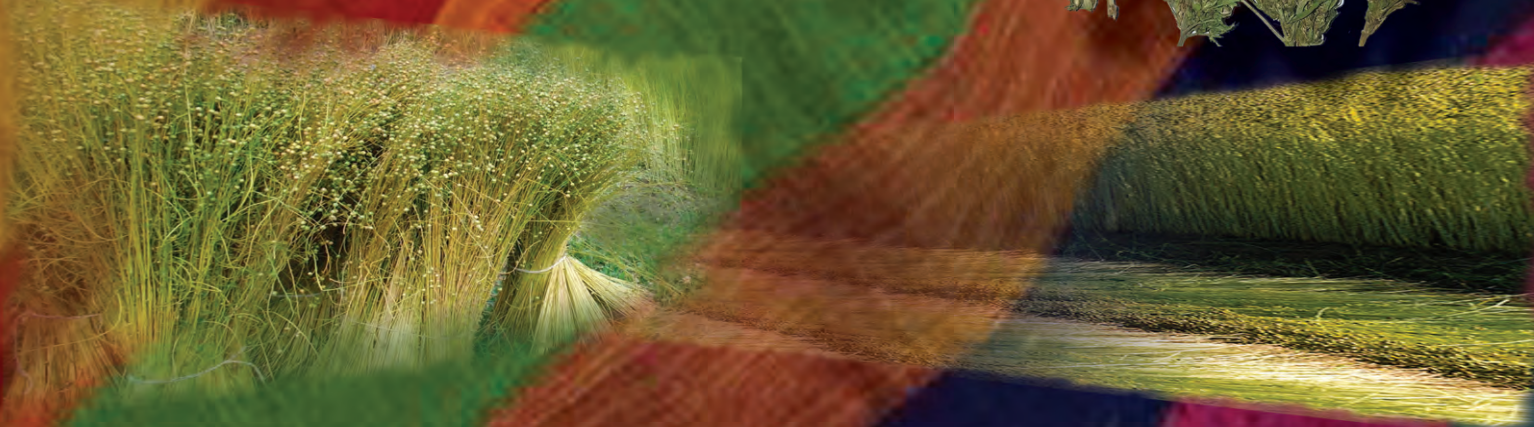
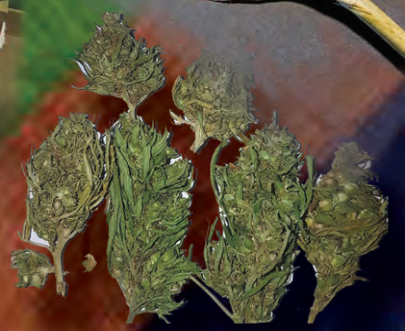


TEXTILES

STANDARD XI



The Constitution of India

Chapter IV A

Fundamental Duties

ARTICLE 51A

Fundamental Duties- It shall be the duty of every citizen of India—

- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities, to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;
- (k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

The coordination committee formed by G.R.No.Abhyas-2116/(pra.kra43/16)SD-4 dated 25.4.2016 has given approval to prescribe this textbook in its meeting held on 20.06.2019 and it has been decided to implement it from academic year 2019-2020.

TEXTILES

STANDARD XI



**Maharashtra State Bureau of Textbook Production and Curriculum Research,
Pune - 411 004**



P4I1H7

The digital textbook can be obtained through DIKSHA APP on a smartphone by using the Q.R.Code given on title page of the textbook. On this Q.R.Code audio-visual teaching-learning material of the relevant lesson will be available.

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Textiles Subject Committee

Mrs. Maneesha Pandit	(Chairman)
Mrs. Varsha Gatpande	(Member)
Mrs. Sonali Kapoor	(Member)
Mrs. Ujwala Hirkude	(Member)
Mrs. Sheetal Thakre	(Member)
Smt. Ketaki Jani	(Member-Secretary)

Cover, Illustrations and Computer Drawings

Shri. Gaurav Gogawale

Typesetter

Baladev Computers

Production

Sachchitanand Aphale

Chief Production Officer

Prabhakar Parab

Production Officer

Shashank Kanikdale

Asst. Production Officer

Paper

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Co-ordinator

Ketaki Jani
Spl. Officer Gujarati

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Vivek Uttam Gosavi, Controller

Maharashtra State Textbook Bureau,
Prabhadevi Mumbai- 400 025



The 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 citizens :

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.

NATIONAL ANTHEM

Jana-gana-mana-adhināyaka jaya hē
Bhārata-bhāgya-vidhātā,

Panjāba-Sindhu-Gujarāta-Marāthā
Drāvida-Utkala-Banga

Vindhya-Himāchala-Yamunā-Gangā
uchchala-jaladhi-taranga

Tava subha nāmē jāgē, tava subha āsisa māgē,
gāhē tava jaya-gāthā,

Jana-gana-mangala-dāyaka jaya hē
Bhārata-bhāgya-vidhātā,

Jaya hē, Jaya hē, Jaya hē,
Jaya jaya jaya, jaya hē.

PLEDGE

India is my country. All Indians
are my brothers and sisters.

I love my country, and I am proud
of its rich and varied heritage. I shall
always strive to be worthy of it.

I shall give my parents, teachers
and all elders respect, and treat
everyone with courtesy.

To my country and my people,
I pledge my devotion. In their
well-being and prosperity alone lies
my happiness.

INTRODUCTION

Dear Students,

It gives me immense pleasure to render you the copy of Textiles Text Book in an interesting format. The syllabus has been upgraded with the current knowledge of concept and developments of new natural fiber, their nature, origin, manufacturing use and care.

The Textbook is designed for students who desire to gain a fundamental knowledge of a creative production and utilization of the fabric with emphasis on the Handlooms and Textiles of the states of India. The topics have covered a huge variety of ideas, informations and advices about the cultural and historical background about the different fabrics, finishes, designs, laundry equipments and techniques of using laundry equipments.

The practical knowledge has been given in the syllabus for the students to practice and understand the application of each topic. Eg. Fiber identification, label identification etc. The students will be prepared to deal with the problems of consumers and be a wise consumer.

The Complete Team of Committee of Authors and Artists were involved in laying out the foundation of their new book with creative and colourful pictures and illustrations to arouse the aesthetic and creative sense of the students. This book has Q.R. Code which will help the students in quick understanding and grasping the subject matter with ease.

The book contains glossary, Bibliography, and websites at the end of more information.

Thanks to the committee of Authors, Artists, Maharashtra State Bureau of Textbook, Production and Curriculum Research for the timely production of the Textbook in an Excellent form.

Thanks to the team of expert reviewers for their valuable advice.

The committee hopes that the students enjoy and gain the basic knowledge of the subjects. All the best wishes for your future educational career.



(Dr. Sunil Magar)

Director

Pune

Date : 20 June 2019

Bharatiya Saur Dinank : 30 Jyeshtha 1941

Maharashtra State Bureau of Textbook

Production and Curriculum Research, Pune

FOR THE TEACHERS

Dear Teachers,

It gives us immense pleasure to handover this very interesting textbook of XIthe standard Textiles to you all.

The book gives an insight about the basic concepts and terminology for textiles fibres, their history and development over the years. It also talks about the manufacturing, properties and uses of Natural Cellulosic fibres. Keeping the current trend of development and growing popularity of other natural fibres in mind - especially at an alternative to synthetic fibres which are not eco friendly - a whole new chapter has been introduced about them. The book deals with manufacturing up to the Yarn stage and a glimpse of different kinds of yarns made and their uses. Keeping the applied component of the subject in mind a chapter has been devoted to Consumers & Textile market, which deals with the challenges faced by the consumers as well as provides knowledge about different types of labels, purchasing and storage & care of textiles. A chapter about Household Textile has also been included keeping in mind the applied component. The basic concepts about laundry and ironing have been covered too. A special chapter has been introduced for the students to develop an interest in handloom as well as the rich cultural heritage of Indian traditional textiles.

The Practical part includes basic knowledge about various sewing equipment, sewing machine as well as basic of stitching. It also includes basics of ironing. There are practicals for identification of fibres and collection and identification of labels. Guidelines for Project Work have also been provided.

The book has been written in a very simple language with lots of communication with the reader and lots of activities for the students. The colourful pictures, various charts, tables and diagrams not only make the book a delight to read but also makes it easy for the students to understand the concepts.

A special feature introduced for the first time is that a QR code has been provided. The students as well as teachers can click onto it for further information, summary, videos, additional photos, more exercises and types of questions. This use of technology will surely make the book and the subject more interesting for the students.

The Board of Studies, authors, reviewers, artists and office staff have put in a lot of effort to make the book interesting, aesthetically appealing and also to get it ready in time.

Hope you all will accept and enjoy learning from this book from the current academic year.

STUDENT'S LEARNING OUTCOME

No.	UNIT	Learning Outcome
1.	Introduction To Textiles	<ul style="list-style-type: none"> Explains the history of the fibres. Understands the meaning and scope of fibres, yarns, fabrics. Obtains information regarding the different properties of textile fibres.
2.	Cotton	<ul style="list-style-type: none"> Understands the cultivation of textiles fibers and manufacturing process of the Cotton fibre & Linen fibre. Studies the properties of the cotton fibres & Linen fiber Understands the uses and applicability of the Cotton fibre & Linen fibre.
3.	Linen	<ul style="list-style-type: none"> Understands the cultivation of textiles fibers and manufacturing process of the Cotton fibre & Linen fibre. Studies the properties of the cotton fibres & Linen fiber Understands the uses and applicability of the Cotton fibre & Linen fibre.
4.	Miscellaneous Cellulosic Fibres & Asbestos	<ul style="list-style-type: none"> Throws light on the development of new cellulosic fibres. Understands the opportunities and developments of the new fibers. Obtains information regarding the uses of the new fibres.
5.	Yarns	<ul style="list-style-type: none"> Explains the concepts and terms used in the yarns formation. Understands the classification and Application of the simple yarn and novelty yarns.
6.	Consumer & Textile Market	<ul style="list-style-type: none"> Highlights the purchase of Textiles. Throws light on the problems of a consumer and Remedies to solve it. Obtains Information regarding. Labels and Storage of different fabrics & care.

7.	Introduction To Laundry	<ul style="list-style-type: none"> • Understands the objective of Laundry and importance of washing methods. • Takes pride in achieving the skills of laundry, washing and ironing methods.
8.	Ironing	<ul style="list-style-type: none"> • Understands the objective of Laundry and importance of washing methods. • Takes pride in achieving the skills of laundry, washing and ironing methods.
9.	Household Textiles	<ul style="list-style-type: none"> • Gains information about the uses and care of household textiles.
10.	Traditional Textiles of India	<ul style="list-style-type: none"> • Highlights the importance of the rich heritage of Indian textiles. • Obtains knowledge and gains information about the unique traditional textiles state wise.

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Textiles

Plants

Animals

Chemicals

Minerals

Fibres



Yarn

Spinning process



Unfinished Fabric

Weaving, Kintting or other techniques



Finished Fabric

Finishing process



Consumer

Textile products



Unit 1

INTRODUCTION TO TEXTILES

What do you think ?

- Do you think prehistoric man used to wear clothes?
- When did mankind started using clothes and why?
- How do we come to know that mankind has been using clothes since very ancient times?

You will find the answers to all such questions in this Section.

1.1 HISTORY OF TEXTILES

Food, clothing and shelter are three basic necessities of our life. Out of these three, clothing is used only by mankind. When mankind was uncivilized, clothing was not needed. Clothing in a way is a symbol of civilization..

Till 18th century, India was one of the leading countries in the field of textiles. (see Pic. No. 1.1 and 1.2) made on handloom with very simple and primitive tools were world famous because of their artistry and finesse. You will learn more about various traditional textiles made in different parts of our country in chapter no. 10.

A peek in the History!

There is archeological evidence of a cotton textile industry at Mohen-jo-daro in the Indus Valley around 3000 B. C., and a few fragments of textiles, parts of handloom and some spinning tools have been found. Based on these evidences, history of Textiles has been documented. These evidences suggest that Linen, Wool Silk and Cotton have been used by mankind since very ancient times. Old Indian scriptures like *Vedas*, *Ramayan*, *Mahabharat*, Buddhist Jain Literatures provide information about the kind of different textiles at that time. All these suggest a very rich and advanced culture of Textiles in our country.



Pic no. 1.1 Handloom weaving



Pic. No. 1.2 Hand woven saree

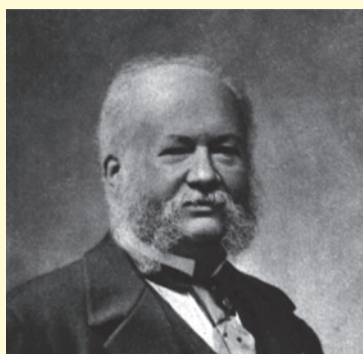
Development of Textile industry

- Can you believe that less than a 100 years ago, people did not know about nylon socks, polyester sarees and terricot shirts?

- Who were the pioneers in development of Textile industry?
- Why did scientists invented new kind of fibres?
- How their discoveries changed the way we use textiles today?

Know your scientists!

In 1884 Count Hilaire de Chardonnet successfully made an artificial fibre using natural raw material. This fibre was highly lustrous and so was named **Rayon** which means ‘reflecting sun rays’. Later many other varieties of rayon were discovered.



Pic. No. 1.3
Count Hilaire de Chardonnet

Due to industrial revolution, the machinery and technology for making fabrics also underwent a lot of change. A number of machines were invented and manufacturing fabrics became a huge textile industry in place of the small cottage industry.

Internet my friend!

Find out which other scientists have contributed in the development of textile industry .

Can you tell !

- What is used as raw material for making clothes?
- Can you name a few fibres?

As population grew, use of textiles increased. Production of natural fibres was not enough to meet the ever growing demand and so scientists started finding out different alternatives for the limited natural fibres.

Know your scientists!

In 1940 a brilliant scientist called **W. H. Carothers** and his team invented the first synthetic fibre called **Nylon** using chemicals as raw materials. A few years later, English scientists came up with another fibre made from a different set of chemicals which became popular as **Polyester**. A number of other man-made fibres have been made ever since.



Pic. No. 1.4
W. H. Carothers

1.2 MEANING AND SCOPE OF TEXTILES

The term ‘textile’ comes from the Latin word ‘textilis’ which comes from the verb ‘texere’. The verb ‘texere’ means **to weave**. Thus the word textiles means –

Any product made from yarns which are spun or made of fibres.

Thus, the term ‘textile’ covers a large area which includes any material that can be worked into fabric, such as fibres and yarns, including woven, knitted, bonded, felted, needle punched fabrics, crocheted goods etc.

Chart No. 1.1 Sequence of Fabric Construction



Importance of Studying textiles :

As textiles is such an integral part of our lives, we must learn how to select and buy fabrics wisely. We must have some knowledge about the different kinds of textile fibres and their properties. This will help us to know how to use them correctly and how to take care of them so that they can serve us well. The study textiles help us to know about the following.

❖ Importance of studying textiles

As textiles is such an integral part of our lives, we must learn how to select and buy fabrics wisely. We must have some knowledge about the different kinds of textile fibres and their properties. This will help us to know how to use them correctly and how to take care of them so that they can serve us well. The study of textiles help us to know about the following –

1. *Different types of textile fibres, their properties and uses.*
2. *Techniques of making yarns and different types of yarns.*
3. *Different ways of making fabrics, different weaves and their characteristics.*
4. *Various finishing processes done on fabrics to improve their quality and performance.*
5. *Selection, use, care and maintenance of different types of textiles.*

❖ Uses of Textile Fibres :

As population grew, use of textiles increased. Production of natural fibres was not enough to meet the ever growing demand and so scientists started finding out different alternatives for the limited natural fibres.

Due to industrial revolution, the machinery and technology for making fabrics also underwent a lot of change. A number of machines were invented and manufacturing fabrics became a huge textile industry in place of the small cottage industry.

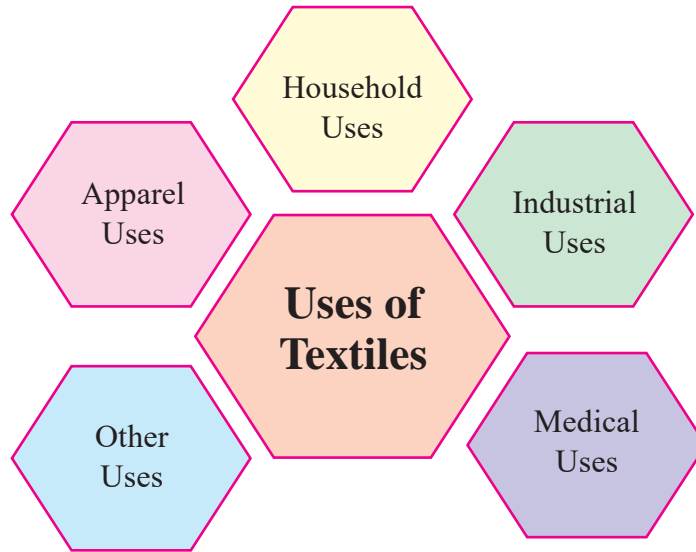
Internet my friend!

Find out which other scientists have contributed in the development of textile industry .

Can you tell !

- *What is used as raw material for making clothes?*
- *Can you name a few fibres?*

Table No. 1.2 Uses of Textiles



Do it yourself : Write more example of each of the uses in the given table no. 1.3

Table No. 1.3 Uses of Textiles

1. Apparel Use	Shirt, Saree, Pant, Salwar, Kameez Kurta Dhoti

2. Household Use	Curtains, Bed Sheets, Towels, Table mats, Draperies

3. Industrial use	Ropes, Sacks, Nets, Fire fighting suits, Threads Bags

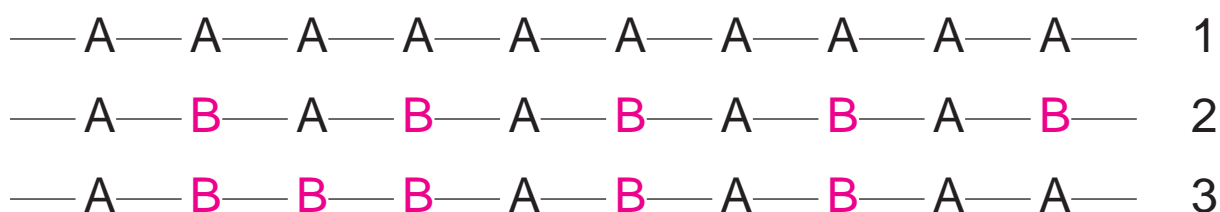
4. Medical Use	Dressing of wounds, Sutures, Artificial arteries,

5. Other Use	Umbrella, Boots, Stitching threads, Purse, Caps Lace

- How many types of fibres are available to us?
- From which sources do we get these fibres?

In case of all natural fibres, this polymerisation happens in nature by itself. In case of man made fibres, polymerisation is artificially done in factories using either high temperature or high pressure or both. The polymer can be composed of single monomeric units only one type (Fig 1.5.1) or multiple monomeric units - different types (Fig 1.5 - 2 and 3) or multiple.

Fig No. 1.5 Polymerisation



The long chain of polymer is not visible with naked eyes or even under regular microscope. The total number of monomers joined together to form a polymer is called “**degree of polymerisation**” or *dp*.

Do you know:

The longer the chain of monomers, the higher the *dp* of the polymer.

The strength of a fibre depends upon *dp*. The more the *dp*, stronger the fibre.

Keep in mind some important terms used in Textiles :

- 1. Staple Fibre** - All such fibres which are short in length and can be measured in cm, inches or feet are called staple fibres. All natural fibres except silk are staple fibres.
- 2. Filament Fibre** - Fibres which are very long and can be measured in thousands of meters or yards are called filament fibres. All man-made fibres fall in this category. Amongst natural fibres, Silk is the only filament.

3. Thermoplastic Fibre - Certain fibres have a tendency to soften or change shape due to heat. If the temperature goes higher, they melt and so they are called thermoplastic fibre (Thermo – heat, Plastic – changing shape). All man-made fibres except Rayon are thermoplastic fibres.

4. Non-thermoplastic Fibre - The fibres which do not melt due to heat are called non-thermoplastic fibres. If the heat is more, they will burn and turn to ash. All natural fibres and Rayon fall in this category.

The difference between Thermoplastic and Non-thermoplastic fibres is shown in Table no. 1.3-

❖ **Composition of Fibres**

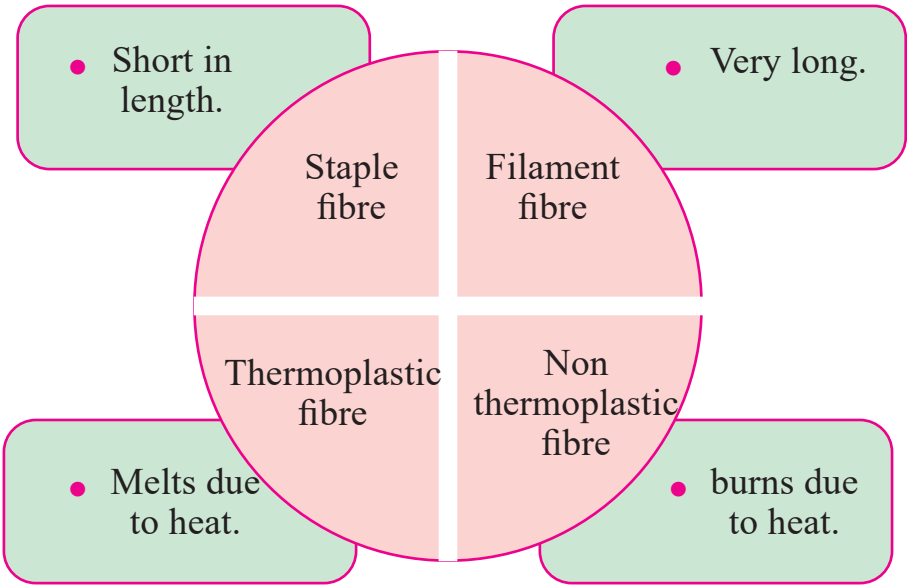
All fibres, whether natural or man-made are scientifically termed as Polymers. The word ‘**polymer**’ is derived from a Greek word meaning ‘**many parts**’. When a number of small molecules i.e. monomers link together to make a big molecule, it is called ‘polymer’.

Single unit (molecule)	-	Monomer.
Many units (molecules) linked together	-	Polymer.

In case of all natural fibres, this polymerisation happens in nature by itself. In case of man made fibres, polymerisation is artificially done in factories using either high temperature or high pressure or both. The polymer can be composed of single monomeric units only one type (Fig 1.5.1) or multiple monomeric units - different types (Fig 1.5 - 2 and 3) or multiple.

Fig. No. 1.4 Important terms used in Textiles

Fig. No. 1.6



The difference between Thermoplastic and Non-thermoplastic fibres is shown in Table no. 1.5

Table No. 1.5 Difference between Thermoplastic and Non thermoplastic fibres

Thermoplastic Fibres	Non-thermoplastic Fibres
1. They start softening and changing shape beyond a certain temperature.	1. They start scorching beyond a certain temperature
2. If the temperature goes higher, they melt.	2. If the temperature goes higher, they burn.
3. Upon melting they form a hard, black bead.	3. Upon burning, they turn to ash.

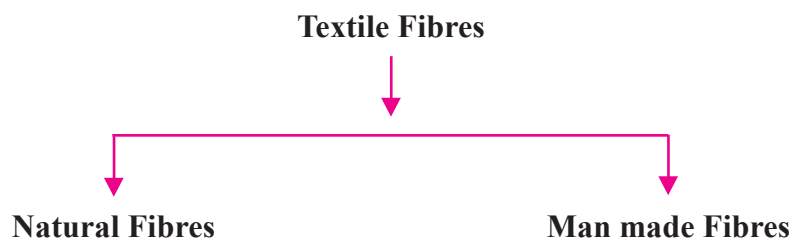
1.3 CLASSIFICATION OF TEXTILE FIBRES

There are many types of fibres available in nature but all of them can not be used for making fabrics. The fibres which can be made into fabrics are called **Textile fibres**. A textile fibre can be defined as follows-

Any small thread-like structure which can be woven or otherwise made into a fabric is called Textile Fibre. It is the smallest unit in textiles.

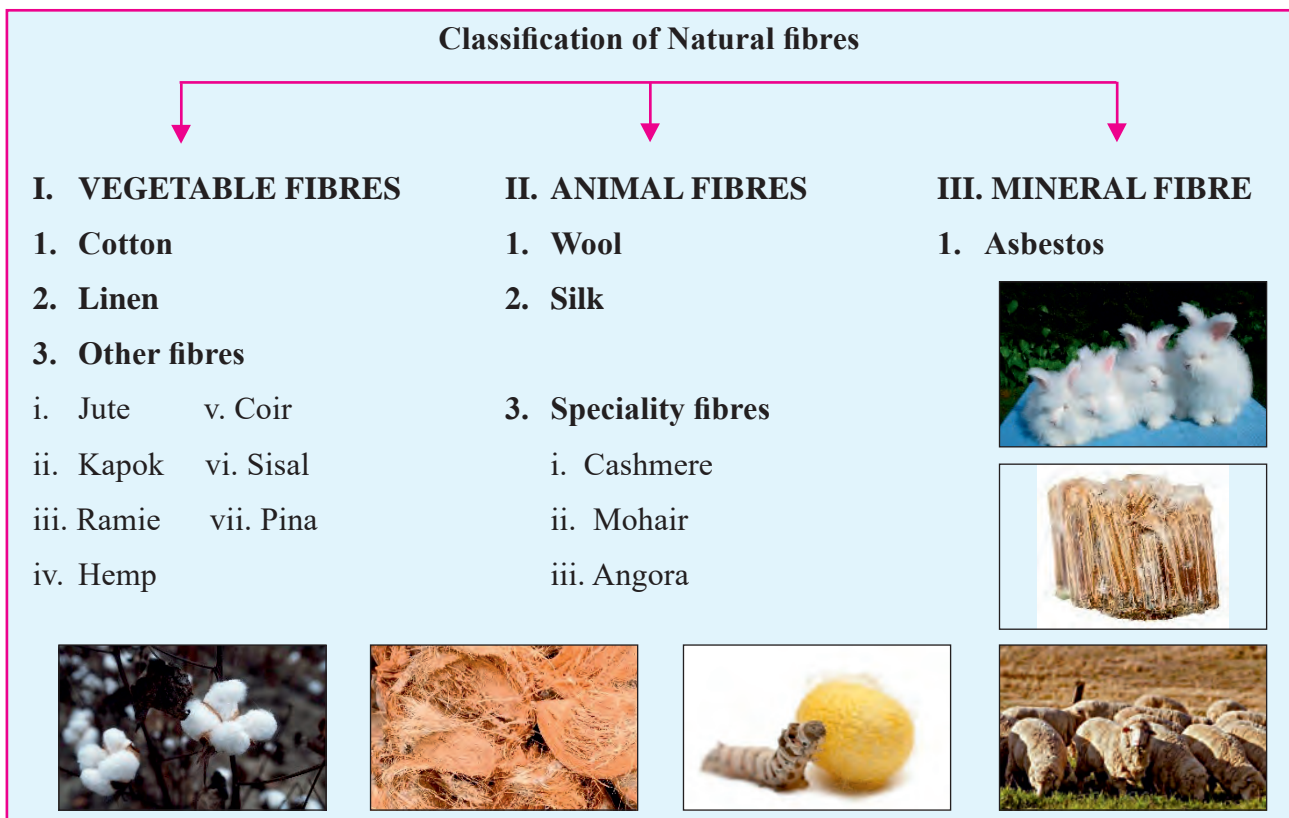
Textile fibres are traditionally classified according to their source. Thus a broad classification of textile fibres will be into **Natural fibres** and **Man made fibres**. These are further divided into specific classes. Chart no. 1.4, 1.5 and 1.7 make this classification more easy to understand.

Chart No. 1.6 : Classification of fibres



The fibres which are available in nature in fibre form are called Natural fibres. They are obtained from three major sources – Vegetable, Animal and Mineral. (See Chart No.1.5)

Chart No. 1.7 :



Vegetable Fibres : These fibres are available from vegetable origin. Chemically they are composed of cellulose and hence are also known as **Cellulosic fibres**. These fibres are available from different parts of different plants like stem, leaves, fruit etc. Cotton and Linen are the most used fibres from this category.

Animal Fibres : These fibres are available from animals. Chemically they are composed of protein and hence are also known as **Protein Fibres**. These fibres are either body hair of certain animals or secretion of certain insects.

Wool and Silk are the most popular fibres from this category.

Mineral Fibres : There is only one fibre available in this category called **Asbestos**. It is available from certain kind of rocks and has a very special property that it does not catch fire. Because of this property it has extensive use in industrial and construction sector.

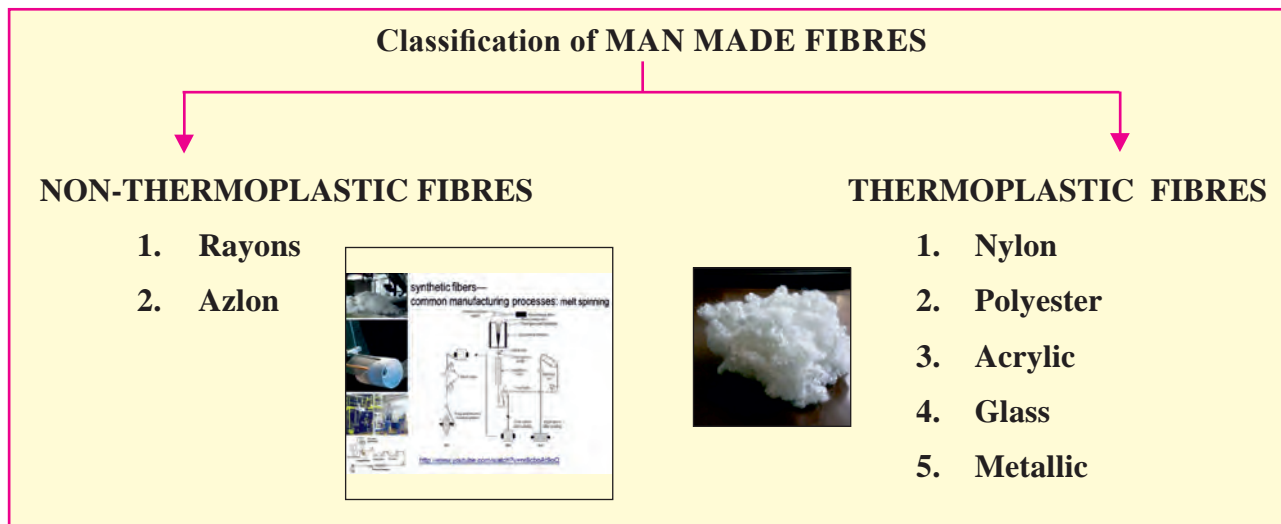
The difference between Natural Vegetable fibres and Natural Animal fibres is given in table no. 1.6 :

Table No. 1.6 Difference between Natural Vegetable Fibres and Natural Animal Fibres

Natural Vegetable Fibres	Natural Animal Fibres
1. Available from different parts of different plants. Examples – Cotton, Linen etc.	1. Available from different animals. Examples – Wool, Silk etc.
2. They are chemically cellulosic fibres.	2. They are chemically protein fibres.

The fibres which are not available in nature in fibrous form and are produced by man with the help of either natural or synthetic materials are known as Man-made fibres or Synthetic fibres.

Chart No. 1.9:



Rayons - The raw material for these fibres is obtained from natural cellulosic source only. Because of this reason, rayons are also known as **Regenerated Cellulosic fibres**. **Viscose rayon** is the most popular fibre amongst all rayons.

Azlon - The raw material for this is obtained from natural protein sources. Azlon fibres are soft to touch and are used to make blends with other fibres.

Nylon, Polyester etc. – The raw material for these fibres is obtained from different chemicals. All these fibres are **thermoplastic**.

Glass & Metallics - These are manufactured by using natural minerals and metals which are not originally in fibrous form. Hence they are also known as **Man-made Mineral fibres**. They are also **thermoplastic** but they melt or change shape at extremely high temperatures.

Internet my friend!

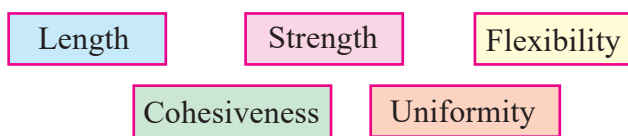
Find out about the latest man-made fibres invented and their various uses.

- *What are the properties of all these natural and manmade fibres?*
- *How the knowledge of these properties help us in selecting textiles?*

1.4 PROPERTIES OF TEXTILE FIBRES

A linear polymer can be called a textile fibre only if it possess certain specific qualities. The properties which are necessary for a fibre to be called a textile fibre are called **Primary properties**. Certain other properties are desirable in a textile fibre. They are called **Secondary properties**. These are properties which may not be an absolute must but their presence improves the utility of the fibre. Chart no. 1.10 shows the primary and secondary properties of textile fibres:

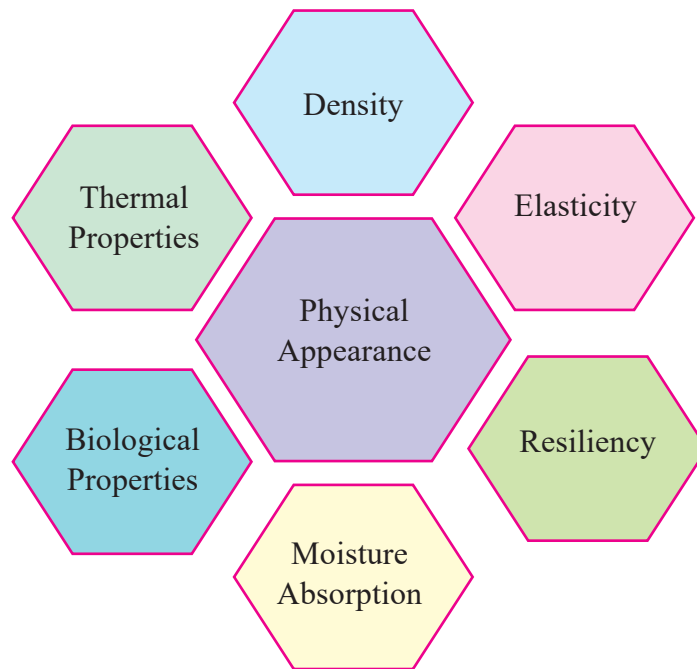
Chart No. 1.10 Properties of Textile Fibres - Primary Properties



Primary properties : These are properties that a textile fibre must possess in order to be called a textile fibre. There are five such properties-

1. **Length** : A textile fibre must have sufficient length to be made into a yarn. It should be at least 100 times longer than its width. Generally, the longer the fibre, the stronger the yarn made from it.
2. **Strength** : A textile fibre must have adequate strength to be spun into a yarn and later woven into a fabric. The strength of a fibre is measured in grams of force per denier (g/den). The strength of a fibre, should be considered in both dry as well as in wet condition. The wet strength of a fibre gives us an idea about which method to use for washing it.
3. **Flexibility** : The ability of a fibre to bend without breaking is called flexibility or pliability. Textile fibres should be flexible so that they can be spun into a yarn. Flexibility of the fibre helps in creating a fabric which has good draping ability. Draping ability helps the fabric to mould over the body and to move with the body.
4. **Cohesiveness** : This is the ability of fibres to stay together and adhere to each other. Without this property, it will be impossible to keep fibres together to make a yarn.
5. **Uniformity** : If the fibres will be similar to each other in all the above four properties, then only it will be possible to make a regular yarn and smooth fabric out of them.

Chart No. 1.11 Properties of Textile Fibres - Secondary Properties



Secondary Properties : These are properties which are desirable in a textile fibre, but not essential. If they are present in a fibre, they help in making a better fabric. But even if they are not present in a fibre, a fabric can still be made from it. There are many such properties.

1. Physical Appearance : Usually length, colour, lustre and texture are considered in physical appearance. In general, a smooth, regular looking fibre will result in a smooth, regular looking fabric.

A. Lustre : It is the shine of the fibre. A lustrous fibre makes a lustrous fabric which looks more attractive. Silk has the best lustre amongst all textile fibres. Cotton is not lustrous. Man-made fibres are very lustrous but their lustre can be controlled.



Pic. No. 1.6 Lustrous Fabric



Pic. No. 1.7 Dull Fabric

B. Colour : Most natural fibres have some or the other colour. Cotton and silk are usually off white or cream coloured, linen is cream to light brown or gray and wool is available in many colours including black. Man-made fibres are usually pure white but they can be manufactured into any colour.

C. Texture : It is the surface quality or the 'feel' of the fabric. Silk is very smooth in touch. Wool and cotton are slightly rough. Jute and Coir are quite rough in texture. Man-made fibres are usually very smooth but their texture can also be controlled.

2. Density : This means mass or weight per unit volume and is expressed in gm/cc. In plain language, it means how dense is the fibre. A high density fibre will make a heavier fabric while a low density fibre will make a light weight fabric.

3. Elasticity : The ability of a fibre to stretch when force is applied and come back to the original position when the force is removed, is known as elasticity. The man-made fibres in general have better elasticity than natural fibres. This is a convenience property. It helps in putting on and taking off clothes.

4. Resiliency : This is the ability of a fibre to save itself from wrinkling. If this property is good in fibre, the fabric will not get creased and ironing will not be required. Bad resiliency results in frequent ironing. Man-made fibres have very good resiliency as compared to natural fibres.

5. Moisture Absorption : If the moisture absorption of a fibre is good, it will absorb perspiration thus making the fabric comfortable to wear. It will take time to dry. If the moisture absorption is not good, fabric will not be comfortable to wear but will dry quickly. Man-made fibres usually have low moisture absorption than natural fibres.

Have you ever wondered?

1. It is a common experience that it is easier to wear or take off a legging as compared to a cotton churidar. Why?
2. You generally have to iron your dresses but not your dupattas. Why?
3. Synthetic clothes dry quickly while cotton clothes take a lot of time to dry especially in monsoons. Why?
4. At times synthetic clothes start sticking to the iron while ironing. Why?
5. We prefer to wear cottons during summers and woollens during winters. Why?
6. Towels start smelling bad during monsoons. Why?

Hint: The answers lie in the properties.

6. Thermal Properties : These are properties related to heat:

A. Effect of Heat : The ability of a fibre to tolerate heat without getting damaged by it. This property helps us to know how to wash and iron fabrics made from different kinds of fibres. Man-made fibres being thermoplastic can easily get damaged by heat.

Use Your Brain Power

B. Heat Conductivity : The ability of a fibre to pass heat through itself. Fibres with good heat conductivity pass our body heat to the outer atmosphere and make us feel comfortable in summers. Fibres with bad heat conductivity does not pass our body heat to the outer atmosphere and thus give us comfort in winters.

7. Biological Properties : These are properties related to damage and durability.

A. Effect of Moth : Certain fibres can get damaged by small insects called Moths. In general, Natural Animal Fibres get easily damaged by moths.

B. Effect of Mildew : This means whether the fibre will get affected by Mildew i.e. fungus. Natural Vegetable Fibres get easily damaged by mildew. Man-made Fibres are least affected by either Moth or Mildew.

1. Some important properties of textile fibres got jumbled below. Find out the property and write it in the given space.

a) Y C I T A S E L I T -

b) C R I L E N Y S E I -

c) T U R E S L -

d) S E D I N Y T -

e) G S T E R N H T -

f) H E L G N T -

2. Use the letters given below to fill in the blank spaces. Use each letter only once. Read the filled space from top to bottom to find a hidden word.

X T L F R I E T B S E I E

J U	_____	E
L I N	_____	N
F L E	_____	I B I L I T Y
D E N S I	_____	Y
P	_____	N A
S I	_____	K
P O L Y	_____	S T E R
	_____	I L A M E N T
S	_____	S A L
A S	_____	E S T O S
A C	_____	Y L I C
H	_____	M P
G L A	_____	S

3. In the table given below, a few categories of fibres / properties and their examples are given. Unfortunately, some places have been left blank. Can you fill them up?

Fibres / Properties	Examples 1	Examples 2
Primary Properties	Cohesion	
Cellulosic Fibres		Linen
	Silk	Wool
Other Uses of Cotton	Bandage	
Filaments		Silk
Staple Fibres	Cotton	
Thermoplastic Fibres		Nylon

EXERCISE

Objective Type Questions

I. Match the following :

(i)

A		B	
1.	Cotton	a)	Protein fibre
2.	Rayon	b)	Man made protein fibre
3.	Asbestos	c)	Regenerated cellulosic fibre
4.	Nylon	d)	Speciality fibre
5.	Silk	e)	Thermoplastic fibre
		f)	Vegetable fibre
		g)	Natural mineral fibre

II. Select and write the most appropriate answer from the given alternatives for each question :

- Non-thermoplastic man-made fibre is
a) Polyester b) Azlon c) Rayon
- Viscose rayon is
a) Man-made fibre
b) Natural fibre
c) Mineral fibre

- Thermoplastic fibre is
a) Cotton b) Wool c) Nylon
- Regenerated cellulosic fibre is
a) Silk
b) Viscose rayon
c) Polyester
- This is a Primary property of textile fibres
a) Density
b) Uniformity
c) Resiliency

III. Write whether the given sentences are True or False :

- Asbestos is the only natural mineral fibre.
- Linen fibres are composed of protein.
- Asbestos is a metallic fibre.
- Moisture absorption is a primary property of textile fibres.

5. Lustre is a secondary property of textile fibres.

IV. Name the following :

1. The only natural mineral fibre.
2. The ability of a fibre to save itself from wrinkles.
3. The only natural filament.
4. Regenerated Cellulosic fibre.
5. Fibre made from natural proteins.

V. Classify the following into following categories :

- i. **Natural fibre and Man made fibre**
jute, acrylic, kapok, polyester.
- ii. **Primary Property and Secondary Property**
uniformity, density, elasticity, strength

Short Answer Type Question

I. Define following terms:

1. Polymerization
2. Thermoplastic fibre
3. Filaments
4. Staple fibres
5. Regenerated fibre
6. Density
7. Resiliency
8. Primary properties

II. Differentiate between :

- i. Thermoplastic fibres and Non thermoplastic fibres
- ii. Natural Cellulosic fibres and Natural protein fibres

III. Give Reason :

1. Fabrics made from man-made fibres dry faster.
2. Towels start smelling bad in monsoon.
3. Synthetic fabrics do not require ironing.
4. Rayon is also called regenerated cellulosic fibre.
5. Cotton is used in summers.
6. Woollens are preferred in winters.
7. If the iron is hot, synthetic fabrics start sticking on it.

IV. Write short notes on the following :

1. Primary properties (any two).
2. Resiliency and Density.
3. Heat conductivity and Lustre.
4. Classification chart of Natural fibres.
5. Classification chart of Man-made fibres.

Self Study / Project

- Make a list of all textile products we use in our daily life.
- Find out samples of fabric made from various natural and man-made fibres



Unit 2 COTTON

NATURAL CELLULOSIC FIBER

Can you tell?

- Which is the most commonly used fiber in a temperate country like India?
- What is origin of cotton fiber?
- Why cotton is termed as natural cellulosic fiber?

2.1 INTRODUCTION

Cotton is obtained from a bushy mallow plant and grows from the surface of seeds in the pods or bolls and so is also called “seed-hair fiber.” The word “cotton” is derived from an Arabic word “quoton” which means plant found in the conquered land. It is one of the oldest fibers known to mankind. Its history is more than 5000 years old. India was the principal country in growing cotton and manufacturing cotton fabrics which were well known all over the world.

❖ Cotton Producing Regions :

The major cotton producing regions are India, China, America, Brazil, Russia, and Argentina. In India, it is cultivated on a large scale in South Indian Plateau, i.e.

Maharashtra, Tamil Nadu, Karnataka and Andhra Pradesh.

❖ Cultivation of cotton :

Cotton is cultivated most satisfactorily in warm, humid climates or in warm climates with adequate irrigation. The deep and black soil is generally most favourable for the cultivation. It grows well in the areas where the amount of rainfall is less but well distributed.

Carefully selected cotton seeds are planted in row. Approximately after 100 days, they begin to bloom as creamy white blossoms. These blossoms change to pink and then reddish purple. Within three days their petals fall off, leaving the ripening of seed pod. The fibers growing inside the pod expand it to about 1.5” long and 1” in diameter. It is now known as **cotton boll**. The boll bursts open about 50 to 80 m days after the flowering with fleecy white cotton ready for picking. Full grown Cotton plant is about 3 to 6 feet in height..

India mainly produces short staple cotton. Recently medium and long staple varieties of cotton like Buri, Laxmi, Varalaxmi, Devraj are cultivated. Arboreum and Harbaciun varieties of cotton produce short, thick, rough but stronger fibers, These varieties are known as desi, asian or ancient cotton. Gossypium originated in America and possesses greater length and better qualities. Fibers of super fine quality and maximum length are obtained from Barbadosense also famous as **Egyptian cotton**. Organic cotton is one of the latest varieties of cotton and is cultivated without using synthetic fertilisers and insecticides. It has great demand in European countries. Experiments on growing species of coloured cotton are being done today. B. T. cotton is produced using technique of genetic engineering. which has improved resistance and for greater production in lesser cost it is cultivated.



Picture No. : 2.1 Hand Picking



Picture No. : 2.2 Mechanical Picking

2.2 MANUFACTURING PROCESS OF COTTON

1. Picking :

Full ripe bolls are picked by hand or by mechanical picking machines.

- i) **Hand picking** : All cotton bolls do not ripen and open at the same time. Only those that are burst are picked by hand. It results in more uniform and better quality cotton, as pickers select only the mature fibers. Cotton fields are repicked for several times.
- ii) **Mechanical Picking** : When mechanical pickers are used, the bolls are left on the plants until they all mature. Plants are sprayed with defoliant or chemicals which cause the leaves to shrivel and fall off.

The full ripe bolls are then picked by machines.

Interesting Historical Facts

Rust, John & Mack

Brothers & native Texans, they invented the automatic cotton picking machine in **1836**. This mechanical picker revolutionized the industry & increased production a great deal. It is estimated that four thousand previous attempts had been made to develop the mechanical cotton picker.



Picture No. : 2.3 Cotton boll



Picture No. : 2.4 Ginning

2. Ginning and Baling :

After the cotton is picked, it is taken to the ginnery. Cotton fibers called as lints are separated and the seeds are removed by the cotton gin. The cotton gin was invented by Eli Whitney in 1794. It subsequently promoted the growth of cotton industry. The modern gins remove foreign matters such as dirt, twigs, leaves and parts of boll.



Picture No. : 2.5 Cotton bales

Internet is my friend:

Collect information from internet about scientist Eli Whitney who invented cotton gin.

Chart No. : 2.1

Manufacturing Process of Cotton

	<p>Picking</p> <ul style="list-style-type: none"> ● hand picking ● mechanical picking
	<p>Ginning & Baling</p> <ul style="list-style-type: none"> ● separating cotton seeds from the fibres ● packing the fibres into large bales
	<p>Grading</p> <ul style="list-style-type: none"> ● Cotton fibres are classified according to their quality. ● Price is established based on this quality.
	<p>Opening, Cleaning & Blending</p> <ul style="list-style-type: none"> ● Bales are opened at mills and fibres are cleaned. ● Fibres are mixed for uniform quality and laps are made.

	<p>Carding</p> <ul style="list-style-type: none"> ● First step to bring fibres in one direction. ● Thick tube like Card slivers are made.
	<p>Combing</p> <ul style="list-style-type: none"> ● A continuation of Carding process for high quality yarns. ● Thin tube like Combed slivers are made.
	<p>Drawing</p> <ul style="list-style-type: none"> ● Combed slivers are stretched and made very thin. ● Fibres are now totally in one direction.
	<p>Roving</p> <ul style="list-style-type: none"> ● A stage inbetween sliver and yarn. ● Slight twist is added.
	<p>Spinning</p> <ul style="list-style-type: none"> ● Final process where yarn is actually made. ● Fibres are given desired amount of twist and wound on bobbins.

The cotton fibers are then compressed into large rectangular bales. These are covered with jute or polythene bags and bound with bands. Each bale is of specific weight and dimension. It is of 180 kg. in weight and generally 120 c. m. × 50 c. m. × 40 c. m. in dimension.

3. Grading :

Cotton fibers are classified according to length, properties, colour and quality

of fibers. Fiber properties measured are fineness, colour, length, uniformity and strength. When all the property values have been determined, the final quality of cotton is registered. The fiber price is established on the quality of the cotton. .

4. Opening, Cleaning and Blending

The bales are opened at the mill and compressed masses and hard lumps are loosened. Fibers from several bales are mixed together. It results in more uniform yarn. The heavier impurities such as dirt, burrs, parts of seeds and leaves etc. are removed mechanically.

5. Carding

In the lap stage, the fibers are still in a tangled condition with some impurities. These impurities must be removed and the fibers must be straightened before it can be made into yarn. This initial process of arranging the fibers in a parallel fashion is called as carding. Card is a textile machine with teeth or wires. It receives the fibers in matted laps or loose fibers and converts into **card sliver**. Sliver is round, with 3/4 to one inch wide, continuous, untwisted rope like strand of fibers. Card sliver produces carded yarns or carded cottons serviceable for inexpensive cotton fabric.



Picture No. : 2.6 Carding



Picture No. : 2.7 Combing

6. Combing

For high quality cotton yarns, fibers are combed as well as carded. The long, desirable fibers of same length are separated from the short, undesirable fibers stock by combing process. In this Process 2 % to 25 % of fibers are removed. The comb is a unit of yarn manufacturing machinery, which arranges fibers in parallel order in the form of **comb sliver**. Only the best grades of the cotton are generally combed. Combed yarns are of outstanding evenness, smoothness, fineness and strength than carded yarns. This process is also applied to coarser yarns when high quality is desired.

7. Drawing

It is a process in yarn manufacture in which the sliver from either the carder or comber is elongated by passing it through a series of pairs of rollers, each pair moving faster than previous one. This permits combing several slivers and drawing and elongating them to straighten the fibers. It helps in creating greater uniformity. The process of drawing is also commonly called **drafting**. In this stage first time a little amount of twist is inserted.

8. Roving

It is an intermediate state between sliver and yarn. It is carried out on roving frame where further the size of sliver is reduced approximately one-eighth of its original

diameter. At this stage very little amount of twist is inserted to hold the fibers together. The new strand called **roving** is laid onto a bobbin.

9. Spinning

This is the final process of manufacturing yarn. During spinning the roving is made thinner to the desired diameter, called the **final draft**. The twist is given to a yarn to give strength and other desirable characteristics. The yarn is then wound onto the bobbin, spools or cones by winding process.



Picture No. : 2.8 Spinning

Development of staple fibers into yarn.

Chart No. 2.2

1. Lap to Card Sliver by **carding** process.
2. Card Sliver to Combed Sliver by **combing** process.
3. Sliver to Roving by the **drawing-** out process.
4. Roving to Yarn by the Drawing and **Twisting** process.
5. Yarn reeled on bobbins, spools or cones by **winding** process.

2.3 PROPERTIES OF COTTON FIBER

Cotton is a remarkable fiber which has many good properties making it one of the most popular fiber in our country and around.

❖ Microscopic Properties

Under the microscope, the longitudinal view of cotton shows a flat ribbon-like structure. There are twists or convolutions seen throughout the length. The diameter is uneven and there is very little lustre. (For diagram refer to Practical No. 8)

Chart No. 2.3

Microscopic Characteristic of Cotton

- Flat ribbon like appearance
- Diameter is uneven
- Convolutions (twists) are seen

B) Physical Properties:

1. **Length** : Individual fibers range from $\frac{1}{8}$ inc.- $2\frac{1}{2}$ inches. Long staple length in cotton is desirable because the fibers can be spun into yarns of higher tensile strength.
2. **Luster** : Cotton has very little luster. A process called ‘Mercerization’ increases the luster.
3. **Strength** : Cotton has a tenacity of 3.0-5.0 grams/ denier. This produces a fiber of moderate to above – average strength. Cotton is 10-20% stronger when wet. Mercerized cotton is stronger than unmercerized cotton.

Think about it!

Why florist wet the cotton thread before making garlands?

4. **Elastic recovery and elongation:** Cotton fiber has very little natural elasticity. It is more elastic than linen but less than silk and wool. Cotton has an elongation of 3-10%, with a recovery of only 75% at 2% extension.
5. **Resiliency** : Cotton has low resiliency, due to this cotton fabrics wrinkle easily and needs frequent ironing. Application of resin finishes improves the resiliency of cotton. .

6. Moisture regain : Moisture regain of unmercerized cotton is 8.5% at 65% relative humidity and 70o F temperature. Mercerized cotton absorb more moisture than nonmercerized fibers. Moisture regain for mercerized fiber varies from 8.5-10% the moisture regain factor of cotton has made it more desirable as summer wear. Water has little effect on cotton, other than

swelling of the fiber, which may cause shrinkage. Even boiling water has no action on cotton. Cotton is stronger when wet. This property of cotton does not demand for any special care while laundering the fabrics.

7. Density: Cotton is one of the high density fibers used with a density of 1.54 – 1.56 gm/cc. This makes the fabric heavy in weight.

Chart No. 2.4

Properties of Cotton Fiber		Can you tell
Microscopic	Flat ribbon – like structure, twists / convolutions are present.	
Length	Staple fiber $\frac{1}{8}$ Inch to $2\frac{1}{2}$ ”	We usually don't wear cotton clothes while going to parties or marriages. Why?
Luster	Low	
Strength – (Tenacity)	Very good 3.0 – 5.0 g/d strength increases in wet condition	Dhobies beat the cotton clothes on the stone while washing them and they are still not damaged. Why?
Elasticity	Low	
Resiliency	Low	After washing, cotton clothes can not be worn again without ironing. Why?
Moisture absorption	Very good	Cotton clothes take a long time to dry. Why?
Density	More – 1.5 gm/cc	
Effect of Mildew	Easily affected	Towels, napkins, dish clothes, mops etc. are always made of cotton. Why?
Effect of Moth	Not easily affected	
Effect of Heat	Can withstand high temperature. Burns readily, keeps on burning, smells like burning paper	Cotton clothes are preferred in summer season. Why?
Heat conductivity	Good	

Hint : The answers lie in the properties of the fiber.

C) **BIOLOGICAL PROPERTIES :**

1. **Effect of mildew :** Being a cellulosic fiber, cotton fabrics especially sized fabrics are affected by mildew readily when permitted to remain in damp condition. Small greenish-black or rust colored spots caused by mildew (fungus) develops, and a musty odour may be detected. Therefore, cotton material should be kept in a dry atmosphere.
2. **Effect of moth :** Being a cellulosic fiber cotton is not attacked by moths and beetles..

D) **THERMAL PROPERTIES:**

1. **Effect of Heat :** Cotton burns readily and quickly. While burning it smells like a burning paper & leaves small amount of fluffy gray ash.
2. **Heat Conductivity :** Cotton is good conductor of heat and hence suitable for summer wear.

2.4 USES OF COTTON

Cotton is the single most widely used fiber and it is an excellent choice for a multitude of purposes. Due to its comfort factor, strength, absorbency, softness cotton has almost universal acceptance. Due to its good moisture regain, these fabrics are very comfortable to wear in hot humid climate in tropical country like India. Due to its good heat resistance they can be used very safely while working in kitchen or while bursting fire crackers. Cotton fiber has high wet strength and most soaps and detergents used in home laundering do not have any harmful effect on them. This makes the fabric care less demanding and hence most of cotton fabrics can be laundered and dried at home without any special precautions.

Cotton is extensively used with man made fibers to achieve new combinations of properties

that are not available in the fibers separately. In such blends the cotton fiber contributes characteristics of comfort, absorbency, softness while manmade fibers add strength and easy care. The fibers have great importance in medical field.

Bedsheets, pillow covers, curtains used in hospitals can be easily sterilized by autoclave. Due to its high absorbency they are used for bandages. It is also favorite fabric for various active sports wear. Cotton due to its high absorbency, absorbs sweat and hence are comfortable as sports wear and for summer clothing. Following are the main uses of cotton.



Picture No. : 2.9 Apparel uses of Cotton

1. **Apparel uses :** Inner garments, hosiery items, scarf, sarees, hand gloves, socks, hats, caps, shirts, pants and various sports wear.





Picture No. : 2.10 Apparel uses of Cotton



Picture No. : 2.12 Household Uses of Cotton

Picture No. : 2.11 Apparel uses of Cotton

- Household uses :** curtains, bed sheets, pillow covers, napkins, table cover & mats, towels, mattress, bathroom mats etc.

- Medical uses :** Threads, bandages, gauze, sterilized cotton, doctor's aprons etc.





Picture No. : 2.13 Medical uses

4. **Industrial and commercial, miscellaneous uses** : Shoe laces, embroidery threads, sewing threads, ropes, twines, socks bags, handbags, laces, nets, trimmings.



Picture No. : 2.14 Commercial Uses

Use Your Brain Power

1. Can you rearrange the steps in Cotton Manufacturing.
 - 1) Roving
 - 1) _____
 - 2) Drawing
 - 2) _____
 - 3) Picking
 - 3) _____
 - 4) Grading
 - 4) _____
 - 5) Carding
 - 5) _____
 - 6) Ginning & Baling
 - 6) _____
 - 7) Combing
 - 7) _____
 - 8) Spinning
 - 8) _____
 - 9) Opening, Cleaning & Blending
 - 9) _____

EXERCISE

Objective Type Questions

I. Match the pairs

A		B	
1.	Carding	a)	quality determination
2.	Spinning	b)	combed silver
3.	Ginning	c)	twisting
4.	Combing	d)	separating lint from seed
5.	Grading	e)	card silver
		f)	Opening cotton bales

II. State whether the following sentences are true or false.

1. Cotton is a bast fiber.
2. Cotton is composed of protein
3. Cotton is easily affected by mildew.
4. Combed yarns are of superior quality.
5. Ginning of cotton separates Lint from seeds.
6. Cotton has poor heat conductivity.

Multiple choice questions

III. Select and write the most appropriate answer from the given alternatives.

1. Burning cotton smells like burning
a) Plastic b) Paper c) Hair
2. Under the microscope, structure of cotton is
a) Flat twisted b) Circular
c) Scaly

3. Natural cellulosic fiber is
a) Wool b) Cotton c) Mohair
4. Resiliency of cotton is
a) Poor b) Medium c) Good
5. Source of cotton is
a) Animal b) Rock c) Plant

IV. Complete the flow chart using correct word.

- 1) **Carding** →
- **Drawing** →
-

Short Answer Type Questions

V. List in order steps involved in the manufacture of cotton yarns.

VI. Give reasons

1. Cotton fabrics are heavy in weight.
2. Cotton is suitable for summer wear.
3. Cotton can be used safely in kitchen.
4. Cotton fiber is more suitable in medical field.
5. Cotton clothes creases easily.

VII. Answer in short.

1. What is Ginning?
2. What is Picking?
3. What is Grading?
4. What is Baling?
5. What is Spinning?

VIII Answer the following.

1. Explain microscopic appearance of cotton.
2. Thermal properties of cotton.
3. Biological properties of cotton.
4. Explain moisture regain and resiliency of cotton.
5. Explain Density and strength of cotton.

Long Answer Type Questions

1. Explain Carding and Combing of Cotton.
2. Explain uses of Cotton.

Self-Study/Project

- Visit a hospital and make a list of items made of cotton for medical use.
- Make a list of Cotton Household articles used in the house.



Unit 3 LINEN

NATURAL CELLULOSIC FIBER

Can you tell?

- *Have you ever seen linen fiber*
 - *Are you aware from which tree linen fibers are obtained?*
 - *Have you ever used linen garments? How different they are from Cotton garments?*
- Let's learn & find out more information about linen in this chapter.*

3.1 INTRODUCTION

Linen yarn is made from fibers removed from the stem of a slender flax plant. Since it is obtained from the stem of the plant it is termed as **Bast** fibers. These fibers, held together under the stem's bark by a gummy substance, pectin, which forms the body of the flax plant.



Fig. No. 3.1 : Flax Plant & Linen Fiber

The word flax is derived the old English Fleax. Linen is term applied to the yarn spun from the flax fibers and to the cloth or fabric woven from this yarn.

The flax fiber is basically composed of the woody substance, cellulose.

Linen is considered to be the oldest fiber used in the Western World, which dates back to about 10,000 BC. There are references in the Bible regarding the use of Linen. It was used in Egypt from 3000 to 2500 B.C. These early fabrics were very fine and delicate and were considered the fabric of luxury. This was fashionable and regal fabric of Middle Ages. From Egypt, it was introduced in Great Britain around 1000 B.C. When cotton gin was developed, linen lost much of its importance.

- **Flax Producing Regions :**

Flax of various grades is mainly produced in Australia, Austria, Belgium, Czechoslovakia, France, Germany, Ireland, The Netherlands, New Zealand, Italy and U.S.S.R.

- **Cultivation of Flax :**

The flax plant requires a temperate climate with cloudy skies and adequate moisture. It grows well in deep, rich, well plowed soil. To obtain best quality of fibers the

crop should be carefully rotated. Crop-rotation program of five years yields good harvest.

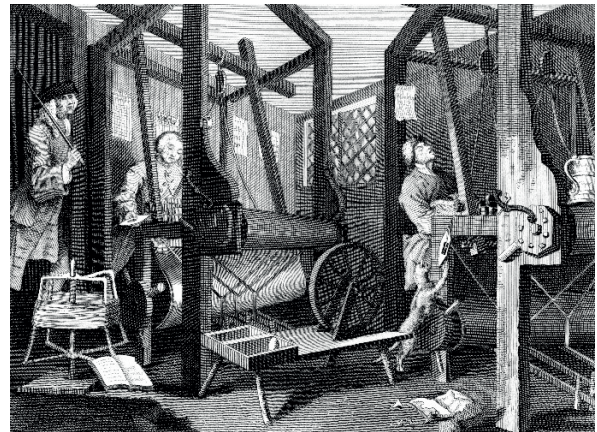
Flax seed is planted by hand in April or May. The seeds are sown close together, so that the plant will grow dense but fine. The flax plant reaches a height of 2-4 feet. Its blossoms are delicate pale blue, white or pink. Plants are pulled before the seeds are ripe when it is to be used for fibers.



Pic. No. 3.3 : Flax Plant



Pic. No. 3.2 : Cultivation of Flax



Pic. No. 3.4 : Processing of Linen in Olden Times

3.2 MANUFACTURING PROCESS OF LINEN

Chart no. : 3.1 Manufacturing Process of Linen Fiber





Breaking



Scutching



Hackling



Spinning

● **Pulling :**

By the end of August flax turns brownish in colour. It indicates that it is ready for pulling. At this stage if it is delayed, the fibers lose its prized luster and soft texture. Flax for fibers is pulled by hand or mechanical pullers, to keep the roots and stalk intact for the fibers extend below ground surface. The stalks are tied in bundles called beets.



Pic. No. 3.5 : Pulling



Pic. No. 3.6 : Drying Linen Stalk

chart no. : 3.2 Types of retting



Dew Retting

- flax straw is spread on open field.
- uneven retting but gives strongest linen.

	<p>Pool Retting</p> <ul style="list-style-type: none"> ● flax straw is immersed under water. ● takes less time but over retting can happen.
	<p>Tank Retting</p> <ul style="list-style-type: none"> ● huge concrete tanks filled with river water. ● best grade Belgium Flax is made by this method.
	<p>Wooden vat Retting</p> <ul style="list-style-type: none"> ● flax is immersed in warm water. ● faster method.
	<p>Chemical Retting</p> <ul style="list-style-type: none"> ● Chemicals are added in water. ● very fast but fibre can get damaged.

- **Rippling :**

After drying the plants, the seeds and leaves are removed from the stem of the flax plant by passing the stalks through coarse combs. This process is called rippling. Bundles of flax are then piled in the fields to dry.

- **Retting :**

To obtain the fibers from the stalk, the outer woody portion must be removed. The bundles of plant are then steeped in water. This allows the tissue or woody bark surrounding the fiber to decompose and loosen the gum that binds the fiber to the stem. This decomposing and fermentation is called **retting**. It is done by the following methods.

Types of Retting :

- 1) **Dew Retting :** The flax straw is spread on the grass to expose it to the atmosphere for three to four weeks. This method gives uneven results but produces flax which is strong and dark gray in colour.



Pic. No. 3.7 : Dew Retting

- 2) **Pool retting :** It requires less time than dew retting from ten to fifteen days. This method some times causes over retting as stagnant water is used and it may result in brittle and weak flax fibers. The fibers obtained are bluish gray in colour.
- 3) **Tank retting :** Bundles of flax are placed in huge concrete tanks with river water. Its temperature of the water is 75° F and increased to 90° F. It requires 24 to 25 days and produces strong, lustrous, highest quality flax fibers. The best grades of Belgium flax are retted in water from the **rivers Lys**.



Pic. No. 3.8 : Tank retting

Internet is my friend!

Collect more information from internet about Retting carried out in various European countries. Also observe the various photographs. Discuss this information in your class.

4) **Wooden vat or mechanical retting:**

The flax is immersed in wooden vats containing warm water at temperature ranging from 75° F to 90° F. This method shortens the retting process. The flax is removed from the vats and passed between the rollers to crush the decomposed bark as clean water flushes away the pectin or gum and other impurities. Linen produced by this method is more susceptible to mildew.

5) **Chemical retting :** The flax is stacked in tanks containing water and chemicals such as Sodium Hydroxide or Sodium Carbonate. Flax is sometimes boiled in dilute solution of Sulfuric acid. It can shorten the process considerably but it may affect the strength of the fibers if it is not carefully controlled.

● **Breaking :**

After retting is complete, the stalk is bundled together and passed between fluted rollers. It breaks outer woody covering into small particles. These are called shives.

● **Scutching :**

Scutching process separates the outer covering or shives from the usable fibers. The flax fibers are thus released from the stalk. This process is done by hand or by machines.



Pic. No. 3.9 : Scutching

● **Hackling :**

Hackling or combing process corresponds to the carding and combing process of cotton. This process straightens the flax fibers and separates short fibers called 'tow' from the long fibers known as 'lines'. It arranges longer fibers in parallel formation. For very fine linen, the process is done by hand and is repeated. Coarse linen is hackled by machine. The fibers are then drawn into a sliver.



Pic. No. 3.10 : Hackling

● **Spinning :**

The flax fibers are drawn out into yarn and twist is imparted. Although the flax is one of the strongest fibers, it is unelastic and requires carefully controlled, warm, moist atmosphere while spinning. Flax fibers are spun by either dry or wet spinning methods. Wet spinning gives best quality yarn.



Pic. No. 3.11 : Flax Seed to Linen Fabric

3.3 PROPERTIES OF LINEN (Flax) FIBER

A) MICROSCOPIC PROPERTIES :

Under the microscope longitudinal view of linen appears to be composed of a number of small fibers cemented together. It looks much like a bamboo pole with crosswise markings called nodes & inter nodes. Flax has a large central canal. (For Diagram of Linen Fiber refer to practical No. 8)

Table No. 3.2

Microscopic Characteristic of Linen

- **Bamboo pole like appearance**
- **Crosswise markings (Nodes)**
- **Large central canal**

B) PHYSICAL PROPERTIES :

1. Length :

Linen fibers vary in length from few inches to 22 inches or more. Linen fibers (Long linen fibers) are usually more than 12 inches and frequently

from 18-22 inches, Average length of fibers after processing is 10-15 inches. Tow fibers (short linen fibers) are less than 12 inches in length and can be as short as a fraction of an inch.

2. Luster :

Flax possesses a high natural luster. Flax is almost silky in appearance and produces attractive yarns and fabrics.

3. Strength :

Among the natural fibers, it is second in strength to silk. It is much stronger than cotton and it gets stronger when wet. Tenacity of flax is 5.5 – 6.5 grams / denier.

4. Elastic recovery and elongation :

Linen (flax) fiber has no significant elasticity. It is, infact, the least elastic of natural fibers. Fibers are naturally stiff and resists bending. It has elastic recovery of 65 % at 2 % extension. It has low elongation of 1.8 – 2 %, may extend as much as 3.3 %.

5. Resiliency :

Linen fiber has little resiliency. Thus fabrics are prone to crease and wrinkle badly. Finishes can be applied to improve this property.

6. Moisture regains :

Linen fiber has good moisture regain. It's moisture regain is 10-12 % at 65 % relative humidity and 70° F temperature. When absorbency is the main consideration, linen is preferable to cotton. It absorbs moisture and dries more quickly. It is therefore excellent for handkerchiefs and towels. Water causes the fiber to swell slightly. This can cause shrinkage. Fabrics can be stabilized in the finishing process.

7. Density :

Linen is a high - density fibre. Its density is 1.5 gms/cc. This makes the fabric heavy in weight.

C) BIOLOGICAL PROPERTIES :

1. Resistance to Mildew :

Being a cellulosic fiber like cotton linen is vulnerable to mildew. Mildew will grow on and damage fiber particularly in humid atmosphere.

2. Resistance to Moth :

Like cotton linen is resistant to moths & insects.

D) THERMAL PROPERTIES :

1. Effect of Heat :

Linen fiber burns much the same way as cotton. Fibers burn readily and quickly with a smell similar to that of burning paper. It leaves a small amount of gray ash.

2. Heat Conductivity :

It is a good conductor of heat and hence is more suitable for summer wear.

Table . No. 3.3
Properties of Linen Fibers

Properties	Linen fiber	Can you tell?
Microscopic	bamboo pole like with crosswise marking (Nodes)	Why term Linen is used for household textiles such as bedsheets, napkins, table cloth, towels etc ?
Length	Staple length. Vary from few inches to 22" or more	
Strength	5.5 – 6.5 gm / denier. High wet strength	Why linen towels are used for dish & glassware ?
Elasticity	Low	Why linen is used primarily for high fashion fabrics ?
Resiliency	Low	
Moisture absorption	Very good.	Why linen it more suitable in summer as compared to cotton ?
Density	More 1.5 gm/cc	
Effect of mildew	Easily affected	
Effect of moth	Not easily affected	Hint : The Answers lie in the properties of the fiber.
Effect of heat	can withstand high temperatures. Burns readily swells like burning paper.	
Heat Conductivity	Good	

3.4 USES OF LINEN

Flax has many advantages. It has a high natural luster, strength, good moisture regain, and drape. Flax is used primarily for fashion fabrics in both apparel and home furnishings due to its high price. Linen can be made into sheer lightweight fabrics. Linen absorb moisture more readily and dries more quickly than cotton. Because of this property linen fabrics are cool and comfortable to wear. Linen is most suitable for summer apparel due to it's heat conductivity. It allows the heat of the body to escape.

Linen launders well and gives up stains readily, its softness is enhanced by repeated washing, because of these special qualities linen has long been used for a wide variety of home furnishings. In fact the often used term of 'linen' which refers to home furnishings now usually made of cotton and cotton blends stems from their original composition of linen because flax fibers are strong, they do not break off in use as quickly as other fibers; as a result, they do not form lint and frequently are used for drying towels for dishes especially glassware.

Linen fibers are also blended with cotton and rayon. In a blend linen fiber will contribute certain of its desirable properties that other fibers may lack.

Following are the main uses of Linen :

1. Apparel uses :

Shirts, Pants, Skirts, Kids wear, Sarees, Formal gents wear, Jackets, Scarf, Handkerchief.



Pic. No. 3.12 : Apparel uses of Linen



Pic No. 3.13 : Apparel uses of Linen

2. Household Uses :

Bed sheets, Pillow covers, Curtains, Table Cloth, Table mats, Dish cloth towels, Napkins.

3. Miscellaneous Uses :

Handkerchiefs, Scarves.



Pic. No. 3.14 : Household & Miscellaneous uses of Linen

TABLE NO. 3.5 PROPERTIES COMMON TO ALL CELLULOSE FIBER

No.	Properties	Importance to consumer
1.	Good absorbency	Comfortable for summer wear Good for towels, diapers, bandages, handkerchiefs and active sportswear.
2.	Good conductor of heat	Fabrics suitable for summer.
3.	Ability to withstand high temperature	Suitable for varying medical uses Fabrics can be boiled or autoclaved to make relatively germ free. No special precautions in ironing.
4.	Low resiliency	Fabrics wrinkle badly unless finished for recovery.
5.	Good conductor of electricity	Does not build up static.
6.	High density (1.5 ±)	Fabrics are heavier
7.	Harmed by mineral acids, but little affected by organic acids	Fruit stains (acidic in nature) should be removed immediately from garments to prevent setting.
8.	Attacked by mildew	Store clean items under dry conditions.
9.	Resistant to moth	Can be stored safely for season without any damage.
10.	Flammability	Less harmful in fire accidents.
11.	Moderate resistant to sunlight	Draperies should be lined.

EXERCISE

Objective Type Questions

I) Match the Pairs

A	B
1. Retting	a) Separating Linen fiber from outer covering
2. Scutching	b) removing linen plant from ground
3. Pulling	c) Decomposition of linen bark
4. Hackling	d) Seeds leaves separated from flax stem
5. Rippling	e) Straightening of linen fibers
	f) Burning of vegetable matter.

II. State Whether the following sentences are true or false :

1. Linen is a seed hair fiber.
2. Linen is a natural cellulosic fiber.
3. Dew retting is carried out by using chemicals.
4. Rippling is decomposition of outer woody bark of linen fibers.
5. Best quality of linen is produced by retting in river lys of Belgium.

Multiple Type Questions

III. State and Write the most appropriate answer from the given alternatives :

1. Resiliency of linen is
a) Poor b) Good c) Best

2. Burning linen fiber smells like burning
a) Paper b) Plastic c) Hair
3. Long linen fiber is
a) Tow b) Line c) Lint
4. Linen belongs to the category of
a) Mineral fiber b) Animal fiber
c) Vegetable fiber
5. Density of linen is
a) Medium b) High c) Poor
6. Short linen fiber is
a) Linters b) Tops c) Tow

IV Complete the flow chart using correct word.

1) **Retting** → →

Scutching

→ →

Short Answer Type Questions

I. Give Reasons :

1. Linen is suitable for towels & napkins.
2. Linen is termed as best fiber.
3. Retting is essential for linen.
4. Linen towels are suitable for dishes & glassware.
5. Linen is useful as summer ware fabric.

II. List the following :

1. List the steps in manufacturing process of linen.

2. List the various types of retting processes.
3. List the flax producing countries.

III. Answer in Short :

1. What is Pulling ?
2. What is Retting ?
3. What is Dew Retting ?
4. What is Pool Retting ?
5. What is Tank Retting ?

IV. Answer the following :

1. Explain microscopic properties of linen.
2. Explain uses of linen
3. Write any three properties common to cellulose fibers.

Long Answer Type Questions

1. Explain types of retting.
2. Explain hackling & spinning of linen.

Project / Self Study

1. Visit nearby textile market & study various textile products made up of linen.
2. Make a list of textile products made up of linen for Household purposes.



Unit 4

MISCELLANEOUS CELLULOSIC FIBRES & ASBESTOS

Do You Know?

- *How many plants provide us textile fibres other than Cotton and Flax plant?*
- *Which are the different parts of the plants from which we get fibres?*
- *From which material gunny bags, ropes, door mats etc. are made?*
- *In olden times which material were used to make sails, fishing nets, life jackets?*

Apart from Cotton, Linen, Silk and Wool, there are many other natural fibres which are used in various ways in different parts of the world. Their production and use is not as wide spread as the four fibres mentioned above but they have their own beauty and utility. These are also very ancient fibres with a rich history. Due to advent of man-made fibres in the 19th century, consumers became attracted towards them and the use of these fibres became very limited. Nowadays, as we are becoming more and more aware of the disadvantages of using too many synthetic products and the damage they are causing to our environment, these natural fibres are again gaining popularity. Due to progress in science and technology, better varieties of these fibres are being produced as well as new ways of using them are also being discovered. These fibres are slowly but surely replacing synthetic fibres in our lives.

4.1 JUTE

Jute is known as the ‘**Golden Fibre**’ due to its golden brown colour and its importance. In terms of usage, production and global consumption, jute is second only to cotton. It is also a **bast fibre**, available from the stem part of its plant like Linen. The production is

also similar to Linen. Jute is environmentally friendly as well as being one of the most affordable fibres. It is bio-degradable and can be recycled.

India is one of the largest producer of jute in the world. The top five jute producing countries are India, Bangladesh, China, Uzbekistan and Nepal. Jute has been used in India on family farms for centuries. Jute fibres are very long (1 to 4 metres), lustrous and golden brown in colour. They are strong, have low elasticity, can absorb moisture but are not affected much by moths or mildew.



Pic. No. 4.1 Jute field

Uses of Jute :

1. Jute has been mainly used for making packaging materials like gunny bags, market bags, grocery bags, shopping bags

and floor mats, ropes and twines since very old times.



Pic. No. 4.2 Jute Products

2. It is also used as lining for carpets and linoleum.
3. Nowadays it is becoming popular in fashion garments, jackets, dress materials and fashion accessories like hand bags, footwear etc.
4. It is used for home furnishing and also for making furniture which are gaining popularity rapidly.



Pic. No. 4.3 Jute Furniture

5. The latest use of jute has been in paper making.

4.2 KAPOK

Kapok fiber is one of the natural cellulosic fibers which grow on the kapok tree. It is available from the pods of that tree. In this aspect it is similar to cotton as both are **seed-hair** fibres. The word **kapok** refers both to the tree and to the fibre. The fibre is also known as **silk cotton** or **Java cotton**. It is produced mainly in Indonesia, Thailand and Java.



Pic. No. 4.4 Kapok Tree

It is creamy in colour and very silky. It is very light in weight – 8 times lighter than cotton. It has a waxy coating which helps repel water, and due to its light weight, kapok is 5 times more buoyant than cork. Its length is short and it is not strong.



Pic. No. 4.5 Kapok fibre

Uses of Kapok:

1. Due to its short length and lack of strength, it is difficult to make yarns out of it. Kapok is therefore mainly used as stuffing for pillows, mattresses and upholstery.
2. It is used as insulation against sound and heat.



Pic. No. 4.6 Kapok Pillows

3. It is used as a substitute for absorbent cotton in surgery.
4. Due to its buoyancy, light weight and waxy coating, it is the material par excellence for the manufacture of lifebuoys and belts, waistcoats and other naval life-saving appliances. It is used by military and navy for these purposes.



Pic. No. 4.7 Kapok Life Jacket

5. It is also used for building construction.
6. With advanced technology, it is possible to mix kapok with cotton and make yarns.
7. This will widen the use of this fibre and provide consumers with more choices.

4.3 RAMIE

Ramie is made from the stalks of a plant called **Chinese Nettle**. In this manner, it is also a **bast fibre** like Linen and Jute. But getting fibres from the stems of this plant is more difficult. The process is more complicated and different from retting done for Linen and Jute. Because of the elaborate making process, Ramie is a costly fibre. The major ramie producing countries are China, Philippines, Brazil, Indonesia and India. It is a very ancient fibre. Traditionally, it was very popular in Japanese textiles.



Pic. No. 4.8 Ramie plant

Ramie fibre is white and lustrous and looks like silk. It is very strong, has poor elasticity, very good moisture absorption and is resistant to mildew. It's clothing is very cool and refreshing and so it is a good choice for hot and humid climate.

Uses of Ramie :

1. Ramie is used since very ancient times in China and other countries to make very sheer and translucent fabric resembling silk and linen and is used in making apparel fabrics like shirts, dresses etc.

- It is not very widely used as it is expensive to make, but with new technology, it is possible to make blends with other natural fibres. This has renewed manufacturers' interest in this fibre.



Pic. No. 4.9 Ramie dress

- It is used for making tablecloths, napkins and handkerchiefs like linen.
- It is also used for making industrial sewing thread, packing materials, filter clothes, fishing nets, canvas, upholstery fabrics, straw hats and fire hose.

4.4 HEMP

Hemp is a bast fibre like Linen, Jute and Ramie. The scientific name of its plant is *cannabises sativa*. It is a very old fibre which was in use in 8000 B.C. too. Today it is cultivated in Africa, America, Egypt, Canada, Europe and Asia. It is known as *San* or *Patsan* in India.



Pic. No. 4.10 Hemp plant

Hemp fibres are 3-4 feet long, very strong and durable. They have good moisture absorption and they are resistant to damage by heat, sunlight or mildew. The fibres are naturally stiff and harsh but now with new technology, they can be made soft and flexible.

Uses of Hemp :

- Traditionally hemp has been an industrial fibre. Since ancient times, it has been used for making canvas, sail clothes, ropes and sacks.
- Also used for making carpets and nets.
- After ways of softening hemp were discovered, it has been used for making jeans, sports clothing and other fashion apparels.



Pic. No. 4.11 Hemp Sails

- It is used with other natural fibres to make blends where it imparts strength to the fabric.
- It is also used in making bedding, upholstery as well as medicinal bandage.
- Nowadays it is also used for making shoes, bags and fashion jewellery.

4.5 COIR

Coir is coconut fiber extracted from the outer shell of a coconut. As it is obtained from coconut husk, it falls under the category of

nut-husk fibres. Because of its golden brown colour and its commercial use, it is also called the golden fibre. Like other natural vegetable fibres, even coir has been in use since ancient times. Use of coir is mentioned in Ramayan and other epics. India and Sri Lanka produce almost



Pic. No. 4. 12 coir fibres

90% of coir used in world. Other main coir producing countries are Phillipine, Vietnam, Thailand, Kenya, Ghana etc.

There are two types of coconut fibers, brown fiber extracted from matured coconuts and white fibers extracted from immature coconuts. Brown fibers are thick, strong and have high abrasion resistance. White fibers are smoother and finer, but also weaker. Both brown and white coir consist of fibers ranging in length from 4-12 inches.

Coir fibres are tough and durable, unaffected by moisture and mildew, are flame retardant and provide excellent insulation against temperature and sound. Due to their coarse texture, they are not used for apparel purpose.

Uses of Coir :

1. Traditionally coir has been used for making ropes and door mats.
2. White coir is used in the manufacture of rope and, thanks to its strong resistance to salt water, in fishing nets.

3. Brown coir is used in making sacks, brushes, doormats, rugs, mattresses.
4. It is also used in making insulation panels and packaging.



Pic. No. 4.13 coir products

5. In Europe, the automobile industry upholsters cars with pads of brown coir bonded with rubber latex.
6. Nowadays coir is used to furnish rooms and offices with trendy look. Coir carpets decorate floors and walls as they look sophisticated and ethnic.
7. **Coir Bhoovastra** - Coir Bhoovastra is used to prevent soil erosion and promote vegetation cover. Naturally resistant to rot, moulds, and moisture, and needing no chemical treatment, coir Bhoovastra is hard and strong, and can not only protect the soil from erosion but can even be used as a protection against sea erosion.

4.6 SISAL

Sisal is cultivated for fibres since 1893 in East Africa. Today it is grown in many tropical and sub-tropical countries like Brazil, Tanzania, Kenya, Madagaskar and China. It is a widely used natural fibre and is easy to cultivate. It is available from the leaves of its plant and so comes in the category of *leaf fibres*. Like all leaf fibres, it is also a *hard fibre* which means that it is toughest of all plant fibres and is not used for apparels but mainly for making ropes. Sisal fiber is an exceptionally durable and low

maintenance fibre. It is recyclable. It is anti static, does not attract dust particles and does not absorb water easily. It has the ability to stretch and does not decay in salt water. It takes dyes easily and it has good sound absorbing properties. Sisal is broadly categorized under three grades - lower, medium and high.



Pic. No. 4.14 Sisal Plant

Uses of Sisal :

1. The lower grade fibre is used by the paper industry.
2. The medium grade fibre is used in the cordage industry for making: ropes, baler and binders twine. Ropes and twines are widely employed for marine, agricultural, and general industrial use.
3. The higher-grade fibre after treatment is converted into yarns and used by the carpet industry.
4. Sisal's main use is in shipping industry.
5. It is used for making mattresses, geotextiles, handicrafts, slippers and support belts.
6. It is also surprisingly used as the fibre core of the steel wire cables of elevators, being used for lubrication and flexibility purposes.
7. It is used in automobile industry with fiberglass in composite materials.
8. The use of sisal in non-woven textile is also of prime significance, as sisal is an environmentally friendly strengthening agent to replace asbestos and fibre glass in composite materials.



Pic. No. 4.15 Sisal Rope



Pic.No.4.16 Sisal baskets



Pic.No.4.17 Sisal Handbag

4.7 PINA

Pina fibres are leaf fibres obtained from pineapple plant. Pineapple is mainly grown in sub-tropic countries including Philippines, Taiwan, Brazil, Hawaii, India, Indonesia, West Indies and Bangladesh. Pina weaving is an age old tradition dating back to Historic times.

During 19th century, pina fabric was much in demand all over the world. However, when other cheaper fabrics became popular, pina fabric almost disappeared. It has been revived in the recent past two decades only.



Pic.No.4.18 Pina Plant

Pina fibres have beautiful elegant appearance with natural shine, similar to that of linen. They are long, fine and lustrous. They are lightweight. They blend very efficiently with other fibers. They are very soft and have better texture than silk. They can be washed and don't need to be dry cleaned. Pina fibres are also divided into two groups - i) fine fibres and ii) coarse fibres.

Uses of Pina :

1. Pina fibres are mainly used for making valuable items like wedding dresses, kimonos, gowns, handkerchiefs etc.



Pic. No. 4.19 Pina Wedding gown

2. They are also used for making table cloths, mats, fans, bags and anywhere a lightweight but stiff and sheer fabric is needed.
3. Pina fiber is often blended with cotton, abaca, and silk to make amazing light and breezy fabrics. When woven with silk, it is known as pina-silk.

Internet my friend!

Find out more details about all these wonderful vegetable fibers and their usefulness in various fields.

Do You Know?

- Do you know which fibre is used extensively in building construction?
- Have you ever heard of a fibre which does not catch fire at all?

4.8 ASBESTOS

It is the only natural mineral fibre. The name "Asbestos" is derived from the Greek word Asbestos which means **in consumable** (by fire). This particular property is the main speciality of asbestos and the fibre is used mainly for this property only. This is also a very old fibre and was known to the ancient Greeks as early as the 1st century A.D.



Pic. No. 4.20 Asbestos rock

Asbestos fibre is obtained from rocks. There are thirty different types in the asbestos group. Only six of them are of commercial importance and of these six, only one “**Chrysotile**” is used in textile manufacturing . Asbestos rocks are available from mines. 80% of the world mines of Asbestos are situated in Canada and Russia. The fibres are separated from the rocks, cleaned and then spun into yarns and later made into fabric.

The most important property of asbestos is that it does not burn. It is not affected by fire at all. The fibres are very lustrous and fine. They have good strength, flexibility and low heat conductivity. It is not affected by water, fire, acid or rust.

A peek in History!

Roman Emperor Charlemagne invited some invaders for dinner to discuss truce. After dinner

he threw the table cloth into fire and later retrieved it without any damage. The invaders were convinced that the Emperor has supernatural powers and so left without fighting and a war was avoided.

Can you guess the fabric from which that table cloth was made?

Uses of Asbestos :

Asbestos fibres have rough edges which can hurt our skin and so it is not used as apparel. In India, it is not available in open market. It is made according to order and supplied to the industry where required. It is used as -

- Body suits of fire brigade persons.
- For military purpose.
- For aprons and gloves of workers in ammunition factories.
- For making insulating material for industries.
- As insulating cover for steam or hot water pipes.



Pic. No. 4.21 Fire suits

- As insulating cover for electric cables.
- For building construction.
- As filter in chemical laboratories.
- For sound proofing.



Pic. No. 4.22 Insulating covers

Asbestos Hazard : Asbestos fibres come out of the fabric, float in air and if inhaled, they get fixed in the lungs causing respiratory problems and cancer. Due to this possible health hazard, nowadays asbestos is not so widely used. Many countries have even banned its use.



Pic. No. 4.23 Asbestos gloves

Internet my friend!

Find out more about the types of health problems caused by Asbestos and which countries have banned its use.

Use Your Brain Power

1. Find out the names of all eight fibres mentioned in this chapter in the following grid.

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

2. Who am I ?

- a) I am a nut husk fibre. _____
- b) I am so light weight that I float on water. _____
- c) I am called the “golden fibre”. _____
- d) I am a Greek word meaning unconsumable by fire. _____
- e) I am a bast fibre resembling silk. _____
- f) I am used in automobile Industry. _____
- h) I am used for making wedding dresses. _____

EXERCISE

Objective Type Questions

1. Match the following :

A		B	
1.	Asbestos	a)	Golden fibre
2.	Hemp	b)	Protein fibre
3.	Kapok	c)	Health hazard
4.	Sisal	d)	Bast fibre
5.	Jute	e)	Very light weight
		f)	Nut husk fibre
		g)	Leaf fibre

2. Select and write the most appropriate answer from the given alternatives for each question :

- Fabric used to prevent soil erosion
a) Carpet b) Bhoovastra
c) Pina calado
- Fibre used for making ropes
a) Asbestos b) Pina c) Sisal
- This is a leaf fibre
a) Coir b) Hemp c) Sisal
- This is a nut husk fibre
a) Coir b) Sisal c) Hemp

3. Write whether the given sentences are True or False :

- Asbestos is obtained from rock deposits.
- Sisal fibre resembles Silk.
- Pina is used for making life jackets.
- India is one of the top Jute producing countries.

5. Jute is used in paper making.

4. Name the following :

- The rock from which Asbestos is obtained.
- The coir fabric which prevents soil erosion.
- Embroidered Pina fabric.
- Light weight fibre used for fibre fill.

Short Answer Type Questions

1. Classify the following into following categories :

- Leaf fibres and Bast fibres
jute, pina, sisal, ramie

2. Give Reason:

- Coir is not used for apparel purpose.
- Kapok is used for making life jackets.
- Hemp is used for making sails.

3. Write short notes on the following :

- Uses of Sisal 4. Uses of Coir
- Asbestos fibre 5. Uses of Ramie
- Hemp fibre 6. Pina fibre

SELF STUDY / PROJECT

- Collect information about the production and uses of various vegetable fibres.
- On a world map, note down the areas/countries which produce the various fibres given in this chapter.



Unit 5

YARNS

Can you tell?

- *Apart from fabric construction for what purpose we make use of yarns?*
- *Why khadi fabric has different texture than your uniform fabric?*
- *What type of instrument is used for spinning yarn?*

Let's learn more about yarns, its types and more such information in this chapter.

To weave or knit a fabric it is necessary to have yarns. Thus making of yarns is as old as manufacturing of fabric and definitely predates recorded history. Most fabrics like woven, knitted, braided, knotted, netted, lace and crochet fabrics are made up of yarns. Yarns are made up of either short staple fibers or long continuous filaments.

The characteristics of the fibre and the way they are assembled determine the characteristics of the yarn. The characteristics of the yarn and the way they are assembled determine the characteristics of the fabric. The type of yarn used to make a fabric determine how a fabric may perform when you wear, launder or dry-clean it.

Some fabric characteristics that are determined by yarns include the surface texture (rough, smooth, harsh, soft, crinkled); its weight (light, heavy, medium); its comfort (cool, warm, clammy, comfortable, soft) and its performance (abrasion, strength, pilling)

5.1 INTRODUCTION

Yarn is defined by the American society for testing materials (ASTM) as:

“A yarn is a continuous strand of textile fibre, filament or material in a form

suitable for knitting, weaving or otherwise intertwining to form a textile fabric”

Yarn occurs in the following forms

- A number of fibres twisted together.
- A number of filaments laid together without twist.
- A number of filaments laid together with more or less twist.
- A single filament – A monofilament.
- One or more strips made by the lengthwise division of a sheet of material such as natural or synthetic polymer, a paper or a metal foil.

Yarns composed of staple fibres are frequently called spun or staple fibre yarns. These yarns are fuzzy yarns with protruding fibre ends.

A Filament yarn is composed of long fibres. Filament yarns may be either multifilament (composed of several filaments) or monofilament (composed of a single filament). Filament yarns are smooth in appearance.

5.2 YARN TWIST

Twist is the spiral arrangement of the fibres around the axis of the yarn. Twist is produced

by revolving one end of the fibre strand while the other end is held stationary. Twist binds the fibres together and gives the spun yarn strength. The number of twists is referred to as **turns per inch (tpi)**.

Table 5.1

Mount of Twist

Amount	Number of Twist
Low twist	2 – 3 tpi
Average twist	20 – 25 tpi
Hard twist	30 – 40 tpi
Crepe twist	40 – 80 tpi

Amount of Twist

The amount of twists varies with

- The length of the fibres
- The size of the yarn
- The intended use

Increasing the amount of twist up to the point of perfect fibre to fibre cohesion will increase the strength of the yarn. In general, the more the twist, the stronger the yarn. Beyond an optimum point however added twist will cause the yarns to kink and eventually the yarn will become brittle and will loose strength.

Increased twist will add elasticity to yarn. This can be observed in the stretchy and curly characteristics of crepe yarns, which are highly twisted. Highly twisted yarns are more resistant to abrasion; they shed soil easily because of a smoother surface and less space between fibres for soil to lodge; and they tend to appear smooth, uniform and of low lustre.

Yarns with low twist are soft and fluffy; they tend to be warmer because there are air spaces to serve as insulation areas. Filament yarns of low twist have more lustre as they reflect more light than high twist yarns. Low twist yarns are less strong, show abrasion, wear more quickly than yarns with high twist.

Table 5.2

Comparison of high twist and low twist yarn

Low twist yarn		High twist yarn	
1.	Less strong yarns.	1.	More strong yarns.
2.	More lustrous yarns.	2.	Less lustrous yarns.
3.	Less elastic yarns.	3.	More elastic yarns.
4.	Yarns have less abrasion resistance	4.	Yarns have more abrasion resistance
5.	Yarns are lofty, soft and warm.	5.	Yarns are regular in appearance and harsh to touch.
6.	Yarns soil readily.	6.	Yarns soil less.

- ❖ **Balanced of Yarn:** Balanced yarns are those in which the twist is such that the yarn will hang in loop without kinking, doubling or twisting upon itself.
- ❖ **Unbalanced Yarn:** Unbalanced yarns will twist and retwist in the opposite direction. Smooth fabrics require balanced yarns, but for crepe and textured effects, unbalanced yarns are frequently used.
- ❖ **Direction of twist**
The direction of twist is described as S – twist and Z – twist.

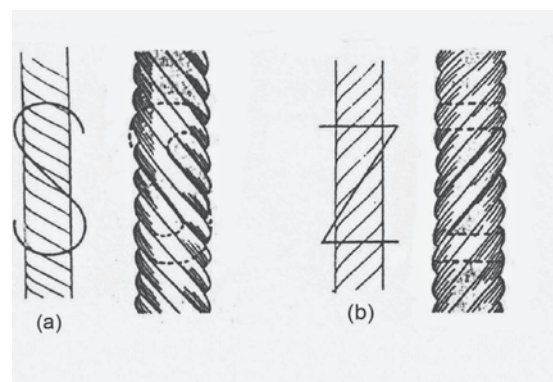


Diagram 5.1 Direction of twist

- **‘S’ Twist:** A yarn has **S** – twist if, when held in a vertical position, the spiral conform to the direction of slope of the central portion of the letter ‘S’.
- **‘Z’ Twist:** A yarn has **Z** – twist if the direction of spirals conforms to the slope of the central portion of the letter ‘Z’.

5.3 YARN NUMBER

Yarn number is a measure of linear density. To some extent the yarn number is an indication of diameter when yarns of the same fiber content are compared. Yarn Number is frequently called yarn count in the indirect system, where as in the direct system it is referred to as Denier.

❖ COUNT [INDIRECT SYSTEM]

Spun yarn size is expressed in terms of length per unit weight. It is called indirect system of yarn numbering because **finer the yarn larger is the number.**

The count is based on the number of hanks (1 hank is 840 yards) in 1 pound of yarn in cotton system. Cotton sewing threads provide an example of yarn number. The most commonly used mercerized thread is number 50. No. 60 thread is suitable of finer fabrics while No. 40 thread for heavier fabrics like denim. drill; and number 8, 16, 20 thread for making buttonholes or for sewing on buttons.

The woolen and worsted system are similar to the cotton system, except that hanks are of different lengths.

Woollen hank – 300 yards

Worsted hank – 560 yards

Table No. 5.3

Cotton System.

Number or count of spun yarn	Length (Hank – yards)	Weight (Pounds)
No. 1	1 (840 yards)	1
No. 2	2 (1680 yards)	1
No. 10	10 (8400 yards)	1

In the above example yarn count no. 1 will be thicker than yarn count 10. Cotton thread for daily use have a count of 50. For stitching thin fabrics, a yarn with count of 60 is more suitable. For thick fabrics like denim, Khaki, drill etc. a yarn count of 40 is more suitable.

❖ DENIER – [DIRECT SYSTEM]

The size of both filament fibers and filament yarns expressed in terms of weight per unit length – denier. In this system, the unit of length remains constant. The numbering system is direct because **finer the yarn, the smaller is the number.**

Table No. 5.4

Filament Yarns size

Denier	Length	weight
1	9000 meters	1 gram
2	9000 meters	2 grams
3	9000 meters	3 grams

Filament yarns are made in a specific denier for certain end uses. For example.

Yarn denier and uses.

Yarn denier	Uses
20	sheer hosiery
40 – 70	Blouses, shirt Support hosiery
140 – 520	Outerwear
520 – 840	Upholstery
1040	Carpets, knitting yarns

Internet my friend!

Find out information on contribution of khadi in India's freedom struggle.

5.4 CLASSIFICATION OF YARNS

Yarns are classified into two basic groups as Simple yarns and Novelty yarns.

Table No. 5.5

Classification of Yarns

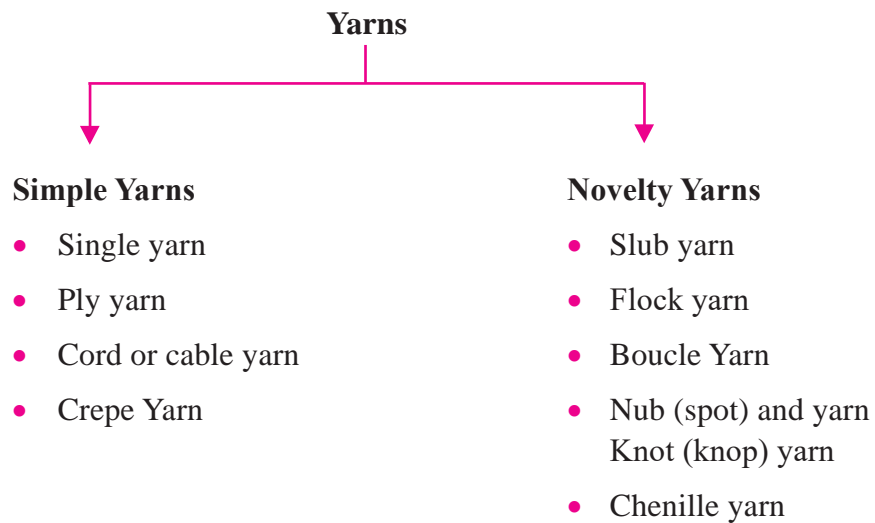
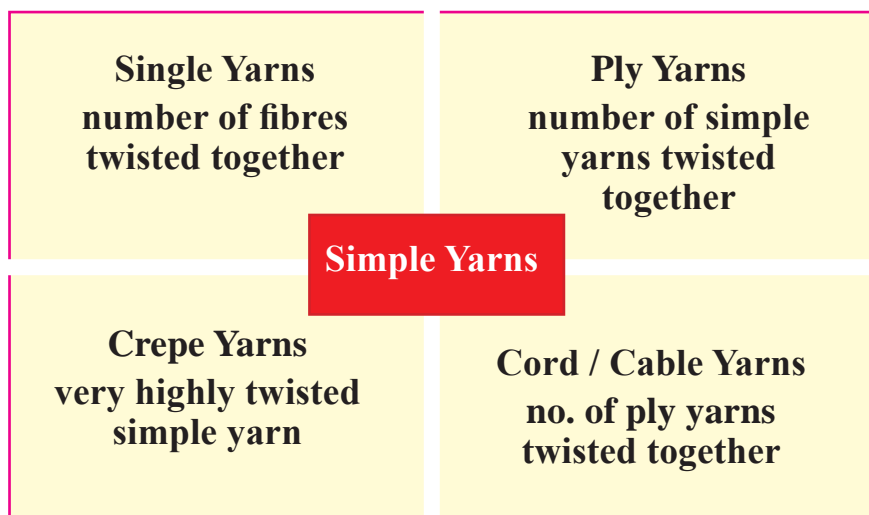


Chart no. 5.6 Types of Simple yarns



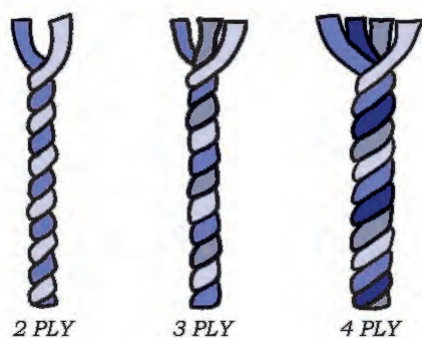
I. SIMPLE YARNS

- Yarns that are even in size, have an equal number of turns or twist per inch throughout their length and are relatively smooth and uniform are called simple yarns.
- **Simple Yarns:** A single is the most basic assemblage of fibres – either staple or filament – suitable for operations involved in making fabrics. When a single yarn is untwisted it will break apart into the individual fibres from which it has been made.
- **Ply Yarns:** A ply yarn is made by twisting or more single yarns. In the naming of ply yarn. Especially a simple ply, the number of singles used precedes the word ply. For example, if two singles are use, the resulting yarn is called two ply; if four singles are use. It is four ply.

Single Yarns



Ply Yarns



Pic No. 5.1

Cord Yarns

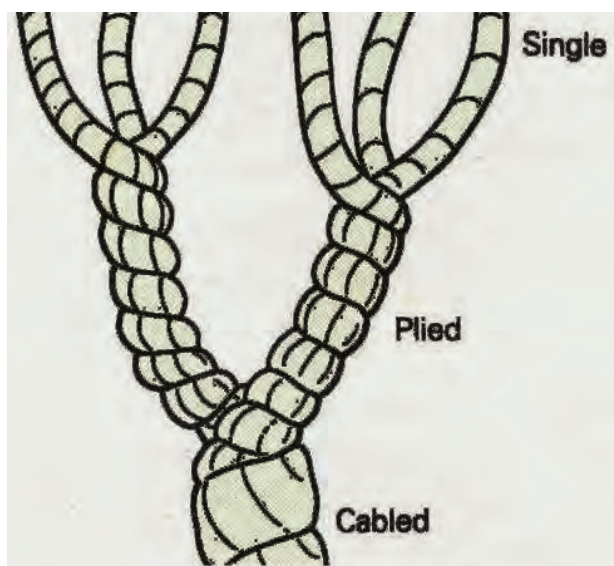


Diagram No. 5.1 Simple Yarn, Ply Yarn and Cable Yarn

- **Cord/Cable Yarns:** Cord or cable yarns consist of two or more ply yarns twisted together. In identifying a cord. One must indicate the number of plies, in the cord. Thus a 'two, four ply cord' indicates that each ply is made up of four singles and that two of these four ply yarns have been combined to make the cord.
- **Crepe Yarns:** Crepe yarns are variation of simple yarns. However, a crepe yarn possesses a high degree of twist, so that yarn tends to kink. This kinkiness results in the rough texture.

USES OF SIMPLE YARNS

Simple yarn tends to produce smooth flat fabrics which are usually considered durable and easy to maintain. These yarns are mainly suitable for fabrics of apparel use.

II. NOVELTY YARNS

Complex or novelty yarns are primarily for their appearance value. They differ from

the simple yarns in that their structure is characterized by irregularities in size, twist and effect. They are called fancy or novelty yarns, because they lend an interesting or novel effect to fabrics made with them. They create textural variations in the fabric.

❖ Characteristics of Novelty Yarns

- Novelty yarns are usually plied yarns but they are not used to add strength to the fabric.
- If novelty yarns are used in one direction only, they are usually in the filling direction. They are more economical in that direction and are subjected to less strain and are easier to weave for design purpose.
- Novelty yarn effects are permanent.
- Novelty yarns that are loose and bulky give crease resistance of the fabric, but they make the fabric spongy and hard to sew.
- Generally, the smaller the novelty effects, the more durable fabric is, since the yarns are less affected by the abrasion.

❖ Basic structure of Novelty Yarns

Complex ply yarns are usually of the following parts.

- Base Yarn
- Effect Yarn
- Binder Yarn

The base yarn controls the length and the stability of the end product. The effect yarn forms the design or effect. The tie or binder yarn holds the effect yarn so that it will remain in position using use and care of the product.

Most complex yarn are either single or ply; occasionally a cord in use in complicated novelty yarns.

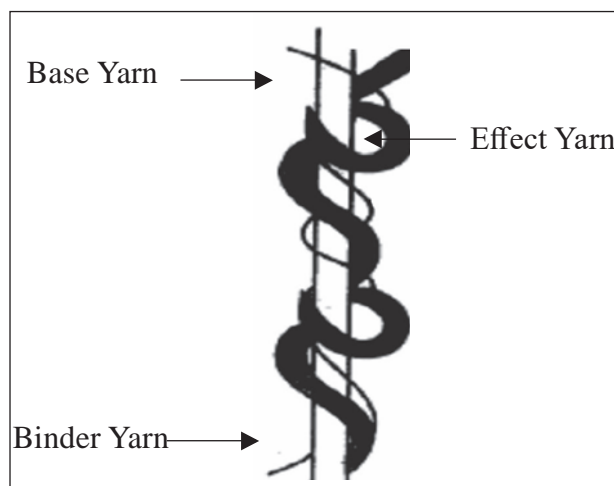
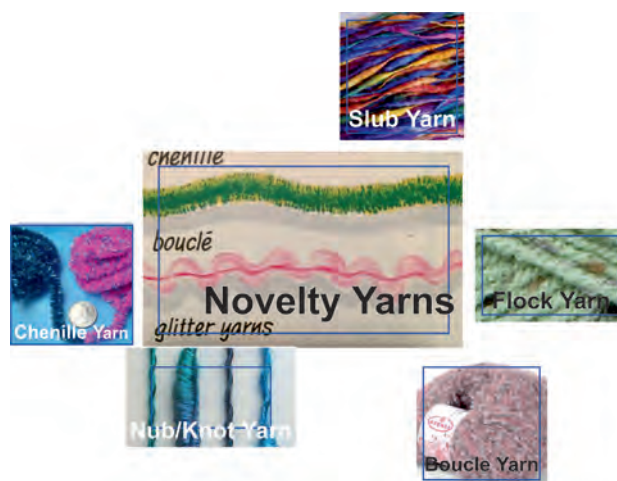


Diagram 5.3 Basic Structure of Novelty Yarns

Chart 5.7 : Types of novelty Yarns

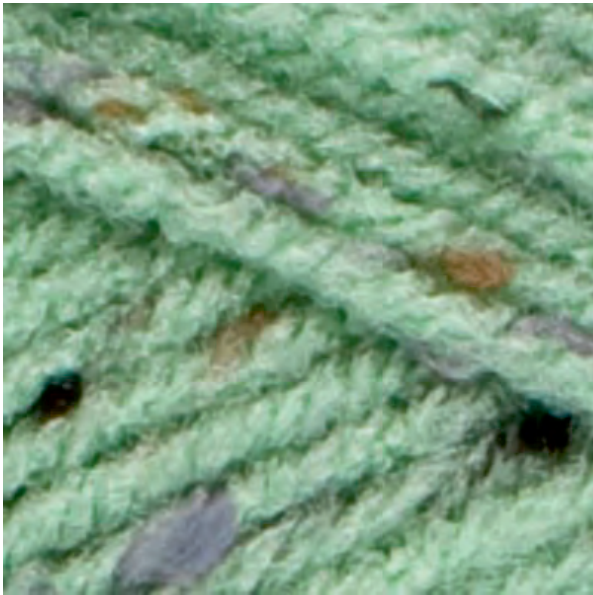


❖ Slub Yarn

In the single slub yarn the yarn is left untwisted or slackly twisted in irregular intervals in order to produce soft bulky sections. This yarn is found in selected knitting yarns.



Pic. No. 5.2 Slub Yarns



Pic No. 5.3 Flock Yarns

- **Flock Yarns:** Flock yarns, frequently called as flake yarns are usually single yarns in which small tufts for fibre are inserted at irregular intervals and held in place by the twist of the base yarn. These tufts may be round or elongated. These tufts are not permanent and can come out after repeated use. Flock yarn is used for effects in suiting and dress fabric.
- **Boucle Yarns:** Boucle yarns are characterized by tight loops projecting from the body of the yarn at fairly regular intervals. These yarns are of three ply construction. The effect yarn that forms the loop is wrapped around a base yarn and then the binder and tie yarn holds the loop in position. These are used to give textured effected to coating dress fabrics. The yarn is also available to consumer for hand knitting. These yarns are soft to touch and give irregular texture to fabric.



Pic. No. 5.4 Boucle Yarn



Pic. 5.5 Boucle Yarns

- **Nub (spot) and knot (knob) yarns:** The terms nub, spot, knot, knob are often used interchangeably; however there are minor differences. In nub or spot yarn the base yarn is held almost stationary while the effect yarn is wrapped around it several times to build up an enlarged segment. The nub is so secured that no binder is required. The knot or knob yarn is produced in much the same way except that brightly coloured fibres are frequently added to the enlarged knot.



Pic. No. 5.6 Nub Yarn



Pic. No. 5.7 Knot Yarn

- **Chenille Yarns:** Chenille Yarn created special effect in fabric and in chenille rugs. The yarn resemble a hairy caterpillar-“Chenille” is French for caterpillar. This yarn is then used a filling in chenille fabrics of warm clothing.



Pic. No. 5.8 Muffer of chenille yarn



Pic. No. 5.9 Chenille Yarns

Let's do this

Make a list - where yarns are used for household & other miscellaneous uses in your house.

❖ **Uses of Novelty Yarns**

Complex or novelty yarns add texture and design to a fabric and are valued for their appearance. However there may be problem in comfort, maintainers and durability. Some complex yarns are rough and harsh. So they many actually be uncomfortable in wearing apparel. On the other hand, many loop yarn are pleasant to touch and they increase warmth making them ideal for sweaters or fabrics where warmth is a desirable property. The rough surface of many novelty yarns and their irregular twists and loop that characterise these yarns may cause them to snag easily and the abrasion resistance is reduced.

Although complex yarns usually require careful handling. They are often selected for their appearances regardless of problems that they might create to the consumer. These yarns are mainly used in fabrics for home decoration such as curtains, upholstery, carpets. They also add interesting textural effects in suiting and coating fabrics and are also popular in knitted fabrics.

Table No. 5.6

Comparison of simple and Novelty Yarns

Simple Yarns		Novelty Yarns	
1.	Usually Smooth in appearance.	1.	Structure is charaterised by irregularities
2.	Used in fabric for functional value.	2.	Used in fabric for appearance value.
3.	Generally more durable.	3.	Generally less durable.

V. Write short notes.

- 1) Yarn twist
- 2) Describe basic construction of novelty yarn with diagram.
- 3) Three Characteristics of novelty yarns.

VI. Give reasons.

- 1) Spun yarns are fuzzy in texture.
- 2) Filament yarns are smooth in texture.
- 3) Low twisted yarns are less durable.
- 4) Novelty yarns required careful handling.

LONG ANSWER TYPE QUESTIONS

- 1) Classify the yarns. Describe Slub, boucle, chenille yarn.
- 2) Describe various simple yarns and write their uses.
- 3) Explain 'count' of a yarn.
- 4) Explain 'Denier' of a yarn.

SELF STUDY/PROJECT

- Collect khadi fabric samples and identify the novelty yarns used in it.
- Collect novelty yarn sample found in apparel & household fabrics and observe the novelty effect.



Unit 6

CONSUMER & TEXTILE MARKET

Can you tell !

- *You must have shopped for clothes many times. Do you enjoy the experience?*
- *Do you feel satisfied with the quality of clothes available in market?*
- *Do you find the prices too high ? Do you have to bargain a lot?*
- *Have you noticed that people in specific profession dress in a specific way?*
- *Do you buy the same type of clothes in summer, monsoon?*

Every one of us is a consumer of textiles. As consumers, we are the ultimate users of the textile product. But buying textiles is not always an enjoyable experience for us. The prices change from shop to shop, we have to bargain a lot, we are never sure of the quality of the product, there is not enough information provided about the product. In case of dissatisfaction or cheating, we do not know where to go and whom to complain. The current chapter aims at educating you about all these aspects.

Do you know?

In every market there are three sectors – Manufacturers, Retailers and Consumers. If there is a good balance between all three, the market will be healthy. **The consumer is supposed to be the pivot for all market activities**, and the manufacturers and retailers are supposed to provide what the consumer wants.

6.1 PURCHASE OF TEXTILES

Purchasing textiles is a hobby for some, an unwanted exercise for some and a routine matter for some. No matter what the attitude of the person is while purchasing textiles, there

are certain factors that influence the selection of textiles. Let us look into some of these factors:

Factors influencing purchase of textiles

1) **Income** : This directly affects the purchasing power of a consumer. If a consumer earns less, he/she will spend very little amount on textiles as the major portion of their income will be used up in buying food. The textiles they buy or possess are bare essentials which satisfy only the basic needs.

A middle class consumer will be able to spend some more money on textiles. But they also choose their textiles as per how useful it will be.

A consumer with high income will be able to spend a lot of money on textiles. He/she will be able to buy many varieties as well as branded textiles.

A middle class consumer will be able to spend some more money on textiles. But they also choose their textiles as per how useful it will be.

A consumer with high income will be able to spend a lot of money on textiles. He/she will be able to buy many varieties as well as branded textiles.

- 2) **Profession** : Certain professions require the person to be dressed in a particular way. For ex. – a manager will be in a suit, a teacher will usually wear saree or salwar kameez, advocates wear black robe, doctors wear white lab coat, workers wear uniforms, sports persons wear jersey and so on.



Pic. No. 6.1 Doctor's labcoat



Pic. No. 6.2 Sports Wear

- 3) **Climate** :The climate and weather of an area also influences the choice of textiles of people living in that area. In hot climates, people prefer loose, absorbent, thin clothes with short sleeves and open necks. In cold climate, people prefer thick, warm clothing with full sleeves and closed necks. In rainy climate, people prefer light weight, synthetic fabrics which will dry quickly.
- 4) **Fashion** : A new style introduced by a small group of people and accepted by a large group is known as 'fashion'. Fashions keep on changing and usually

follow a 'cycle' i.e. they return after every 20-30 years. Fashion affects the demand for that particular textile product. When fashion reaches its peak, the demand increases. When the fashion becomes outdated, the demand decreases. Fashion influences the purchase of textiles to such an extent that other important factors like comfort, quality etc. are often overlooked for its sake.

If a fashion remains for a very small period of time and is accepted and followed by a small group, it is called a 'fad'.

- 5) **Advertisement** : Customer comes to know about various products available in market through advertisements in the form of hoardings, posters, magazines, news papers, television, radio, movies etc. The effect of audio, visual or audio-visual advertisements is tremendous on the minds of customers. Most of the advertisements have an emotional appeal. They 'create' wants, which influence purchasing.

Internet my friend!

Browse for various trends in fashion and innovative advertisement..

Do you know?

- *Do you read the labels put on textile products? Can you understand them?*
- *Do you feel the sales persons try to influence or put pressure on you to buy certain clothes about which you are not too sure?*
- *Do you easily get lured by signs of 'Sales' and 'Discounts' and later feel cheated?*
- *Do you know where to complain and how, if you are not happy with the quality of clothes purchased?*

6.2 PROBLEM OF CONSUMERS

The main problems faced by a consumer in the textile market are as follows:

Chart No. 6.1 Problems of Consumers

<p style="text-align: center; background-color: #ffff00; margin: 0;">Lack of Knowledge</p> <ul style="list-style-type: none"> ● not knowing about fibres. ● not able to understand labels. 	<p style="text-align: center; background-color: #ffff00; margin: 0;">Unfixed Prices</p> <ul style="list-style-type: none"> ● prices change from shop to shop ● Prices are too high at times. 	<p style="text-align: center; background-color: #ffff00; margin: 0;">Wrong Practices</p> <ul style="list-style-type: none"> ● wrong labelling ● cheating by shopkeepers.
<p style="text-align: center; background-color: #ffff00; margin: 0;">Impressive Marketing</p> <ul style="list-style-type: none"> ● sales & discounts. ● dishonest advertisements. 	<p style="text-align: center; background-color: #ffff00; margin: 0;">Non enforcement of laws</p> <ul style="list-style-type: none"> ● no solid system. ● no penalties. 	<p style="text-align: center; background-color: #ffff00; margin: 0;">Lack of Organization</p> <ul style="list-style-type: none"> ● disorganized consumers. ● consumers do not know where to complain

1) Lack of knowledge : An average consumer knows very little about textiles. Consumers may be familiar with the names of the fibres or fabric but mostly they have no idea about the different properties of the fibres or their use and care. As a result, many times the product gets spoiled.

Manufacturers usually put labels giving information about the textiles, but the consumers are not able to use this information as they do not know the technical terms and symbols.

2) Unfixed Prices : Different shops will have different price tags for the same type of products. The prices of products also change according to the city, place or area. Most of the shop keepers allow bargaining also and so the consumers are never sure about the true value of the product.

Many a times the prices are too high for an average consumer. Also the high prices do not ensure good quality.

3) Wrong practices : Manufacturers and merchants both often indulge in various ways of cheating the consumers. The manufacturers often put wrong labels on their product or deliberately produce inferior quality products and sell them at high prices.

The shop owners or retailers also cheat the consumers by measuring less fabric, putting inferior quality products in boxes of good quality products and knowingly or unknowingly provide incorrect information about the products.

4) Impressive Marketing : Different kinds of 'Sales' and 'Discounts' are offered to attract the consumer. Many shops and malls offer particular days or 'festivals'

during which they claim to sell products at a cheaper price. They also offer various kind of ‘schemes’ like buy two, get one free’. They give ‘membership cards’ which will avail some discount on purchases made from that particular mall or shop. Most of these sales or discounts are not genuine.

Advertisements have a great influence on the psyche of the consumers. Their real value lies in providing correct information about the product to the consumers. But many times manufacturers overhype the characteristics of the product or make totally wrong claims about them. This is called ‘**dishonest advertising**’. This type of advertising misguide the consumers. In the long run, dishonest advertising does not help as consumers feel cheated.



You should know this:

The ‘Sales’ in *KhadiBhandar* are always genuine. They are offered by *Khadi Gramodyog*, an enterprise of government of India for popularising handloom products and to provide employments in rural areas. There are two sales annually – one around 2nd October i.e. Gandhi Jayanti and the other one around 26th January i.e. Republic Day. The making and use of handloom is also ‘**eco-friendly**’. This is one more reason why every one of us should buy and use *Khadi*.

5) Non-enforcement of rules/laws : The government of India has made a number of laws about following minimum standards in the manufacturing of textile products. There are penalties if these rules/regulations are not followed. Unfortunately, there is no solid system to implement these rules, to check whether these rules are being followed and to penalise those who are neglecting them. As a result, the manufacturers do as they please and get away with it.

6) Lack of organization : As explained before, there should be balance between the three sectors of the market – Manufacturers, Retailers and Consumers. In a healthy market, the manufacturers and retailers provide products according to the requirements of the consumer. Unfortunately in Indian market, the manufacturers and retailers are having strong organizations but the consumer sector is not organized. It becomes difficult for a single consumer to take on the strong organized sectors of manufacturers and retailers. As a result of this, the manufacturers and retailers do as they please.

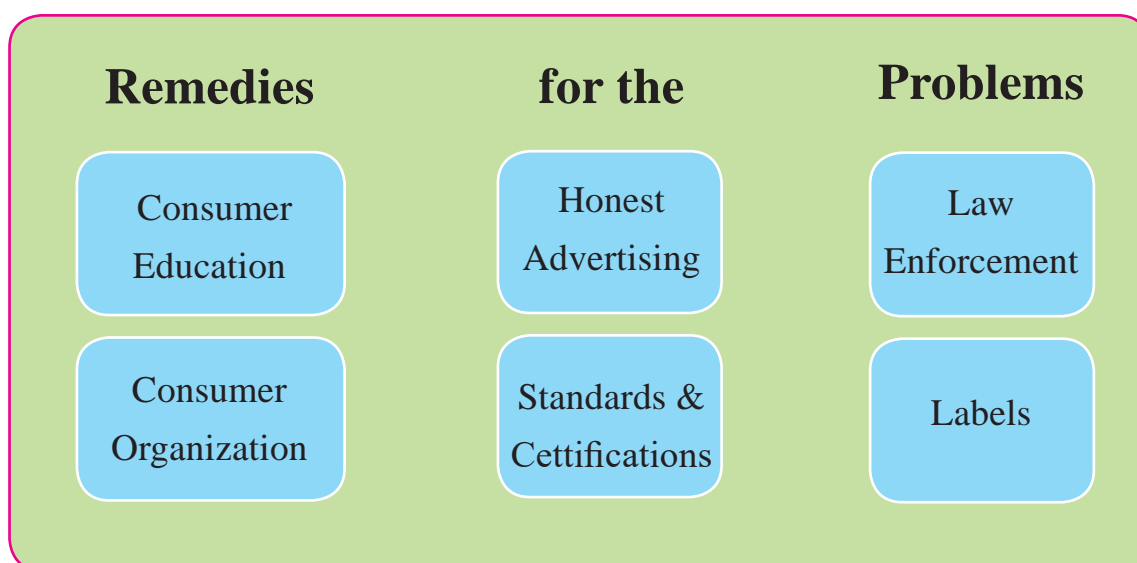
Discuss amongst your friends:

Do they face any other problems while shopping for clothes?

- *What can be the solutions to all these problems?*

6.3 REMEDIES FOR THE PROBLEM

Chart No. 6.2 Remedies for the Problems



Due to the above mentioned problems, buying is not enjoyable for the consumers. They do not get full satisfaction and value for their money. Following remedies can help in solving these problems -

- 1) **Consumer Education** : A consumer having knowledge about different fibres, fabrics and their properties will be able to select and take care of the textile products in a better way. Consumers can be educated through different courses in schools and colleges, books, periodicals, articles in newspapers or magazines, exhibitions, pamphlets etc. Such education will help the consumers to judge the quality of a textile product, its suitability for the end use and to know whether they are getting their money's worth.
- 2) **Honest advertising** : Honest Advertising provides correct and factual information about the product. It does not make tall claims which may not be true. Honest advertisements create a faith and goodwill in consumers and earn their loyalty. This

loyalty proves to be beneficial to the manufacturers in the long run and so all reputed companies, always do honest advertising.

- 3) **Law enforcement** : The government should have clear rules/laws and should implement them strictly. The procedure to pick offenders and penalise them should be swift and effective. This will create a respect in the minds of manufacturers and retailers about the law and they will stay clear of various malpractices that they indulge in. The government should also develop guidelines and standards for production to make manufacturers and retailers aware of their responsibility.
- 4) **Consumer organizations** : As described earlier, in Indian market, consumer sector is very weak and so consumers have to face many malpractices and injustice. Consumers are often unaware of their rights and responsibilities. To help the consumers, Consumer Association of India was set up in 1959 in New Delhi.

This is a non-government, non-profit body working for the welfare of the consumers. A consumer association can help the consumers in following ways :

- It makes consumers aware regarding their rights and responsibilities.
- It restricts malpractices by manufacturers and retailers.
- It helps in making the market consumer oriented.
- It helps in guiding the consumers and solving their problems.



Pic. No. 6.4 Consumer Protection

5) **Standards and Certification marks :** *These marks indicate specific quality of the products.* These marks are at times given by the manufacturers themselves or they are given by an independent authentic body like **Textile Association of India** or **Ministry of Textiles** in India. Once this mark is put on a particular product, the manufacturers have to ensure the same quality of the product all the time. These marks may make the product a bit costly, but the consumers are assured of the quality. These marks do not provide any other information about the product or its properties. **ISI** is an example of certification mark which is put on a wide range of products. In the field of textiles, Woolmark, Handloom mark and Silkmark are examples of such certification marks. In case of handloom products, government has authenticated more than one logo.



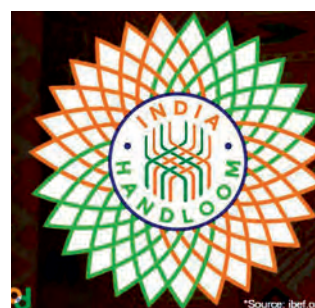
Pic. No. 6.5 Handloom Logos



Indian Handloom



Indian Handloom



Pic. No. 6.6 Indian Handloom Logos

6) **Information through labels :** Manufacturers provide the information about their products to the consumers through labels. Labels are in written form and so are more authentic. They provide **factual information** regarding the quality, contents, price, processes etc. By reading the label carefully, consumers can make a wise choice and get their money's worth.

Internet my friend!

Find out more about consumer's associations and consumers' rights.
See the different types of logos, certification marks etc. given for various textiles.
See the other various handloom marks given by government of India.

Can you tell !

- Are you in habit of checking labels before purchasing?
- What information do the labels provide?
- How do labels help us in taking proper care of our clothes?

6.4 LABEL

Label is a small piece of paper or fabric with written information attached to a product.

Every consumer has a right to get information about a product before buying it. Labels are the most popular, effective and accurate way of providing this information. They are put on products in a no. of ways -

1. Printed label pasted on the item - Sarees, dress materials etc.
2. Tag attached to the product - Readymade garments.
3. Woven or Stitched labels - back collars of shirts, T shirts, Dresses etc.
4. Woven identification on selvedge - suiting and shirting fabrics.
5. Printed identification on the wrapper - bed sheets, towels etc.

❖ **Importance of Labelling :** Labels are important for following reasons-

1. Labels are authentic. **The information given by labels is factual.**
2. Labels give information about the quality of the product, constituents, name of the manufacturer, price, date of manufacturing etc.
3. Consumers can read labels and compare different products before making decision.

4. Manufacturers are bound by law to provide true and enough information on the label. Consumers get legal protection if the product does not match to the label.
5. Labels give information about the use and care of the product and so it does not get spoilt.

❖ **Types of Labels :** Labels are generally divided into three broad categories – 1. Informative labels, 2. Brand labels and 3. Certification labels.

1. **Informative Labels :** An informative label helps the consumer in two ways – first, it provides information about the manufacturer, size, price, fibre content, fabric construction and finishes applied and secondly, they inform the consumer about how to use and take care of the product. The information is based on laboratory tests. One important aspect of informative labels is the care instruction they provide to the consumers. As this information remains with the fabric or clothing almost permanently, such labels are called **Permanent Care labels**.



Pic. No. 6.7 Informative label

Permanent Care Labels : These labels specifically inform the consumers about how to take care of the product. They do not provide information about price, size, manufacturer, fibre content etc. They only inform the consumers about how to wash, dry, iron or bleach the cloth. They are usually on the back side of the clothing and so remain with it permanently. They can be woven, printed, sewn or fused to the clothing.



Pic. No. 6.8 Care label

One major problem consumers faced with these care labels was that they were printed in the language of the country in which the product was made. Consumers not knowing that particular language, were not able to understand the label. To overcome this language barrier, symbol systems have been developed. There are three major symbol systems prevailing in care labelling – 1. Dutch, 2. British and 3. Canadian. All these systems have the same basic symbols as shown in Pic no. 6.9-



Pic. No. 6.9 Permanent Care Label Symbols

The Dutch and Canadian systems use Red, Amber and Green colours to instruct about the different operations of laundry while using the same symbols as shown above. Table no.6.1 shows the use of colours for different instructions with the same symbols :

Table No. 6.3 Meaning of colours in Dutch and Canadian system











































Red	Do not carry out the instruction depicted by the symbol. For eg. a red triangle means do not bleach.
Amber	The instructions can be carried out but some caution is necessary. For eg. an amber triangle means you can bleach but be careful with the type of bleach used.
Green	You can carry out the instruction without any caution. For eg. a green triangle means it can be bleached by any bleach.

The British system uses only black colour. The care symbols and their interpretations are given in table no. 6.4.(page no.)

The American system uses written instructions regarding care and maintenance of garments.

Table No. 6.4 Care symbols

Care Label Chart

Care Label Chart						Warning Symbols for Garments	
 Machine Wash	 Machine Wash HOT	 Machine Wash WARM	 Machine Wash COLD	 Hand Wash			
	 Normal	 Permanent Press	 Delicate/Gentle				 Do Not Wash
 Bleach	 Any Bleach When Needed	 Only Non-Chlorine Bleach When Needed					 Do Not Bleach
 Dry	 Normal	 Permanent Press	 Delicate/Gentle	 Line Dry	 Drip Dry	 Lay Flat	 Do Not Dry (Used with Do Not Wash)
	 Any Heat	 HIGH Heat	 MEDIUM Heat	 LOW Heat	 NO HEAT/Air		 Do Not Iron
 Iron	 HIGH Heat	 MEDIUM Heat	 LOW Heat				 Do Not Tumble Dry
 Dry Clean	 Any Solvent	 Any Solvent Except Inchloroethylene	 Petroleum Solvent Only				 In the Shade (Added to Line Dry, Drip Dry, or Dry Flat)
	 Short Cycle	 Reduce Moisture	 Low Heat	 No Steam Finishing			 No Steam (Added to Iron)

2. **Certification Labels :** *This label indicates that a particular product has been tested in a laboratory for quality.*

It does not provide any other information about the product except that the product has been approved or guaranteed by a particular laboratory or agency. **Such labels assure the consumers about the quality or authenticity of the product.**

The government of India has established the Indian Standards Institute. The ISI mark given by this institute assures the consumers that the product they are buying is of good quality.



Pic. No. 6.10 mark for pure wool

Handloom mark, Wool mark and Silk mark are examples of certification marks provided to textile goods. The Handloom mark assures the consumers that the product is actually made on a handloom. Wool mark guarantees that the product is made of 100% pure wool. Silk mark assures that the product they are buying is made of 100% pure silk. The logos of these marks are shown in pic. No. 6.10, 6.11 and 6.12.



Pic No. 6.11 mark for wool blend



Pic No. 6.12 mark for pure silk

6.5 STORAGE & CARE OF TEXTILES

Have you noticed?

Your mother spreading out occasionally used sarees and other textiles in sun at least once a year.

Your mother putting moth balls or a small packet of spices in the bag or cupboard.

Your mother wrapping silk and zari clothes in an old cotton saree or bed sheet.

Your father putting special clothes like suits and jackets on a hanger.

Have you ever asked them why are they doing it?

We must know how to take care of our textiles in order to get maximum use and money's worth from them. There are certain simple points which should be kept in mind while storing textiles. This will help us in maintaining their appearance, protect them from spoiling and extend their usefulness. Some important points are listed below -

1. **Sorting :** Textiles are sorted by their fibre content like cottons, synthetics, silks, woollens etc. Household textiles are usually sorted like curtains, bed sheets, towels, rugs etc. Special textiles like fur articles, leather, suede, velvets, laces, crochet etc. should be kept separately.

2. **Darning and Mending :** All clothes should be checked for any wear and tear. If any button or fastener has come off, it should be sewn. Undone seams should be stitched again. If there is any hole in the clothing, darning should be done. For larger holes, patches can be used.

3. **Refreshing :** Textiles require refreshing from time to time. This can be done in two ways :

a) airing and b) brushing.

a) **Airing :** Fabrics made from natural fibres require airing. Cotton, silk and woollen clothes should be spread outdoor if possible. If that is not possible, they should be taken out of closet and spread under a fan. Airing prolongs the life of the textiles.

b) **Brushing :** Brushing removes the loose dirt on the clothes. The clothes should be brushed by a clothes brush with soft and firm bristles. Woollen garments, fuzzy fabrics, suits, jackets etc. require brushing.

General guidelines for Storage of fabrics:

1. Storage space should be clean and dry.
2. Storage area should be covered and dust proof.
3. Moth balls or moth repellent should be used.
4. While storing fabrics, they should be clean, completely dry and ironed.

Some specific guidelines about storage of textile products are given in Table No. 6.5 -

Table No. 6.5 Specific Guidelines for Storage of Textiles

Cottons	1. Clothes to be stored should not be starched.
	2. Coloured clothes should be kept away from sunlight otherwise their colour will fade.
Silks & Woolens	1. Sharp creases should not be made in silk.
	2. Silk & wool should be wrapped in cotton fabric to save them from moth and mildew. Saree bags are available in market.
	3. Moth balls or moth repellent should be used.
	4. Suits, coats and jackets should be hung on hangers and then covered with plastic to protect them.
Synthetics	1. Synthetics should be hung on hangers to maintain their shape
	2. They should be stored in cool place.
Leather	1. Leather garments should be padded with paper and wrapped in muslin cloth.
	2. They should be powdered to absorb moisture.
Zari fabrics	1. Zari fabrics should not be folded on the same crease again.
	2. Zari fabrics should be folded with a layer of cotton or paper between them so that two surfaces do not rub against each other.



Pic. No. 6.13 Cotton saree bag



Pic. No. 6.14 Jackets on hangers

Use Your Brain Power

1. Identify the terms hidden in the grid with the help of the clues given below –

- a) This process helps in removing moisture from clothes and keeps them fresh.
- b) These are small designs to show the consumer how to take care of the clothes.
- c) The pivot of all market activities.
- d) A mark certifying that the product is made from 100% wool.

- e) The symbol system which uses only black colour.
- f) A new style introduced by a small group and accepted by a large group.
- g) The quality and the price for this is same everywhere.
- h) Written, factual information about a product.

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

2. Complete the sentences –

- a) Long sleeved, thick clothes are preferred in _____ .
- b) Certain professions like nurse, police have specific _____ .
- c) A fashion which is short lived and followed by few people is _____ .
- d) An advertisement which makes false claims is called _____ .

- e) The three sectors of market are manufacturers, retailers & _____ .
- f) The information given by the labels is _____ .
- g) Labels which tell us how to take care of the product are _____ .

- h) Certification labels ensure us about the _____ .
- i) For storage, leather garments should be padded with _____ .
- j) Moth balls should be used while storing _____ .

EXERCISE

Objective Type Questions

I. Match the following :

A		B	
1.	Brand Labels	a)	Advertisements
2.	British system	b)	Use of different colours
3.	Certification Labels	c)	Trademark
4.	American system	d)	Black colour
5.	Dutch system	e)	Silk mark
		f)	Written form
		g)	Storage of Textiles

II. Select and write the most appropriate answer from the given alternatives for each question :

1. Care label system using colours for symbols
 - a) Dutch
 - b) British
 - c) American
2. This influences our purchase of clothes to a great extent
 - a) Culture
 - b) Fashion
 - c) Education
3. The pivot of all markets should be the
 - a) Manufacturer
 - b) Retailer
 - c) Consumer
4. Brand labels are provided by
 - a) Government
 - b) Manufacturer
 - c) Laboratory
5. Garments which should be hung on hangers
 - a) Cotton
 - b) Synthetic
 - c) Woollen
6. Advertising which makes false claims about the product.
 - a) Honest advertising
 - b) Dishonest advertising
 - c) hoardings

III. Write whether the given sentences are True or False :

1. The Canadian system of symbols use only black colour.
2. Honest advertising creates trust among consumers.
3. Labels provide factual information.
4. British system uses written information on labels.
5. Consumer association fights for the consumers.
6. Fashion influences purchase of clothes.
7. Silk garments should be wrapped in cotton cloth or put in cotton bag for storage.
8. Sales and discounts always offer good quality products at cheaper rate.

IV. Draw symbols for the following care instructions:

1. Luke warm washing
2. Drip drying
3. Cool iron
4. Flat drying
5. Dry in shade
6. Hand wash only
7. Hot washing permitted

V. Name the following :

1. Putting clothes out in open air and sunlight.
2. A small piece of paper of fabric attached to the textile product with written information about it.
3. This label suggests that a particular product has been tested in a laboratory for quality.

4. A distinctive design or symbol in combination with words.
5. The organization which fights for the rights of consumers.

Short Answer Type Questions

I. Explain following terms:

1. Fashion
2. Advertisement
3. Airing
4. Brand label
5. Consumer association

II. Give reasons :

1. Zari sarees are folded with paper between them.
2. Coats, jackets should be hung on hangers.
3. People prefer synthetic clothes in rainy season.
4. Branded clothes denotes quality.
5. Moth balls /repellent should be used while storing silk or wool clothes.

III. Write short notes on the following :

1. Informative labels
2. Consumer association
3. Storage of woollen fabrics
4. Fashion
5. Brand Labels
6. Honest advertising
7. Airing
8. Dutch & Canadian systems of care labelling.

9. Storage of leather garments
10. Income -a factor affecting purchase
11. General guidelines for storage

Long Answer Type Questions

1. Write about the various problems faced by the consumer in the market.
2. Write about the remedies for the problems of consumers.

3. Explain in brief how following factors affect purchase of textiles :
 - a) Income
 - b) Profession
 - c) Fashion
4. What are labels? What is their importance?

SELF STUDY/PROJECT

- Visit different malls/shops in your area and collect information about various types of labels.
- Educate your family and friends about various types of labels and what they indicate.



Unit 7

INTRODUCTION TO LAUNDRY

Remember a little

- *Why it is necessary to wash the clothes?*
- *How does the clothes worn by you get soiled?*
- *What requisites are required to wash the clothes?*

7.1 INTRODUCTION

The fabric soils when the loose dust particles rest on the surface of the fabric or are held by means of greasy substance. Clothes require laundry after they are used so that they can be worn again, clean, fresh, hygienic and spotless clothes are the outcome of successful laundering.

- Laundry is both science and art. It is based on the application of scientific techniques which require certain skills. Laundering involves different processes Example. washing drying, ironing, pretreatments stain removal, starching dry-cleaning etc. To take good care of the fabrics is the main aim of laundry. Knowledge of laundry is very essential to achieve this aim.

- **OBJECTIVES OF LAUNDRY :**

1. **To clean the clothes:** Laundering process removes the dirt from the garments and makes it clean. It involves two processes a) immersion of fabric in a solvent b) agitation to remove the dirt.

2. **To improve serviceability of the clothes:** Fabrics can give good serviceability if proper care is taken during laundering.

3. **To retain attractiveness of clothes:** Finishing process like blueing, stuffing and ironing can help in retaining good attractive look of the material.

4. **To study various principles and methods of laundering:** different fibers react differently to various processes and reagents. Thus based on the nature of fabrics various principles and methods are used to get best results.

5. **To develop skills regarding the use of various laundry equipment's:** Various Types of tools and equipment's are used in laundry today. Most of the modern appliances are time and labour saving. The skillful use of these equipment's is the need of the modern laundry.

7.2 SCOPE OF LAUNDRY

- The textile industry is scaling new heights and entering new horizons, so do the field of laundry. Majority of people in Indian families launder their clothes at home. The urban families use electric washing machines and new laundry reagents in household laundry.
- Today Big Cities and town have commercial laundries. These laundries have customers and tie-ups with hotels, hospitals, hostels and various firms. They use bigger equipment's and have various sections to perform the task.
- Many institutes like hotels and hospitals have their own laundry. Thus knowledge of Laundry science is important to get maximum performance and satisfaction from to use.

7.3 VARIOUS METHODS OF WASHING

When we use/wear clothes, they get soiled and creased and need laundering before they can be worn again. It involves two main processes :

- i) Cleaning clothes to remove dirt.
- ii) Finishing them to regain their new, neat appearance.

The method of laundering depends upon the type of fabric and the type of dirt. Choosing the most appropriate method of laundering is important in order to make the clothes last longer and serve us better.

- **The dirt on the fabrics can be of two types :**

1. Loose dirt
2. Fixed dirt

The loose dirt can be removed easily by just brushing the fabric but the fixed dirt has some portion of grease in it which makes it stick to the fibres of the clothes.

Can you tell ?

- What preliminary arrangement are required before washing clothes?
- Which washing methods are adopted for washing clothes at home.

- **Preparation of clothes for laundering :**

1. Empty the pockets and examine the garments for tears, holes and stains.
2. Repair the garments before washing them.
3. Remove those stains which are not likely to be removed by laundering.
4. Sort out clothes according to size, colour, type of fabric and amount of dirt.
5. Shake well before steeping to remove loose dirt.
6. Steep white and coloured clothes separately.

Different types of clothes require different treatment while washing. This is because of a variety of factors like fibre content, surface of the fabric, amount of soil present in the fabric and so on. There are few scientific methods of washing or laundering clothes which are as follows-

1. Friction washing, 2. Application of light pressure, 3. Suction washing and 4. Washing by machine.

1. Friction Washing : Here the fabric is rubbed to remove the fixed dirt. This method can be applied only for strong and durable fabrics which can withstand friction without damage like cotton and linen fabrics. Friction can be applied in different manners :

A. Hand Friction – This method is useful when small clothes like handkerchiefs or baby clothes are to be washed. Clothes are steeped in soap solution and then rubbed by hand to clean them (see picture. No.7.1). This method does not put much strain on the clothes but it is not suitable in case of bigger clothes or heavily soiled clothes.



Fig 7.1 Hand Friction

B. Scrubbing Brush –Scrubbing brush is a small appliance made of plastic and available in different sizes and colours. Washing with scrubbing brush is the most popular method used at household level (see picture. No.7.2). It is suitable for most of the

clothes. The bristles of brush get in between the yarns and pull them and so there is more possibility of damage to the fabric by this method. It is definitely not suitable for washing Turkish towels as the bristles may get into the loops on the surface and ruin them. If the cloth to be washed is of big size, this method will take a lot of time and effort.



Picture. No. 7.2 Scrubbing Brush

C. Scrubbing Board – This is a specific instrument used for laundry. It is not a household item but it can be found in commercial laundries and laundry laboratories. Large, very soiled clothes like pants, shirts, uniforms, overalls etc.canbe washed easily by this method in less time and with less effort. It is made of wood. A number of horizontal wooden strips are fixed on two bigger vertically placed wooden strips (see picture. No. 7.3). Sometimes corrugated cement, zinc or fibreglass sheets are used. It is small enough to fit in a laundry tub. The cloth is steeped in soap solution and then put on the board and is

rubbed against the wooden strips. The clothes get cleaned quickly with less effort and the damage to the clothes is also less.



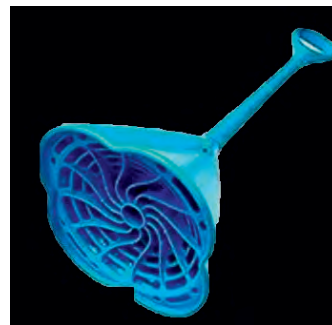
Picture. No. 7.3 Scrubbing Board

- Application of Light Pressure :** This method is also known as **Kneading & Squeezing method**. This method is suitable for delicate fabrics which can not withstand friction washing. The clothes are steeped in soap solution and then kneaded lightly taking care that too much pressure is not put on the fabrics (see picture. No. 7.4). The soap solution is removed by gently squeezing the clothes, hence the name Kneading & squeezing method. This method is especially suitable for silk, wool, lace, net and such delicate fabrics.



Picture. No. 7.4 Kneading and Squeezing Method

- Suction Washing :** Large and heavy clothes like blankets, bed sheets, curtains etc. can not be satisfactorily washed by scrubbing brush or scrubbing board. To save the time and energy in washing such clothes, a specific instrument called Suction Washer is used and so the method is called suction washing. At the lower part of suction washer, a shower like hollow part of copper or zinc with holes or openings in it. A wooden rod is fitted



Picture. No. 7.5 Suction Washer

to the upper part of this (see picture. 7.5). The clothes are put in a tub filled with soap solution and the suction washer is pressed upon them in an up and down movement again and again. Every time the suction washer is pressed down on the clothes, a vacuum force is created and so water comes out with force through the holes taking away some dirt from the clothes with it. When the pressure of the suction washer is removed, the clothes are filled with soap solution again. A suction washer is usually worked for 10-15 min. In this manner to clean a fabric. Very large and heavy clothes also get cleaned very easily. It is also useful in washing clothes which are evenly soiled.

4. **Washing by Machine :** This is the latest and most convenient method of washing clothes at home. An electric machine called Washing Machine is used for this purpose. It saves energy. A lot of clothes of different varieties can be washed in this machine with ease. There are various brands available in market. All washing machines are based on the general principle of Pedesis.

Always Remember:

Even in still water, the water particles keep on moving slightly to and from. This slight movement of water particles is called **Pedesis**. This phenomenon is important in laundry because when the fabric is in water, the water particles go in and out of the fabric. Every time they go inside the fabric they dissolve some dirt and every time they come out, they take the dirt out with them.

The washing machine has one or two tubs made of steel or plastic in which dirty clothes are put. The tub is filled with water either automatically or manually and soap is added. When the machine is switched on, the tub rotates alternately in clockwise and anti-clockwise direction putting clothes and soapy water in motion thus enhancing the pedesis. The clothes are cleaned by the combined effect of soap and the movement of water and clothes. The various factors involved in washing of clothes like filling and draining out water, movement of clothes, direction and speed of revolutions of tub, rinsing, spinning, temperature of water and time required for these functions are controlled by specifically programmed electronic device fitted inside the machine. Different modes are given for washing different types of clothes like cottons & linens, delicate, wool, silk, synthetics. The modes can be selected by moving the knobs and pressing the buttons situated on the front side of the machine.

Washing machines are mainly of two types – Semi automatic and Fully automatic depending upon how they carry out the three major operations of washing i.e.

1. **Washing** - with soap solution
2. **Rinsing** - with clear water
3. **Spinning** - draining as much water as possible from clothes

● **Semi Automatic Washing Machine**

In this machine, there are twin tubs (see picture. No. 7.6). The operations of washing and rinsing are carried out in one tub while the operation of spinning is carried out in another tub. The person operating the machine has to be around to fill up the first tub with soiled clothes, add soap powder in the space provided and start

the machine. The water can come into the tub by a direct connection or can be poured into the tub manually. Once the operations of washing is over, the machine requires fresh water for rinsing which again might have to be supplied from outside. Once the rinsing operation is over, the machine gives a beep sound and then the washed clothes have to be picked from the first tub and put in the second tub for spinning operation.

The special facts about this type of machine are :

- The three operations are carried out in two tubs separately.
- Person operating the machine has to be around all the time.
- Regular continuous supply of water is not required. Water can be added with the help of bucket.
- These machines are cheaper.
- These are top loading machines i.e. the tubs have lids on the top and clothes are put and taken out from top.



Picture. No. 7.6 Semi-automatic Washing Machine

PREPARE A LIST AND DISCUSS

- Name the companies manufacturing washing machines.
- What are the facilities given to the consumer by the washing machine manufacturers.

● **Fully Automatic Washing Machine :**

In this machine, there is only one tub and all the three operations i.e. washing, rinsing and spinning are carried out in it. It is called fully automatic because once the clothes are put and the soap powder is added, we just have to press the on button and the machine does the entire process of washing clothes by itself (picture. No. 7.7).

The special facts about this machine are :

- The three operations are carried out in a single tub.
- The person operating the machine can load and switch on the machine and his/her continuous presence is not required.
- Continuous water supply is required.
- This machine is costlier.
- The machine can be top loading or front loading i.e. the lid of the tub is either on the top or in front of the machine.



Picture. No. 7.7 Fully-automatic Washing Machine

7.4 WASHING DIFFERENT TYPES OF CLOTHES

Washing and cleaning of clothes is a daily chore in every household. The person carrying out laundry must have the knowledge of washing different kinds of clothes in a correct manner.

1. Washing of White Cottons : Cotton is a strong fibre. It has good moisture absorption and is not affected by high temperature and alkali. Because of these properties, it is easy to clean cotton fabrics.

● **Preparation :**

- a. Separate the white cottons from the coloured and synthetic ones.
- b. Check the clothes and repair any holes or tears if present.
- c. Remove all those stains separately which are not likely to be removed by regular washing.
- d. Open the clothes fully and steep them in hot soapy water. As cotton is not affected by alkali any soap or detergent can be used.
- e. Add washing soda if the clothes are too soiled.

● **Washing :**

- a. White cottons can be soaked for as long as 30-40 minutes.
- b. Use scrubbing method to clean white cottons. For small articles like handkerchiefs and baby clothes, use hand scrubbing and for bigger clothes use scrubbing brush or scrubbing board.

- c. Special attention should be given to collars and cuffs as they are usually more dirty.
- d. White cottons can also be boiled for 15 minutes in soap solution.
- e. Clothes should be rinsed 2-3 times with clear water till all the trace of soap is removed.

Do you know this?

Sunlight is a natural oxidizing bleach which helps in whitening white cottons without damaging them.

● **After treatment :**

- a. A little amount of blue used in the last rinse gives a blue tinge to the white clothes and make them look more white.
- b. If starching is required, it should be done at this stage. Starching and blueing should be combined to make it one process.
- c. Wring the clothes tightly to remove as much water as possible.
- d. Dry them in direct sunlight.

2. Washing of Coloured Cottons : The main thing to consider while washing coloured cottons is to maintain the colour fastness of the cloth. Because of this reason, the washing of coloured cottons differ from that of white cottons in certain aspects. The colour fastness is affected by following factors :

- a. Long steeping time
- b. High temperature of water

- c. Acidic and alkaline laundry reagent.
- d. Friction

- **Preparation :**

- a. Separate the coloured cottons from other clothes.
- b. Check the clothes and repair any holes or tears if present.
- c. Remove all those stains separately which are not likely to be removed by regular washing.
- d. Open the clothes fully and put them in soapy water at room temperature.

- **Washing :**

- a. Soak the clothes for 5-10 min only.
- b. Suction washing or kneading and squeezing method should be used instead of friction by scrubbing brush.
- c. Clothes should be quickly rinsed 2-3 times in clear water.

Let's try this?

If the colour is Bleeding, addition of salt or vinegar in the rinsing water helps in stopping or reducing that.

- **After Treatment :**

- a. A little vinegar or acetic acid in the last rinse helps in fixing the colour and make it look brighter.
- b. If needed, starching should be done.
- c. Wring the clothes as tightly as possible and dry them in shade.

Do you know this?

The ultra violet rays of sunlight break the bond between the colour and the cloth thus making the colour fade. This is why coloured cottons should not be dried in direct sunlight.

- 3. **Washing of Woollens :** Wool needs to be washed carefully because of a number of reasons-

- a. Wool is a weak fibre and in wet condition its strength decreases further.
- b. It is affected by temperature.
- c. It is affected by alkali.
- d. It is affected by friction.

- **Preparation :**

- a. Shake the woollen garment to remove loose dirt.
- b. If there are any holes repair them before washing.
- c. Mark out the outline of the garment on paper before washing as woollens have a tendency to shrink after wash.
- d. Remove all those stains separately which are not likely to be removed by regular washing.

- **Washing :**

- a. Put the woollens in lukewarm water in which a neutral soap is added.
- b. Do not steep as the woollens get weaker the longer they remain in water.

- c. Apply the light pressure method to wash woollens and be quick so the woollens are in contact with water for minimum time.
- d. Rinse quickly but thoroughly 2-3 times in clear water.

Do you know this?

A neutral soap is a soap which does not have any free alkali in it. As you know wool is damaged by alkali.

Ritanut is a natural neutral detergent and gives very good results in case of woollens.

● After Treatment -

- a. A little amount of citric acid or lime juice is added in the last rinse for white woollens while vinegar is used for coloured woollens to counteract any traces of alkali and make them look fresh.
- b. Wringing woollens will damage them, so they should be wrapped in a dry towel and pressed by hands to squeeze out as much water as possible.
- c. After removing the moisture, place the garment on the paper on which its shape was drawn and if shrunk, pull it to bring it to its original size.
- d. Spread the woollen garment flat on towel or mat or a piece of cloth for drying in shade.

OBSERVE THE FACT:

Woollens can be stretched and brought back to their original shape and size easily when they are wet. Once they dry up in the shrunken state, it is impossible to bring them to their original shape and size.

If woollens are hung when wet, they stretch and go out of shape, so they have to be dried flat.

4. **Washing of Silks :** Silk has a delicate texture and a natural luster which must not get

damaged due to laundry so extra care is required while washing silk garments.

Following factors should be considered while washing silks-

- a. It is an animal fibre and gets damaged by alkali.
- b. It can get damaged by high temperature of water.
- c. It gets weakened when wet.
- d. Any kind of force cannot be applied while washing as it will damage the fine texture.

Always Remember

Silks have to be ironed when still slightly damp as they cannot be damped for ironing like other fabrics. The water does not spread through the fabric and then water spots are seen on the fabric after ironing.

● Preparation :

- a. Separate white and coloured garments.
- b. Check the clothes and repair any holes or tears if present.
- c. If there are any stains, remove them carefully using milder reagents like borax, sodium per borate, hydrogen peroxide etc.

● Washing :

- a. Steeping is not done in silk as it gets weakened in water.
- b. Use lukewarm water and neutral soap like woollen washing.

- c. Use Light pressure method to wash silk fabrics.
- d. Rinse thoroughly but quickly 2-3 times in clear water.

● **After Treatment :**

- a. Add lemon juice or vinegar in the last rinse with cold water to improve the sheen of the fabric.
- b. If extra crispness is required, a little amount of Arabic gum water can be added in the last rinse.
- c. Squeeze the silks lightly to remove water from them.
- d. Dry in shade.
- e. Iron it when still little damp for best results.

5. Washing of Synthetics : Garments made from synthetic fibres like nylon, polyester etc. are easy to clean. They do not attract dust and dirt due to their smooth surface and they dry faster because their moisture absorption is less. They are strong and do not require any special precaution for washing.

● **Preparation :**

- a. Separate white and coloured garments.
- b. Check the clothes and repair any holes or tears if present.

- c. Remove all those stains separately which are not likely to be removed by regular washing.

● **Washing :**

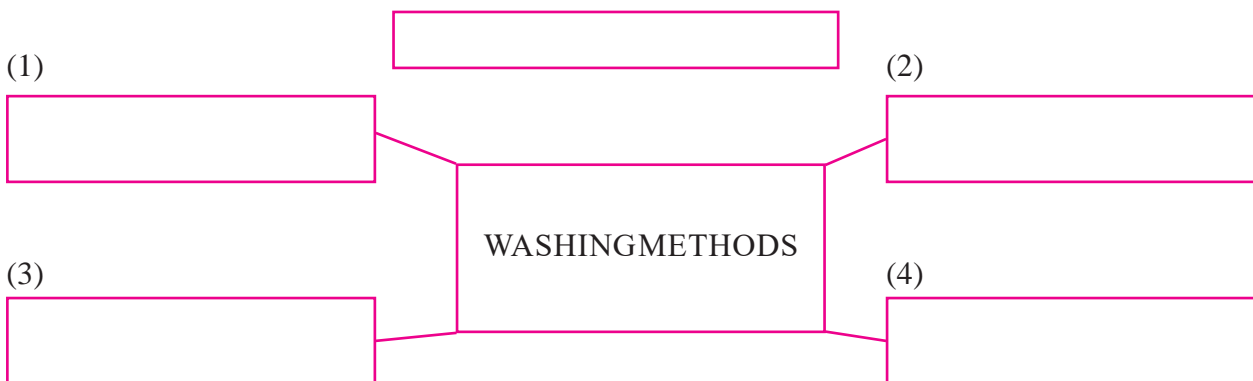
- a. Lukewarm water and mild soaps or detergents are used for washing synthetics.
- b. Steeping does not help because the water anyway remains on the surface and does not penetrate the fabric.
- c. Any method of washing can be used but heavy friction with a scrubbing brush should be avoided as it may damage the smooth surface.
- d. Rinse thoroughly to remove soap from the fabric.

● **After Treatment :**

- a. Synthetics are drip dried as wringing does not help

Do you know this?
 Synthetic fibres absorb less water and the water does not penetrate the fabric so wringing these garments is not helpful. The water is on the surface only and when they are hung dripping wet (drip dried), they dry better and require little or no ironing at all.

COMPLETE THE WEB



EXERCISE

Objective Type Questions

I. Match the following pairs :

A		B	
1.	Semi- automatic machine	a)	White Cottons
2.	Fully automatic machine	b)	Coloured Cottons
3.	Gum Arabic	c)	Continuous water supply
4.	Neutral soap	d)	Twin tubs
5.	Drying in shade	e)	Washing of woollens
		e)	Washing of synthetics
		f)	Stiffening of silk

II. Write whether the given sentences are True or False :

1. Suction washer is used for heavy fabrics.
2. A person has to be around while operating a fully automatic washing machine.
3. Woollens should not be steeped in water for long.
4. Silks should be dried flat.
5. Synthetic garments may lose their shape while washing.

MULTIPLE CHOICE QUESTIONS

III. Select and write the most appropriate answer from the given alternatives for each question :

1. Clothes which should be dried in direct sunlight
 - a) Coloured cottons
 - b) Woollen
 - c) White cottons
2. Washing method most suitable for delicate clothes
 - a) Hand friction
 - b) Suction washing
 - c) Kneading & squeezing
3. Washing machines operate on the basic principle of
 - a) Rinsing
 - b) Pedesis
 - c) Cleaning
4. The soap used for washing woollens
 - a) Alkaline
 - b) Neutral
 - c) Acidic
5. Drying method for synthetic garments
 - a) Flat drying
 - b) Drip drying
 - c) Line drying

6. Stiffening agent for silk
 - a) Gum Arabic
 - b) Maida
 - c) Rice
7. Washing machine with the lid in front.
 - a) Semi-automatic
 - b) Top loading
 - c) Front loading

Fully automatic washing machine
and
Semi automatic washing machine
Kneading & squeezing method
and
Suction washing

Short Answer Type Questions

I. Give reasons :

1. Coloured cottons are dried in shade.
2. White cottons are dried in sunlight.
3. An outline of the woollen garment should be made on a paper before washing it.
4. Ritanut is used for washing woollens.
5. Vinegar is added in the last rinse for silk clothes.
6. Vinegar is added in the last rinse for coloured cottons.

II. Draw diagram and label them :

1. Suction washer
2. Scrubbing board

III. Differentiate between :

Washing of white cottons
and

Washing of coloured cottons

IV. Write short notes on the following :

1. Washing of woollens - After Treatment
2. Washing of coloured cottons - Preparation
3. Washing of synthetics
4. Types of washing machines
5. Give the objectives of laundry

Field Visit

- 1) Collect the information about various types and models of washing machines by visiting the shops of home appliances in the market or websites of various manufacturers on internet.

Self Study / Project

- 1) Visit a commercial laundry and prepare a chart of the cost of laundering different garments.
- 2) Go to commercial laundries near your house and observe the way they sort out clothes, the pre treatments and the after treatments.



Unit 8

IRONING

Can you tell?

- *Do you wear ironed clothes*
- *Why clothes are ironed*
- *What difference you find between ironed clothes and clothes not ironed*
- *Prior to invention of the iron, what procedure was used to iron the clothes.*
- *Which types of irons do you know.*

Ironing is the process of removing wrinkles by heat and pressure. This process is required after washing the clothes to regain its attractive look. This process of ironing is done with the use of an iron which is a small appliance used for this purpose.

Irons are available in various types

8.1 TYPES OF IRONS

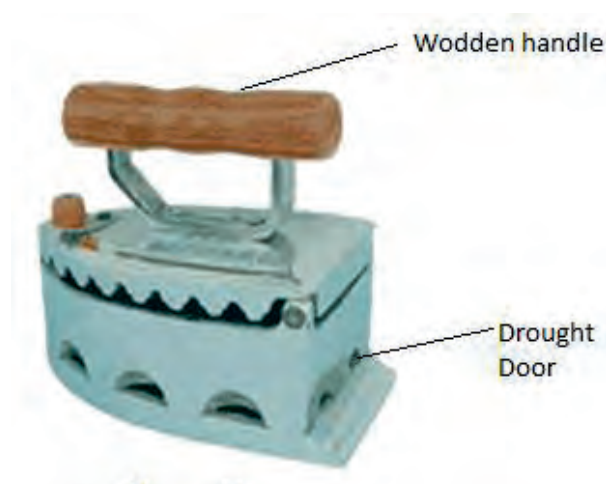
The commonly used irons are

1. Charcoal iron
2. Thermostatic iron
3. Steam iron

1. CHARCOAL IRON :

A charcoal iron consists of a metal box with a lid and a wooden handle at the top.

When the iron has to be used a few pieces of fresh charcoal is heated and placed inside the box and then the lid is closed. The draught door at the back of the iron is left open to let air in, which keeps the charcoal burning.



Picture No. 8.1 Charcoal Iron

This iron is useful where electric supply is not available.

● **Disadvantage :**

- a) This type of iron need to be replenished every time with fresh live charcoal.
- b) Tiny pieces of live charcoal or ash escapes and falls on the fabric. So cannot be used for delicate fabrics.
- c) Temperature cannot be controlled or regulated.

2. THERMOSTATIC IRON:

A Thermostatic iron is also called as an automatic iron where the temperature is regulated by an adjustable thermostatic control as per the fabric origin. The Thermostatic irons have an indication lamp which glows when the current is switched on and goes off when the iron gets heated up to the set temperature.



Picture No. 8.2 Thermostatic Iron

The adjustable knob on the top of the iron selects the temperature as required for the fabric being ironed

A thermostatic irons are light in weight and safe to use.

3. STEAM IRON:

Steam iron is an electric iron with a built in reservoir. It is filled with water. When the current is switched on, water boils and steam is entitiled through the holes at the ironing surface.

The clothes need not be previously dampened when the steam iron is used. Hard water should not be used in the steam iron.



Picture No. 8.3 Steam Iron

8.2 IRONING BOARD

The ironing board is an equipment which facilitate ironing easily in the standing position. The ironing board has a flat surface with its padded with flannel with a firm woven cover which is stretched properly and fastened well so as to make the surface smooth. The left side of the flat surface of the board is tapering which allows ironing of skirts and shorts easily. At the right side of the board, there is an asbestospiece which is fixed to place the iron safely on it.



Picture No. 8.4 Ironing Board

The ironing board is generally collapsible and can be folded easily. It does not require much space for storing when not in use.

8.3 USE AND CARE WHILE USING IRON

1. Always use three pin plug for the iron.
2. Fit plug pin into the plug on the switch board and then switch on the button.
3. Set the appropriate temperature with the help of a dial of thermostat.
4. Always keep the iron on iron rest when it is hot or keep it on the asbestos pad in a flat position.
5. Do not use any hard, sharp or pointed object to remove and clean stains on the sole plate.
6. Avoid moving on hard objects like pins, zippers or buttons, on surface of the iron.
7. Hold the plug while removing plug pins from the switch board.
8. Do not wind the cord around the iron.

Do you know?

Temperature used according to the fibre while ironing different clothes :-

Fibre	Temperature ° celsius
1) Dacron (polyster)	107
2) Nylon (orlon)	149
3) Silk/woollen	149
4) Rayon	191
5) Cotton	218

8.4 METHODS OF IRONING

Various methods are used to make the garments appear attractive and neat.

The methods include: ironing, pressing, steaming and roll pressing:

a) **IRONING:** It consists of moving hot iron forward and backward along the warp yarns of the fabric with pressure. The temperature of the iron and the amount of pressure applied depend on the texture and the nature of the fabric.

The damped garment is opened out and stretched to its original shape. Double parts on hem are ironed from the wrong side, moving the hot iron in the direction of warp yarns. Then the right side is turned out to iron the rest of the garment.

b) **PRESSING:** It consist of placing a hot iron on a creased portion of the fabric and then lifting it up. This operation is repeated till the crease disappear.

Fabrics with special texture like georgette and crepe are finishedby pressing.

c) **STEAMING:** This process allowed the steam to pass through the surface of the fabric. When the steam passes through the fabric it helps to raise and fresh up. The damp garment is held in front of a very hot iron. The heat of the iron convert moisture into steam, which while escaping through the fabric straightens the pile.

Fabrics with pile surface like velvet or velveteen is finished by this method.

- d) **ROLL PRESSING:** This process is used in commercial laundries. It consists of a series of smooth metal rollers which are rotating at a specific speed, the fabric is kept manually between the two heated rollers which while rotating dries the moisture. The material is ironed out due to the pressure caused by the rotation.

Roll pressing is done to iron straight pieces of cotton or linen bedsheets, curtains, sarees etc.

Internet my friend

Prepare the list of irons manufactured by various companies mentioning their names which operate with the help of “thermostat” device. What difference was noticed. Discuss in the class.

Interesting Historical Facts:

Inventors their Inventions

Haffman Adon J.

American inventors in 1905, of the pressing machine, which revolutionized the garment Industries throughout the world.

EXERCISE

Objective Type Questions

1. Match the columns :

A		B	
1.	Charcoal Iron	a)	Pile Fabrics
2.	Thermostatic Iron	b)	Commercial Laundry
3.	Steaming	c)	Easy to Iron skirts
4.	Roll Pressing	d)	Adjustable knob
5.	Ironing Board	e)	Heavy weight

2. State whether following statements are True of False.

- In a Charcoal iron the temperature can be controlled.
- Thermostatic iron is easy to handle
- In a steam iron water should not be filled in it.

- Ironing Board requires a big place to store when not in use.

3. Name the following :

- Name the parts of a charcoal iron.
- Name the method ironing used for georgette.

Short Type Answers

1. Give reasons for the following :

- Charcoal Iron is not used on delicate fabrics.
- Thermostatic Irons are easy to handle.
- A steam iron can be used safely for silk fabrics.
- Steaming method is used for pile fabrics.

2. Give differences between :

1. Charcoal iron and thermostatic iron.
2. Thermostatic iron and steam iron.
3. Ironing and pressing.
4. Ironing and roll pressing.
5. Ironing and steaming.

Long Type Answers

1. Explain the types of irons with the diagram.
2. Explain the methods of ironing.
3. Discuss the points to be kept in mind while using the iron

Field Work

- Visit a commercial laundry and write a report

Project / Self Study

- Collect the information about various types of ironing and stick the pictures related to them in a scrapbook.



Unit 9

HOUSEHOLD TEXTILES

- *In which ways do you use various textiles in your daily life other than apparel?*
- *Which are the textiles that can be termed as household textiles?*
- *What do you keep in mind while buying household textiles?*

The main area of use of textiles is as apparels but the other most significant area in which textiles are used by all of us on a daily basis is at the household level. All around us we see different kinds of fabrics being used as curtains, sofa covers, bed sheets, cushion covers, towels, napkins, blankets, dish clothes, rags, mops, carpets and many other similar uses. All such fabrics are called **Household Textiles**. Proper selection, use and care of these textiles is important as it will help them last long, (give us full value of our money) and serve us well. In this chapter we will be learning about four major household textiles namely **Towels & napkins, Bed sheets & pillow covers, Curtains & draperies and Carpets & rugs.**

9.1 TOWELS AND NAPKINS

- *Why do towels and napkins have so many loops on their surface?*
- *What are the criterial you consider when you are buying a towel?*

Towels are used to absorb moisture from body after a bath, so they are made using absorbent fibres and weaves. These towels are known as **Terry Towels** or **Turkish Towels**.

- **Selection of Towels :** While selecting towels, following points should be kept in mind :

1. **Material & Construction :** In India, mainly cotton is used for making towels. In western countries, linen is used. **Pile weave is mainly used for making towels.** Piles (loops) increase the absorbency.
2. **Colour & Design :** In western countries, bath towels are always white and plain. In India, we get all sorts of colours and designs. Young children prefer bright colours and cartoon prints in their towels.
3. **Texture :** Some people prefer very soft towels while some other may prefer slightly crisp and rough texture. For very young and very old persons, towels should be of very soft texture as rough texture can damage their skin.
4. **Workmanship :** The two open sides of the towel should be properly folded and stitched otherwise thread will keep coming out and the towel will not last long. Interlocking is best.

- **Types of Towels :**

1. **Bath Towels :** These are regular towels found in everybody's bathrooms. In western countries they are white and plain, while in India we get all kind of colours and designs.
2. **Beach Towels :** These towels are used only at the beach in western countries. They are brightly coloured and have beautiful designs on them. They are much bigger in size than bath towels so a person can lie on them to take sun bath (see picture no. 9.1)



Picture No. 9.1 Beach Towel

3. **Hand & Face Towels (Napkins) :** These are small sized towels which can be individual or can be one for the entire family, hanging by the wash basin. The standard size for napkins is 18"x12".
4. **Dish Towels :** These are usually made by simple weave and strong, tightly twisted yarns so that there is not **lint** formation.

They should be kept clean and dry. These towels are used for wiping utensils.

Do you know?

Lint are the very small fibres on the surface of fabric. If the dish cloth has lint, it can stick to the wet utensils.

9.2 BED SHEETS AND PILLOW COVERS

- Have you ever shopped for bed sheets? What were your criteria?
- How do you wash and take care of bedsheets?
- Why do pillows get dirty than bedsheets? What can we do to preserve them?

Bed sheet is the material which is spread over the mattress and tucked beneath. It is made of a thinner material and has matching pillow covers. **Bed cover** is a thicker material which is spread over bed sheet during day time to protect it.

- **Selection of Bed sheets :** The following criteria should be considered :

1. **Material & Construction :** In India we usually have cotton bed sheets while in most countries abroad, they are made of linen. Mostly they are made of plain weave.
2. **Colour & Design :** In western countries, the bed sheets are always white and plain. In India, they are available in different colours and designs. Light coloured bed sheets have a soothing effect on the

person sleeping on it. Dark colours should be avoided because if there is any insect on the bed, it will not be seen.

3. **Texture** : The texture of the bed sheet should necessarily be smooth and soft so that a person can rest on it peacefully.
4. **Workmanship** : The two raw edges should be folded and stitched firmly so no loose thread comes out of them. Interlocking is best.
5. **Size** : The bed sheet should be big enough to cover the mattress and its sides completely as well as to tuck underneath. There are two standard sizes available in market –Single bed sheet and Double bed sheet

Pillow Covers : Mostly a bed sheet comes with two matching pillow covers made from the same material. Ready made pillow covers are also available in market in all colours, design and size. The size of the pillow cover should be 2 inches more in width and 4 inches more in length than the pillow. A slip should be used to protect the pillow covers.

Always remember

A *slip* is a piece of old sheet or towel spread over the pillow cover on the area where our head touches it. It helps in protecting the pillow covers from getting dirty.

9.3 CURTAINS AND DRAPERIES

- Why do we hang curtains in our home?
- How many different types of curtains are available in the market?
- What points will you keep in mind while selecting curtains?

Curtains and draperies are an integral part of home decoration today. They are basically there to cover and frame windows but they also make a room look more beautiful. Curtains and draperies are two different things and should not be misunderstood as one and the same. The difference between curtains and draperies is given in table no.9 .1 :

Table No. 9.1 Difference between curtains and Draperies

Curtains	Draperies
1. Made up of light and thin material.	1. Made up of heavy and thick material.
2. Short in length and reach up to window sill.	2. Quite long and reach up to the floor.
3. Hung next to window glass.	3. Hung over the curtains.

- **Aims of hanging Curtains** :
 1. **To make a room look attractive** : Curtains make interiors beautiful and interesting. For ex. - Curtains in living rooms, restaurants, reception areas of offices etc.
 2. **To avoid excess sunlight** : Curtains in bedrooms are often hung with this purpose.
 3. **For privacy** : Bedrooms, hospitals and bathrooms have curtains mainly for this purpose.



Picture No. 9.2 Curtain

4. **To avoid dust and dirt :** Houses on ground floor, near main roads or near open fields need curtains to keep the dust and dirt away.



Picture No. 9.3 Draperies

5. **As partition :** Mainly in offices and hospitals. Sometimes even in homes a big room is divided into two with the help of curtains.

- **Selection of Curtains :** The following criteria should be considered -

1. **Material & Construction :** Cotton, linen and polyester curtains are most durable.

Silk and rayon curtains as well as lace and net curtains are less durable. Curtains made from glass fibre are considered excellent as they are very durable and easy to care.

2. **Colour :** The colour of the curtains should be matching to the colour of walls and other furniture in the room. In warm climates, cool colours like white, blues, greens are preferable. In cold climates, warm colours like yellows, reds, oranges are preferable.

Light coloured curtains will help a small room look bigger.

3. **Design :** For low ceiling rooms, curtains with vertical designs are more suitable as they create an illusion of height. In big rooms, curtains having big designs look good. For small rooms, curtains with small prints or plain curtains should be selected. They make a small room look bigger.

4. **Use of the room :** For different rooms, selection of curtains have to be done differently.

Living Room / Hall : Beautiful and attractive curtains perfectly matching with the furniture should be selected for living room.

Bedroom : Curtains of soothing colours and thick material should be chosen for

bedrooms to provide rest and privacy. The choice of the person occupying the bedroom should also be considered.

Bathroom : Mostly plastic curtains also known as **Shower curtains** are used for bathrooms. They do not get damaged due to moisture and can be cleaned easily.

Kitchen : If possible fire resistant cloth should be used for making kitchen curtains.

5. **Style of Furniture :** The type of material, colour and designs of curtains should be selected keeping in mind the style of furniture.

Wooden carved furniture : Silk, satin or velvet curtains will look better.

Modern steel and glass furniture : Net, lace or synthetic curtains with modern abstract designs will be more suitable.

Cane furniture : Cotton curtains with earthy colours and designs will look good.

9.4 CARPETS AND RUGS

- Why do people use carpets?
- Which different types of carpets are available in market?
- Do you find it difficult to clean the carpet?

Carpets and rugs are considered an integral part of home decor nowadays. Most of us tend to use these two terms interchangeably but actually there is a difference. **A carpet is always wall-to-wall, covering the entire floor**

while a rug is small in size, covering only a certain part of the floor. They are usually found in living rooms and many times in bed rooms, dining rooms, lobbies, staircases too. They are also found in hotels, restaurants, offices, stores, airports, auditoriums, hospitals, schools etc.

● **Aims of using Carpets :**

1. They make a room look beautiful.
2. They give warmth and comfort. In cold climates, carpets are primarily used for this purpose.
3. They absorb floor noise as well as other noise in a room.
4. They prevent slipping while walking on the floor.

● **Selection of Carpets :** The following criteria should be considered -

1. **Material & Construction :** Traditionally carpets were made by wool, cotton, jute and sometimes silk. Nowadays all kinds of synthetic fibres are used. Carpets made from glass fibre are considered very durable and easy to maintain. Carpets are usually made of Pile weave.
2. **Colour :** Traditional carpets and rugs are available in earthy colours like red, maroon, orange, brown, black, blue, cream, white etc. Nowadays they are also available in light pastel colours, fluorescent colours as well as silver and gold. A carpet should be matching or complementing to the colour of walls and furniture.



Picture no. 9.4 Traditional Carpets

3. **Design :** Traditional carpets have floral designs usually with a border or an entire scene made on them. These carpets are usually hand made and the designs are pretty intricate. Modern carpets have traditional as well as modern, abstract designs.
4. **Texture :** Traditional carpets were made mostly of wool and so had a rough texture. Modern carpets use synthetic fibres and so can be extremely soft in texture.



Picture no. 9.5 Modern Carpets

5. **Ease of care :** Traditional carpets made from natural fibres are more difficult to take care as they tend to get spoilt or eaten up by insects very easily. Cleaning them is also more difficult. Modern carpets made from synthetic fibres have a longer life as these fibres are not easily affected by any natural element. They get cleaned also easily.
6. **Price :** Carpets are usually a costly item amongst furnishing and so we should invest in them wisely. Traditional woollen carpets like Kashmir or Iranian carpets are expensive because of the pure wool used as well as the fact that they are hand made with intricate designs. Modern carpets use synthetic fibres and are mostly made by machines so they turn out to be cheaper.

With intricate designs. Modern carpets use synthetic fibers and are mostly made by machines so they turn out to be cheaper.

Do you know?

The world's largest hand-woven carpet measures 60,000 square feet. It is installed in Sheikh Zayed mosque in Abu Dhabi. It took weavers two years to make and is reportedly valued at \$5.8 million.

- *How can we take proper care of household textiles?*
- *How often should we wash/clean the household textile.*
- *How can we prevent their spoilage?*

9.5 CARE OF HOUSEHOLD TEXTILES

Proper care and maintenance of household textiles will make them last longer, serve us better and give us value for money. Following points should be kept in mind –

1. Wash it before it gets too dirty.
2. If any repairing is needed, it should be done immediately.
3. They should be stored only after they are completely dry.
4. Scrubbing brush and iron should not be used in case of towels.
5. A fabric softener should be used from time to time to keep towels soft.
6. During day time, a bed cover should be used to protect the bed sheet from getting dirty.
7. A **slip** should be used to protect pillow covers.
8. Velvet, silk, satin curtains should be dry cleaned.
9. Carpets should be brushed and vacuum cleaned regularly.
10. Special carpet shampoos are available in market. Trained persons are also available to clean it.
11. A **rug cushion** should be kept below the rug to reduce the wear.
12. Carpets and rugs should be rolled for storage and some insecticide should be used.

A rug cushion is a mat or piece of old bed sheet spread below the rug to protect it from wear –n-tear.

Use Your Brain Power

1. Fill in the blanks using letters given below. Use each letter only once -

U E O A I S P E K E T T A
 D R I E A H O U E E C W E
 I S E X E U A L O W S I S
 L H S I N L I R O R A

- | | |
|------------------------------|--------------------------------------|
| a) C ___ R ___ ___ I N S | f) S ___ ___ P |
| b) R ___ G S | g) D R ___ P ___ R ___ ___ S |
| c) B E ___ S ___ ___ E T ___ | h) C ___ R P ___ ___ S |
| d) T ___ ___ E L ___ | i) P I ___ L ___ ___ C ___ V ___ ___ |
| e) N ___ P ___ ___ N S | j) W ___ ___ K M ___ N ___ H I ___ |

2. Name the household textile based on the clues given below –

- a) Window sill - next to glass - thin material
→ _____
- b) Warmth - stop slippage - absorb floor noise
→ _____
- c) Pile weave - cotton fibre - different sizes
→ _____
- d) Next to wash basin - small size - hand & face
→ _____

- e) Smooth texture - next to mattress - light colour
→ _____
- f) Tightly twisted yarn - clean - dry
→ _____
- g) Wool fibre - more care - intricate designs
→ _____
- h) Over the pillow - under head - small in size
→ _____
- i) Jute or cotton - to protect rug - facing floor
→ _____
- j) Very big - colourful - for lying down
→ _____

EXERCISE

Objective Type Questions

I. (A) Match the following :

A		B	
1.	slip	a)	below the rug
2.	dish towels	b)	towels
3.	rug cushion	c)	silk
4.	pile weave	d)	plastic curtains
5.	shower curtains	e)	jute
		f)	protection for pillow covers
		g)	tightly twisted yarns

II. Select and write the most appropriate answer from the given alternatives for each question :

1. Weave used in making towels
a) Twil b) Plain c) Pile
2. Colour of bed sheets in western countries
a) Light b) Dark c) White
3. Design suitable for curtains in low ceiling rooms
a) Vertical
b) Horizontal
c) Plain

4. Term for a small floor covering
a) Carpet b) Rug c) Mat
5. Clothes used for drying utensils.
a) Hand towel
b) Beach towel
c) Dish cloth
6. Fibers used for making carpets are easy to maintain.
a) Cotton b) Wool c) Glass

III. Write whether the following statements are True or False :

1. Beach towels are bigger in size as compared to other towels.
2. Bed sheets should be light in colour.
3. Carpets made from synthetic fibres require more care than woolen carpets.
4. Thick material is used for draperies.
5. Dish clothes should be loosely woven.
6. Plastic curtains are suitable for bathroom.

IV. Name the following :

1. Piece of cloth used below the rug.
2. Piece of cloth used on pillow covers.
3. Small towel used for wiping hand and face.
4. Weave used in towels.
5. Wall to wall floor covering.
6. Curtains used in bathrooms.

7. Very small fibres on the surface of fabric.
8. Cloth used for wiping utensils.

Short Answer Type Questions

I. Give reasons :

1. Glass fibres are considered good for making curtains.
2. Plastic curtains are suitable for bathrooms.
3. Pile weave is used for making terry towels.
4. A rug cushion is required while spreading a rug on the floor.
5. A slip should be used along with pillow cover.
6. Scrubbing brush should not be used while washing towels.

II. Differentiate between:

Curtains and Draperies

III. Write short notes on the following :

1. Aims of hanging curtains.
2. Selection of bed sheets (any 2 points)
3. Selection of towels (any 2 points)
4. Care of household textiles (any 4 points)
5. Selection of carpets (any 2 points)
6. Selection of curtains (any 2 points)
7. Aims of using carpets.
8. Napkins.

IV. Define the following terms :

1. Lint
2. Slip
3. Rugs
4. Carpet
5. Beach towel
6. Drapery
7. Napkin
8. Dish cloth

SELF STUDY/PROJECT

- Do a market survey on the various types of house-hold textiles.
- Find out the methods used by home-makers to take care of their household textiles through a survey.



Unit 10

TRADITIONAL TEXTILES OF INDIA

Remember

- Please tell the names of the Textile fibres.
- Which Textile fibres are famous of the various part of India?
- At which occasions are the traditional clothes used.

The present chapter is an endeavor to represent our glorious textile traditions from our rich collection from different regions and diverse communities of the Indian subcontinent. India has evidence of dyed and woven textiles found at Mohenjo-Daro about 5000 yrs ago, which proves that the people had both the knowledge as well as the art of dyeing and weaving fabrics.

Can you tell?

- Where are fabrics manufactured?
- In the past how the fabrics was manufactured?
- Have you seen "A Handloom"?

Internet My Friend

Find out information regarding Handloom and various terms used like warp, weft, selvedge. Also collect information regarding various traditional looms used in India.

● Handlooms Means Handwoven Fabrics

Handloom textiles constitute a timeless fact of the rich cultural heritage of India. As an Economic Activity, the handloom sector occupies a place second to agriculture

in providing livelihood to the people. It is estimated that handloom industry provides employment to 65 lakh workforcedirectly and indirectly and there are about thirty five lakhs looms spread all over India.

The production of Indian Handloom fabrics is estimated to be approximately 6947 millions sq. mtrs. and the contribution of handloom to the total cloth/textile production is estimated to be about 16%.

The Handloom industry in India is best knownforitsdistinctiveness, style, traditionalism and modern technology. Each and every state in India has the capability of boasting innovative printing, weaving, embroidery and designing trends.

Handloom industry is significant because of the use of fine textured fabrics, exclusively beautiful woven patterns and design, trendy outlook intricate motifs.

All Handlooms Products/fabrics are spun with hand spindles and small shuttles filled with coloured, gold or silver thread passed through the wrap as required manually.

A land of variety in every sense – India has so much to offer from the array of interesting customs, traditions and festivals that every state has its own cultural unique fabric and every region has its own handloom Techniques that are used to weave many amazing fabrics.

Do you know:

- *Various types of Indian fabrics represent the culture of the India.*
- *The person who may be ultramodern will wear traditional garments at the time of traditional ceremonies.*
- *Today traditional garments are preferred over modern garments.*
- *Even in fashion shows, now a day's traditional fabrics are reintroduced.*

10.1 KASHMIR - PASHMINA

“PASHMINA” SHAWLS are famous from Kashmir even in the times of Emperor Ashok (3rd B.C.). Sultan Zain-UL-Abiddin (1420-1470 A.D.) has initiated the shawl industry in Kashmir.

The Pashmina word came from Persian word “Pashn” meaning soft and silky. The Pashmina shawls are hand woven with a high quality of wool that is obtained from the Pashmina goat.

Pashmina shawls are embroidered by silk and staple threads. They are soft, silky and warm fleece, elegant and dignified, sober and pure that resembles the clean white tops of the Himalayan ranges. Pashmina shawls are shoulder mantle which were worn by the kings and Queens since

ancient times and since then it has been used in India in a variety of forms by rich and the Middle class as a protective garment against the biting cold.

Motifs Used: - are usually formalized imitations of the leaf of chinar tree found in the high altitudes, apple blossoms, the almond, the tulip and occasionally the fruits of the mountains and the birds also are used with delicate flowers.

ColoursUsed: -The Pashmina shawls found in natural white and off white colours. They are also found in yellow, black, blue, purple, crimson and scarlet colours after dyeing.

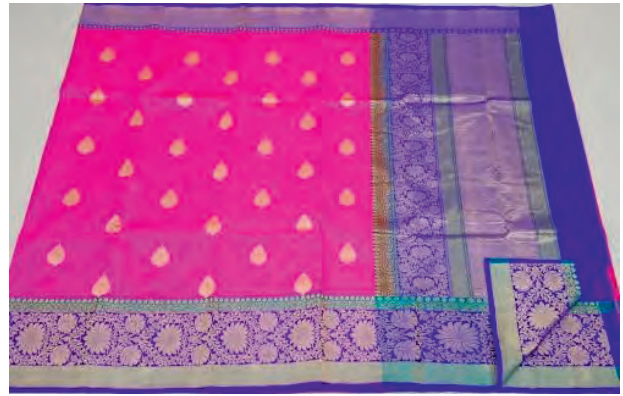
Other famous shawls found are Jamiavars, Do-rukka or Doshala (Twin Shawls).



Picture No. 10.1 Pashaina of Kashmir



Picture No. 10.1 Pashaina of Kashmir



10.2 UTTARPRADESH BROCADES

The special occasion sarees from Banaras are called **“BROCADES”**.

The sarees are woven in pure silk wrap and weft on handlooms. They are heavy in weight.

The Brocade Sarees are decorated and woven with elaborate design in border, body and pallu with Zari threads.

Mofits Commonly used are: - Elephant, Parrot, Floral, Standing couple, Mahabharata Scenes Horse and Riders, Kalash etc.

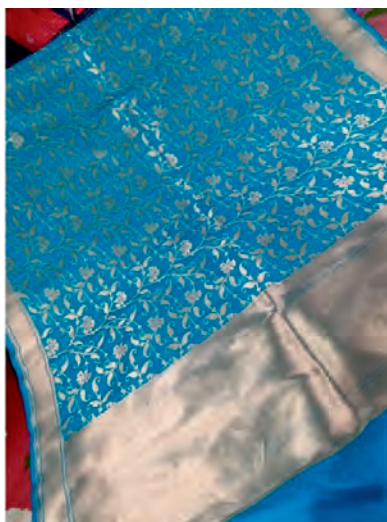
Colors Used are of golden or silver zari and nowadays of metallic threads with maroon, blue, green, or bright colours.



Pic. No. 10.2 Brocades

10.3 WEST BENGAL - JAMDANI

Jamdani is a wedding Saree of West Bengal. It is derived from Dacca Muslims with the woven-in Pattern known as “Jamdani”.



Picture No. 10.3 (a) Jamdani

Jamdani is woven in fine cotton yarn and rarely in silk yarns.

Motifs Used: - Flowers are figures and elaborate designs are woven in the entire pallu.

Colors used: - Golden, Yellow, Red and White, Purple and Blue.

● **BALUCHARI :**

“Baluchari or Buttedar” are silk sari from Murshidabad from West Bengal.

They are Traditional silk saree with floral and geometrical silk brocaded design.

Motifs: - Stylised trees, mango, man riding a horse, swan etc.

Colors: - Dark red and blue.



Picture No. 10.3 (b) Jamdani

10.4 ORISSA - IKAT

The common handloom weaving centers of Orissa are Sonpur, Butapalli and Navpatna.

“IKAT” Sarees are the handloom sarees of Orissa. Ikat Sarees is a made through a process of tie-dyeing the wrap and weft threads to create the design on the loom before weaving, it forms feathered edges and a hazy fragile appearance.

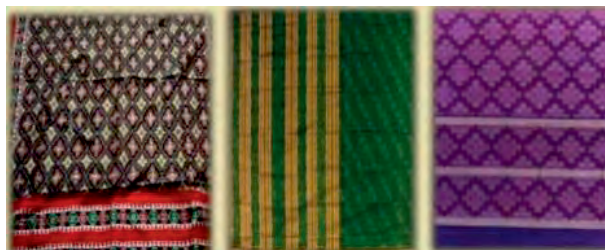


Pic. No. 10.4 (a) Ikat

These sarees are woven in pure mercerized cotton with multi colored designs.

MOTIFS USED: Birds, fish, flowers, animals, shankh, geometric, Shell etc. and the layout is well planned with a woven borders and pallu. The floral and butta design are repeated throughout the body.

Colors Used : For Ikat textile, Black, Red, Violet, Yellow & magenta colours are used. Sometimes for both borders & body portions pastel colours are used.

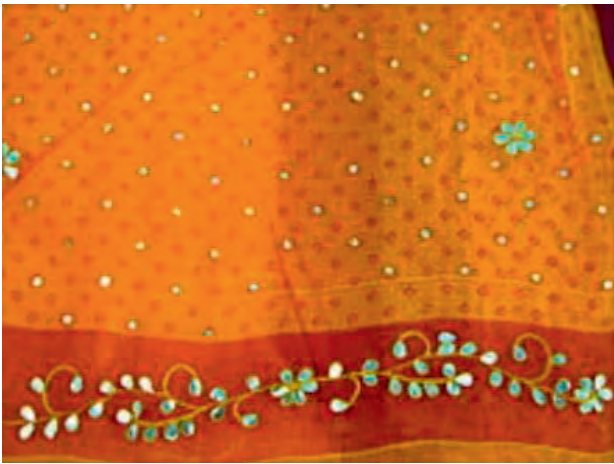


Picture No. 10.4 (b) Ikat

10.5 RAJASTHAN - KOTA - DORIYA

“KOTA DORIYA” is one of the woven sarees made at Kota district in Rajasthan. These Sarees are made of pure cotton and silk threads. The chequered weave of a kota sari is very popular. They are very fine weaves and weigh very less.

KOTA DORIA is woven on a traditional pit loom in such a way that it produces square checks pattern on the fabric known as Khats.



Picture No. 10.5 Kota Doria

DORIA mean thread.

They smear onion juice and rice paste with lot of care into the yarn making the yarn so strong that no additional finishing is needed.

Colors Used: They are dyed in bright colors like orange, pink, yellow, green etc.

10.6 MAHARSHTRA - PAITHANI

Paithani saree took its name from a place called PAITHAN.

This sari is made of silk with an ornamental zaripallav and border. (gold and silver threads).

Motifs Used: traditional Vines and flowers, shapes of fruits and stylized forms of birds are used in this saree.

The Tota : Maina motif or Muniya symbolizes parrot sign of love and passion. The lotus or kamalpushpa is a motif which resembles murals of Ajanta caves.

The traditional coconut border (Narali) known as Sripthal is the fruit of God, coconut tree or kalpavriksha, and geometrical figures are used.

Colors used:- Mostly Red, Black, Yellow, Purple colours are used.



Picture No. 10.6 Paithani

10.7 GUJRAT - PATOLA

“PATOLA” is a famous wedding saree in Gujrat.

These Sarees are also woven by using tie and dye techniques in the design in the wrap and weft threads while weaving.

This saree is also known as “DOUBLE IKAT SAREE”



Picture No. 10.7 Patola

Motifs Used: - are stylized animals like elephant, camels, tigers, birds, flowers in symmetrical motifs, dancing women and pen.

Colors Used: bright red, orange, deep red, navy blue, yellow, green, violet, off white.

10.8 KARNATAKA - IRKAL

“IRKAL” Saree is a traditional form of 9 yards’ saree which takes its name from a town ilkal in the bagalkot district of Karnataka.

Irkal sarees are woven in either cotton, pure silk or a mixture of cotton and art silk threads.



Picture No. 10.8 (a) Irkal

Motifs Used:- Are traditional patterns like palanquins, elephant and lotuses.

The designs and patterns are divided in 2 parts: -Pallu and Border.

Pallu :- The pallu part which falls on the shoulders carry motifs of “Temple Towers”

The end region of the pallu is made up of patterns of different shapes like Hanige (comb), kotikampli (fort ramparts), toputene (tower) and rampa (mountains).



Picture No. 10.8 (b) Irkal

Border:- The border of the saree is very broad made odochire patterns.

Colors used:- The traditional colors used are red, maroon, pomegranate red, brilliant peacock green, parrot green, only bridal wear is made of color called GiriKumkum.

10.9 TAMILNADU - KANCHIVARAM

“KANCHIVARAM” Saree are famous from a town called Kanchipuram 74 km away from Chennai in Tamil Nadu.

It is woven in pure silk saree with golden Zari and silver Zari Threads.



Picture No. 10.9 Kanchivaram

Motifs and Designs: Specialty of this Saree is solid border, solid body, solidpallu and small butta designs are used all over the body with golden and zari threads

Colors: used are solid colors of the same threads or contrasting colors in the border.

Mostly green and red, blue and pink, orange and purple colors are used.

10.10 KERALA - BALARAMAPURAM

“BALARAMAPURAM” Sarees are woven sarees of Kerala well known for its quality and variety.

These sarees are woven 5.5 mt long and 1.2 mt wide narrow fabric worn by ladies, Kuthampully sarees, Balarampuram Sarees are woven on Thiruvananthapuram district and use of pure zari for border designs. They are woven on traditional looms.

Motifs Used: are peacocks, diamond shapes or stylized forms of elephants and geometrical shapes.

Colors used:- white or off white colors with woven gold bands on the borders and pallu.



Picture No. 10.10 Balarapuram

Internet my friend:

Obtain the detailed information regarding traditional clothes and present in the class.

EXERCISE

Objective Type Questions

I. Match the following pairs :

A		B	
1.	Paithani	a)	Uttar Pradesh
2.	Irkal	b)	Gujarat
3.	Pashmina	c)	South India
4.	Patola	d)	Maharashtra
5.	Brocades	e)	Rajasthan
		f)	Karnataka
		g)	Kashmir

II. State True or False

1. Banarasi Brocades are light in weight.
2. Jamdani Sarees are woven in cotton fibers.
3. Ilkal Sarees are 9 yards'saree.
4. Kota Doriya Sarees have round patters known as khats.
5. Peacock motif with a bangle is common n Kanchipuram sarees.
6. Patola is a traditional saree of Kerala.
7. Kanchivaram Sarees have a bold border and bold palluj.
8. Balaramapuram Sarees are black in color with golden borders.

MULTIPLE CHOICE QUESTIONS

- **Select and write the most appropriate answer from the given alternatives for each subquestions:**

1. IRKAL Sarees is a traditional form of _____ Saree of Karnataka.
a) 4 yards b) 9 yards c) 5.5 yards
2. The pure cotton Sarees of Orissa is _____.
a) Patola b) Ikat c) Irkal
3. The Bangle Peacock motif is very common in _____ sarees.
a) Paithani
b) Jamdadi
c) Kanchivaram.
4. The famous wedding saree of Gujarat is _____.
a) Kanchivaram
b) Paithani
c) Patola
5. The speciality of _____ sari is a solid border, solid body, solid pallu and small butla designs all over the body with golden zari threads.
a) Balampuram
b) Kanchivaram
c) Baluchari

IV. Answer in one word only :-

1. Name the saree of Kerala
2. Name the color used for weaving Jamdani Sarees
3. Name of the handloom sarees of Orissa

4. Name the South Indian Sarees
5. Name the pattern of Kota Doriya
6. Name the shawl found in Kashmir
7. Name the place where brocades are woven
8. Name 2 handloom centre of Orissa
9. Name the village where Paithani Saree is Woven
10. Name the Saree of Rajasthan
11. Name the traditional 9 yard saree of Karnataka
12. Name the white Saree with golden border found in Kerala
13. Name the famous silk sare of South India

Short Answer Type Questions

1. Classify the sarees of the states :

- A) Western states**
- B) Eastern states**
- (i) Jamdani
 - (ii) Patola
 - (iii) IKAT
 - (iv) Paithani
- (i) Gujarati
 - (ii) Maharashtra
 - (iii) Rajasthan
 - (iv) Orissa

2. Write Short Notes on :

1. Describe the Pashmina Shawls (Motifs and colors)
2. Explain Brocades of Uttar Pradesh
3. Explain the Weaving pattern of Kora Doriya

3. Give the difference between :

1. Ikkal Sarees and Patola Sarees.
2. Kanchivaram Sarees and Balarampuram Sarees.
3. Jamdani and Baluchari Sarees

LONG ANSWER

1. Explain any 2 state handloom Sarees.
2. Write about the Handloom Industry of India.
3. Describe the Paithani Sarees found in Maharashtra.

FIELD WORK

- Visit Handloom centres of your city or area of any.

PROJECT / SELF STUDY

- Collect small samples/ picture of the different other handloom articles of different states.





PRACTICALS



Practical - 1

SEWING TOOLS AND ACCESSORIES

Stitching clothes involves the use of a variety of sewing tools and accessories. We must know about different tools and accessories available, their function and method of use. This will help us make proper selection of the tool required for a particular job. The different sewing tools can be classified according to their use in the following way :

Chart No. 1.1 Sewing Tools & accessories



1. Measuring Equipments :

- a) **Measuring Tape :** Used for taking body measurements or measuring fabrics. It is 60 inches or 152 cms long. It is made of plastic or rexin, is flexible and marked on both sides.
- b) **Rulers :** A ruler can be 12 or 6 inches long, made of wood, plastic or metal and has measurements marked in inches as well as centimeters.
- c) **Tailor's square :** This is a 'L' shaped instrument made of wood, plastic or metal. It helps in measuring straight lines and right angles on pattern layouts.

2. Marking Equipments :

- a) **Tailor's chalk :** This is a soft, flat piece of chalk which is thick in the middle and tapers at sides. It is available in different colours and shapes. **It is used for marking on fabrics.** Marking with this chalk is easy and the markings rub off easily too.
- b) **French Curve :** These are used for drawing curves while drafting designs. They are made of plastic and are available in different shapes and sizes.
- c) **Tracing wheel :** This is a small saw-toothed wheel made with steel with a wooden or plastic handle. It is used to mark perforations in the fabric to indicate seams, positions of pockets, necklines, pleats etc. It can be used alone or along with a carbon paper.

We can mark more than one layer of fabrics at the same time, using tracing wheel.

- d) **Dressmaker's Carbon :** These are carbon papers available in red or yellow colour. They do not leave dark smudges on the fabric. **They are used along with tracing wheel to mark more than one layers of fabrics at the same time.**
- e) **Coloured Pencil :** Also known as tailor's pencil. It is half red and half blue. Used for marking on the fabrics. It is not so popular nowadays.
- f) **Brown Paper :** This is used for making drafting patterns before marking and cutting the fabric.

3. Cutting Equipments :

- a) **Shears :** Shears are two bladed cutting tools used for cutting fabrics. They can be 9-12 inches long. One of the handle is round for inserting thumb and the other is long which can permit 3-4 fingers for better control while cutting. They are available in different sizes. The blades are made of iron or steel and the handles can be brass, plastic or steel. The shears used for cutting fabrics should not be used for other purposes otherwise they will lose their sharpness.
- b) **Scissors :** These are small sized cutting tools also known as clippers. They are 6-9 inches long and made of steel. The handles are

made either with steel or plastic. Both the handles are round to insert thumb and forefinger. **These are used to cut paper, threads etc.**

4. Stitching Equipments :

- a) **Thimble : This is a small cap which is worn on finger to protect it from needle prick while hand stitching.** Thimbles are available in plastic, steel or brass.
- b) **Hand sewing Needles : These are used for hand stitching.** They are available in different sizes and in assorted packages. No. 9 needle is ideal for home stitching.
- c) **Threads :** For regular stitching, threads should match the fabric in colour, lustre, and yarn size . They vary in size from No. 10-150. **For**

normal home stitching cotton thread of No. 40-50 is used.

- d) **Pins :** The pins are used to hold the pieces of fabrics together while stitching. They help in faster stitching and avoiding mistakes. They are a must for beginners but are used by experts too for greater efficiency. They should be of steel and have fine, sharp points so that they do not spoil the fabric. Attractive dressmakers pins with pearl heads are also available.

5. Finishing Equipments :

- a) **Pinking Shears :** These shears have zigzag edges which are used to finish seams so that threads do not ravel from the open edge of the fabric. They are heavier and costlier than other shears.

Table No. 1.1 Threads and Needles for Sewing

Fabric	Cotton Thread	Hand Needle	Machine Needle
Fine, sheer fabrics- Chiffon, Lace etc.	80-100	9-10	9
Light weight fabrics – Muslin, Voile etc.	60-80	8-9	11
Medium weight fabrics – Poplin, Woollen, Shirting etc.	40-50	6-7	14
Heavy weight fabrics – Denim, Drill, Khaki, Curtains, Bed sheets etc.	30-40	4-6	16-19
Canvas, Fabrics with heavy weaves like Jacquard etc.	20-30	3-4	21



Practical - 2

PARTS OF SEWING MACHINE, THEIR FUNCTIONS AND CARE

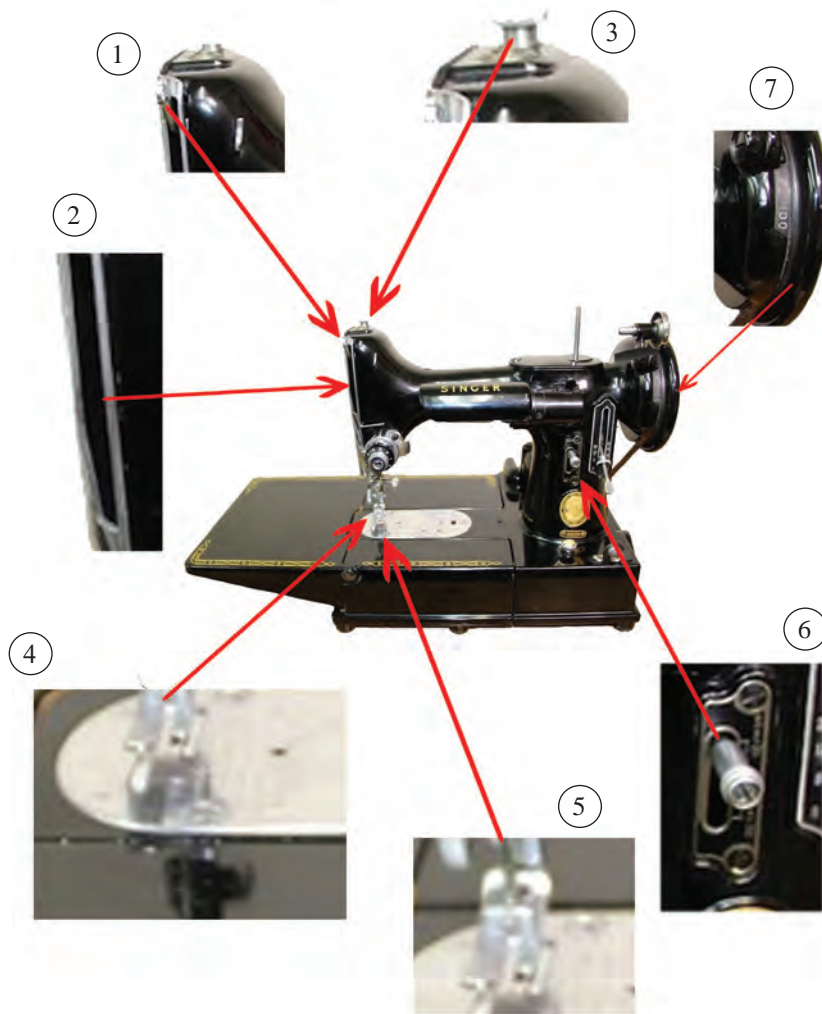
The sewing machine is the most important equipment required for stitching. It is essential for us to know about its different parts, their functions and how to take care of it.

- **Parts of sewing Machine and their Functions :**

Many types of sewing machines are available in the market. They have different designs and facilities. Certain basic parts are given below :

1. **Thread tension regulator - This regulates the tension on the spool thread.** It is on the extreme left side of the machine and it is turned clockwise or anticlockwise to increase or decrease the tension on the spool thread. The tension on the spool thread must match with the tension on the bobbin thread, otherwise stitches will be improper.
2. **Take up lever -** This moves up and down as the machine runs and **controls the flow of spool thread. Without its movement, the spool thread will not reach up to the fabric.**
3. **Needle bar -** This is a bar going vertically through the machine and it keeps on moving up and down when the machine is running. **The machine needle is attached at the lower part of this bar. Without its movement, the needle will not reach up to the fabric.**
4. **Presser foot -** This is a very important part of sewing machine. This is a small shoe-like device attached at the lower end of the presser bar. **This holds the fabric in place while stitching.** Because of this, the machine stitching is always in one straight line.
5. **Feed dog -** This is also a very important part of sewing machine. It is situated just below the needle plate. It is a small device with teeth. **It pushes the fabric forward while stitching.** If this stops moving, stitching will not be possible.
6. **Stitch regulator -** It is in the front at the right side of the machine. **It regulates the length of stitches.** It has numbers and we can set it at a desired number to get corresponding size of the stitches. It is connected from below to the feed dog. The feed dog moves less or more according to the number selected, thus pushing less or more fabric after every stitch. This results in smaller or bigger stitches.
7. **Fly Wheel or Hand wheel -** This is the wheel at the extreme right of the machine. When this wheel moves, it moves the needle bar, thread take - up lever and feed dog. This enable the machine to stitch. In hand machines, there is a handle attached to this wheel to move it easily.

Picture No. 2.1 Parts of Sewing machine



These are the parts which will be there in any sewing machine. If the machine is a Foot machine, certain additional parts are added below the table.

1. **Drive Wheel:-** This is a bigger wheel below the table. It is connected to the fly wheel with the help of a belt. **This drive wheel is rotated to rotate the fly wheel and run the machine.**
2. **Belt:-** This is leather belt which connects the drive wheel and the fly wheel. It transfers the motion of drive wheel to the fly wheel.



Picture No. 2.2 Foot Operated Machine

3. **Treadle:** It is at the bottom near the feet of the person who is operating the machine. **It is passed with both feet in an up and down movement to run the machine.**
4. **Pitman rod:-** This is a small rod of the treadle and drive wheel which connects the two. It is responsible for transferring the up & down movement of the treadle to circular movement of the drive wheel.

Internet my friend!

- 1) Find out the names, position and functions of other parts of sewing machine?
- 2) Also find out about the important parts below the table in case of Foot Machines.
- 3) Find out about the different kinds of sewing machines available nowadays.

Something Interesting

- ❖ **Inventors and their Inventions :**
- ❖ **Thimmonier, Barthelemy**
- ❖ This Frenchman was the first to receive recognition for a sewing machine in 1830. However his machine were destroyed by workers, who feared that the sewing machine would cause the to loose their jobs.

His machine was of the chain-stitch type and he was interested in making uniforms for the armies of french on a mass production basis. Opposition however, caused him to give up his plans.

❖ **Siger Isaac :**

Invented his sewing machine in 1846 and this was the year in which these machines were used in factories.

Care of Sewing Machine :

1. Machine should be cleaned regularly to keep it running smoothly.
2. Machine should be kept covered when not in use, to keep it safe from dust & dirt
3. All loose threads, dirt and lint should be removed with the help of a brush.
4. **Machine should be oiled once a week** with a good brand of oil for lubrication. This is to reduce friction and to avoid rusting.
5. Machine should be wiped thoroughly after oiling to avoid oil stains on the fabric to be stitched.
6. If the machine is not used for a long time, the oil dries up making the machine hard to run. In such case, a drop of liquid paraffin should be put into each of the oiled parts and the machine should be ran without fabric.



Practical - 3

STICHING OF TABLE CLOTH

Size of Tablecloth = 90 cm X 90 cm

Casement Material. = 1 meter

Finish all four sides by machining.

Then all four sides can be finished with a lace or crochet.

Pic No. 3.1 Table Cloth



Practical - 4

SEAMS

Any dress or piece of clothing is made by joining a number of differently shaped fabric pieces together. These 'joints' of fabric pieces are called 'Seams'.

A seam is a line of stitching which joints two or more pieces of fabrics or sections of a garment.

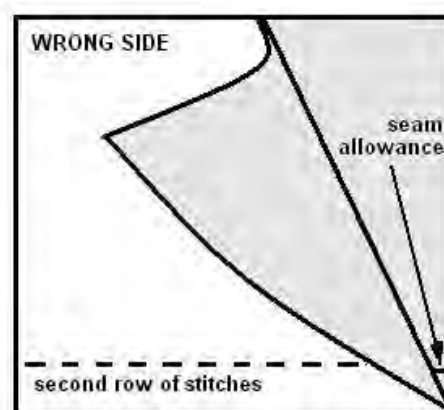
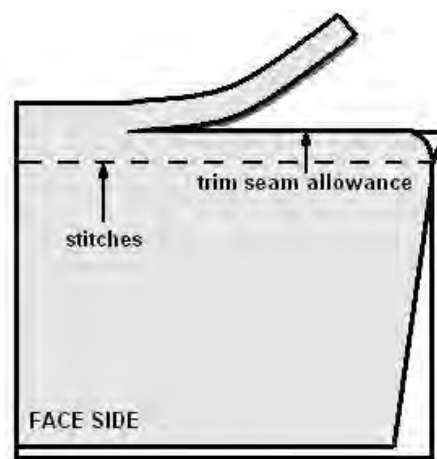
A good seam must possess certain characteristics.

1. It should be strong and secure.
2. It should be neat.
3. It should not be bulky.

❖ **Seams can be made in many different ways. A few important seams are as follows.**

- 1) **Plain or Simple Seam** :Two pieces of fabric are put with their wrong sides out and right sides facing each other. The edges are matched perfectly, 0.5 cm or 1 cm seam allowance is taken and the machine is run to make the seam. The edges can be finished by cutting them with pinking shears, or by overcasting. This seam is most commonly used in making dresses. (Diag. No. 4.1)
- 2) **French Seam**:Two pieces of fabric are put with their right sides out and wrong sides facing each other and a plain seam is made at a distance of 0.5 cm. the edges

are trimmed and then the fabrics turned so that now right sides will be facing each other. Another seam is made at a distance of 1 cm. thus the first seam gets enclosed with the second seam. This seam is extensively used in children's clothing, saree blouses and for sheer materials like voile, organdy etc. (See diag. no. 4.1)



Diag. no. 4.1 French Seam



Practical - 5

NECKLINES

❖ Necklines are finished by using facing or bindings.

1. **Fitted Facing:** A facing is a strip of fabric which is stitched along the neckline to finish it and then folded completely on the wrong side. It is not visible on the right side. The fitted facing is cut in the same shape as the neckline. It is usually about 4-5 cms wide. The facing is put on the right side of the garment and stitched. Then it is folded completely on the wrong side and finished by hemming. Square or fancy necklines are mostly finished by this facing.

2. **Bias Facing:** To cut bias we need an angle of 45° going exactly in the middle of the two grain lines of fabric. For achieving this, the fabric is folded in such a way that the warp yarn fall in the direction of the weft yarns (see pic 5.1). The folded diagonal line is cut and taking even width, bias strip of 2-3 cms are cut. The bias strip is stitched along the neckline, giving latitude for the shape of the neckline. Then it is folded completely on the wrong side and finished. This is used very commonly in ladies and children's dresses.



Picture No. 5.1 Cutting of bias strips



Practical - 6

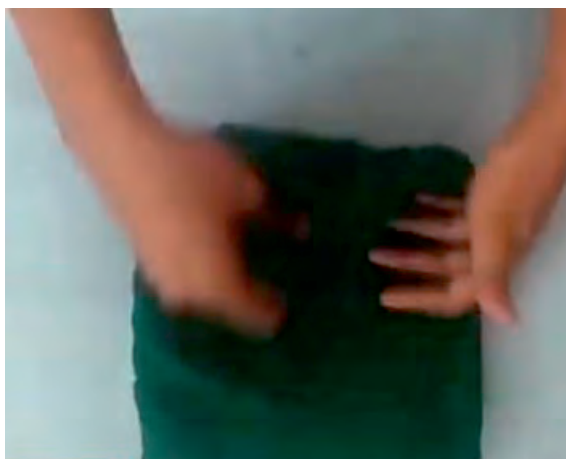
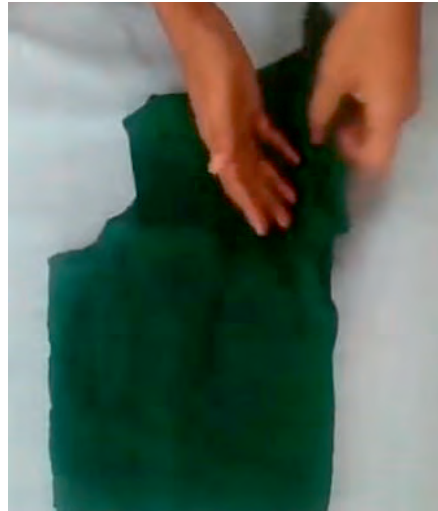
6. IRONING

A) Ironing of a saree blouse

1. Iron the sleeves from the back and then from the right side.
2. Iron the body part that is the left front and right front.
3. Iron the back.

4. Folding

- a. Fold the blouse vertically into half keeping the buttons open.



Picture No. 6.1 Folding of Saree blouse

B) Ironing of kameez

1. Adjust the temperature of the iron according to the garment.
2. Iron the double part first, seams, neckline, Hem etc.
3. Iron by using vertical strokes of the iron, do not move the iron constantly on one part.
4. Iron the front side of the kurta first.

1.



3.



5.



5. Folding :

- a. Place the kurta on the ironing board with back side uppermost.
- b. Fold the sides towards the centre.
- c. Fold the sleeves down straight and see that it forms a triangle.
- d. Fold the kurta horizontally, such that it forms a rectangle.

2.



4.



6.



Picture No. 6.2 Folding of Kameez

C) Ironing of salwar

1. Adjust the temperature of the iron according to the fabric of salwar.
2. Iron the hem (poncho) of the salwar first.
3. Then iron the belt if it is a belted salwar.
4. Iron with the toe (pointed part) of the iron, the gathers/pleat (the inside part).

5. Always move the iron from the flair or hemline towards the waist band.

6. Folding

- a. Join the two legs of the salwar together.
- b. Fold the extra part of salwar horizontally such that it becomes a perfect rectangle.
- c. Fold the length of salwar into half.



Picture No. 6.3 Folding of Salwar



Practical - 7

COLLECTION OF TEXTILE LABELS AND IDENTIFICATION

Informative, Permanent care, Brand and Certification Labels.

- ❖ Student should collect & stick labels in the journal.
- ❖ Student should observe Labels carefully.
- ❖ Students should notice the characteristic of each label.

(A) Informative labels :

A typical informative label on a fabric may give following information.

1. Manufactures's name
2. Logo of the manufactures
3. Fabric's commercial name
4. Fiber content
5. Yarn used
6. Fabric construction / count
7. Finishes applied
8. Batch Number / date

9. Length & Width

10. Price / meter

(B) Permanent Care labels :

These can be in written form or in the form of symbols.

Washing, Drying, Ironing, Dry cleaning, Bleaching instructions may be seen on the labels.

(C) Brand labels :

A distinctive design or symbol may be seen. It may also have a combination of words with these design ie. Trade mark or Trade Name.

(D) Certification Labels :

This label itself is a assurance of quality. eg. – Silk Mark, wool Mark, Handlooms mark or any similar certification label.



Practical - 8

IDENTIFICATION OF FIBRES BY MICROSCOPIC TEST

One of the ways to identify fibres is viewing them through microscope. The microscopic test reveals the inner structures of fibres which are remarkably different from each other. Microscopic test is an authentic test to identify a given fibre.

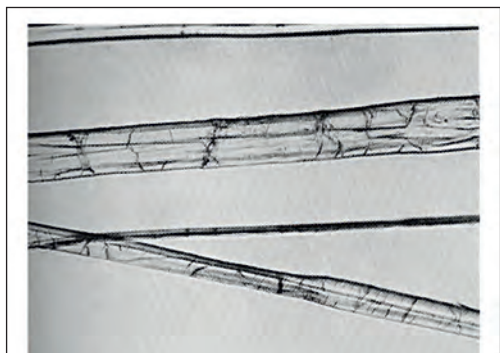
(A) Microscopic Test of Cotton Fibre :



Pic. No. 8.1 Cotton fibre

1. Flat ribbon-like structure.
2. Uneven width.
3. Convolutions (twists) are seen

(B) Microscopic Test of Linen Fibre :



Pic. No. 8.2 Linen fibre

1. Striations are seen.
2. Nodes are seen.
3. Uneven width.
4. Slight lustre.

(C) Microscopic structure of Jute fibre :



Pic. No. 8.3 Jute fibre

1. Cylindrical fibre.
2. Uneven diameter.
3. Dark in colour.
4. Striations are seen.



Practical - 9

IDENTIFICATION OF FIBERS BY BURNING TEST

Qualitative identification of fibers is difficult and may require several tests. The burning test can be used to identify the general chemical composition of fiber such as cellulose, protein, mineral or man made fiber.

❖ **Test Procedure:**

1. Unravel a yarn from the fabric sample.
2. Untwist yarns so the fibers are in loose mass.
3. Hold the loosened fibers in forceps or tweezers, and move them towards the flame from the side.
4. Notice the odour given by the fiber during burning.
5. Observe the ash or residue formed.

Table 9.1
Buring Characteristic of Fibers

Fiber	Approaching the flame	In the flame	Removed from the flame	Odour	Residue
Natural Cellulosic Cotton Linen/ Jute	Does not shrink away; ignites upon contact	Burns quickly	Continues burning, after glow	Similar to burning paper	Light feathery. Light or charcoal gray in colour.



Practical - 10

MAINTENANCE OF THE JOURNAL

- ❖ **Students should maintain journal and write all the practicals serially as per the syllabus.**



Practical - 11

PROJECT WORK

Students are supposed to do one project work during the academic year. This project should be based on the syllabus. The suggested topics are listed after every chapter. The student can choose any one of them or can find out a new topic for project subject to teacher's approval. The format of the project i.e. how it is to be presented is given below.

Format of the Project

- Title page – Title of the project. Name of the student, Class, Division, Roll No. / Seat No. Name of the College.
- Acknowledgement
- Index / Table of Contents
- Introduction
- Main body of the Project with suitable photographs, illustration, tables, graphs, diagrams etc.
- Conclusion
- Bibliography
- Annexure
- Websites



GLOSSARY

Term : Definition / Meaning

- **Balanced yarn** : Yarns in which twist is such that yarn will hang in loop without kinking. Doubling or twisting upon itself.
- **Bias** : Any direction in the fabric which does not follow exactly warp yarns or weft yarns.
- **Bleaching** : A Chemical process that makes fabrics, yarns or fibers white or prepares them for dyeing or printing.
- **Boucle yarn** : A novelty yarn characterized by light loops projecting from the body of the yarn of regular intervals.
- **Carding** : An initial process in yarn making of removing impurities and arranging the fibers into parallel fashion and convert them into card sliver.
- **Cellulosic fibres** : Fibres having cellulose as their basic component. All natural vegetable fibres are cellulosic fibers. Rayon is a regenerated cellulosic fibre.
- **Chenille yarn** : A novelty yarn which resembles a hairy caterpillar.
- **Cohesiveness** : The ability of fibres to stay together and adhere to each other.
- **Combing** : A process involved while manufacturing high quality yarns, which separates long desirable fibres of same length from short, undesirable fibres and arranges them in parallel order in the form of sliver.
- **Cord Cable yarn** : A yarn made by twisting together two or more ply yarns.
- **Crepe yarns** : Variation of simple yarn, having a high degree of twist which tends to kink resulting in the rough texture.
- **Delusterning** : The process of dulling the luster of man – made fibre with chemicals usually titanium dioxide.
- **Density** : Mass / unit volume. It is expressed as gm/cc. The closeness with which the molecules of a substance are packed within it. Fabrics made with high density fibres are heavier than fabrics made with low density fibres.
- **Detergent** : A substance having cleaning ability.
- **Detergency** : The ability of a substance to clean.
- **Draperies** : Window covers which are thicker and longer than curtains and which are hung over curtains.
- **Drawing** : A process in yarn manufacture in which the sliver is elongated by passing through a series of pairs of rollers.
- **Durability** : The quality of a substance which makes it long lasting.
- **Elasticity** : The ability of a substance to change dimensions when force is applied and to come back to original position once the force is removed. Clothes made from fibers having good elasticity are easy to put on or take off.
- **Filament fibres** : Long, continuous, fibres whose length can be measured in meters or yards. All non- made fibres and silk are filament fibres.

- **Flammability** : The manner in which a fibre reacts to fire.
- **Flexibility** : The ability to bend without breaking.
- **Flock yarn** : A type of novelty yarn in which small tufts of fibres are inserted at irregular intervals and held in place by the twist of the base yarn.
- **Heat conductivity** : The ability of a substance to allow heat to pass through it. Fibres with good heat conductivity are more comfortable in summer and fibres with bad heat conductivity are more suitable for winter.
- **Household Textiles** : Fabrics which we use for various activities in our homes.
- **Knot or knob yarn** : A novelty yarn produced in the same way as nub yarn except that brightly coloured fibres are added to the enlarged knot.
- **Lustre** : The amount of light reflected back and reaching our eyes from the surface of a substance.
- **Man – made fibres** : Fibres which do not occur in fibrous form in nature and have to be made into fibres.
- **Monomer** : A single unit or molecule from which polymers are formed.
- **Natural Fibres** : A fibre which is available in nature in fibrous form.
- **Non – thermoplastic fibres** : Fibres which do not change shape or melt due to heat. Such fibres burn and turn to ash on contacting fire.
- **Novelty yarn** : A yarn characterized by irregularities in size, twist and effect and creates an interesting novel effect or textural variation in the fabric.
- **Nub or spot yarn** : A novelty yarn in which the base yarn is held stationary while the effect yarn is wrapped around it several times to build up an enlarged segment.
- **Piles** : The loops formed on the surface of a fabric with the help of extra warp or weft yarn.
- **Ply yarn** : A yarn made by twisting two or more single yarns together.
- **Polymer** : A large molecule formed by linking together many monomers.
- **Polymerisation** : The linking of many monomers to form a polymer.
- **Regenerated fibres** : Fibres for which the raw material is taken from nature and then a new fibre is made by various chemical treatments. Rayon is a prime example.
- **Resiliency** : The ability of the fibre to recover after wrinkling or to save itself from wrinkling.
- **Simple yarn** : Yarn that is even in size, has equal twist throughout length and is smooth and uniform.
- **Single yarn** : A yarn which when it is untwisted will break apart into the individual fibres.
- **Sliver** : Round, continuous untwisted rope like strand of fibres.
- **Slub yarn** : A type of novelty yarn in which yarn is left untwisted or with slack twist at irregular intervals to produce soft, bulky sections.

- **Spinning** : A final process of yarn manufacturing where twist is imparted to the yarn to give strength and other desirable characteristics.
- **Staple fibres** : Short fibres whose length can be measured in cm or inches. All natural fibres except silk are staple fibres.
- **Suction Washing** : A method of laundry which uses a special instrument called suction washer. This method is used mainly for heavy and large clothes.
- **Synthetic fibres** : Fibres made from chemicals that were never in fibrous form.
- **Tenacity** : The tensile strength of a fibre expressed in gm / denier.
- **Textile fibre** : A thin, long, thread – like structure which is enough flexible and strong to be made into yarns fabrics.
- **Texture** : The touch or feel of a surface.
- **Thermoplastic fibres** : Fibres which start changing their shape or start melting beyond a certain temperature.
- **Twist** : The spiral arrangement of the fibres around the axis of the yarn.
- **Yarn** : A continuous strand of textile fibers, filaments or material in a form suitable for knitting, weaving or otherwise intertwining to form a textile fibre.



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