etc.
3. Cooking makes food safe, kills the micro organisms and increases shelf life. For eg. Boiling milk kills the micro organisms, thus makes it safe for drinking and lasts longer than unboiled milk.
4. Cooking increases nutritive value. Eg. Dals, legumes, soyabeans contains trypsin inhibitor. While cooking it gets

destroyed, thus increasing the nutrient content.

5. Cooking makes food tasty and improves flavour and palatability. For example meat and fish undergoes improvement in flavour and palatability after cooking. Cooking changes the taste of potato.
6. Cooking adds variety to our food. i.e. from same type of food, different food items can be prepared.

**Principles of cooking:**

Application of scientific principles to our daily cooking ensures better health. It is very important to remember the following principles-

- a) To keep flavour in: When meat, fish, pakoras, cutlets are cooked in a fatty medium, the flavour of the food is enclosed inside the crisp covering. It makes food tasty and stimulates digestive secretion for better utilization of nutrients.
- b) To keep flavour out: When meat, vegetables are cooked slowly, it draw out its flavour into the water eg. Soup, stew are cooked slowly which brings out changes in the texture of food. The



## CHAPTER - XV

## 3.6. PREPARATION OF FOOD

From the previous chapter, you have come to know about selection and preservation of food. We all know that one cannot eat raw food unless it is being processed. Food preparation is an important step after which one can accept the raw food. In this chapter, we will discuss about the methods of food preparation.

After reading this chapter, you will be able to understand the following-

- a) Food preparation.
- b) Reasons and principles of food preparation.
- c) Methods of cooking
- d) Effect of cooking on nutritive value of food.
- e) Methods of enhancing nutritive value of food.

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- b) To keep flavour out: When meat, vegetables are cooked slowly, it draw out its flavour into the water eg. Soup, stew are cooked slowly which brings out changes in the texture of food. The

water soluble nutrients are drawn into the water and thus it makes the gravy tasty and nourishing.

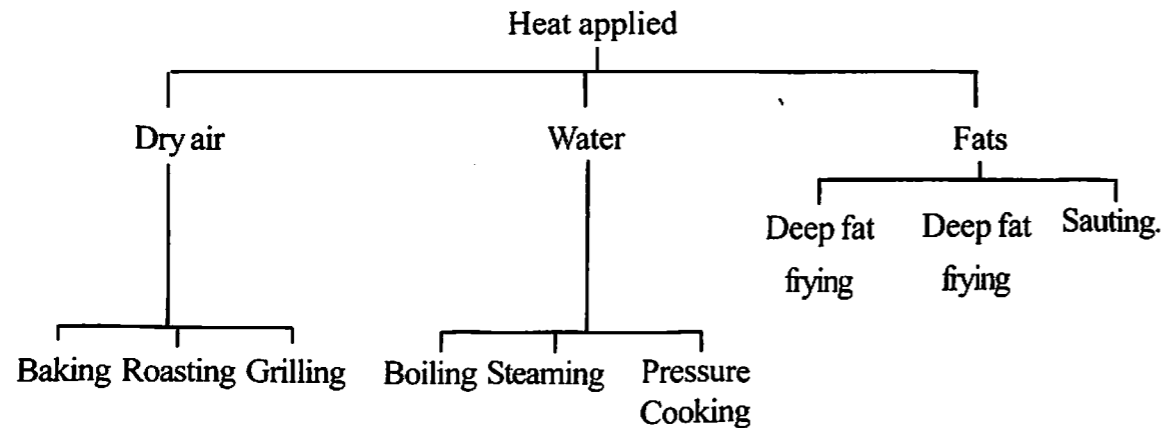
- c) To preserve the nutritive value of food: Foods such as vegetables when cooked by steaming method, retains the nutritive value. When vegetable are cooked in a covered pan using less water with low flame, the loss of nutrient is minimum.

**Method of Cooking:**

Foods can be cooked in various methods by applying heat. Water, air and fats are the medium used for cooking. These medium accept heat and cooks food. Thus medium has an important role in cooking. The cooking methods are categorized according to the medium used for cooking. They are –

**Baking:** In this method, food is cooked using dry air in a closed chamber called oven. The air inside the oven is heated by means of gas or electricity. In oven, heat can be regulated according to our requirement. Foods cooked in this methods are easily digested and nutrients can be preserved. Cake, biscuits, breads, pies, pastries are prepared by this method.

**Roasting:** Foods are roasted by radiation method using clay oven or tandoor, heated metal, hot coals or in hot ashes. The oven or the hot coals are heated first and the foods to be cooked are kept inside it. Foods prepared by this method are chapatti, roti, chicken, potato, sweet, potato, tomato, brinjal etc. Nuts, maize are roasted in hot sand. Roasting foods requires adequate skill and constant attention is needed. Roasted



food forms a protective covering around it thus moisture cannot come out, and makes the food more tasty.

**Grilling:** It refers to cooking of food by exposing it to direct heat. It is used by primitive people in which the food is subjected to red hot fire. Now-a-days grilling is done on electric flames in oven. The food is kept in high heat and rotates continuously so that food get cooked evenly. Meat, fish, tikka, kababs are prepared by this method.

**Boiling:** In this method foods are fully immersed in boiling water. While boiling foods, the nutrients specially water soluble vitamin, minerals come out from food to the boiling water. Therefore quantity of water used for boiling should be minimum or use the leftover water to prevent nutrient loss. Boiling food can be easily digested.

**Steaming:** In this method, the foods are cooked in steam. Steaming can be direct or indirect. In direct method, the water is constantly boiled and food is kept on a steamer. The lid is tightly closed so that air cannot escape from the water. Idlilies, dhoklas, steamed fish are prepared by this method.

**Pressure cooking:** In this method, the steam under pressure is used for cooking. The equipment used for cooking is known as pressure cooker. In this method, heat is transferred from the steam to the food. The food to be cooked is placed in the pressure cooker with water up to 2/3<sup>rd</sup> of its capacity and the lid with rubber gasket is held in place. The weight helps to build up pressure. Due to the pressure build up, the temperature around the food is higher than 100°C and requires less time and fuel for cooking. In this method of cooking, no loss of nutrients takes place, micro organisms are killed easily. Therefore this method is considered as the best method for cooking.

**Parboiling:** In household parboiling method, the food is put in boiling water, which denature the enzymes, naturally present in foods. Parboiling controls auto spoilage and kills some bacteria. The B-complex vitamins present near the skin penetrate into the food and the food becomes more nutritious. Parboiled rice are prepared by this method. Peas are parboiled before freezing them.

**Frying:** Oil or fat is used for frying food items. In this method, fat or oil is heated in a

pan and fried. The outer portion of food becomes crisp when fried and inner portion becomes soft. The method of frying are of three types depending on the amount of fats or oil used. They are –

**Shallow fat frying or pan frying:** It is the method of cooking food in a lightly greased pan. In shallow frying, little amount of fat is used. Parathas, cutlets, omlettes, dosas are prepared by this method. Only a thin layers of food are cooked in this method. The food must be turned from one side to another to ensure complete cooking.

**Deep fat frying:** A large amount of fat or oil is heated in a pan or saucepan and food to be cooked is fully immersed in it. The fat or oil is heated to a temperature of 150°C-200°C. Frying makes the food crisp, rich in colour and tasty. Puri, Pakora, fish, bringals are prepared by using this method.

**Sauteing:** In this method, very little amount of fat is used. The food should be frequently turned or stirred into hot fat over low heat. The food to be cooked must be kept over heat until the food becomes soft and absorbs oil. A little water may be sprinkled for hard and tough foods.

The food cooked by this method is useful for persons with diabetes and heart disease as only little fat or oil is used. It requires less time, energy, oil and fuel. Sauted foods are not very tasty hence not preferred by children.

### 3.4.(7) EFFECT OF COOKING ON THE NUTRITIVE VALUE OF FOOD:

A number of changes occur in the food components as a result of cooking. Sometimes materials are also lost. Therefore, it is necessary to understand the effect of cooking, to prevent the loss of nutrients. Let us see what change occur as a result of cooking food.

1. **Carbohydrate:** (The important carbohydrates found in foods are – starch, sugars, pectin, cellulose, hemi-cellulose etc. When dry cooking is used on starch, it changes to dextrin, which is a midway product between starch and sugar. When you toast bread, the outer portion is changed to brown in colour. Have you seen? It is because of change of the formation of dextrin which is easy to digest. Starchy foods when cooked in wet or in water medium, it swells, burst on cooking and

forms jelly like substance. These substances are easy to digest.

Sugar gets caramelised when subjected to dry heat. Sugar dissolves in water and when heated, this solution forms a syrup. This solution when supersaturated and heated again, crystallisation occurs. The crystallized sugar if heated will become brown in colour or sometimes completely burnt.)

2. **Protein:** All proteins are coagulated by heat. If the coagulated protein is further heated, it becomes dry and rubbery which reduces the digestibility. The connective tissues of protein gelatinize with wet cooking methods. These are soluble in water and easily assimilated in the body.

3. **Fats and oils:** When foods containing fats are heated, the fat portion separates and forms a layer on top of the food item. When fatty foods are cooked at high temperature, it will change to fatty acids, which has a strong flavour and difficult to digest. Fats which are solid at room temperature soften on heating. When fats are heated beyond its boiling point, fat smokes, flashes and finally catches fire. If the same fat is heated further for long time, it becomes brown and thickens.

4. **Vitamins:** Most of the vitamins, specially vitamin-c and vitamin-B<sub>1</sub> or thiamine is affected by cooking. The amount of loss depends on many factors. In normal cooking, the loss of thiamin is about 20-25 percent. Some thiamin loss occurs when the cooking water of rice, dal and vegetables are discarded. Because nutrients present in these food comes out to the water used for cooking. Vitamin-c is a labile vitamin and it is easily oxidized and affected by heat. Exposing vegetables to air for long time before cooking results in loss of some amount of vitamin-c. Loss of vitamin-A is about 40-60percent, if these foods are cooked using deep fat frying method.

5. **Minerals:** The loss of minerals does not occur in normal cooking methods. If cooking water is discarded; some water soluble minerals may be lost.

### Loss of nutrients during preparation and cooking of food and their minimization.

(It is important to know the rules to minimize the loss of nutrients during preparation and cooking of food. It is also important to ensure that, while cooking and retaining the nutritive value of food,

palatability is not sacrificed. Sometimes it is seen that even the nutritive value is retained during cooking, the foods are not tasty and people do not like it. One should remember that the food can provide nutrients to the body only after it is eaten. Therefore acceptability and palatability must be considered along with nutritive value of food. For example – raw bean is not tasty and people do not like it. When beans are cooked and boiling water is discarded, vitamin B<sub>1</sub> get lost. To minimize or to avoid loss of vitamin B<sub>1</sub> we should cook beans in just enough water, prepare soups or which is tasty and palatable. Some simple ways to minimize the loss of nutrients are –

1. Wash vegetables before cutting. It will minimize the loss of water soluble vitamins.
2. Select fresh fruits and vegetables.
3. Vegetables should be peeled very lightly as most of the vitamins and minerals are present just below the skin of the vegetables and fruits.
4. Cut vegetables just before cooking and should be cut as big as possible.
5. Introduce cut vegetables into boiling water, if to be cooked in water. Use just enough water needed for cooking.

6. When preparing soups, the slower cooking ingredients should be added first, followed by other ingredients, which get cooked in shorter time. For example – While preparing meat and vegetables soup, meat should be cooked half way before adding vegetable, as meat requires more time to cook than vegetables.
7. Salads and fruits should be prepared just before serving. Otherwise vitamin-c will loss.
8. Always use a lid or cover, while cooking vegetables.
9. Do not use alkalis with foods like pulses and vegetables as water soluble vitamin will loss.
10. While cooking Protein rich food, do not cook in high heat.
11. Do not cook food for a long time and avoid repeated and frequent heating.

#### 3.4. (8) Methods of enhancing nutritive value of food:

The quality of food can be improved by enhancing the nutritive value through various method. During Pujas or in any religious festival, Hindus offer pulses as

'Prasad'. These pulses if allowed to germinate will be more nutritious and tasty. Perhaps, you too have such habits of eating. We can enhance the nutritive value of foods by the following way –

- (a) Germination
- (b) Fermentation
- (c) Fortification
- (d) Combination

**(a) Germination:** It is the simplest and popular method. Centuries ago, sprouting of soyabean and green gram was developed by Chinese. In this method, whole grain pulses are soaked in water for 12 to 14 hours and then allowed to sprout or germinate under warm, moist conditions for about 6-8 hours. When the beans have absorbed water, the excess water is drained and the soaked grain is tied with a clean wet muslin cloth and kept in warm place. Water should be sprinkled on the cloth until sprouting. After sprouting, it can be cooked or may be eaten raw.

Germination changes the nutrients and their content in food. For example – starch gets converted to glucose, fructose and sucrose and become easy for digestion. Fats and proteins are broken down to fatty acids

and amino acids respectively. Vitamins present in bound form are converted to free form. Vitamin-c and niacin content increase three time more than the normal amount. Thus germination enhances the nutrient content of food.

**(b) Fermentation:** It is a process through which, the nutrient quality can be improved. Fermentation is brought about by micro organisms that are present in food. Micro-organisms secrete the enzymes which convert storage nutrients in food to readily available. For example – curd is formed from milk due to presence of Lacto-bacillus. Due to enzyme action, starches undergo changes in their physical and chemical composition and produce carbon-di-oxide. The production of carbon-di-oxide makes the food spongy and light. These foods are soft and easy to digest.

Formation increases vitamin B content such as thiamine, riboflavin, niacin and vitamin-c, folic acid content in food. Apart from curd, other fermented foods are – idli, dosa, dhokla, bhatura etc.

**(c) Fortification:** It is a process, in which nutrients are added to a commonly eaten food to improve its quality. With

advancement in science, fortification of foods has come into wide use.

According to FAO/WHO expert committee (1970) "fortification is the process whereby nutrients are added to foods to maintain or improve the quality of the diet of a group, a community or a population."

During fortification of foods, nutrients are used in food, to make it richer than the unprocessed foods. For example – Vitamin-C is added to fruit juices, iodine is added to salt etc.

**The objectives of fortification are:**

- To restore the level of nutrients that are lost during food processing. For example in milling of rice, some amounts of B-vitamins lost. In some countries like Japan and Thailand the milled rice is fortified.
- To prevent nutritional deficiency diseases among population. For example iodisation of salt to prevent iodine deficiency.
- Enrichment of substitute foods to equivalent nutrient levels. For example – Soya milk or groundnut milk are

enriched with nutrients to make it comparable to cows milk.

- Fortification to make food complete in itself such as ready to eat foods.
- Addition of nutrients for other purposes such as vitamin-E is added to fat as antioxidant, carotene as colouring agent.

Some fortified foods are- Vanaspati ghee fortified with vitamin A, milk and milk products with vitamin B.

- Combination :** It is a process of combining different foods to improve the nutrient content, and to add variety to foods, and improve its taste and palatability. Combination process is profitable method from the economic point of view. For example Meat, fish are expensive protein foods. Combining milk with dal, kheer can be prepared, which will provide same nourishment as any meat or fish preparation. If milk is combine with rice, custard powder or dalia, the nutrient content specially protein and calcium can be improved. Rice donot contain lysine, which is an essential amino acid. Pulses lack in essential amino acid methionine. While

preparing 'Khichiris' rice, dal and vegetables are added and cooked. Khichiri contains all the essential amino acids, vitamins, minerals apart from carbohydrate, proteins and fats.

Thus combining different food items we can not only improve the nutritive value of food but can prepare different food items.

### SUMMARY

- ☞ Cooking makes our food tasty and helps in digestion.
- ☞ Cooking has some effect on nutritive value of food.
- ☞ Loss of nutrients can be minimized by washing vegetables before cutting, vegetables should be cut into large pieces, use just sufficient amount of water during cooking and cook food in a pan with lid.
- ☞ To enhance the nutritive value of food, it is essential to germinate, ferment, fortified foods and use combination method of cooking.

### QUESTION

**A. Very short answer questions**

- What is pressure cooking method?
- What is dextrin?
- What do you mean by fermentation?
- What is fortification?
- What do you understand by germination?

**B. Short answer questions**

- What do you understand by food preparation?
- What are the principles of cooking?
- What are the methods of enhancing nutritive value of foods?
- Write about the combination method.

**C. Long answer questions**

1. What are the reasons for cooking? Explain.
2. Write about the effect of cooking on nutritive value of food.
3. What are the ways to minimize the loss of nutrients during preparation and cooking of foods?
4. Write about the objectives of fortification of foods.

**Unit – IV**

**CHAPTER- XVI**  
**OUR RESOURCES**

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**INTRODUCTION:**

Neela was very happy to buy a local brand heater at a cheaper rate of price, than her friend Mamata who had bought one with ISI mark that costs more, But recently, Neela has got an elective shock while using it. Fortunately, she was saved. Then she has realized that, it is better to buy standard and safe item at a higher price than sub-standard item at lower price. What are money, heater, knowledge? Why it is necessary to make wise use of money? How will Neela manage her money efficiently? In this chapter you will find answers to such questions.

**After going through this chapter you will be able to :**

- ◆ Explain the term 'Resources' with the help of examples.
- ◆ Categories resources as human and non human.

- ◆ List out the characteristics of resources.
- ◆ Mention the need for management of resources.
- ◆ Describe the ways to manage community resources.

**4.1. Resource and its meaning :** Each and every individual has certain needs and desires and he strive for their fulfillment. But it always depends on the availability of resources to each individual and to the family as a group. The dictionary meaning of the term 'Resource' is 'a means of satisfying needs of human'. Thus Resource can be defined as anything useful that help us in meeting our needs. Resources include all types of possessions, tools, capabilities, ways and means to satisfy wants and to achieve goals.

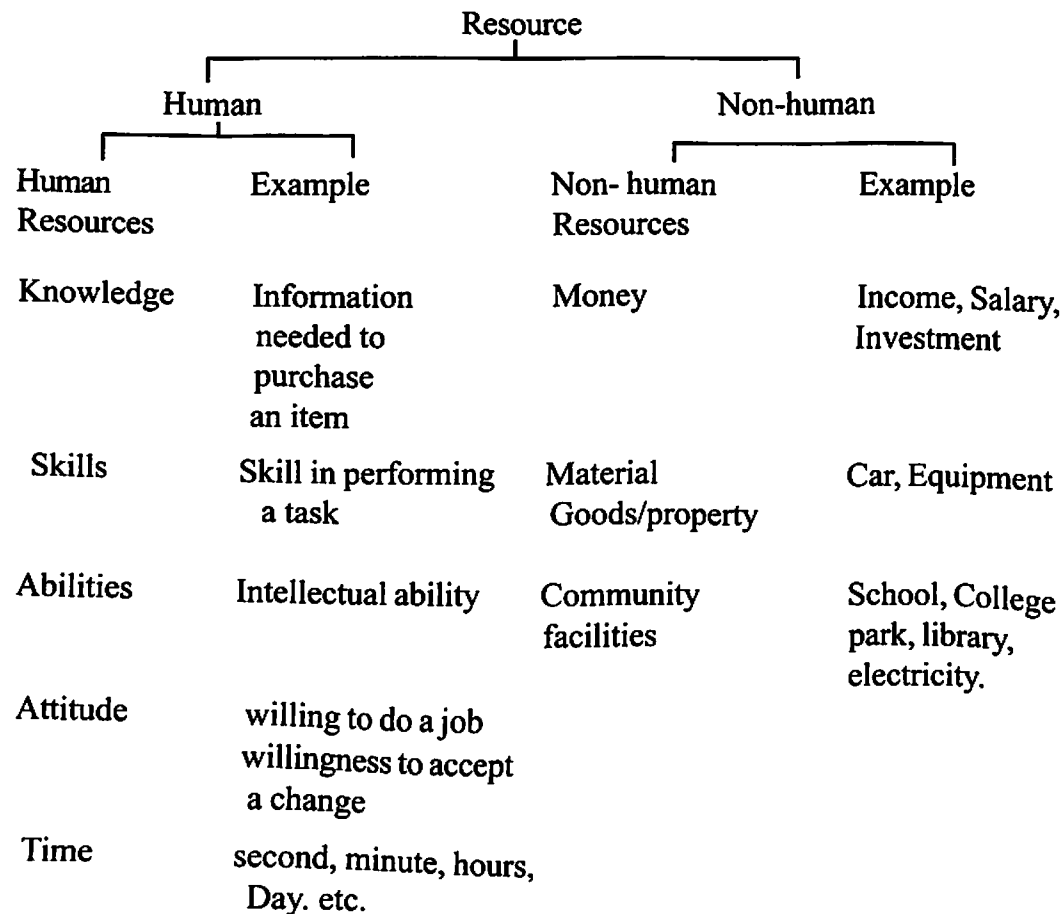
It is known to all that each and every day several activities are performed in a home on in an institution. Can you carry out these activities without spending time and

energy? You need both time and energy to carry out any activity either in your home or in your institution. Besides, these, you need certain tools, items, services etc. Can you purchase them without paying for it? No, it is not possible This shows that one need money for purchasing required goods.

Now you see, within a day you may perform varieties of activities such as in the morning you help your mother in household

activities, going to school or college by bus in the evening you do computer classes, at the night you study and also help your mother in serving food. To perform all these activities you require time, energy, knowledge, skill, money, school, college, bus etc. Because of these items you are able to do all those activities.

From all these, we can define 'Resource as a means or ways of fulfilling needs, desire and to achieve goals.



**4.2. Classification of Resources**

Resources can be classified into two categories-

- (i) Human Resource.
- (ii) Non-human Resource.

**i) Human Resource:** Human resources are internal in nature and of great importance as compared to non-human resources. Human resources comprise of time, energy, skills, abilities, knowledge etc. They are less tangible and constitute the personal characteristics and attributes.

**(ii) Non-human Resource-:** These resources are tangible but not internal. They are available for use and include- money, car, house, computer, tools and equipments and community facilities like-school, college, library, park, hospitals etc.

**4.2.1 Some Human Resources are given below:**

**a) Knowledge:** It is a resource essential for all individuals. One can achieve his goals and able to utilize his available resources properly with the help of knowledge. There is a saying that "knowledge is power", yes it is true that knowledge gives us power to manage our resources properly and help us

to fulfill our needs and desires. If a home maker has knowledge of elements principles of art and design, she will be able to use her knowledge to make a wise selection of fabrics, materials and accessories at an economical rate for effective decoration of her house.

**b) Abilities and skill:** These human resources include both inherent and acquired resources of an individual. These may range from manual skills such as washing clothes to social skills such as ability to communicate effectively. Skills can be developed through systematic learning and practices. A housewife proficient in making a dress can make a lovely dress with better result than the one who has never acquired this particular skill.

**c) Time:** It is the only resource which is equally available or distributed to all. Time is valuable human resource and once the time is consumed it is gone forever. There is a saying that "Time and Tide wait for none". It means once it is over, it cannot be regained and can't be conserved for future use. So it should be utilized properly to achieve goals.

**d) Energy :** It is the power to do a job. Energy is an important human resource

required to carry out both physical and mental abilities. You need energy for walking, talking, bathing, and other activities, including while sleeping you need minimum energy to carry out functions of the body. In thinking process, you need energy for eg. when you setting up goals, making plans and carrying out plan, all these mental activities require energy.

**e) Attitudes:** These resources are possessed by the individuals and families and they are the least tangible one. Attitudes originate from human values and goals of one's life. These can be influential activators or inactivators in the process of achievement of goals. Attitudes may be positive or negative one. If some exhibit positive attitude and work in right direction, it will be easy for him to achieve the goal, whereas, others might have negative attitude and think twice before entering into any commitment.

#### 4.2.2 Some of the non-human resources are-

**(i) Money :** It is a non-human resources, which has purchasing power. With the help of money one can purchase goods and services. For instance you as a student, need book pen, pencil, note book etc. you can

purchase all these items with the help of money . you can also procure services with it. For example you are suffering from fever; you have to take medical help from doctor. You need money to pay the doctor who gives you medical treatment. The number of material, goods and facilities one acquires and enjoys the services depends on the availability of money.

**(ii) Material goods:** We need several items like book, cycle, dress, towel, soap, toothpaste and brush, bags etc. everyday. All these items of goods can satisfy our work. So all these are termed as non human resources.

**(iii) Property:** It includes house, flat, plot of land, car, shops, Jewellery both golden and silver etc. These are termed as resources as they satisfy wants and give security to men.

#### 4.2.3. Community Facilities

These resources are used by all individual and families of a locality or community. For example- Neepa and Pomi are two good friends, they study in the same school, they go to the school by school bus, play together in the park, go together to the

library for borrowing books etc. What are schools library, bus and park? These are community facilities and important resources for individual and family. These resources are equally available to all the members of the community.

#### 4.3. Characteristics of Resources

There are variety of resources. From the above examples, you will be able to understand that there are different types of resources. But all these have certain basic characteristics. They are—

- a) **All resources are useful :** They have the power to satisfy the needs of people.
- b) **Resources are limited:** Both human and non-human resources are limited in nature. The limitation of resources can both be quantitative and qualitative. As we all know that, there are 24 hours a day, 60 minutes an hour, we cannot make 25 hours a day or 65 minutes an hour etc. Like time, other resources are also limited in supply.
- c) **All resources are interrelated:** One needs more than one resources to perform a task or achieve a goal.

Because it is not possible to fulfill a task with one resource. For example you have great interest in singing and also have sweet voice but if you don't have time, musical instrument, good teacher, physical health and money, then you cannot pursue it. To become successful singer you need all these resources along with your interest.

- d) **Resources can be substituted:** In order to solve a problem or to achieve goals one resources can be used as substitute for another.

#### e. Alternative use of resource:

Resources can be used in a wide variety of methods or ways. One has to decide upon the alternative use of resources to achieve particular goals. For example, a housewife may use her leisure time in various ways like by reading book, conducting music class, designing dresses, gardening, practicing or doing some other activities etc. on the basis of her interest.

#### 4.4 Need for management of Resources:

After understanding the characteristics of resources, it is evident that the availability



of resources are limited and some of them cannot be used repeatedly. On the other hand men have lots of needs and desire and they wanted to fulfill them. So there is the need for the management of resources. Whatever be the availability of resources. The best use of them can be made. Achievement of goals, fulfillment of desire always depends on how available resources are utilized, and for this, proper management of resources is essential.

For example, most of the time, students get limited amount as a pocket money. What will happen if he spends his money without proper planning? Will he be able to fulfill all his needs? No, it is not possible. But, if he made expenditure plan and follow that plan properly, then it will be possible for him to meet all his needs and it also helps him to get personal satisfaction. Therefore, management of resources is essential. Like management of personal resources, one has to know the management of community resources.

#### 4.5 Community Resources :

Community Resources are those resources which are shared or used by the people of a locality or area and they are

mainly comprised of non-human resources. These includes- school, college, library, water, roads, transport, park, hospitals, fuel etc. Can you make a list of these resources which are available in your community?

Today, there is remarkable increase in the availability of community resources while makes our life smoother than what it was beofre. For example in each and every locality you can find shop, market, school, park etc. But in the earlier time, it was not possible to get such facilities and you will have to go on long distances in search of these facilities. In order to manage these resources, a good amount of money is required, which is paid by the public in the form of taxes. Thus care must be taken to manage these resources properly, so that all the citizen can avail these facilities.

Another important fact is how you share all these resources. For example, in summer season, the demand for electricity, which is a community resources, is high or it is required by all consumers. Load shedding is often resorted to satisfy the needs of all consumers. It should be done in all the areas for a particular time, instead of load shedding for a few areas for prolonged period.

Similarly, when government introduces public distribution system or other services like health, services, it should be provided to all the citizens irrespective of cast, creed, religion and region etc. so that all the people can avail or enjoy all the facilities offered by the government.

The availability of community resources may vary from one place to another. You must understand that if any of such resources is available in your locality, it is not the private property for some people, it can be used by the people of near by locality also. For example, a community water tap has been provided near your house. Your father also happens to be the leader of the community. You cannot consider your self and your father as the owners of the tap. You have to share the water with all the member of community. However you or your father can look after the resource for proper utilization.

Community resources should not be misused like our own resources, it should be used properly. Since you all share all these resources it becomes joint duty to look after them as well as to find ways and means for conserving them. Proper management is one of the important ways of conserving these resources. All citizens must be aware

not only of the rights but also of the duties and responsibilities of using and conserving these resources. For example the public sweeper is there for cleaning the roads, it is your duty to ensure that whether the roads in your area are clean or not whether and it is your responsibility to see that the people of that locality do not use roads as dumping ground for their household and other wastes.

Thus it is the duty of the people of the locality to look after the shared resources and ensure that all the resources should be used properly and conserve them for future use. No one should be allowed to misuse them.

#### Conservation and management of community Resources :

There are a number of community resources. Here discuss about the conservation we will discuss and management of some of these resources. They are-

**Fuel:** Fuel is any type of material capable of producing heat or power and with this heat, varieties of work can be performed. So it has great demand. One must be careful enough while using them and should always think of conserving them.

In household, fuel for cooking can be conserved in the following ways——

- a) Collect all the ingredients, before lighting the source of heat.
- b) Put off the flame immediately after use.
- c) Always reduce the flame once boiling starts or boiling point is reached.
- d) Use wide and shallow vessels for cooking.
- e) The quantity of water should be minimum, while boiling foods.
- f) Soak food like cereals and pulses before cooking as it can reduce cooking time.
- g) Use pressure cooker for cooking, which can save both fuel and time.
- h) Use clean burner, which can ensure bright and blue flame. Bright and blue flame indicates efficient burning whereas yellow flame signifies inefficient burning and wastage of fuel.
- i) Always use clean vessels to cook food.
- j) Allow frozen food to reach room temperature before cooking.

#### (b) Electricity

It can be used for different purposes like lighting, cooking, heating, running

electrical appliances etc. and it is expensive one. One must use this in an efficient way, as it is expensive and limited resource. This can be done by using following ways.

- a) Use fluorescent tubes and bulbs instead of ordinary bulb.
- b) Switch off the lights when leaving the room.
- c) Use, properly working electrical appliances to prevent wastage of electricity.
- d) Always, switch off radio, T.V., tape recorder, computer etc. when not in use.
- e) Wherever you need dim light, use low wattage bulbs.
- f) Economies the use of electricity, by sharing lighting, space heating and cooking equipment such as table light, room heater, heater etc. as far as possible.

#### (c) Water:

Water is one of the basic needs of the human being as nothing can be done without water. So water should be used properly and conserve for the future. One can ensure its conservation to a great extent by adhering to the following guidelines. They are——

- (a) Use water only in required amount.
- (b) Close the tap or sources of water after use.
- (c) Used water that is water used for cleaning rice, pulses, vegetables etc. Should be channelised to kitchen garden.
- (d) In case of community source of water proper maintenance must be ensured. Tap should be turned off after use.

#### (d) Public transport:

These facilities are available everywhere whether it is in town, village, city etc. which facilitate people, luggage, goods etc to move from one place to another. These include buses, cars, auto, trains, auroplanes and are very expensive.

You must have heard about people, students, damaging, burning the vehicle for want of proper service or for other resources. Now a days, this type of incidents occur quite frequently. As a result, problems arise like the number of buses is reduced, frequency of buses will decrease, and public has to suffer. Is it necessary?

Sometimes, antisocial element blow off the transports causing damage to this public

property. The compensation for these antisocial acts increases the financial burden of all the member of the community.

**Parks:** Park is also considered as a community resource where young children can play, older children can acquire knowledge about different types of flowers, plants, leaves etc. Older people can walk, do exercise, take rest and get relaxed. These park should be well maintained so that it can change the environment of the locality and enhance the beauty of the locality. For maintaining the park, the resident must take the responsibility of cleaning (removing weeds), watering, using manure in the plants regularly and also other activities relate to gardening.

**Schools and Hospitals:** These two institutions are also included in the list of community services. One is meant for imparting education and the other is looking after the patient suffering from diseases and accident cases etc. These two places requires Proper cleaning and should be maintain properly Care must be taken not to damage the tools and equipments and furniture of these institutions.

Besides these, proper and efficient procedure should be followed for proper functioning of these two institutions so that facilities can be availed by all needy individuals.

**Roads:** These are indispensable resource for transport and communications. One locality or region can be connected with another by roads only. So it is our responsibility to make best use of this

resources. One must not block them for personal activities as it will create problem as well as inconvenience to other members of the society. Moreover, it is the duty of the citizen to keep them, clean and also inform to the authority to get them repaired when they become damaged. As a citizen, if you are alert and keep your road clean and safe, it will be convenient for the entire community.

### SUMMARY

- ☞ Resources are means to achieve our goals.  
Resources are two types: Human resources and non-human resources.
- ☞ Human Resources includes- knowledge, ability, time, energy, skill. Non-human resources include : money, goods, property, community resources are school, college, park, hospital, roads etc.
- ☞ The characteristics of resources are- they are useful, limited in supply, they are interrelated etc.
- ☞ Community resources are assets to a family.
- ☞ It is essential to manage them properly.
- ☞ All citizen must follow all the ways and means of conserving these resources.

### QUESTION

#### A. Very short answer questions

- (i) Name two human resource
- (ii) Write two community resources of your locality.
- (iii) Mention one characteristics of resources

#### B. Short answer question

- (i) Define resource
- (ii) Write two characteristics of resource.
- (iii) Write about the importance of conservation of community resources.

#### C. Long answer question

- (1) What is resource? How will you classify them? Write about the characteristics of resources?
- (2) How will you conserve and manage community resources of your locality?

## CHAPTER-XVII

### 4.2. Management – Meaning and needs

#### Introduction

Rupa and Robin are working members of their family. Rupa teaches in a school and Robin works at a private company. Rupa has very good reputation as she teaches well and Robin also very sincere, in his work, he also has a name in his organization. They have two children. They always manage to carry out all the activities well in time because they always take right decision which enable them to manage all activities required to run their home efficiently. Management of resources is also required to sustain the standard of living of a family. In addition to that management also helps in efficient use of community resources which can do wonders for the welfare of people and bring happiness to them. So good management lies the hope of a brighter future.

Let us see—

- (a) What is management?
- (b) What are the processes involved in management?
- (c) What are steps involved in decision making?

In this lesson, you will find answers to these and other related questions.

After reading this chapter, you will be able to :

- ◆ Explain the concept of management and its needs.
- ◆ Know the process of management.
- ◆ Explain decision making and their steps.
- ◆ Understand the role of decision making in management.

#### 4.2.1. Meaning and need for management :

In simple term, management means ‘manage by man tactfully’ that is, man uses his ability to use ‘what he has’ to attain ‘what he wants’. In other words it can be defined as the process to utilize what you already have and to achieve what you require. It is a mental process, where one uses his knowledge as well as his intelligence. As we all know that “man is superior being among all the beings of this universe.’

Now a days, the word ‘management’ is used very frequently. For example when you go for picnic or to attend your friends birthday party, if you enjoy well and everything goes on smoothly, then you say that the management is quite good. On the other hand, if something goes wrong, not happy with the management then you comment that management is not at all good or encouraging. Is not it? So we should know the basic meaning of management. The success of management lies in the proper exploitation and optimum utilization of the available resources.

The term of “management” is not confined to the four walls of business

organization, institute, industry or corporate house. It is indispensable every where, be it in hospital, club or even in home. It has occupied an important place in the home and applies all the principles in the management of affairs at home. Home management is the administrative side of family living and it is a dynamic process that consist of making up of series of decisions which leads to action and attainment of desired goals. Management, whether it is for individual or family, results in nurturing of values and satisfying needs and it caters to all aspect of family life ie. social, psychological Economical, spiritual etc. It also makes it possible for a homemaker to utilize all the available family resources in a planned manner to meet the challenging situations, to solve problems as well as to help to resolve conflicts that arises in the home and family front. It depends on homemaker’s management skill, ability, leadership qualities, interest, attitude and her ability to motivate other members of the family, which plays key role in the optimum utilization of family resources. So it becomes imperative for a homemaker to have an adequate knowledge of different aspects of

management, and also by her best to follow the process of management.

The definition of it can be given as "home management is a series of decision where family resources are utilized in order to achieve family goals" or it is a mental process through which one plan, control and evaluate the use of family resources in order to achieve family goals.

This definition put emphasis on four basic aspect-

- First - Acquiring Resources.
- Second - Utilization of Resources.
- Third - Achieving goals.
- Fourth - On Decision making.

This definition can be shown diagrammatically which will help you to understand well.



#### 4.2.2. Need for management

Today, management has become essential to every member of a family and the process of management has become familiar to them. Because, absence of proper management or lack of knowledge of management procedure create problems in making best use of resources and to attain desired goals. As time changes, changes take place everywhere- be it in home, society, state, country etc. which is inevitable. So the need for management becomes all the more important. Out of all these changes some of them are apparently visible, for example as a result of industrialization, gainful employment for home makers, better competitive market, flooding the market with labour saving devices and greater mobility of families, are the new options open for a home maker. She finds herself in constantly changing and challenging environment. So she has to make several decisions according to the new environment to solve problem.

So, management is essential and it is through management that she can bring about an orderly change or development to her family and solve the problems that arise

in family situation. Besides these, it also helps to achieve individual as well as family goals along with community goals. For example. In a family, parents want that their children should pursue higher education. That is the goal of that family. To achieve this particular goal, family should manage their resources well.

Moreover, we know that the availability of resources are limited. Whereas our needs, desires are unlimited. Therefore, management is essential to achieve our unlimited goals and desires with limited resources.

It is also essential to fulfill needs and desires of each and every members of the family, which will help to form strong bond among the family members and good relation among them. This is essential for creation of healthy environment in the family.

#### 4.2.3. Process of Management

Management in the home is dependent on various management processes. These include decision-making, understanding of the processes and nature of the work involved, supervision and the successful use of proper method. The work process

consist of a series of action aimed at fulfilling desired goals. It requires knowledge, experience, skill, abilities, intelligence and other resources to man. The whole process of management is termed as “mental process” as it is a mental work. This process comprises of the following five interdependent and interrelated steps. They are\_

- a) Planning.
- b) Organization.
- c) Implementing.
- d) Controlling.
- e) Evaluating.

**a) Planning:** It is the first step in managerial process and it is done before starting an action. It is always based on fact and information but not on wishes or feelings of an individual. For efficient planning we have to find out answers of certain basic question like- ‘what’, ‘why’, ‘where’, ‘how’, ‘when’ and ‘who’.

Planning helps in bridging the gap from where you are, where you want to go that is achievement of our goal. For example if you want to be a specialist in one particular subject or want to become a lawyer, first you have to collect information on eligibility

criteria, entrance test, qualifying age etc. Moreover, while selecting institution, you have to consider admission fees, infrastructure, transport and communication facilities etc. On the basis of collected information, you can plan for future and take decision accordingly.

A successful plan must have the following qualities. They are-

- (i) The plan should be a simple one.
- (ii) It should be action – oriented.
- (iii) It should be flexible so that it can be change whenever necessary.
- (iv) Plan should be such that all the family members can participate actively or plan should motivate all the members to take part in it actively.

With reference to the example of becoming a lawyer or specialist in a particular field, what action you will be taking to acquire knowledge needed for entering into the course? Are your family members cooperating with you? Are they encouraging you for this? In case you don’t make it to become a lawyer or specialist in that field, be flexible and opt for an alternative course, so your plan should be a flexible one.

**(b) Organising:** It is one of the most crucial step in management process and the success or failure of a plan depends on the organization structure that is how good organization structure is laid. In simple term, organizing means mobilizing all essential resources and technique and arrange them in an orderly manner. In home, usually various plans are made and several activities are performed. So organization is essential to carry out all these activities effectively. Organization is also essential for smooth function of home as well as to achieve family goals.

Organization is concerned with mobilizing, combining and co-ordinating the available resources. In previous example, organizing include collection of information, study material for specialised course or bachelor of legislative law course. In addition to these, you can take help from your family regarding the teacher teaches such course, to ensure admission to such a course.

**(c) Implementation:** It is the third step, in the management process. It means implementing a putting the plan in to action. When a plan has been finalised, resources are assembled and organized, then it is ready to be put in to action.

Referring to the earlier example of pursuing special course or law, the student will have to carry out the detailed time and study schedule. This also include analyzing whether the needful preparation for the purpose of achievement of goal is insight or not.

**(d) Controlling:** It is another important step in management process, because the success of the plan depend on it. The process of control is conducted on the implementation of the plan. In the absence of proper control, all efforts will prove to be failure. During the process of implementation, problem may arise and in order to solve the problem one has to control? Controlling is an art of measurement and application of correction to any performance of activity. It helps in smooth execution of plan and during controlling certain measure has to be taken if events seem to be getting off the track. If anything goes wrong with the prior action plan, then it helps to set things in right position.

Referring back to the earlier examples, in case your study is not up to the desired level at a certain stipulated time, what control can you exercise? You can cut down leisure

time, devote more time for study, take help from capable, qualified person, so that you can tide over your difficulties. In this way, controlling help to carry out plan in a right direction.

**(e) Evaluation:** It is the final stage of management process. It is an essential step as it help in assessing the success and achievement of the management process and of the results achieved. It indicates whether things are turning out as originally planned or whether any modifications are needed. So it consist of looking back over the steps of planning, implementing, controlling the carrying out plan to assess how good or poor the plan was and it also helps to make improvement in future planning. Evaluation must be done in relation to goals or objectives set by the members of the family.

All the steps of the management process mentioned earlier, one followed to use resources of the family.

#### 4. 2.3. Decision-making:

Decision- making is at the heart of all management and influences the management process-planning, organizing, implementing, controlling and evaluation. At every steps, there are several problems and situation that

call for decision to be taken. Sometimes, it also happens that selection of one action, once considered to be the best, but proves incorrect or inadequate, when implemented. At that point new alternatives have to considered and fresh decision should be made .In a home situation, a housewife generally faces lots of problem and to solve these problems she has to take decision. So it is considered as an influential tool.

In Webster's Dictionary, it is defined that "Decision-making is the act of determining in one's mind upon an opinion or course of action."

#### 4.2.3.(i) Steps in Decision making

In the process of decision making, several logical steps are involved. They are-

- a) Identifying the problem.
- b) Obtaining information and formulating possible course of action.
- c) Evaluating the consequences of each alternatives.
- d) Selecting the best course of action.

**a) Identifying of problem:** The first step in decision of making process is to identify the problem. The problem must be identified and understood in all its details. It

is essential to understand and analyse the total situation that is the source of the problem and how it take place etc. Therefore, proper assessment of problem in all respect is needed. For example, a family, which finds it difficult to pay monthly electricity bills, as a result it piles up and at the time of final payment huge amount has to be paid. It creates problem, and you have to find out why it has happened? Whether the problem is due to improper use of money or misusing the estimated amount of electricity for other purpose, or unnecessary use of electricity etc.

To identify the real problem, the home maker or the responsible person of the family must assess the total financial position. In order to solve the problem, the home maker must analyse the situation and find out all the factors responsible for the problem and tackle the situation without being biased or emotional.

#### **b) Obtaining information for formulating possible course of action:**

It is the second step in decision making process. In this step one has to formulate possible course of action after identifying the problem or situation. This should be based

on all available knowledge and information. One must have adequate knowledge and information about all possibilities which may help in achieving the desired goals. Referring to the earlier example, there are three alternatives to pay the electricity bill' like one can take loan to solve the problem or to approach the authority to give permission to pay the bill in two installment or discuss with the authority to allow them to pay certain amount along with regular bill for few months on an installment basis. One has to select one, out of there thre alternatives to solve the problem.

**c) Evaluating the consequences of its alternatives:** The third step of decision making is to evaluate or examine all the informations of each alternative so that the decision maker can identify one of the alternatives which may be the best in all respects. The decision maker has to evaluate thoroughly all the alternatives before selecting one.

**d) Selecting the best course of action:-** This is the last step of decision making process and it is a difficult task of selecting the best course of action from amongst the various alternatives. Referring to the earlier

example, suppose the decision maker has taken the decision to pay the bill by taking loan and make it a point to pay the bill regularly and takes care about the proper use of electricity.

### Role of decision making in management:

Decision making is essential in all the phases of management and the quality of decision determines the quality of the management. Management process is a complex one which can be seen from various point of view and can be applied or operated at different levels of importance. It occurs where there is some problem to solve or some choice to make. Therefore it is an important mental process in solving problem of acquiring and using resources to achieve goals.

As we all know that, there is a central point in each and every process. In case of management process, decision making is the

heart of the process and it requires knowledge of essential information, application of knowledge in real life situation and also the willingness to know and to apply. Thus it has great role to play in management, which involves knowing and applying essential information in the problematic situation of every day life. One needs to be aware of what is involved in decision making, who makes the decision, where and how decisions are made and how it affects one's daily life.

Certain decisions are routine one and some decision are made during certain times of one's life span, like decision on education or marriage etc. Once decision is taken, it cannot be change. On the other hand, decisions on purchasing an item, household task or final plan can be changed easily. Decision are of different types like- some of them are complex, some are necessary.

### SUMMARY

- ☞ Process of management aims at achieving the desired goals.
- ☞ Management process is essential to utilize the resources to the fullest extent.
- ☞ The managerial process consist of planning, organizing, implementing, conholing and evalunling in the use of resources.
- ☞ Decesion Making in the heart of all management.
- ☞ Four steps in decision making are- identifying the problem, obtaining informations for formulating possible coueses of action Evaluating the consequences of its alternatives, selecting the best course of action.

### QUESTION

#### A. Very short answer questions :

- (i) Define management.
- (ii) Mention the differents steps of management process.

#### B. Short answers question :

- (i) Write about the importance of management of resource.
- (ii) What is decision making?
- (iii) Mention the qualities of a successful plan.

#### C. Long answer question :

- (i) What is management? Why it is important write in brief about the process of management.
- (ii) Define decision making. Write about the different steps of decision making.



## CHAPTER XVIII

## MANAGEMENT OF TIME AND ENERGY

In a home various activities are carried out and most of them are common to all households. Let us see some of the routine activities of a household. Suppose your friend Biva get up early in the morning, freshens herself, gets ready, take breakfast, goes to school, return from school, take lunch, rest for a while, finishes her home work, play with her friend, does her evening prayer, watches T.V. takes dinner and goes to sleep. If you observe yourself, then you will find that you too perform same activities.

We all know that each day has 24 hours and it is during this time, we have to perform all the above mentioned activities. If Biva or you can't finish your work in a given time, it is not possible to give extra time.

In the same way, we should see that while performing activities Biva utilized her energy. Energy is required for walking,

talking studying, playing, washing etc. Quite after Biva reports that she gets tired and wants to take rest.

Above example suggest that time and energy are limited resources. Some question arises in our mind as to, why do we feel tired after doing some work? What is tiredness known as. Are there any ways to overcome this tiredness?

After going through this chapter you will learn the following things.

- ◆ Concept of time and energy management.
- ◆ Importance of time plan and their steps.
- ◆ Factors to be considered while making time plan.
- ◆ Energy cost of work and types of work.
- ◆ Fatigue and its causes.
- ◆ Concept of work simplification and their methods.

- ◆ Role of member of a family in efficient running of a house.

#### 4.3.1 Concept of Time and Energy Management.

Time and energy, both are limited human resource. They are interrelated and interdependent. It implies that both time and energy are managed together. Time has its own characteristics i.e it is equally available for all, can be measured and express in terms of minutes, hours etc. Energy varies from individual to individual. But both resources are essential for human beings and for optimum utilization of this resources, management is necessary.

#### 4.3.2 Importance of time management :

Time is a limited resource. There are 24 hours in a day and the time of 24 hours can be divided into three equal parts. Each part has 8 hour, one part (8 hours) for rest and sleep, another part (8 hours) for work and the third part (8 hours) for personal living. So planning is necessary for carrying out all the activities efficiently.

Efficient management of time helps people to satisfy their needs and desires by completing their work or activities on time.

On the other hand, inefficient management may lead to a life full of worries and tensions. For example, Ritu has sound sleep in the night and always looks fresh in the morning, whereas her friend Loni always looks tired and tense right from the morning till night. She cannot complete her previous days work, always carries previous days pending work and is unable to cope with time. What could be the possible reasons, it is due to lack of proper time planning.

You will understand well if you perform the small exercise.

How do you start a day in the morning? Please tick mark the appropriate answer?

- \* Start with the day's job and complete the work as and when the need arises.
- \* Prepare the list of activities to be performed in a day and start accordingly.
- \* Plan and prepare the list of jobs to be performed in sequence and start doing according to the plan.

The first point indicates that you do not plan your time.

The second point indicates that you plan to some extent.

The third point indicates that you plan your time properly. In other words, you make a time plan.

#### 4.3.2 (a) Time plan

The plan which is made to use time is known as 'Time plan'.

Time plan enables you to finish all your jobs or activities on time. You can have fixed time to take rest and be able to enjoy your leisure time. The success of time plan lies in its practicability and it should be a workable one.

##### Steps in Making time plan:

There are certain steps one has to follow while making time plan. They are-

##### (i) List all the activities to be performed during a given period.

It is the first step, one has to follow and these activities can be of different types like daily activities which includes cooking, bathing, washing, studying, combing etc. Some of them are weekly activities like clearing and arranging study table, changing bed linens, visiting friends etc. Some activities are monthly, seasonal and annual like sewing of dress, thorough cleaning of home, cleaning of the wardrobe etc.

##### (ii) List all these activities which have to be done at a specific time-

Some activities like going to school and office have fixed time. So particular time must be allocated for these activities and others can be adjusted accordingly. For example, prepare breakfast/lunch and pack the tiffin for school going child and office goes before they leave. Cleaning the house or making the bed can be done later.

##### (iii) Estimate the time required for each and every activity and prepare a tentative plan.

It is well known that time is necessary to perform a task. So one has to keep enough time for doing a task. It is important to note that, if the estimated time of the plan is not enough to do a particular task, then the plan is an impractical. For Example, in your plan if you keep half an hour but require fifty to sixty minutes to reach your school, you will be late for school.

##### (iv) Sequence of work should be organized.

It is necessary to group together the related activities so that wastage of time can be minimized. All activities like buying vegetables, grocery items, paying bills,

repairing articles that involve going out should be done in a single trip. It will help accomplish a number of tasks in a specified time and in a single trip to the market.

##### (v) Check the time plan.

This is the last step in making the time plan. Time plan should be checked to see if all the activities are included in it. If there is any difficulty to accommodate all the activities into the time plan, then one can delete some activity or dovetail a couple of activities to catch up with the lost time.

#### 4.3.2. Controlling and evaluating the time plan.

After completion of time plan, work should be done according to the plan and control the plan if necessary. Sudden arrival of guest, at time of illness, etc. one has to adopt the plan as required. One or two tasks may be omitted, perform other task little faster etc.

Evaluation of time plan is most essential. Here time plan is reviewed to see whether one can finish task within the allotted time or certain question can be

asked. Is the plan feasible? Does it help the worker for smooth running of the house?

If not, how can it be improved? Future plan can be made on the basis of the result of the evaluation.

One sample time plan for student is given below. You can also plan your time in following manner.

Morning- 5:30 - 6:00	Getting up and do personal work.
6:00 - 7:30	Study.
7:30 - 8:30	Get ready for school.
9:00 - 3:00	School hours.
Afternoon- 3:00-3:30	Return from school.
3:30 - 4:00	Personal work
4:00 - 4:15	Time for meal.
4:15 - 5:00	Rest.Evening-
5:00 - 6:00	House hold Work.
6:00 - 6:15	Prayer.
6:15 - 6:30	Tea time
6:30 - 9:30	study time.
9:30-10:00	Dinner.
10:00-10:30	Watching TV.
10:30-10:45	Personal Work.
10:45	Go to bed.

### 4.3.3 Factors to be considered while making time plan.

There are certain factors one must consider while making time plan. They are-

(i) Firstly, one should see whether any help is available or not in performing a task.

It is because the plan for lone worker will be different from the other who has helper in performing a task.

(ii) Second factor to be kept in mind is the sequence of the task. The task which is accomplished systematically and logically takes less time than when done in a haphazard manner. For example, while cleaning a room, dusting is the first and foremost task, followed by brooming and mopping the floor. If you do it the other way round, there will be a need to clean the house again.

(iii) The third factor is to combine and carry out two or three activities at the same time. it is known as dovetailing. Let us see the following example for better understanding of the technique of dovetailing.

Suppose you have to perform three tasks like preparing breakfast, tiffin and ironing school dress at the same time.

1<sup>st</sup> case: Do all the three task independently.

- (a) Preparing breakfast – 20 minutes
- (b) School tiffin-25 minutes
- (c) Ironing of school dress-15 minutes
- (d) Total time taken -60 minutes

Second case: Combine or dovetail the three activities

- (a) Boiling water-2 minutes
- (b) Cutting and cleaning vegetables -5 minutes
- (c) Boiled vegetables – 5 minutes with hot water.

**[Keep the tiffin box ready and washing Rice & dal for khichiri]**

- (d) Separate vegetables- from hot water and add rice & dal 8 minutes .
- (Allow khichri to cook, in the mean time cut bread and start ironing school uniform)
- (a) Heat oil, add boiled vegetables & bread for tiffin 5 minutes
  - (b) Heat oil and cooked boiled vegetables, rice and dal 5 minutes
  - (c) Packing tiffin and serving food-5 minutes
  - (d) Time taken for complete ironing-5 minutes

Total - 40 minutes

One can follow both the methods to accomplish above mentioned task but the first method requires one hour whereas in the second method only forty minutes is required. Thus it is clear that one can save time by making proper plan as well as dovetailing or combining two, three works together.

There are certain periods of the day, when most of the activities are carried out in the short span of time. For example, a working woman has to prepare breakfast and packed lunch for all the members, get herself ready to go to office. In this case, morning period may be considered as a peak load period. There may be more than one peak load period in a day. So one must keep in mind the adequate spacing of peak load periods in a time plan.

The next point one should consider while making time plan is providing rest period in the time plan, so that worker can carry out the work/effectively.

Another factor one has to keep in mind while making plan is keeping provision of leisure time. Leisure time is necessary for the worker to relax and all the family member sits together at this time. They can watch

T.V, listen to music, read books, paint, etc. Can you name some more?

Lastly, the time plan must be flexible. It must have some free time, to cater to the emergency.

### 4.3.4 Management of Energy :

Like 'Time' 'energy' is also a resource. It includes both human energy and non-human energy or fuel. Human derives energy from food, which is essential to perform various task. It is also necessary even while taking rest. You have already learnt about management of non-human energy on the fuel. In this chapter you will learn about effective management of human energy.

Management of energy is more complicated as compared to time management,. Because time required to do a task can be assessed easily whereas it is difficult to assess requirement of energy to accomplish a task. Besides, availability of time is equal to all, whereas possession of energy varies from individual to individual. Its availability is dependent on the physical and mental health of a person

However, heredity and environment also affect the amount of energy available to any individual.

Let us see, what 'energy' is. It is the 'power' or 'capacity' to do a work. It has already been mentioned that we can perform any task with the help of energy and even while we take rest we need energy. The amount of energy needed to carry out an activity is determined in terms of oxygen consumed by the body per minute. It is expressed in term of calories. Energy cost means the difference of extra energy required by the body to accomplish a task, the minimum energy required by the body while resting.

Energy cost of a work = Energy required to perform a work - Energy required by the body while taking rest.

The work is classified into three categories on the basis of energy cost. They are-

Light work, moderate work and heavy work.

Light work requires less than 100% extra energy than the resting energy does. Moderate work requires 100-150% extra energy over and above the resting energy. A list of works of different categories are given blow.

TYPE OF WORK	ENERGY REQUIRED	LIST OF WORKS
a. Light	Less than 100% of additional energy	Peeling, chopping vegetables, table setting, dusting, knitting etc.
b. Moderate	100 to 150% additional energy	Ironing, Brooming, Climbing staircase, preparing cake batter.
c. Heavy	150 to 200% additional energy	Lifting heavy object, Washing clothes, scrubbing floor etc.

In this way all work can be categorized and it will help to plan your work more effectively by alternating light, moderate and heavy work. It reduces the feeling of tiredness and if you take a small break, or rest for a while after heavy work, you will soon overcome your fatigue.

**4.3.5 Fatigue**

After accomplishing a task we feel tired. Do you feel, so? Yes, we all feel tired or fatigue after doing some work. Fatigue can be defined as a feeling of extreme physical and mental tiredness or it can be defined as a state of mind and body when we are not

willing or able to do a task. It happens after doing a heavy work for long time, walking long distance or running, reading, writing etc. for a long time. If you do all these activities for a long time, gradually your capacity to do work get reduced. Fatigue is of two types-

- (a) Physiological Fatigue.
- (b) Psychological Fatigue.

**Physiological Fatigue**

It is a state when an individual is unable to perform a task. During muscular activity the body requires energy that is obtained from food. Energy is stored in the form of glycogen in the body. During work, the oxygen you breath is combined with glycogen to release energy.

(Energy is required, which is obtained from food when glycogen is oxidized, energy is released.) But, during muscular activity, oxidation of glucose is incomplete, as a result lactic acid is formed, get deposited in the muscles. This deposition of lactic acid in the muscles causes fatigue. This type of fatigue is termed as physiological fatigue. In order to avoid this fatigue lactic acid should be removed from the muscle which can be done with the helps of oxygen. So rest or deep

breathing helps to draw oxygen into body which oxidizes lactic acid. As a result a person feels fresh and recover from fatigue.

**Psychological Fatigue**

It is state of mind when an individual is able to do work physically but not willing to do so. Why it has happened? It may arise out of boredom, lack of interest, dislike for the task being performed, non-conducive working condition, inexperience, mental worries etc.

**Ways to reduce fatigue**

It is quite natural to get tired or feel fatigue after performing a task. But one should know the ways to reduce fatigue.

In case of physiological fatigue, one can reduce fatigue by taking rest for a while, by using labour saving devices, by changing the method of work etc. If you take rest you can restore the capacity to work and also feels refreshed for doing new job.

Psychological fatigue can be reduced by keeping the following points in mind. They are-

- (a) One can make the work interesting.
- (b) Having proper and well planned place of work.

- (c) Making the work environment pleasant and attractive.
- (d) Procuring suitable tools and equipments.
- (e) Motivating workers to develop skills at work.
- (f) Setting short term goals, achieving goal one after another for eg. moving up on the ladder to success.
- (g) Keeping free time in daily work schedule etc.

#### 4.3.6 Work simplification:

It is quite clear from the previous discussion that energy management involves maximum utilization of available energy of an individual. It is necessary to make work simple for proper management of time and energy. As time and energy are closely related, saving of any one invariably saves the other. Work simplification means reducing the amount of time and energy, required for performing a task, thus ensuring effective use of time and energy. It can be defined as a conscious seeking out of the simplest, easiest and quickest way of doing a work.

The main objective of work simplification is to accomplish a work by using minimum amount of time and energy. Moreover, to reduce physiological and psychological fatigue of an individual, work can be simplified by the following ways:

- A. Changes in hand and body motion.
- B. Changes in work, storage space and equipment used.
- C. Changes in end product.

#### (A) Changes in hand and body motion:

One can change hand and body motion by following methods.

#### (i) Eliminating all the extra movements

In doing any activity one uses many motions of body which is not actually needed. If one is conscious about this then many steps and motions can be eliminated, while performing a task. For example, one can use a tray to carry all the essential items for laying table instead of carrying each item individually. It helps to save both time and energy.

#### (ii) Improving the sequence of work.

Work can be done easily, if one follows the sequence of work. For example, for a right handed person, it will be easy to stock dirty utensils to the right of sink, wash them and then transfer them to the draining board on the left.

#### (iii) Developing skill at work.

There is a proverb that 'Practice makes a man perfect' and this can be followed in developing skill at works. It means one can improve his capacity or skill in performing certain work, if he does it regularly. For example, when you knit a garment for the

first time you tend to spend more time and energy, but when you acquire the skill of knitting it will take less time to do so.

#### (iv) Using correct Posture.

One can save energy while performing a task by using correct posture. If a person's posture is not proper he may feel pain, get tired easily and result in poor efficiency in performing the task. For example, when you hang out clothes, it is better to keep the bucket on a comfortable height rather than keeping on the floor and bend each time to hang the cloth.

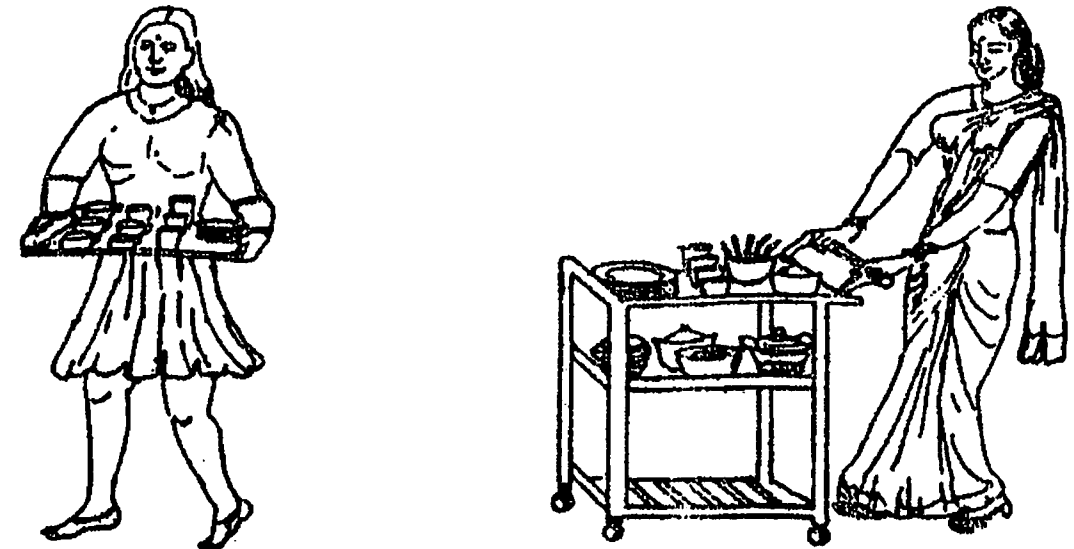
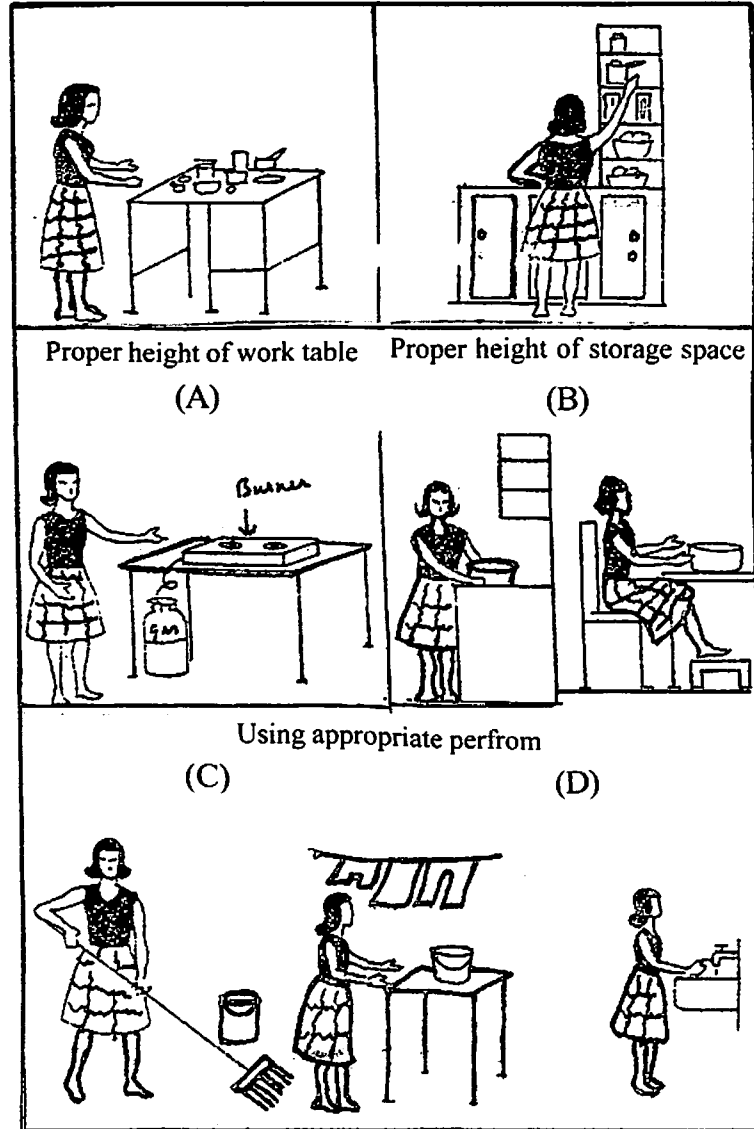


Fig-11 Use of trolley and tray to save time and energy.

**(B) Change in work, storage space and Equipment.**

It emphasizes adequate organization of the work Place, storage space, tools and equipments. For organizing space one

should remember that the equipments must be within the reach of the worker. The height and width of the work surface must suit the worker.



Proper method of working

Fig-12



Keeping frequently and items within reach.

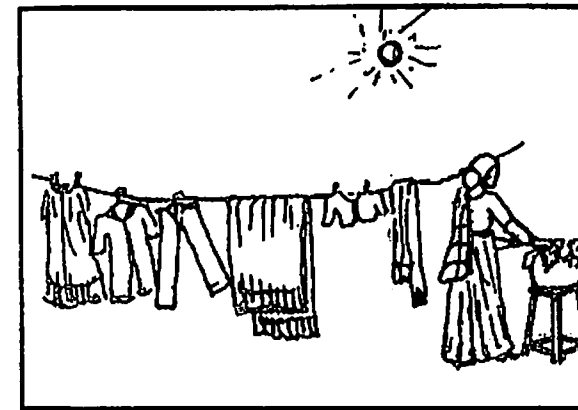


Fig-13 Hanging cloth by keeping bucket on tool.



Fig-14 Hanging cloth with wrong posses.

The equipments which are used very frequently should be placed within the reach and should be easily accessible, so that the worker finds it easy to handle them. Whereas, the equipment which are used occasionally, can be stored at the top or

bottom of the shelves. For example, the plate stand should be fixed in such a height that the worker is able to keep it in proper place after washing and takes out them easily at the time of serving food.

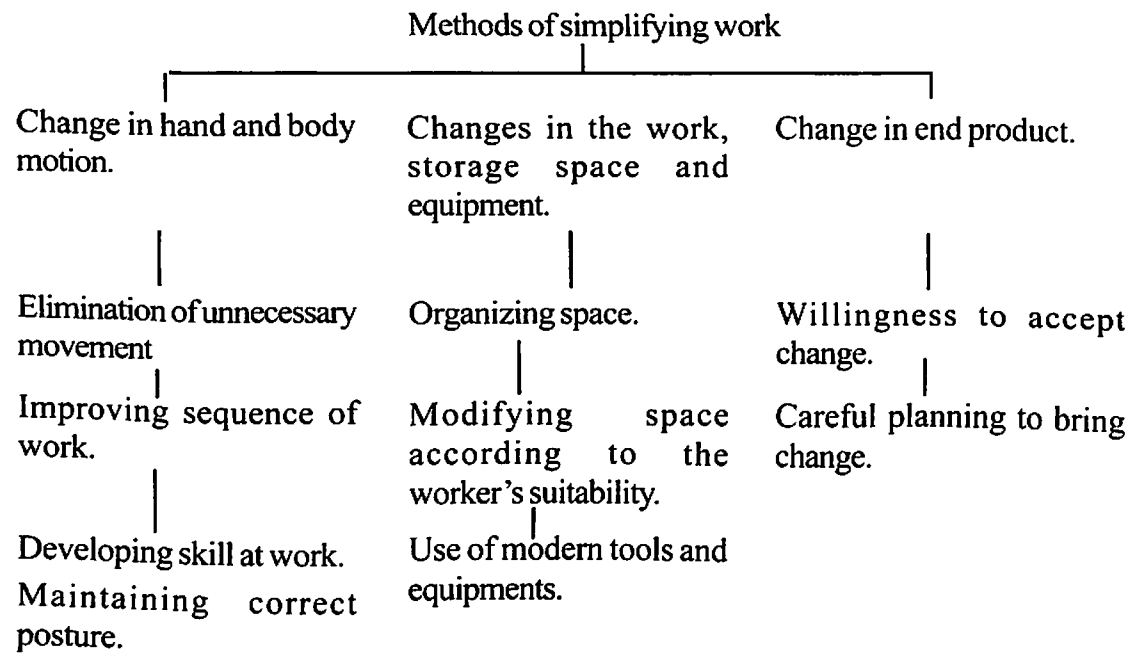
Time and energy can be saved by using labour saving devices. Today's market is flooded with devices like peelers, Cutters, graters, squeezer, slicers, beater, grinder, pressure cooker, oven, toaster etc. All these are labour saving device and one can make use of them to save their time and energy.

**(c) Changes in End Product:**

Every family maintains certain standards for housekeeping and follow certain norms and traditions. As time changes changes has come to family and you are also aware that change is fact of life. So you must take initiative to accept new ideas

if they can save time and energy. For example, the spices which we used in preparing curry, if ground by using mixer grinder, we are able to get smoother consistency than others which is traditionally ground by grinding stone. If dal is cooked in pressure cooker, it gets cooks quickly, makes dal tasty and nutritious. It also saves time, fuel as well as less effort is required. Such methods are acceptable in the present day context.

The different modes of work simplification can be summed up as follows.



**4.3.7. Role of different family members in efficient running of the house.**

Family members play an important role in efficient running of the house. In most of the household, each member perform certain task which are termed as his rule. For example in your home, who is responsible for cooking, washing utensils, looking after the young children. Your mother is not it? In the same way, father helps in purchasing materials from the market, paying bills and repairing equipment etc. Children also help in performing certain task depending on their skill and abilities. Do you help your parents?

In this way, if the tasks accomplished by all the family members whole heartedly, then it will develop team spirit and closeness among the members, work can be done quickly, result will be satisfactory and reduces the work pressure of individual member, thus providing opportunity for enjoying the leisure periods. But care must be taken to distribute work among family members depending on certain factors like age, interest and abilities.

Work should be distributed on the basis of age and interest, to get satisfactory result, specially when work is given to

children. They enjoy doing some jobs, enhance their confidence and likes to be the part of the family work force. The parents should be appreciative of their contribution and give more responsible tasks to them as they grow. It encourages the child to become responsible person in later part of his life.

The following table shows the contribution of 6 or 7 years child and a teenager in the organization of work at home.

Household jobs for 6 to 7 year old child.

Household jobs for teenager

- a) Water the plants.
- a) Make bed, tidy up the room.
- b) Put cloths and toys in their place
- b) Wash own cloth, dresses.
- c) Set the table
- c) Polish shoes. Iron cloth.
- d) Clear the study table.
- d) Help mother in the kitchen.
- e) Arrange shoes.
- e) Prepare market list etc.

List out the activities you and your younger brother or sister do in your home.

Household jobs are divided among family members on the basis of age. Because the boy can carry or lift heavy object easily than the girl of the same age. In this way, like and dislikes or interest of individual should be considered while division of work is done to get satisfactory result. You will be happy to see the amount of work that can be accomplished if all the family members of your family contribute whole heartedly. The work can be done in a short time and it develops team spirit, closeness among the family members. As a result, all the members get the opportunity for enjoying the leisure time. For example, you have invited your uncle and his family for lunch on Sunday. All the activities related to the invitation have

been divided among all the members like your father has the duty to collect ingredients from market, you cleaned the ingredients, you and your father peel, chopped the vegetables together, your mother has cooked the food, your younger sister has sets the table, you have arranged crockeries and cutlery's, your mother has served the food to the guest and family members. And you have enjoyed the lunch together. As works have been distributed among all the members, the burden of work of your mother has been reduced, you and your sister have enjoyed doing the job and the feeling of belonging In this way you must have done different jobs in your home.

#### SUMMARY

- ☞ Time and energy are limited human resource and need to be saved.
- ☞ Time plan is careful thought out plan of action and its steps are-
  - (i) List all the activities to be performed.
  - (ii) List the activities that are to be done at specific time.
  - (iii) Estimate time for each activity.
  - (iv) Check out the plan.
- ☞ Energy is the capacity to do a work.
- ☞ Activity can be classified as light, moderate and heavy.

- ☞ Fatigue is the feeling of tiredness and it is of two types- physiological and psychological.
- ☞ Effort should be made to reduce fatigue.
- ☞ Work simplification helps in effective management of energy.
- ☞ Work can be simplified by three ways like bringing changes in hand and body motion in work, Storage space and equipment, and in the end product.
- ☞ Each and every family member play an important role in efficient reming of the house.

#### QUESTION

##### A. Very short answer questions :

- (i) Write two factors influence in making 'time plan'
- (ii) What is energy?
- (iii) Name two types of fatigue.
- (iv) Mention two ways of simplifying work.

##### B. Short answer question :

- (i) What is time plan? Mention the importance of making time management.
- (ii) What is physiological fatigue?
- (iii) Mention two ways of reducing psychological fatigue.
- (iv) Write about the importance of simplifying work.

##### D. Long answer questions :

- (i) What is time management? Why do you want to manage your time? Write about the steps of making time plan.
- (ii) Define fatigue. How will you classify them. Write about the ways of reducing fatigue.
- (iii) What is work simplification? Write about the methods of simplifying work.



## CHAPTER-XIX

### ORGANIZATION OF SPACE AND WORK AT HOME

A home is a place where a family lives together and enjoys family life. You all know that one among the three needs of human being is shelter or home where we perform various activities. So space is required to perform various activities for which space should be organized in such a manner that one can perform tasks easily.

In this chapter you will learn about :

- ◆ Importance of home.
- ◆ Common activities carried out at home.
- ◆ Allocation of space for different activities of home.
- ◆ Methods of organizing space in house.
- ◆ Appreciate the use of colour and other accessories to enhance the beauty of rooms.

#### 4.4.(i) Importance of home.

Home is a place where an individual and his family enjoy happiness, love and affection and performing different activities related to physical and social, psychological needs of the inmates. It gives the feeling of security and safety to all the members of the family. It is the place where children learn values, tradition of the family, form good habits, manners etc. One can express his feeling, views etc. freely in his home only. Home is the place where one can realize his needs and be oneself.

Home can strengthen the bonds of love and affection and the members learn to stand by one another through thick and thin.

The functions of Home are –

- 1) To give shelter
- 2) Protect from rain, sunshine, cold and other natural calamities

- 3) Provide the feeling of security.
- 4) Give in privacy, so that one can perform personal activities, fulfill biological needs etc.
- 5) Help individual in the development of personality and helps in learning manners, family traditions, values etc.

So, home has close relation with the individual and one can not separate a person as individual from his home. It is impossible to have a home without individual and vice versa. Home is the place where one takes shelter, enjoy privacy and security, learn traditions, form good habits, learn norms of society and religious codes etc.

#### Common Activities of Home

Activities are task that an individual perform to achieve goals and to satisfy his needs and desire. For example if anyone wants to be clean than he has to take bath, clean his place and washes his clothes etc. If you want to enjoy, you may listen to music, watch television, movie or games etc. When you feel tired you take rest, sit or sleep. So all the above mentioned tasks are termed as activities. All these activities are performed at home to fulfill our desire.

These activities can be categorized as work – oriented, rest-oriented and leisure activities. Some of the work oriented activities are- cooking, washing, cleaning, studying etc. On the other hand rest-oriented activities are sleeping, resting, relaxing etc. Similarly leisure time activities includes listening music, watching movie, television, playing games, dancing, enjoying the company of friends etc.

We can make a list of activities which are mentioned above- Preparation of food, serving food, cleaning vessels, washing clothes, ironing cloth, cleaning home, taking rest, entertaining guest etc. All these activities comprise of several sub-activities. For example washing cloth includes sorting of soiled clothes, soaking them in soapy solution, washing, rinsing, drying, folding, ironing before putting them in to the cupboard. These sub-activities must be carried out properly and in sequence, so that time and energy can be saved.

#### 4.4.(2) Allocation of space for different Activities.

Space is required at home to perform different activities and a good house must

provide adequate space for the activities. Required space for performing different activities are given below-

household activities. But it is difficult or problem arise when area is small and one has to adjust space for all activities in it. It is

Activities	Space allocated
a) Preparation of food (cooking)	Kitchen
b) Serving food (Eating)	Dinning room/space
c) Entertaining Guest	Drawing room, living room.
d) Studying	Study room, Bed room, Living room.
e) Sleeping or resting	Bed room, verandah, study room.
f) Bathing	Bath room
b) Washing cloth	Bath room, Back yard of house.

It is learnt from the above table that there is a need to have some space allocated for carrying out different household activities. Space allocation is easy for a large home, as separate space can be kept for major

possible to carry out all activities even in one room, if space is organized properly.

**Importance of maximum use of space**

It is a matter of fact that, as the space is limited, it becomes important to utilize

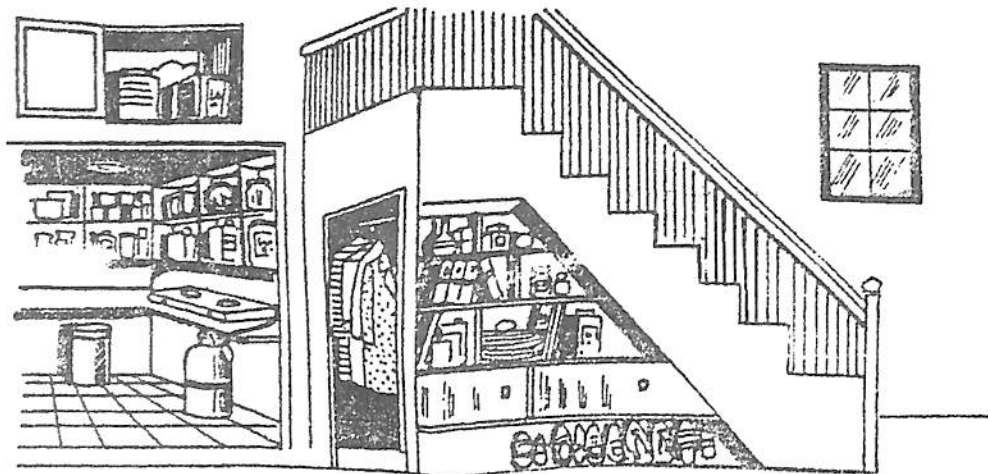
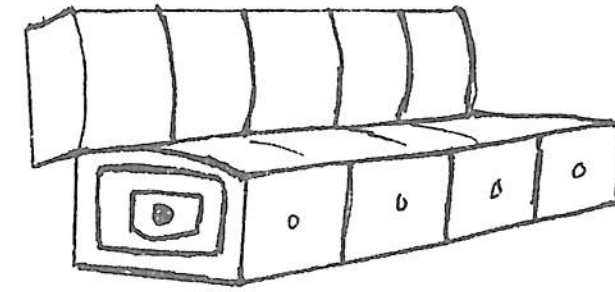


Fig. 14 Proper use of available space



Sofa-cum-bed

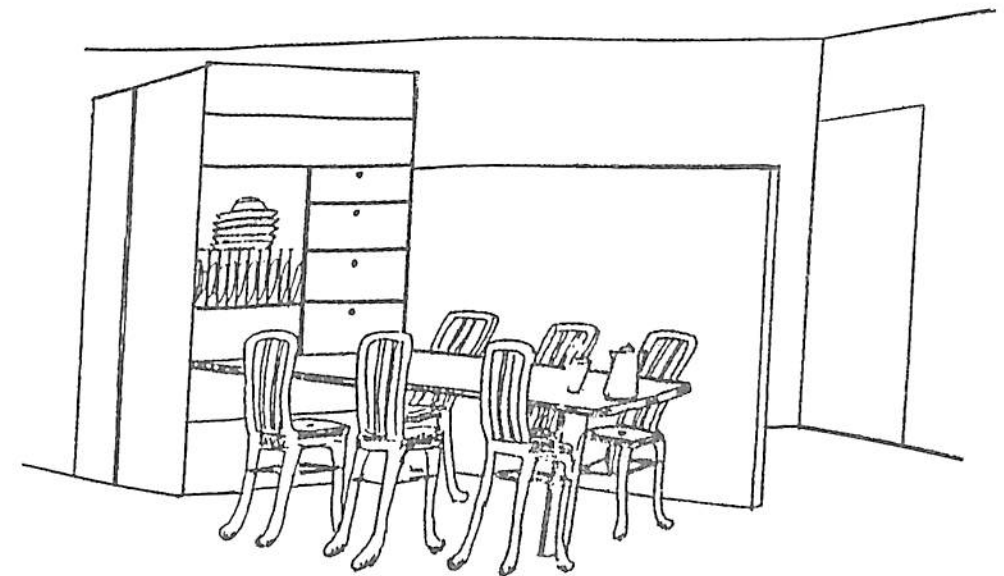


Fig. 15 Division of rooms

every inch of the available space. It depends on effective organization of space by the dwellers. Besides it increases efficiency and provide comfort to the inmates.

Today, it is not easy to find a spacious accommodation specially in town and cities. It is therefore essential to make best use of available space. For example, if a room is

used for sitting, dining, studying and sleeping etc then multipurpose furniture must be used in which all these activities can be performed like the use of sofa-cum-bed. The space and furniture should be organized in a manner that due consideration is given to each and every activity of the household, two activities should never interfere with each other and

should ensure the freedom of movement inside the house. For example, if space is limited and has to be used for various activities, then, one can use one corner of the room for sitting purpose while a dinning table can be arranged on the other wall, which can serve dual purpose like dining and studying. When a particular space is used to perform various activities, that space or room is known as "Multipurpose room".

Space can be expanded with proper use of furniture, mirror and light etc.

**a) Expanding space by furniture arrangement-**

- In order to expand space of a room, furniture should be arranged in the following way.
- It is better to use two sofas instead of four chairs.
- Place two small seating units together to occupy less space.
- Big pieces of furniture should be placed against the wall.
- Folding and light furniture should be used whenever possible.
- In one roomed apartment, instead of using two bed, one double bed with cushions will look better.
- Low lying furniture when arranged in a room gives the feeling of spaciousness.

**b) Expanding space with mirrors:**

Use of mirrors always gives depth and added length and width to a room. In a small room the effective use of mirrors on opposite walls create an illusion of space, as a result the room looks larger than actual size.

**c) Expanding space with light:**

Light can bring difference in the perception of space. So it can be used properly to create illusion of spaciousness. It will give tremendous effect of spaciousness of proper light when mirror is used in a room.

**(d) Expanding space with colours.**

Proper use of colour can create the illusion of spaciousness in a room as light colours always gives feeling of expanse. If the room is small, it is better to use white, cream, yellow colour as they reflect light, spread illumination and add spaciousness to any area.

**4.4.(4) Use of colour and accessories in a room.**

Functional aspect is an important aspect in organising space along with attractiveness of the organized area. Proper planning for decoration is essential for the

limited space and it can be done by using colour and accessories. Use of colour and placing accessories like flower arrangement, hanging picture etc. at right place can enhance the beauty of the room.

**✓ a) Colour**

Colour has the power to enhance the beauty of an area and it has emotional effect. But it has to be used effectively. So one should know about different colours, their dimension etc.

Colour has three dimension-Hue, value, Intensity.

Hue- It indicates the name of the colour like red, blue, yellow.

Value- It indicates the quality of colour such as lightness and darkness of the colour.

Intensity- It signifies the dullness and brightness of colour.

**✓ Classification of colour:**

Colour are classified into three- groups Primary, Secondary and tertiary colour.

**Primary colour:** Red, yellow, Blue are primary colours. Other colour are derived from these three colours.

**Secondary colour:** These colours are obtained by mixing two primary colours in equal proportion.

**Primary + Primary Secondary colour colour colour**

- Red + Yellow Orange.
- Yellow + Blue Green.
- Red + Blue Purple.

So, orange, green, purple are secondary colour.

**Tertiary colour:** These colours are obtained by mixing one primary colour with one secondary colour.

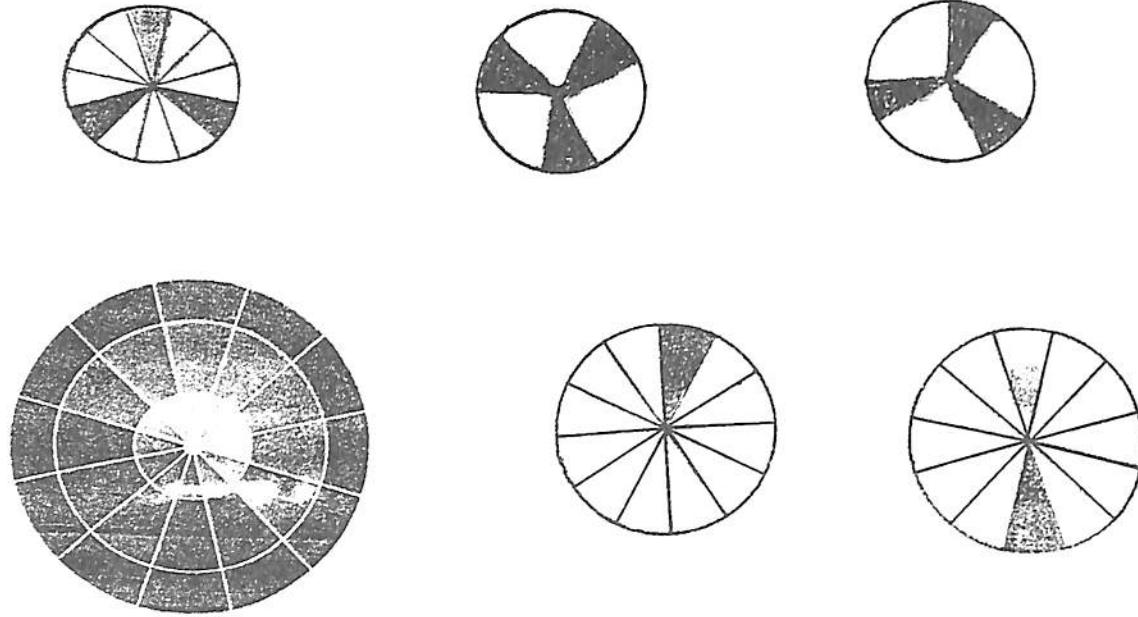
**Primary + Secondary Tertiary colour colour colour**

- Red + Orange Red orange.
- Yellow + Orange Yellow orange.
- Blue + Green Blue green.
- Yellow + Green Yellow green.
- Red + Purple Red purple.
- Blue + Purple Blue purple.

Thus, Red orange, yellow orange, blue green, yellow green, red purple, blue purple are tertiary colour.

**Colour scheme**

It is a scheme where colour from colour wheel are selected to use. It can be done



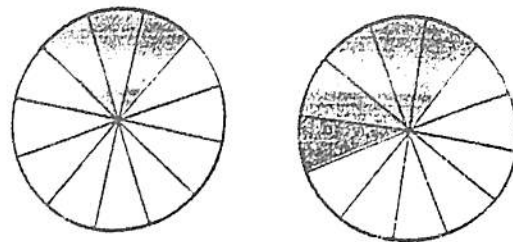
by combining two three colour or different shades of one colour. There are several colour schemes which is categorized as related colour schemes and contrast colour scheme. They are—

**a) Monochromatic colour scheme:** It is a single-colour scheme. It consist of using several values and intensities of the same hue or colour. For example, light, medium and dark-blue combination could be one illustration of the scheme.

**b) Analogous colour scheme:** It is a combination of neighbouring colours on the colour wheel. For example, blue and blue-purple, purple form an analogous colour

scheme. This scheme may have 3 to 5 colours.

**c) Complementary or contrast colour scheme:** In this colour scheme, colours which are opposite to each other on the colour wheel are used. This scheme is lively and vibrant in which one warm and one cool colour are used together. If the amount of cool colour is more than the amount of warm colour, then it will give vibrant effect.



For example, one can use deep red colour for carpet, with different values of green for other furnishing material in a room.

Besides these three colour scheme, there are split complementary colour scheme, Triad colour scheme etc. Which can be use for decorating a house.

#### **Selection of colour scheme for different –rooms.**

A dark room can be turned into a well lighted room and a dull object can be made into a bright one with the help of proper colour scheme. Thus, selection of colour is an important aspect and one must consider certain points while selecting colour scheme for a room such as size and shape of the room, style of room, use of the room, personal taste and current fashion etc.

Colour can change the size and shape of a room. A small room can be made to appear large and bright by using light, cool colours on the wall. A long, narrow room can look proportionate by painting the longer walls in a darker colour.

Colour sets mood of a room. Use of bright colours in a room expresses warmth, friendliness, fun etc, while the use of light,

white colour express cleanliness and peacefulness.

Activity of the room is another important consideration while selecting colour for a room. For example, warm colours are for drawing, sitting room whereas cool colours like green, blue are for bed room etc.

#### **Colour wheel**

Colour wheel is a wheel where all the three colours that is primary, secondary and tertiary colours are spaced together.

#### **Warm colour**

Red, orange, Red purple, yellow orange are termed as warm colour as they create a feeling of warmth and advancing in space.

#### **Cool colour**

Blues and greens, blue-green colours creat cool effect hence they are known as cool colours.

#### **Accessories**

Accessories like flower arrangement, picture and other articles are used in interiors to enhance the beauty of the room. Some of the accessories are discussed below.

**a) Flower arrangement:**

Like other accessories used in home, flowers also play an important role in enhancing the beauty of the area in which they are placed. It is an art of organizing flowers, other plant materials like leaves, buds etc. in a vase, in such a manner, that can enhance the beauty of the surrounding area where it is kept. The principle of art like harmony, colour, texture and balance are followed while making arrangement of flowers. The main objectives of arranging flowers is to make the place cheerful, lively and beautiful.

Flower arrangement can be used at various location such as on a center table, corner table, window sills, walls etc. to suit the occasion and space. The colour of the arrangement should be in harmony with the colour of the room.

There are different types of arrangement-

- a) Line arrangement (b) Mass arrangement (c) Combination of line & mass arrangement (d) Miniature arrangement.

Line arrangement is based on element of line, in which small amount of plant

material is used in order to display the beautiful lines of plant growth. This type of arrangement is suitable for corner table of a room, near the wall of room etc.



**Fig. 18 Line arrangement**

In case of mass arrangement, a single type of flowers or varieties of flowers are arranged in a group and grouping may be compact or airy. This arrangement can be seen from all sides i.e. from the front and the back. Mass arrangements are used in the center table, dining table etc.



**Fig. 19 Mass arrangement**

In case of combination of line and mass arrangement, the best feature of line arrangement and the best feature of mass arrangement are combine together. So it huge, and attractive arrangement and this type of arrangement is suitable for conference room table, big hall, dining hall table, party table etc.



**Fig. 19 Line & Mass arrangement**

In diminutive or miniature arrangement, very few plant or flower are used. In this type of arrangement, small bottle, mug, cup, bottle cover are used as a flower vase. The height of this type of arrangement should not be more than five inches (5") and are suitable for bedside table, dressing table, near sink, food tray etc.

**Picture Hanging**

Pictures are also used in decorating a room. They are used either on the wall, table, mantle pieces and so on. There are certain point one has to consider while selecting picture for a room. They are- the picture should have both aesthetic appeal and subject matter appeal. Aesthetic appeal is the effect created by colour and form of the picture. Colour appeal of the picture should be considered in relation to the room where it is to be hung. Picture should have pleasant subject for the purpose of decoration.

The size and shape of the picture is another important aspect and it should go well with the size and shape of the wall on which it is to be hung.

Picture should be selected on the basis of the activities of the room. For example, landscape, marine, flower picture are suitable for living room. Flower, fruits, vegetables and picture of eatable are suitable for dinning room as they can enhance the appetite of an individual. Bed room may have personal, family photograph which have a touch of belongingness, security, love and affection. It should enhance emotional balance of the inmates.

Another important consideration is hanging of pictures. Picture should be hung

as flat as possible as they will appear to the part of the wall and hung low and not above the eye level of standing person. Small picture should be hung in group according to the theme and colour and less place is to be left between the pictures.

#### Other accessories

Some other accessories like table lamp, mirror, clocks, stature can be used

for decorating a room or house. Accessories may be categorized as decorative and utilitarian article according to the purpose they serve. For example- decorative item include-stature, utilitarian includes lamp etc. Can you make a list of all the accessories that is available in your home? All accessories should be placed in such a manner that can enhance the beauty of the room.

#### SUMMARY

- 1) The home fulfills physical, social and psychological needs of all family member.
- 2) Different household activities are- cooking, dinning, relaxing, sleeping, studying, washing, entertaining guest, bathing etc.  
Each household activity is comprised of several sub-activities.  
All works should be organised properly to save time and energy.  
Works should be shared among the family members.
- 3) The house must provide adequate space for household activities.
- 4) The objective of space organization is to make the house more comfortable and functional.
- 5) Colours and accessories play an important role in enhancing the beauty of the home.

#### QUESTION

##### A. Very short answer questions :

- (i) Define multi purpose room.
- (ii) Name two secondary colour.
- (iii) Mention two methods of expanding space.
- (iv) Name two colour scheme.
- (v) Name two types of flower arrangement.
- (vi) Write the name two accessories used in decorating a room.

##### B. Short Answer questions :

- (i) Write two functions of home.
- (ii) How will you expand space with light?
- (iii) What is colour wheel?
- (iv) Write about monochromatic colour scheme.

##### C. Long answer questions :

- (i) What are the importance of home?
- (ii) How will you allocate space for different activities of home.
- (iii) Mention the ways of expanding space by arranging furniture.
- (iv) How will you select colour scheme for different room of a house?
- (v) What is flower arrangement? Write about the types of flower arrangement.

**CHAPTER-XX**  
**WORK ETHICS**

**Introduction :**

Today, everyone is conscious about their career. Infact each and every individual wants to do a job. If one conducts a survey among senior secondary students, many of them would report that they would like to take up a job in free time. One has to be truly professional and well contented with the job so that he will be able to become a successful individual in future.

‘Momi’ and ‘Buli’ are working in public sector enterprises. Momi used to be late to her office, not remaining in her place during office hours and often rude to her colleagues. So nobody wants to maintain friendship with her. Quite often she is found reading magazine without completing her job which is assigned to her. She expressed her reluctance to go for in service training for updating her knowledge and skills.

‘Buli’ on the other hand, is a sincere worker always present in her place during working hours and finished her job on time. She is polite and well behaved, So she can adjust with everyone in her office. She always tries to keep herself update about the latest development in her field of work. So she has been promoted to a senior position. After going through these two examples do you want to become ‘Momi’ or ‘Buli’

In order to become like ‘Buli’ you need to have strong work ethics. After going through this chapter, you will be able to know-

- ◆ The meaning and importance of work ethics.
- ◆ Establishment of the relation between work ethics and satisfaction.
- ◆ Discipline at work place.
- ◆ Code of work Ethics.

**Meaning and Importance work ethic:**

The word ‘ethics’ means morality ; infact it means a sense of right and wrong. This sense has great influence on the personality of the individual.

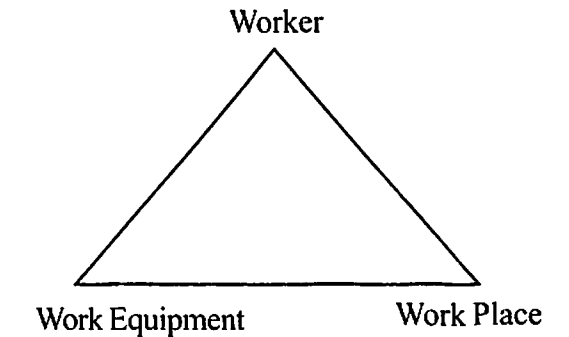
A ‘work ethic’ is a standard of conduct of job performance. Work ethics is influenced by the individual’s concept of ‘good and bad’, right and wrong’ etc.

A ‘work’ or ‘job’ is essential for all of us. It is considered as an important part of one’s life. The general concept of job is that it should be livable and enjoyable part of one’s life. But it depends on the worker to make his job pleasant one. Because the worker can make the job enjoyable. Individuals who are of the view that “work is worship”, they work hard for their organization and are able to derive satisfaction from their jobs. There is a close relation between work ethics and personal satisfaction. The individual who has an urge and interest in work, who is sincere, honest and hard working he can accomplish the job efficiently.

**4-5(2) Elements of work place.**

There are three components in any work place. They are- worker, work place

and work equipment. All these are essential to perform a task and they are interlinked to each other. This can be shown by the following diagram.



In this diagram, the worker is at the top of the triangle because he is the most influential person in any work environment. Because he has the capacity to think, to plan, to analyse and to manage any situation with tact. The second component is work equipment, these equipment should be safe and in good working condition so that the worker finds them safe to operate with. The third one is the ‘work place’ which is essential for performing a task and it should be arranged properly. The tools, equipments and machinery should be in proper order and sequence so that the worker can perform task smoothly and efficiently.

In order to achieve success in the job performance, one must have urge, interest,

aptitude, ability and adequate knowledge of the work. If one lacks these qualities, even the best of the work place and work equipment will not yield the desirable result.

### **Development of work Ethics**

In order to maintain discipline at work place and to be successful in his job, one has to develop work ethics. For that, it is necessary to inculcate the following habits by an individual. These habits help in the formation of strong work ethics. They are-

- (i) Have respect for the job undertaken.
- (ii) Maintain punctuality and regularity in the job performance
- (iii) Stick to the job and remain in the chair during the working hours.
- (iv) Know the job well.
- (v) Use polite and respectful language with colleagues.
- (vi) Be systematic and methodical.
- (vii) Expand your knowledge by attending training courses if any.
- (viii) Manage and use available resources properly.
- (ix) Acquire the necessary skills.

#### **(i) Have respect for the job undertaken:**

It has been mentioned earlier that, the work which you undertake must give you pleasure and it depends on you. It can be possible by forming right attitude towards the job. If you have respect for your work, than you will be able to enjoy it by doing the assigned job and perform that job successfully. For example, a woman who is proud to be called a 'Nurse', will be able to look after patient well, behave with them well in comparison with a woman who feels that becoming a 'Nurse' is not a respectable job in the society. Thus the performance of the first lady will be better than that of the second one.

#### **(ii) Maintain punctuality and regularity in the job performance:**

In order to maintain discipline at work place, punctuality and regularity of worker are necessary. These two important aspects enable to accomplish our task within the given time frame. Suppose your school bus does not come at right time every day, then the valuable time of your parents will be wasted while waiting with you for the bus. Why it has happened? It may be for the

reason of not sending the bus by bus operator on time, or may be for some other reason. If the bus operator or the driver has right attitude towards his job then he will be on right time or he will send the bus at right time and manage the situation well.

#### **(iii) Stick to the job and be on your chair/ seat during working hours:**

It is very much essential for the worker to remain in his seat during working hours along with punctuality and regularity. For example, if the person responsible for enquiry counter of bus stand is not found in his seat, it can create problem for the public. There could be disorder or delay in the smooth running of the work related to passenger services.

#### **(iv) Know the job well**

It is essential for the worker to have an adequate knowledge about the different task involved in a job. For example, in an organization, if the accountant is conversant and experienced, he followed correct procedure in keeping account and entered every thing in the ledger properly. On the other hand, if he is not conversant with accounting procedure, it may cause various

problem and delay in smooth functioning of the office. Thus, the worker should have proper knowledge about their task to run as well as to earn good reputation for the organization.

#### **(v) Use polite and respectful language:**

It is an important quality for all human being. The worker should always be polite, courteous, curious and he should use respectful language while interacting with people. He must be able to communicate effectively with public as well as with his own colleagues. If one employee show respect and use polite language to the other then favorable environment can be built which is essential to run the organization smoothly. For example, if one guardian has come to your school to enquire about some fact, and if he is not treated well or not answered by the employee of your school, how would the guardian feel and react? What attitude, the guardian will have toward your school or there might be uncalled for arguments leading to loss of the reputation of your school and wastage of time and energy. This in turn hinder the working system as well as development of your school.



**(vi) Be systematic and methodical:**

It is essential to be systematic and methodical to carry out a job efficiently. So worker must be systematic, organized and methodical while performing the task and he should plan his job before hand, stick to his plan and follow them in sequence till the job is done. It helps him to save his valuable resource like time and energy and to get satisfactory result.

**(vii) Expanding the horizon of knowledge or update knowledge:**

It means acquiring latest information about a particular subject or collect essential information to make one aware of latest situation: For example, if a doctor keep himself constant touch with the latest development of his subject and collect information, technique, medicine etc, he can perform his work smoothly and the patients also can approach him. Infact he will be able to run his clinic efficiently. So it is essential to keep abreast with the latest knowledge and technology in the field you are working.

**(viii) Manage available resource properly:**

Usually, a group of people work

together in any organization but there should be a good team spirit to get the job done successfully. It is essential for all the members of the group to co-operate with each other and have fellow feeling among themselves, so that they can solve any problem that might arise in their working situation. All the members should share the credit of doing good job or earning good reputation for the organization. Be an understanding human being and certainly do not to be harsh to the team members. In this way, good team spirit can be maintained and in the long run healthy environment can be created.

**(IX) Acquire the necessary skills :**

In the age of advancement of science and technology changes has come in every sphere of life which is inevitable. We also adjust ourselves with the changes and for this we must acquire new skills to go ahead. For example, in a office, previously all the works were done by using type writer but now it has replaced by a computer, so the employee has to learn the technique of operating computer so that they can work quickly and efficiently. But if the employee is not willing to learn the technique it will create problem in the office.

**4.5.(4) Code of work ethics:**

There are certain rules to maintain discipline at work place. Besides, these will help us to perform our job efficiently and to create good reputation for our organization, if we follow them properly. These codes are termed as code of work ethics. They are as follows-

1. Be regular and punctual at your work place.
2. Be polite, good nature, have patient and use respectful language while communicate with others.
3. Remain in your work place during working hours and finish the assigned job within the time frame.
4. One should have urge to do work and try to acquire necessary knowledge and skills.
5. Try to find out suitable solution for any problem related to the job.

6. Follow the rules, regulations, programs and priciples while performing tasks.
7. Resources should be managed and utilized properly
8. One should be impartial, neutral and judicious while performing his own task.
9. Be prepared to learn new things and try to adjust one self with the time.
10. Should have respect to all sorts of jobs. If corruption is noticed in any field one has to come forward and take proper step and eradicate it.
11. One should have honesty, sincerity, accountability toward his jobs and to his organization.

All these above mentioned codes or rules make the job easy and help us to run an organization smoothly and efficiently, if there are followed properly.

**SUMMARY**

- ☞ Maintaining strong work ethics is essential to achieve personal satisfaction and recognition .
- ☞ There are three basic components- workers, work place and work equipments in any work situation. Of these the worker plays the vital role.
- ☞ One should always keep in mind the essential Components like working knowledge, interest, aptitude and skills etc., while choosing a career.
- ☞ Worker must be disciplined and strive to do the best.
- ☞ They should know or be aware of the code of work ethics.

**QUESTION****A. Very short answer questions :**

- (i) Name the elements of work place
- (ii) What is the meaning of work ethics?
- (iii) Mention three habits which help in development of work ethics.

**B. Short answer questions :**

- (i) Write about the importance of work ethics.
- (ii) Mention the rules essential for maintainy discipline at work place.

**C. Long answer questions :**

- (i) What is work ethics? Why it is important? Write in brief about the elements of work ethics.
- (ii) Explain the habit which help in formation of strong work ethics.

**Unit-5**

**CHAPTER-XXI**  
**OUR APPAREL**

**Introduction:**

There is a close association between you and your personality with your apparel. It reflects your individuality, enhance your beauty, provide comfort as well as expresses or reflects your social status. As we all know that one of the basic needs of human being is clothing. Your apparel helps you to live with comfort for the whole year i. e. for all seasons.

To day, there is a variety of fibers and fabrics being manufactured to enhance the beauty in terms of look, texture, draping, durability and the necessary customer appeal. It has become essential that the consumer makes wise selection of dress materials, furnishing materials and others including the cost factor. As a consumer you too select fabric for different aspect. Hence, you need to study about fibre, fabrics, selection and care of different materials.

In this chapter, you will learn about the following-

- ◇ Definition of fibre
- ◇ Types of fibre
- ◇ Propertise of fibre and their care and maintenance
- ◇ Identification of fibre.

**5.1.1. Fibre Science**

Fibres are fundamental unit used in manufacturing of textile yarn.

Yarns are drawn from fibre and from yarn, fabrics are made and from fabrics, dresses of our own choice are prepared. Other materials like table linen, household linen, are also made from fibre. But it is not possible to prepare fabric from all sorts of fibre. Because all fibres don't possess all the characteristics which are essential for weaving, fabrication of fabric. These characters are –

- (a) The length and width of fibre
- (b) Fibre strength
- (c) Pliability
- (d) Spinning quality
- (e) Uniformity
- (f) Moisture regain and absorption
- (g) Elastic recovery and elongation.
- (h) Thermal behavior

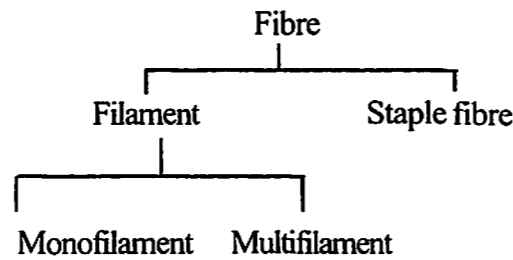
**5.1.2. Types of Fibre**

Fibers are classified on the basis of length, nature, physical properties etc.

The first classification is on the basis of length of the fibre, they are-

- a) Filament.
- b) Staple fibre

Filaments are of continuous length, measurable in yards and meter. Its length vary from 1/2 to 18". On the other hand staple fiber are short, measurable in inches. All natural fibres except silk are staple fiber. Filaments are again classified in to two-groups Monofilament and multifilament. Monofilament are made up of a single, smooth filament with solid strength. Whereas multifilament are composed of number of tiny filament twisted together.



Fibers are again classified in to two groups on the basis of their source or origin- (i) Natural (ii) Man made or artificial.

Natural fibers are derived from natural sources like roots, bark, leaves of the plant, hair of animal and mineral rocks. They are again classified in to three categories-

- (i) Vegetables fibres.
- (ii) Animal fibres.
- (iii) Mineral fibres.

Manmade fibres are classified in to five groups like- 1) Cellulose 2) Protein 3) Mineral 4) Metallic and 5) Synthetic.

In another classification, fibers are classified in to 4 group which is based on their chemical composition.

They are -

- (a) Cellulose Fibre.
- (b) Protein Fibre.
- (c) Mineral Fibre.
- (d) Thermo plastic Fibre.

Table-1

*This Classification is shown below*

Types	Cellulose	Protein	Mineral	Thermo plastic
Natural Fibers	Cotton Flex Jute Coir	Silk Wool	Asbestos Rubber	
Man made	Rayon	acryl	Fiber glass Steel wool Gold	Nylon, Decron Orlon

**5.1.(3) Natural Fibre :**

Fibre which is derived from different sources of nature are termed as natural fibre. Some of them are obtained from seeds, bark, leaves of the plant, some from animal and some other from mineral rock. So natural fibres are again classified in to three categories- a) Vegetable fiber, b) Animal fiber, c) Mineral fiber.

**A. Vegetable fibre :** Vegetable fibres are derived from plant source, so their basic material is 'cellulose' and they possess certain basic properties. They are-

- a) All vegetable fibres have high density
- b) They have high water absorbency.
- c) They are good conductor of heat.
- d) They have resistance to alkalis.

e) They have low resiliency. So the fabric of this fibre wrinkle easily.

Vegetable fibre include cotton, flex, jute, Pina etc.

**B. Animal Fibres :** Animal fibres are derived from the hair of animal, saliva of silk worm etc. The basic element of this fibre is 'protein' so they possess certain common properties. They are—

- a) Animal fibres have medium density.
- b) They are bad conductor of heat, so the fabrics of these fibre are suitable to use in winter.
- c) As they have high resiliency, wrinkles of these material goes off easily.

- d) They are susceptible to strong alkalis so mild and neutral detergent can be used for washing.
- e) Animal fibres are susceptible to high temperature, strong sunshine etc.

Animal fibre includes - silk, wool etc.

**B. Mineral Fibre :** These are inorganic materials, derived from mineral rock and shaped into fibres. They are mainly used for industrial purpose. The common properties of this fibre are-

- They have resistance to acids.
- They are highly pliable.

Asbestos, fiber glass are the example of mineral fibre.

**D. Manmade or artificial Fibre :** These fibres are prepared in the laboratory from chemicals.

The common properties of man-made fibres are -

- a. They have high strength and resistance to abrasion.
- b. They have high resiliency, elasticity and elongation.
- c. They have low affinity for dyes, so it is difficult to dye the fabrics of these fibres.

- d. Man made fibre have high resistance to moth, mildew and insects.

Nylon, Rayon are man made fibre.

### 5.1.(3) Natural Fiber

**a. Cotton:** Cotton fibres are drawn from cotton seeds which are composed of 90% cellulose, 10% mineral salt, wax and pectin. It is a white downy fibrous growth enveloping the seeds in the fruit of cotton plant and when it gets matured, the fruits split open and the white fluffy masses of cotton strands comes out.

This fibrous mass after separating from the cotton seed is used for cotton fabrics. Cotton has a tremendous range of application : clothes, towels, bed linen and most of the household linens are made from cotton. The length, softness, brightness of the fibre depend on the quality of soil, seed, mode of cultivation and climatic condition.

#### Properties of Cotton fibre:

The cotton fibre is the shortest of all the textile fibre, whose length varies from  $\frac{1}{2}$ " to 2 inches and show twist when viewed under microscope. This twist gives strength to the fibre and made easier to spin in to long fibres. The other properties of cotton fibres are –

- a. Cotton fibres are quite strong as compared to other fibre and this strength increased up to 25% when wet.
- b. They have low resiliency therefore wrinkle easily. So suitable finishes are given to overcome wrinkling.
- c. Cotton absorbs moisture easily, hence absorb perspiration thereby giving cooling effect. This property makes cotton suitable for summer season.
- d. Cotton is good conductor of heat
- e. Cotton fibre can withstand high temperature. So cotton material can be boiled in water for considerable time. While washing, cotton does not get affected by mild alkalis. Soda, borax, ammonia can be used on them safely.
- f. Hydrochloric acid, sulphuric acid weaken the cotton fibres.
- g. Silver fish can damage cotton materials as they live on cellulose. Therefore starch is not used on material before storing them for longer period. Cotton material gets spoiled by mildew during hot and humid weather conditions.

#### Use and care of cotton

Cotton fiber possess certain characteristics so they should be taken care of in the following manner-

Cotton fibre are strong so they can withstand rough handling during washing, drying and ironing. They have resistance to high temperature and not harmed by alkalies. So, cotton material can be boiled with caustic soda before washing and hot iron can be used for ironing purpose. It can be dried under the sun or hanging in open space.

Cotton fibre are used to make dresses bed linen, table linen, curtains, draperies under garment etc.

#### Silk Fiber

It is an animal fibre drawn from silk worm. Silk worm secretes two types of fluid namey 'fibrion' and sericin'. The fibrion as it comes out from the head of the silk worm, gets hardened on exposure to air. It forms a filament coated with 'sericin'. With this thread caterpillar wraps itself round to form cocoon. The cocoon contains 200 to 1500 meter silk thread.

Silk worm have a short life of only about two months, during which they pass through four stages- egg, larvale, pupae and moth. Silkworm lay eggs on specially prepared paper and store them in cold storage for six weeks. The paper sheet with

egg are washed and kept in incubator for hatching. Eggs are hatched on special mats and emerged caterpillars are fed on mulberry leaves. When caterpillars are about eight weeks old, it started to secrete fluid from two glands on its head and coming out through mouth. This fluid is known as fibrin and at the same time two other glands secrete another fluid known as 'Sericin' passes through mouth. The fibrin gets hardened when it comes in contact with air and forms a film coated with sericin. With this thread, the caterpillar wraps itself round to form a cocoon. In order to separate thread from cocoon they are killed by immersing them into hot water. Then they are dried and stored. Fibres are taken out of the cocoons, and collected. Thus these are twisted by passing through a strong thread and yarn is obtained. This is wound around spools and these spools are sent for weaving.

#### Properties of Silk

Silk is a protein fibre as it is made of protein called 'Fibron'. It is rod shaped, transparent and has colours of its own which range from white to cream. Other properties of silk fibres are -

(a) It is strong, smooth and lustrous.

- (b) It is a poor conductor of heat and does not allow body heat to radiate out. So it is warmer than cotton, linen and is preferred as winter wear.
- (c) Intense heat weakens the strength of silk fibre so one cannot use hot water for washing and very hot iron for ironing.
- (d) Silk fibre is sensitive to sunlight. Sunlight deteriorates the quality of silk fibre.
- (e) It is a good absorbent of water. This property makes silk suitable for dyeing and finishing.
- (f) Dilute acids have no harmful effect on silk but strong acids destroy the silk fibre, especially when kept in contact with them for a longer period.
- (g) Strong alkalis have a harmful effect on it but weak alkalis like ammonia, borax can be used safely.
- (h) Mild bleaches like hydrogen peroxide, potassium permanganate can be used safely on silk but sunlight and chlorine bleaches damage silk fibre.

#### Use and care of silk

Silk can be washed with mild detergent and when it is washed at home, warm water should be used and it requires thorough

cleaning and gentle handling. One should avoid squeezing silk material. It is best to dry clean the silk fabric. After washing, water can be removed by pressing it in a thick towel and dry it by hanging in shade.

#### Uses

Silk material is suitable for dress and furnishing material. Silk can be used with other fibres by blending them properly to make suitable dress as well as household linen.

#### c) Wool

It is a natural animal fibre as it is drawn from the hair of animals like sheep, rabbit etc. It can be drawn from both living and dead animals. If it is sheared from a living animal then it is known as 'fleece wool' and when it is taken from a dead animal it is known as 'pulled wool'. Pulled wool is generally mixed with fleece wool during yarn making process and before fabric construction.

#### Classification of wool

Wools are classified into four groups. They are-

1. Fine wool
2. Medium wool.
3. Long wool.
4. Carpet wool.

**Fine wool-** This fibre is sheared from 'merino' sheep. It is 1 ½" to 5" long. It is known for its quality and fineness.

**Medium wool-** This wool is 2 ½" to 6" long and the quality is average.

**Long wool-** This is 5" to 15" long. It is strong and lustrous. It is sheared from large sheep like Lincolns, Cotswool etc.

**Carpet wool-** It is 6" to 15" long. It is strong and resilient and sheared from cross breed sheep.

#### Manufacture of wool:

Shearing is the first step of manufacturing wool and for this purpose sheep are washed in early summer then shearing is done. Few weeks later, wool is cleaned by washing, scouring, carbonizing to remove impurities from the fibre.

For washing of wool, a series of four connecting tanks are used. Each tank contains warm soapy water with weak alkalis. Fibres are washed in the first tank and rinsed in the other. In this way dirt, grease is removed and soft, white material can be obtained. After washing, wool is dried in a humid atmosphere to preserve its elasticity and softness.

In the next step wool is immersed in dilute sulphuric acid in order to remove burrs, leaves and other vegetable matter. Then fiber is rinsed in warm water and spread out on racks. Oiling is done to keep the wool soft and elastic.

After oiling, fibres are passed through rollers. As the teeth of the roller removes small fibres they tend to lie parallel. This is known as 'carding'. After this, silver of wool goes directly to spinning operation. Wool fibre are then drawn out and twisted in to yarn. If the twist is loose then fluffy yarn is produced, which can be used to made soft woollen materials. On the other hand if twist is tight and evenly done it can be used to weave 'worsted yarn'.

Dyeing of woollen yarn can be done at any stage after scouring and acid colours are used for this purpose. Bleaching is done for undyed woollens because yellow colours is produced by scouring process.

#### Properties of wool

Wool is a protein fibre and 'Keratin' is the fibre material of wool. The length of the wool varies from 1" to 5" and width from 15 to 40 microns. It has natural 'crimp' which increases the elasticity of the fabric.

This crimp holds air thus providing good heat insulation. It is a poor conductor of heat. Some other properties of wool are-

- (a) It is a strong fibre.
- (b) It has resistance to shrink age
- (c) It absorbs large amount of water
- (d) Low heat has no effect on it, but strong heat weaken the fibre and destroy the colours.
- (e) Dilute acid has little effect on it but either hot or concentrated acid weakens or dissolved the woollen fibre.
- (f) Mild detergent can be used on wool but strong solution of carbonate (washing soda ) can damage the fibre.
- (g) Strong bleaching agents like hypochlorites have harmful effect on wool. But potassium permanganate, sodium peroxide, hydrogen peroxide can be used safely on it for bleaching and stain removal purpose.
- (h) It has high affinity for most of the dyes.
- (i) Wool is easily damaged by moth, so special care is needed to store them. However mildew does not affect wool fibres.

#### Use and care of wool

Woollen fabric can be washed with mild detergent and it requires gentle washing or handling during washing process. Moth can damage woollen fabric. So moth proofing treatment can be given. One can use naphtha balls while storing them, as these balls emits odours that are noxious to insets.

As strong heat Weakens the fibre, warm water is used to wash woollen garments and we cannot use very hot iron for ironing purpose.

Usually wool is used to make shawl, cardigan, sweater, blanket, socks, cap etc.

#### 5.1.4. Man made fiber

Man made fiber includes- nylon, rayon, and polyester.

**a) Nylon :** Nylon is the first man made fiber which was developed in 1927. It is a polyamide fibre, made from coal, air and water. Nylon polymer is made from two coal tar product namely adipic acid and hexamethylene diamine. The mixture of these two is heated in air to give a condensed product which is known as 'Nylon Polymer'. The molten product is then pumped out through spinnerete. As the fibre

emerges from the spinnerete and hit the air, they solidify and form yarn. Then, this yarn is stretched between a system of roller and kept ready for use.

Nylon yarn is found is three form –

- i) Monofilament
  - ii) Multifilament
  - iii) Staple.
- (i) Monofilament nylon fibre:** This yarn is made up of a simple solid strand of great length. They are used for hosiery product.
- (ii) Multifilament nylon fibre:** This yarn is made up of a number of individual strand also twisted together to form one multifilament fibre. The number of strand and amount of twist vary. These are used in making bathing towels, blouses, upholstery etc. These yarns are smooth and soft.
- (iii) Staple Nylon fiber:** This yarn is very short ranges from 1 ½" to 5" and shows crimps. The fabric made out of this type of yarn are light, smooth and soft to touch. This fiber is used in making Sweaters, Pullovers, socks etc.

**Properties of Nylon fibre.** It is made up of organic substances comprised of carbon, hydrogen nitrogen and oxygen. The properties of nylon are-

- (a) It is strong, tough and pliable. So it can withstand extremes of rubbing, scrapping, bening and twisting without breaking.
- (b) Nylon fabric loses its strength and become yellow at high temperature. So hot iron cannot be used for ironing.
- (c) It absorbs a small amount of moisture. So the fabric of this fiber gers dried easily after washing.
- (d) Nylon is not affected by alkalis but all acids have damaging effect on it.
- (e) It has resistance to mildew.

#### Use and care of Nylon

The fabric of nylon fibre is easy to wash and to take care Both cold and hot water can be used to wash. But it is better to use cold water to avoid wrinkling.

Nylon is used for dress material, furnishing material, net and also used to blend with other fibres to increase its versatility.

**Rayon:** Rayon is a manmade cellulose fibre, which is lustrous. It is used as a substitute to

silk fibre, it is also known as 'Artificial silk' as it resembles the natural silk. It is soft, cool and light in weight and has bright appearance.

There are four methods of manufacturing rayon. They are—

- a) The nitrocellulose process.
- b) The cuprammonum process.
- c) The viscose process.
- d) The cellulose acetate process.

**a) NITROCELLULOSE PROCESS:** This is the first process used for production of rayon. In this process, cotton linters or short stapled cotton is used and these are treated with sulphuric acid and nitric acids to produce nitrocellulose. Then these substance are dissolved in ether and passed through spinnrette in to air. Spinnrette contain numbers of holes. When this solution pass through these holes, each holes form one strand or filament. This form of filament is highly inflammable so it is treted with sodium hydrosulphide.

**b) CUPRAMMONIUM PROCESS :** In this process cotton linters or wool pulp are first boiled in soda and soda ash. They are bleached with chlorine in the next step. These are dissolved in a solution of copper

sulphate and ammonium hydroxide and kept for ripening. After that this solution is passed through a fine jets in to dilute acid where it turns in to regenerated cellulose filament.

**c) VISCOSE PROCESS:** Here spruce chips are used which is reduced to wood pulp and purified for cellulose base. Wood pulp is treated with caustic soda to form alkali cellulose and then treated with carbone bisulphate to form cellulose xantherte. In the next stage, this is dissolved in dilute caustic soda solution. This solution is filtered and kept for ageing until a thick fluid is formed which is known as 'Viscose'. This solution is forced through fine jets in to dilute solution of sulphuric acid. In this way, rayon fiber is prepared.

**d) CELLULOSE ACETATE PROCESS:** In this process cotton linters are treated with a mixture of acetic acid and acetic anhydride. This is kept for ageing until it is ripen. When it is ripen the product is washed with water. Then dissolved in acetore. After that the solution is filtered, and passed through fine holes of spinnerete in to hot air. As Acetone is evaporate and leaves a fine fibre of cellulose acetate.

These four process are used to prepare rayon fiber from cellulose.

**Types of Rayon:** Rayons are classified in to two group—

- (1) Regenerated rayon
- (2) Cellulose acetated Rayon

Regenerated rayon is prepared by nitrocellulose process, cuprammonium process, viscose process, Cellulose acetate process. Cellulose acetated Rayon is produced by the cellulose Acetate process and its properties are different from regenerated rayon. Because cellulose of this is combined with acetic acid.

#### Properties of Rayon—

- (1) This fibre does not have natural elasticity, so pressure may split the fiber.
- (2) Rayon absorbs more moisture than cotton and linen but donot give out moisture easily.
- (3) Rayon is damaged by excess heat, so hot iron can not be used for ironing purpose.
- (4) Rayon losses strength when wet. Water weakened rayon to such an extent that great care is necessary to prevent tearing while washing this fabric.

(5) Rayons are weakened even by dilute solution of acid. Alkalies spoiled or destroyed the lustre of the rayon fibre especially cellulose acetate. Hot, concentrated solution of alkalies perish the fibre.

This fibre take up dye stuff easily. Cellulose rayon can easily dyed with wide range of dye stuff but acetate rayon can be dye, only with their specific dye stuff.

#### Use and care of Rayon:

Water weakens this fibre to such an extent that great care is necessary to prevent tearing during washing. Mild detergent, warm water can be used in washing, instead of hot water and strong alkalies. Acid also weakens the fibre. So when acid is used to remove stain from this fibre, it should be washed immediately. Friction causes holes or stretch the fabric and spoil its shapes. Therefore it should be avoided while washing them. Rayon material can not be dried under bright sunlight for long time as it weaken the material and hot iron can not be used for ironing purpose.

Rayon materials are used to make cushion cover, bed cover and other

furnishing material as this fibre is soft, light in weight and attractive.

**Polyester :** It was introduced in Britain in 1946. One group of industry termed polyester as 'Decron', another group termed it as 'Terylene'. It is easy to maintain this fibre as it crease resistance fibre. In order to prepare this fibre, terephthalic acid and ethylene glycol are polymerised in vacuum at high temperature and polymer is extended in the form of ribbon. They are then cut in to small chips and polymers are passed through spinnerettes. It is polymerized at high temperature in vacuum and these melt spun like nylon. This fibre is similar to nylon on physical appearance and suitable for both weaving and knitting method of fabric construction.

#### Properties of Polyester:

- (1) Polyester fibre is rod like, partially transparent, smooth with a uniform diameter, when viewed under microscope.
- (2) The strength varies with different polyester. Some are strong like nylon and others are less strong like rayon. But there is no change in the strength of fibre when wet.

- (3) It is warm to touch and easy to maintain, as it is excellent in crease resistance.
- (4) It has low absorbency. Hence washing and removing stains from its surface is very easy. It also dries up quickly.
- (5) Polyester is not affected by weak alkalies but has little resistance to strong alkalis. In case of acids, it has resistance to all acids at room temperature. But strong acid and high temperature. destroys the fibre.
- (6) Direct sunlight weakens polyester fibre but has good resistance, when it is kept behind the glass. So it is suitable for curtains and draperies.
- (7) It has affinity for dyes. Hence it can be dyed in a complete range of colours. Polyester fibre has resistance to moth, mildew, microbes and other insects.

#### Use and care of polyester:

Polyester is very popular among consumer as it is easy to maintain. Acids, alkalis and organic solvents hardly affect the fibre. Even a heavily soiled material can be washed without any problem.

Polyester is widely used as furnishing, upholstery and some floor coverings in house

hold sector. In industry it is widely used and certain items like conveyor belt fine hoses, ropes, automobile tyre etc. Besides these, it is used for surgical implants blood vessels in cardiac surgery without any reaction.

#### 5.1.5. Blended Fabrics:

Blended fibre means fibres which are prepared by blending or combining different fibres and yarns. This can be done by following methods—

- (a) By blending two or more fibres in to a single yarn.
- (b) Single yarns of different fibres can be piled together.
- (c) Single or ply yarn of one type of fibre are mixed with single or ply yarn of another fibre.

Hence, it can be defined as a single yarn, spun from a mixture of different fiber'. The fabric which is made up of these yarn are known as Blended fabrics.

The blended fibre have superior qualities and hence easy to maintain and to take care and maintain. The blended fibre ensures large number of desirable characteristics than those achieved by single



fibre. For example cellulose fibres are blended with polyester to give more absorbency, improved strength, easy to maintain.

Some of the commonly used fabrics are as follows.

**a) Terry Cot :** It is blended fabric made of terylene and cotton. It has 80% polyester and 20% cotton fibre and in some cases 65% polyester 35% cotton fibre. Some terry cotton materials which are used as bed sheet and pillow cover contain 50% polyester and 50% cotton fibre. It can be identified by the stamp pasted on the material.

This material is suitable for summer use as polyester holds crease while cotton provides absorbency of moisture. It is best suited for shirts. If shrink resistance finish is given to cotton fabric before blending puckering do not take place and the affinity for dyes and other chemical finishes can be improved.

**b) Terry Wool:** It is a blend of wool with terylene in which 60% of polyester and 40% of wool fibre is used. This blend is suitable for use all through the year. It has wrinkle resistance and crease retention properties. Terry wool is more durable than wool.

**c) Terry silk:** It is the blend of silk and polyester. So the fabric is soft, smooth and lustrous. It takes up dyes easily which is permanent. Terry silk is more durable than silk and remains relatively wrinkle free. It is easy to wash, iron and maintain.

In this way Cotswool is prepared by blending cotton with wool fibre.

#### 5.1.6. Fibre Identification :

Fiber identifications is a process by which we are able to know the source of fibre. It was easy to identify fibre till twentieth century. As there were only four fibre like— Cotton, Silk, Jute, Wool used in textile industry.

But as time passes, it becomes complicated as more and more fibres are drawn from various sources. So scientific method is necessary for identification of fibre.

Proper identification of fibre help us in various ways- taking care of the material, storing them properly, proper use of dyes on material etc. Today, blended fabrics are also available in the market as consumer prefer them to use. So proper identification is essential to take care of them.

Fibre identification can be done by four different methods. These methods are—

- (1) Physical observation or Visual inspection.
- (2) Burning test.
- (3) Microscopic test.
- (4) Solubility test.

#### Microscopic Test:

The internal structure of fibre varied from fibre to fibre. One can identify fibre by observing the structure of fibre but it cannot be done by naked eyes. Hence, A microscope has to be used in this purpose. In this method, the fibre to be identified is taken on a slide with a drop of water or

Table-II

Fibre	Length(mm)	Colour	Lustre	Surface
Cotton	10-16	White	Dull	Smooth
Wool	50-500	WhiteBlack	No	Rough (Scales)
Silk	200-1500	White Golden Butter colour.	Bright	Smooth
Nylon	Filament	No Colour'	Bright	Smooth
Rayon		of its own		

#### Physical Observation

In this method, certain characteristics like length, lustre, colour, texture, softness to hardness, rough to smooth etc are visualized and inspected by hand. Some of the characteristic of fibre can be easily identified which are given in Table- II.

**Burning Test:** In this method, a small piece of fabric (2X2cm) is hold with a pair of forceps or a tongue near flame and observe the following characteristics given in Table- III

glycerin and covered with covering glass and keep under microscope. Now observe the structure of different fiber given in : Table - (iv)

**4. Solubility test:** It is another method of identification of fibre. Some fibre specially man made fibre looks almost similar with each other. So it is difficult to identify them by visual inspection and microscopic test. Burning test cannot be used for proper

identification of such fibre. Therefore this method is used where solvents are used to identify fibres.


In this method, the fibre is taken on a glass test tube and then solvent is added into it slowly and observe the reaction of the fibre

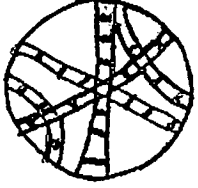

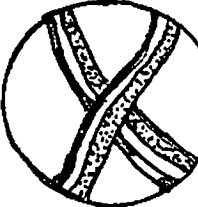

Table-III

Fiber	Approaching Flame	In flame	Removed from flame	Odour	Residue
1) Natural Fibre(Cotton, Linen)	Catch fire on contact	Burns quickly	Continuous burning	Like Burning paper	Lightgrey in colour
2) Protein Fibre(wool)	Curss away from the flame	Burns Slowly	Stop Burning after removing from flame	Like burning hair	Small black bead
3) Mineral Fibre(Glass)	No action	-	-	-	-
4) Synthetic Fibre (Nylon Decron)	Melt and Shrink away from the flame	Burns Slowly	Stop burning after removing from the flame	Smells of chemical	Hard black bead formed

Table-IV

Fiber	Observation
Cotton	It looks like flat fibre and has ribbon like twist but there is no crimp and lustre



Linen	It looks like a round rod. Nodes are present at certain interval, fine lines are also seen but there is no crimp on the fibre.	
Wool	Rough surface and crimps are very evident. Scales are present in this fibre.	
Silk	It looks round rod like structure. Gum present on surface and there is no crimp.	
Nylon	It looks round rod like structure with smooth surface translucent, high lustre but no crimp.	
Rayon	It looks straight and even surface. Lines are present on surface but there is no crimp.	

and identify the fibre. A list of fibres and their solvents which will dissolve them is given in Table-v.

Another table (vi) is given below where reaction of different fibres with different acids and alkalis are give. Fibre can be identified from these reactions also.

Table-V

Fibre	Solvent
1. Cotton	Cuprammonium hydroxide (Partially soluble)
2. Silk	Strong Sulphuric acid.
3. Wool	Bleach 20% Caustic soda 5%
4. Nylon	Phenol 90%.
5. Viscos Rayon	Cuprammonium hydroxide.
6. Cellulose Acetate	Glacial acetic acid.
7. Decron	Concentrated Nitric acid.

Table-VI

Fibre	Hydrochloric acid	Sulphuric acid	Sodium Hydroxide	Sodium Carbonate
Silk	Frays	Dissolve	Harden	Harden
Wool	Frays	Frays	Harden	Harden
Rayon	Harden	Harden	Not effected	Not effected
Nylon	Dissolve	Dissolve	Not effected	Not effected
Acetate	Frays	Frays	Not effected	Not effected
Cotton	Frays	Frays	Not effected	Not effected
Linen	Frays	Frays	Harden	Harden.

## SUMMARY

- ☞ Fibres are fundamental units of textile yarn.
- ☞ Textile fibres can be drawn from nature as well as from chemical.
- ☞ Cotton, Silk, Wool are natural fibre. The basic element of cotton is cellulose and protein is the basic element of silk and wool.
- ☞ Nylon, Polyester, Rayon are man made fibre.
- ☞ Man made fibres are stronger and durable than natural fibre.
- ☞ Blended fibre like terry cot, terry wool, terry silk are popular among consumer as they are easy to maintain and possess high quality.
- ☞ Identification of fibre is an important aspect. There are four methods of identification.
- ☞ Proper identification of fibre helps to take proper care of material.

## QUESTION

## A. Very short answer questions :

- (i) Define fibre.
- (ii) Give two examples of natural and manmade fibre.
- (iii) Write two characteristics of textile fibre.
- (iv) Name two blended fiber
- (v) Name two methods of manufacturing rayon.

## B. Short Answer questions :

- (i) What is staple fibre.
- (ii) Mention any two characteristics of vegetable fibre.
- (iii) How will you take care of cotton fabric?
- (iv) What is polyester fibre?

(v) Why blended fabrics are superior than fabric of single fibre.

(vi) Write any two importance of identification of fibre.

**C. Long answer questions :**

(i) What is fibre? How will you classify them? Mention the characteristics of textile fibre.

(ii) What are the properties of animal and mineral fibre?

(iii) Write about the characteristics of rayon fibre.

(iv) Why do we want to identify fibre? Write about the methods of identification of fibre.

## CHAPTER-XXII

### 5.2 FABRIC CONSTRUCTION

In the previous chapter, we have discussed about fibre, which is also known as element of fabric. Let us see how fabrics are made from yarns. Primitive people made rope, basket and mat by twisting and interlacing twigs, seeds grass etc. Later they learn to twist together short fibres of cotton and wool to make cloth. Indian history reveals that Yarn making has been known to Indian people from long time back. They use needle of bronze and copper for drawing the yarn for making cloth. It was found during the Mohenjodaro excavations. The people of Egypt also knew the process of yarn making, which was revealed from the material they used to cover the mummies. The production of fabric was practised by men in the past, at present and it will continue in the future also. It is also important for us to know the process of yarn making.

After going through this chapter, you will be able to

- ◆ Define yarn, its types
- ◆ Construction of yarn
- ◆ Fabric construction like weaving and their types
- ◆ Knitting and non-woven fabric
- ◆ Effect of weaving on fabric.

**5.2.1. Yarn :** It is composed of a group of fibre laid in parallel and kept together by twisting. Yarn can be made from natural and man made fibre or mixture of different natural and man made fibre. Different yarns are known for their unique characteristics. e.g. cotton for absorbency, wool for warmth etc. yarns are of two types—

- a) Filament
- b) Staple

**a) Filament :** Filaments are long strands. For example- the long strand coming out from the mouth of the silk worm and wound around the cocoon are filament. Synthetic filaments can be made by squinting the viscose chemical liquid from fine jets of the spinneret. These filaments are smoother, longer, more regular and lustrous than the twisted yarns.

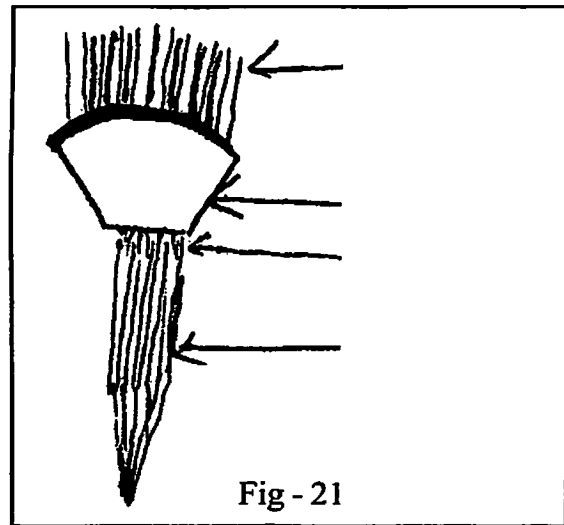


Fig - 21

**b) Staple yarn:** Staple yarns are made from short fibre. They are made by loosening the entangled fibre of varied length and thickness. These are then separated, straightened, laid together and twisted to make them suitable for making the fabric. Twists not only holds the small fibres together but also strengthens them.

### Strengthening Fibers and Yarns

Strength of the fabric always depends on the strength of the yarn used and it depends on the number of twists given to the yarn. The amount of twist is measured by the number of twist given to staple yarn per inch, which is called tpi.

Generally - In case of low twist yarn it has - 0-3 tpi

Medium twist yarn - 4-7 tpi

High twist yarn - 8-12 tpi

Twists are given from both right and left side for staple yarn. When they are given from right side then it is called 'Z' twist and when it is given from left then it is known as 'S' twist. Further there could be single twist or double twist which is shown below-

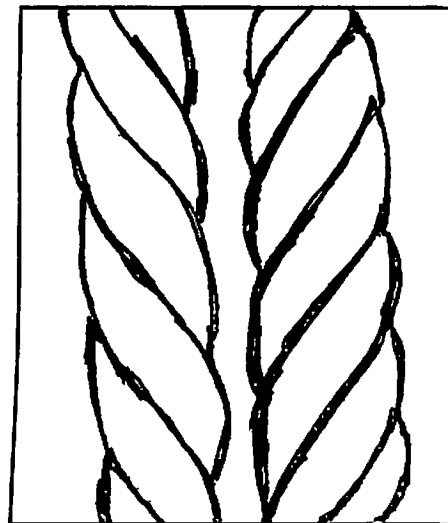


Fig. 22 S and Z twists

Yarns are again classified as

- a) Simple Yarn
- b) Fancy or Novelty Yarn

**a) Simple yarns:** Simple yarns are used for the construction of fabric for personal use or household use. These yarns are drawn from both natural and man made fibre having regularity in their length and physical properties. If this yarn is made from single strand then it is known as single ply. If it is made from two strands then two ply. In this way from four strands, four ply and if made from six strand then known as six ply etc.

**b) Fancy or Novelty yarn:** This yarn is different from single yarn due to the presence of irregularities deliberately produced during its preparation. Usually in single yarn irregularities are made by inclusion of 'knot' 'loop' of curls, slabs etc. In case of pile yarns irregularities may be due to variable delivery of one or more of its component or

twisting together. In order to make them attractive, different colours materials are used for novelty yarn.

### 5.2.2 Yarn making:

The techniques of yarn making has been undergoing tremendous changes over the years. Man's incessant quest for making more yarn at economic rate has brought fruitful result. There are two methods of yarn making.

- a) Mechanical Spinning
- b) Chemical spinning

**a) Mechanical Spinning:** Cotton yarns are made by this method, where after plucking cotton pods from plants are sorted out to have uniformity of colour, luster and fibre length. Then seeds are separated from cotton fleece and send the seed for oil preparation. They are then cleared by cording in which vibration is made by tools.

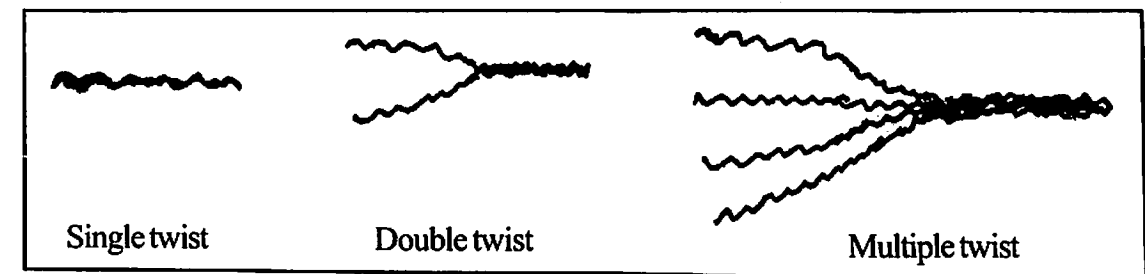


Fig - 23

Vibration disentangles the fibre and separate them from dirt, twigs, leaves etc. In the next step the fibres are laid parallelly and drawn into a loose rope or silver. Then the silver is drawn into yarn with spindles. Simultaneously the yarn is twisted to add strength and durability. The thickness, thinness and uniformity of the twisting yarn depends on the skill of the spinner. Combing is done to clean the yarn and keep ready for weaving.

**b) Chemical Spinning:** Manmade fibre are filament in nature so they have to be processed before being converted into yarn. There are four basic process involved in chemical spinning.

- i) Wet spinning
  - ii) Dry spinning
  - iii) Melt Spinning
  - iv) Emulsion spinning
- i) Wet spinning- In this type of spinning, the concentration of the polymer used is charged to make the fibre soluble. It is then extruded into water and concentration of solution is considerably reduced before being forced through the spinneret. Rayon is made by this method.

- ii) Dry Spinning - In this process, the fiber solution is forced through the spinneret into warm air chamber, where solvent evaporates in contact with hot air. Then the yarn take shape. Acetate and acrylic fibres are prepared by this method.
- iii) Melt Spinning- In melt spinning process, the fiber polymer is first melted, then it passes through spinnerets in rotten state. The emerging filament hardens on cooling and is ready for conversion into yarn. Polyester, terylene are made by this method.
- iv) Emulsion spinning- It is a complex process so it is not used frequently. Here the fiber solution is dispersed into another chemical liquid then forced through the spinneret.

### 5.1.3. Methods of Fabric construction

Fabrics are made by using different methods. They are –

- i) Weaving
- ii) Knitting
- iii) Non-woven

**i) Weaving:** Most of the fabric which we used either as dress material or as furnishing material are prepared by this method. It is a

(process in which two sets of yarn are inter laced at right angles to each other on a 'loom'. The yarn running along the length of the fabric called 'warp' and the filling yarns are called 'weft' yarn. There are five parts in a loom like- the warp beam, heddles with harness, shuttle, reed and cloth beam.

Looms are of different types – hand loom, power loom and shuttle loom. Now a day different kinds of shuttle looms have developed. Each type has a different method of picking, which provides specific characteristics and application. These are projectile loom, rapier loom, water jet loom and air jet loom.

### Types of Weave

Do you notice the differences between your dress material and your brother's jeans pant? If you notice them well, you will find the differences in your dress materials which is smooth and soft whereas your brother's pant is rough and thick. It is because of the methods of weave used. Some weaves are suitable for fine yarns while others are used for coarse yarn. With the help of weave, fascinating effect can be produced on material.

Some of the weaves are –

- a) Plain weave
- b) Twill Weave
- c) Satin Weave
- d) Sateen Weave

**a) Plain Weave:** It is the simplest form of weaving, where filling yarn is alternatively float over and under each warp yarn. Such fabric does not have wrong side, durable with neat appearance and is suitable for long cloth voil, muslin, organdy etc.

**b) Twill Weave:** It is another basic weave used to manufacture fabric. It has distinctive and alternative appearances and are strong

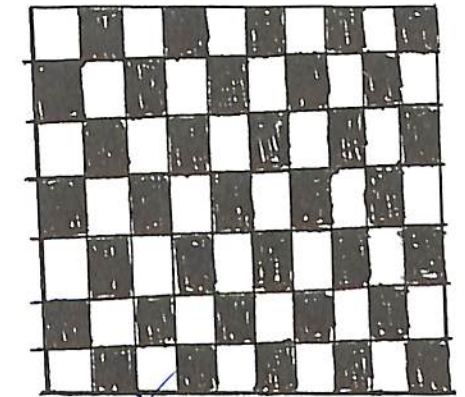


Fig - 24 Plain weave

and durable. In this weave the filling yarns float over and under the wrap yarn in regular variation to form the diagonal lines. It is seen on jean material, drill, table linens, khaki material etc. Material of twill weave are strong, easy to maintain, attractive but expensive.

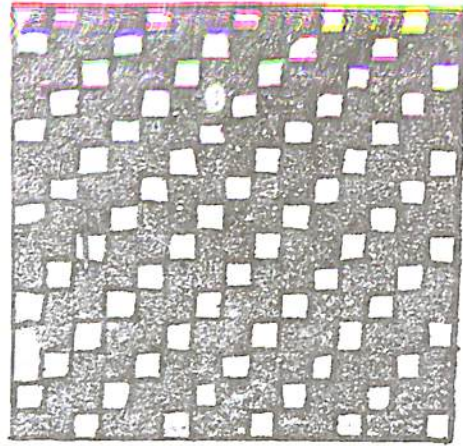


Fig - 25 twill weave

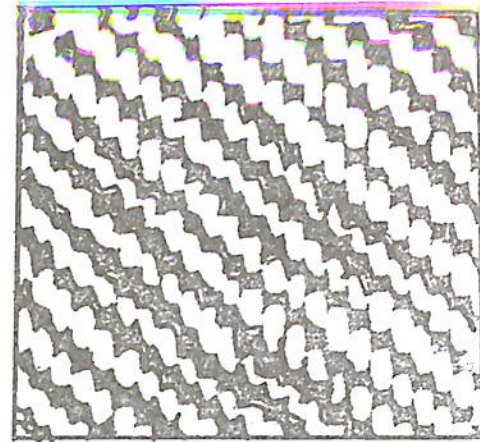


Fig - 26 twill weave

**c) Satin Weave :** Material of this weaves are lustrous, smooth and attractive. It is produced by passing wrap yarn float over the filling yarn. The yarn usually float over a minimum of 4 or 7 yarns.

**Sateen Weave :** It is the reverse of the satin weave where filling yarn float over warp yarn. The long floats create the shiny surface that reflect the light. Cotton material is woven with this weave.

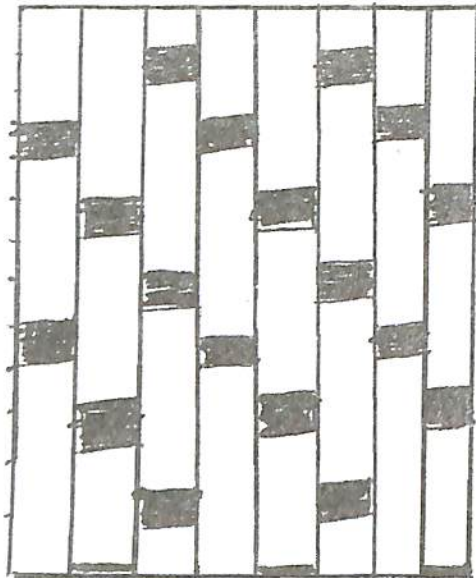


Fig - 27 satin weave

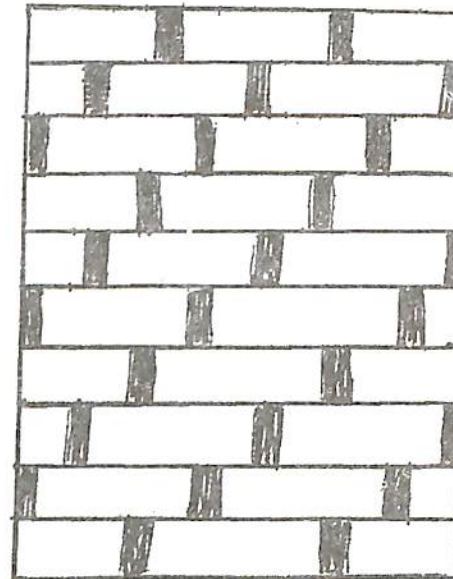


Fig - 28 sateen weave

**Knitted Fabrics**

It is another method of construction of fabric in which loops are formed in the yarn and interlooping those on sophisticated machine to form the fabric. Knitted fabrics are light in weight and comfortable to wear. Knitted fabrics are wrinkle free, therefore easy to maintain. So these fabric have become very popular among consumer.

Knitted fabric can be made with a single yarn that is formed into interlocking loops by the use of hooked needles. When the interlocking loops run lengthwise, each row is called 'wale' and the loops lying crosswise of the knitted fabric is called 'course' and the term 'gauge' refer to the number of needle or loop per inch which determine the firmness of the knitted fabric.

Knitted fabrics are of two types- Tubular and flat Knit. In case of Tubular

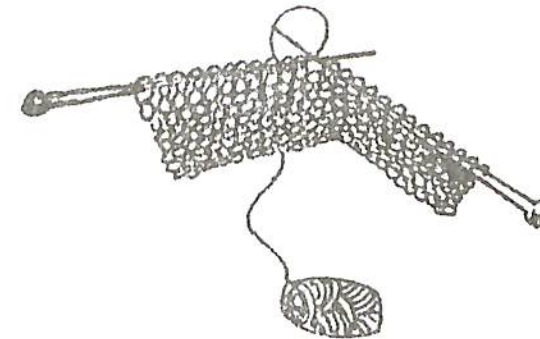


Fig - VI kitting

knits, the needles making the loops are arranged in a circle and suitable for socks and stockings, whereas in flat knit, the needles are arranged in a straight row. This is suitable for making of such garment which allows movement of the body.

The advantages of using knitted fabric are that they fit to the figure of the individual and allow the body to move freely and also give warmth to the body, the users feel comfort by using this fabric.

**d) Non-woven Fabric:**

Besides weaving and knitting there are some other methods used to construct fabric from fibre. You must have noticed your mosquito net, volleyball net and some other articles which are made by using different method. These methods are- Felting, Netting, bonding, Braiding etc.

**Felting:** In this method, fabrics are constructed directly from the fibre, which depends on the special characteristics of wool hair or fur fibre. Wool is the most suitable fibre for felting but other fibre also are used with wool for special use.

Felt is a type of fabric in which loose fibre are used, but not yarn. In this process wool fibre are interlocked with mechanical effort, chemical action, moisture and heat

bonding without adhesive. Because when a layer of wool or fur is rubbed while wet, in the presence of steam, then fibre become entangled and interlocked. This closing up of fibres leads to the formation of compact fabric in which the fibers are so lightly interlocked that it has sufficient strength to withstand on pulling.

Wool is suitable for felting as it has the ability to coil up on itself, interlock and shrink when subjected to heat, moisture, pressure etc.

Felt fabric are suitable for floor covering and for various industrial use.

It possess certain characteristics like

- It absorbs sound
- It is a good insulator
- It can be cut into shape and the edge require no finish
- It has excellent resilience
- It can be finished as moth proof, fire proof, water proof etc.

### 5.2 Effect of weaving on fabric or Garment.

It has mentioned earlier that weaving is one of the method of making or fabric. But it has some effect like enhancing the beauty, durability, ease of care etc.

Let us see, how weaving has effect on material.

**1. Appearance :** We as a human always appreciate beautiful object. So we like to wear beautiful dress and also it gives us pleasure, satisfaction and confidence.

Fabrics made out of plain weave look neat and clean and both the surfaces are same. On the other hand, material of twill weave gives interesting texture and design to the surface. So they have attractive appearance. It also has right and a wrong side. Satin and Sateen weave produce smooth lusterious surface to the fabric.

**Durability :** It is another important point to be noticed. Plain and twill weave produces strong and durable fabric. Twill weave material has good wrinkle recovery. But the material of satin and sateen weave have low strength because the floating yeare snag which may shag that result in rough surface.

**Care and Maintenance :** One can make use any material for long period by taking proper care and maintenance. Weaving has great effect on it. One should consider the weave while taking care of fabric. Because plain and twill weave materials can be easily maintained whereas proper care should be taken in materials of satin and sateen weave.

### SUMMURY

- ☞ Yarns are made of fibres laid together in parallel.
- ☞ Short yarns are called staple while long yarns are known as filament.
- ☞ Yarns are twisted to increase strength. This twist may be 'Z' twist or 'S' twist. It may have single or double twist.
- ☞ Fancy on novelty yarns are produced by incorporating desired irregularities of yarn to enhance its beauty.
- ☞ Yarns can be spun mechanically and chemically. Fabrics can be produced by weaving, knitting and felting.
- ☞ Felt fabrics are made by interlocking the woolen fibre.

### QUESTION

#### A. Very short answer questions

- Name the methods of yarn making.
- List out the methods of fabric coustructions.
- Mention the types of weave.
- Name two effect of weaving on fabric.

#### B. Short answer questions :

- What are the advantages of using knitted fabric?
- What is felting?

#### C. Long answer questions :

- What is yarn? What are the different types of yarn?
- Write about the methods of yarn making.
- What is weaving. What are the different types of weaving?



## CHAPTER - XXIII FINISHING

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### Introduction:

In the previous chapter, we have discussed about different methods of production of fabric from fibre. The material that you use is prepared in the same way. But as soon as the material is produced, it may not be suitable for use. So certain treatment is given to the material to make them usable. In this chapter, different method of finishing are discussed and you will learn the following-

- ◆ Define Finishing
- ◆ Importance of Finishing
- ◆ Basic method of Finishing
- ◆ Special Finishing
- ◆ Other Finishing- dyeing, printing.

### 5.3.1. Finishing

The newly made fabric as they come out from the loom are not suitable for use. They are known as 'Grey Goods'. 'Grey goods' means unfinished fabric. These fabrics must pass through various finishing process to make them suitable for use.

Finishing is the process of giving finish to the fibre, yarn or fabric before or after weaving, to bring changes to the material.

It can be defined as- the process used to bring changes to fibre, yarn or fabric to make them suitable for use. The aim of this process of finishing are-

- a) to make the material suitable.
- b) to make the material attractive or to enhance beauty.
- c) To produce variety.

## FINISHING

- d) To improve durability.
- e) To give weight to the material.

### 5.3.2. Importance of Finishing

It has already mentioned that the newly prepared material as they come out from the loom are not suitable to use, so they have to pass through various finishing process to make them suitable for use.

Secondly, finishing can make the material lusterous and attractive. Don't you like to wear attractive material? As a matter of fact, that all human being likes to wear bright, attractive dress. When yarn and fabric come from the spinner, weaver or knitter, they are in rough condition and in many cases they are soiled or have oil stain. They need clearing and bleaching. Sometimes during weaving, knots and loose threads are left. To remove this, finishes like napping is given. Some fabrics like cotton are not smooth to touch, these requires a treatment like calendaring to smoothes the texture.

Thirdly, with the help of finishing, suitability and utility of the fabric can be improved. Some materials are not suitable for dress as they are lack of draping quality and keeping the shape and style of the

garments. By giving a crepe effect these qualities are imparted to such fabrics and to improve draping quality the fabrics are given crease resisting finish.

Fourthly, finisher like water proofing, fire-proofing, mildew proofing are given to improve the utility of the fabric.

Fifthly, finishing is also done to some fabric to make them durable specially in cotton, wool, and acrylic fabric.

Lastly, variety produced is either by giving surface finishes like napping, battling, creping or dyeing or printing the fabric in different colours and design.

### Classification of Finishing Process:

Finishing process are of many types and their classification is done in different ways.

**1. On the basis of degree of permanence:** Finishes are classified as permanent, semi-durable and temporary. A permanent finish involves a chemical process that changes the fibre structure, so that it will not alter subsequently throughout the life of the fabric. A semi durable finish will last through several laundering and temporary finish can be removed or can be reduced when the fabric is laundered or dry cleaned.

2. Finishes are classified into two as chemical and mechanical on the basis of textile processing. Chemical finishes are those finishes in which chemicals like- acid, alkalies, bleaches, starch and resins are used to bring permanent changes to the fabric. For example mercerizing which is given to cotton. You must have heard about mercerized cotton.

On the other hand mechanical finishes brings physical changes to the fabric, which is done by different tools and equipment.

3. In another classification, finishes are classified as Basic finish and special finish. Basic finish includes cleaning, bleaching, stiffening, tentering etc. Special finish process includes mercerizing, shrinkage control, water proofing etc.

Some of the basic and special finishes are discussed below.

**a) Cleaning:** The grey fabric has dirt, wax oil, nitrogenous substance and other sizing compound. These substances have to be removed before the fabric is subject to bleaching, dyeing and other finishes. Cleaning is also called as 'scouring' which has different steps. These steps are – Pre-wash-It is done by using detergent to

remove the designing chemicals. Sizing materials are added to the yarn before weaving.

b) In the next step, waxes, gum are removed by using soda, sodium hydroxide and other substances.

c) If the material required numbers of cleaning and concentrated solution of cleaning agent then the material should be washed repeatedly with concentrated solution of cleaning agent.

d) After washing, through rinsing is essential to wash away all wax, dirt and other chemical.

**b. Bleaching:** It can be done by drying the material under sun or by using oxidative and reducing bleacher. In case of sun drying, if fabric is dried on grass or on bush, the result will be better due to the action of chlorophyll of the grass or the bush. Reduction bleaching do not last for long time because the fabric get back to its natural colour on exposure to air. Hydrogen peroxide, potassium permanganate are oxidative bleaches used, for bleaching fabric. Hydrogen peroxide can be applied to all fabric by changing its concentration. Potassium permanganate is also used to bleach fabric and it can

bleached away the perspiration and mildew stain from the fabric. Fabric should be rinsed properly after bleaching to remove excess bleach from the fabric as they damage the material.

**C. Stiffening-** It is the finish given to the fabric like cotton, silk etc. It adds luster, made smooth, increase strength and resistance to friction and do not get soiled easily.

Stiffening materials are obtained from plant like rice, wheat, maize, potato, gum etc. as well as from chemical substances like resins, alcohol, methyl cellulose etc.

**D. Tentering:** Bleaching and dyeing often cause narrowing of the fabric width but it can bring back to the normal size with the help of tentering process. In this process the fabric is passed through tentering machine when it is wet. While passing, the selvage of the fabric is held firmly by clip that move in a chain in the machine. The material gets dried when it passed through the hot air chamber and then it sets to its normal width.

### 5.3.5 Special Finishing Process

Special finishing process includes Mercerizing, Shrinkage Control, water Proofing, dyeing etc.

**a) Mercerizing:** It is used in cotton and cotton blend like terycot fabric. Chemicals

are used in this process which made the material strong, lusterous, and affinity to dyes. In this process, first, wet the fabric thoroughly, soak and leave the material in 18 to 20% of Caustic soda solution at room temperature for specific period. Then wash the material with neutralizing chemical and rinse the fabric thoroughly. During this process, the fabric, undergoes physical and chemical changes. As a result the structure of the fibre changes permanently and give stability to the weave of the fabric. The alkali swells up the fibre, which remove the twist, so the fibre appear cylindrical. The chemical changes provide lusture and sheer to the fabric.

**b) Shrinkage Control:** Cellulose fibre like cotton and linens get slightly deformed when they are woven and knitted. If the cloth is calendared (beat between two rollers) then it smoothen the fabric and increases the length of the material. When the fabric is excessively stretched, it tends to shrink.

c) Today modern method is used to produce unshrinkable fabric in which the fabric is fed in open width in a slightly damp state along with a thick rubber blanket over and against a hot cylinder. As the fabric and blanket pass over the roller, the outer surface of blanket extend the fabric, sticks tightly to the blanket

and when it cools, blanket retract together with the fabric. Thus the fabric is physically shortened or compressed, and the fabric will not shrink further. As a result, manufactures can give the mark 'Sanfonising' with a guarantee that it will not shrink. It is stamped on the fabric at regular intervals as a hall mark of consumer protection. Have you ever noticed such stamp on fabric? If not, you will notice them in future.

**d) Water proofing:** you or your friend must have used, raincoat during rainy season. Have you notice what type of material is used in raincoat? Yes, water proof material is used to make rain coat. This material possess that quality which do not allow water to remain on its surface so that water can not penetrate through this fabric. Here, coal tar products are used to coat the fabric to make it water proof. This makes the fabric impervious to rain, so it is not suitable for dress material. In earlier days, rubber, varnish were applied to the fabric to make it water proof. Now a days rubber is replaced by synthetic resin

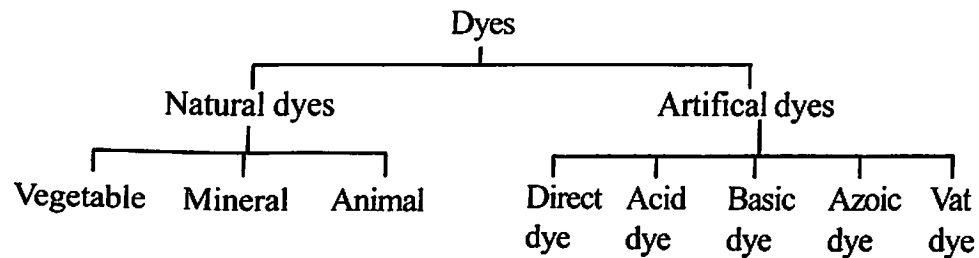
and later, emulsion of aluminum soap is applied for this purpose.

### 5.3.6 Dyeing and Painting

Finishing of fabric can be done by using dyes on it on printing the material with dyes. Don't you like to wear colourful dress? Yes, colour makes the fabric attractive. Do you know what it is? How it is used? Let us, see what they are and how they are applied on material.

A dye is a compound that can be fixed on a substance in a more or less permanent form that evokes the visual sensation of specific colour. Dyes are used on fabric for various reasons- like- it makes the material colourful and attractive, it can change the old material to reuse, stained material which are not suitable to wear but with the help of dyes, they can be changed and use, again.

**Types of dyes :** Dyes are prepared both from nature and chemicals, hence they are classified into two groups, namely  
i) natural dyes ii) Artificial dyes



**Vegetable Dyes :** These are prepared from leaves, barks, pods, flowers, fruits of some trees. For example - henna leaves, onion peels etc.

**Animal Dyes:** These are prepared from insect, sea fish etc. For example cochineal, tyrian purple etc.

**Mineral Dyes:** These dyes are prepared from minerals. For example 'iron buff' which is prepared by soaking scraper of iron in water and vinegar for a particular period.

**Artificial Dyes:** These dyes are prepared from chemicals which is fast to sunlight, perspiration water, light and washing process. They are of different types-

- i) Direct Dyes
- ii) Acid Dyes
- iii) Basic Dyes
- iv) Azoic Dyes
- v) Vat Dyes

**i) Direct Dyes:** These dyes are composed of 'amines' and 'phenol' and soluble in water. These can be applied to animal and vegetable fibre but generally used in cellular fibre. Direct dyes are not affected by sunlight and artificial light so they are used on curtain and draperies

**ii) Acid Dyes:** These are sodium and calcium salt of coloured organic acids. They are used on nylon, polyester and protein fibres but not suitable for cotton.

**Basic Dye:** These dyes can be used on silk or wool but in case of cotton some mordant should be used. They can produce brilliant colour on silk but these colours are not fast to light and washing.

**Azoic Dyes:** These are called Naphthol dyes and are used in cold water baths. These dyes are suitable for cotton so they are used on towel and bed sheets etc.

**Vat Dyes :** These dyes are soluble in alkaline solution but insoluble in water. So they produce excellent fastness and are durable. Vat dyes are suitable for cellular fibre and can also be used on man made fibres under certain controlled condition.

**5.6.6. Dyeing!** It is the process by which dyes are applied on yarn or fabric. Dyeing is done at various stages of fabric production like before spinning, after spinning, after weaving or after knitting etc.

When dyes are applied before spinning it is done in the form of solution dyeing, stock dyeing or top dyeing. In case of solution dyeing, coloured pigment are added to the spinning solution whereas in stock

dyeing dyes and added to loose fibre before spinning. Top dyeing is similar to stock dyeing.

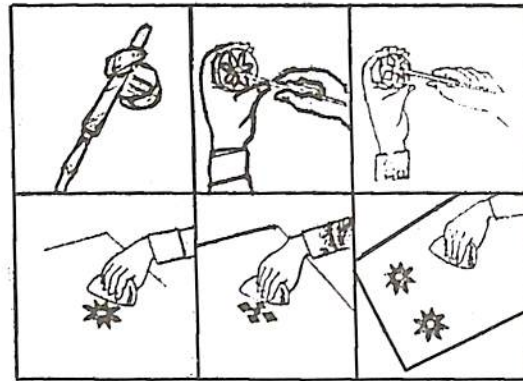
Regarding yarn dyeing, yarns are dried in skeins on packages before weaving. These packages are placed on carrier, put in the dyeing machine and dyes are circulated around this in two way motion. Yarn dyeing is cheaper than stock dyeing.

Dyes are also applied on fabric which is known as piece dyeing. In this process fabric is immersed in dye bath fully stretched and exert pressure on it so that dyes can be penetrated to the fabric and then squeeze out to take out excess of dye.

**5.6. Printing:** It is a process by which dyes are applied on fabric in the form of design. It produces colourful effect on the fabric. Printing is of different types-

- a. Block printing
- b. Roller Printing
- c. Discharge Printing
- d. Resist Printing
- e. Screen Printing
- f. Pigment Printing

**a. Block printing :** It is the oldest and simplest method of applying design to the fabric. In this process, blocks are made of wood, metal or other material in which design is carved on. These blocks are



**Fig.30 Block Printing**

dipped in paste of colour and then pressed on fabric, so that coloured pattern is produced on the fabric. Different blocks are used if the pattern is multicoloured one.

It is slow process, costly and uniform pressure is required to transfer the colour.

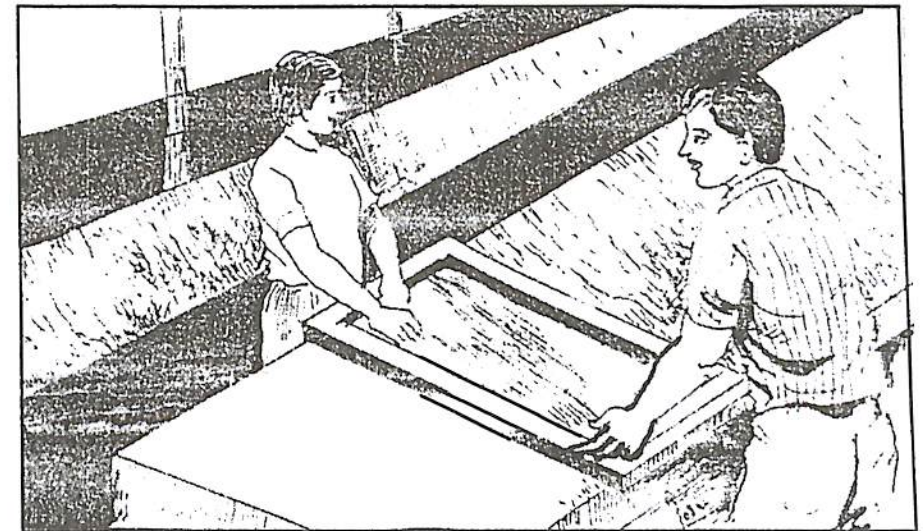
**2. Roller Printing:** In this process, copper roller is used in which design is engraved and the colour is fed on to this roller with the help of a colour furnishing roller. The fabric is then passed around this roller. Then the fabric is passed through a drying and steaming chamber to fix the colour. The modern machine of roller printing is very sophisticated, in which instead of one roller, sixteen rollers are used and fabric can be printed with sixteen different colour at the same time. It is a fast and economical method of printing as thousand of fabric can be printed within a short time.

**3. Discharge Printing :** This is done on dark coloured fabric by removing colour from the material with discharge paste (chemicals). The colour of the fabric is removed in such a way that a pattern is made and the area where the dye is removed left white. This white area may be covered with another colour if desired. Cotton, Rayon are generally printed with this technique. The chemical which is used as discharge tend to weaken the fabric

**4. Resist Printing:** In this process, white fabric is printed with a paste, which prevents the fixing of dyes on area that we want to remain white and resist penetration of colour. Then it is dyed in the desired colour and the colour is fixed with steam and heat treatment. The paste is washed off to get a white pattern on coloured background.

**5. Screen Printing:** In this methods fabric to be printed is stretched on a table which is padded and covered with oil cloth. Then the screen is placed on the material and the paste of colour is brushed over its surface and then lightly pressed. The colour is allowed to dry. As soon as one colour has put, another screen is placed on top of the first and the second colour is put on the fabric. The process continues till all colours have been used.

**6. Pigment Printing:** In this printing, pigment dyes are used which is prepared from chemicals. They are insoluble in water and very fast to light and other adverse influences. Pastes are prepared from pigments, and printed on fabric by roller or screen printing. Then the fabric is heated to bind the pigment to the fabric.



**Fig. 31 Screen Printing**

## SUMMERY

- ☞ Finish is anything that changes the appearance of fibre, yarn or fabric. The common finishes given on fabric are – cleaning, bleaching, tentering and stiffening.
- ☞ Some of the special finishes like mercerizing, shrink control, water proofing, dyeing and printing are also given to the fabric.
- ☞ Dyeing can be done on yarn or fabric state. Dyes are obtained both from nature as well as from chemicals.
- ☞ Painting is different from dyeing in which dyes are applied on fabric through design. Printing are of different types like block printing, discharge printing, resist printing screen printing etc.

## QUESTION

## A. Very short answer questions

1. Name the following
  - a. Two bleaching agent
  - b. Chemical used in mercerizing process
  - c. Two vegetable dyes
  - d. Two methods of printing fabric

## B. Short Answer questions :

- a. What is finishing?
- b. How will you classify finishing process?
- c. What is dye?

- d. What are the reasons for dyeing fabric?
- e. What is printing?

## C. Long answer questions :

- a. Write about the objective of finishing fabric.
- b. Explain any three methods of finishing.
- c. Write any two methods of printing.

## e. Write Short notes on :

- a. Importance of finishing
- b. Tentering
- c. Dyeing
- d. Screen Printing.

