Notes

216en10

10

FIBRE TO FABRIC

You know that fibres are what fabrics are made of. Just look at the fabric of the dress you are wearing. It is made of the thread prepared from small fibres. Just pull out a thread from a piece of fabric and open it up by untwisting. You will see those small fibres. You do know that there are a large number of fibres available to us and from which a variety of fabrics are made. This is why in any cloth shop you find such a variety of fabrics on the shelves of cloth shops in the market.

In this lesson we want you to get all the knowledge and acquire skills needed to recognize the fabric you want to buy by associating it with its specific properties and assessing its suitability to specific uses. You are familiar with the variety of uses various fabrics have in our daily life. The study of fibres and fabrics gives us the complete knowledge of properties and uses of various fabrics available in the market. This knowledge will help us to choose wisely the fabric we require and make the best use of it after purchase.

OBJECTIVES

After studying this lesson, you will be able to :

- discuss the functions of clothing and other household uses of fabrics;
- explain that the basic unit of a fabric is fibre which can be obtained from many sources;
- state typical characteristics of different fabrics;
- identify fibres and fabrics on the basis of visual examination and non technical tests;
- elaborate the process of yarn making and fabric construction;
- differentiate fabrics made from different yarns and tell their end uses;
- select fabrics for personal and household use.

10.1 FUNCTION OF CLOTHING AND HOUSEHOLD USES OF FABRICS

Why do we wear clothes? Our clothes are rightly recognized as "the second skin." At every stage of life and in every ceremony, clothes play an important role. They cover our body and protect it from adverse climatic conditions.

Clothes enhance our personality. These are made from various kinds of materials and sewn in several forms called **dresses or garments.** A well-fitted dress, worn according to the occasion and time speaks a lot about the person's habits, taste, social status, behaviour and many other traits. Generally, men, women and children dress up differently and they also have sets of dresses for different purposes and occasions, for example, dresses for formal, casual occasions, sports and nightwear.

Colour of our clothing, in our country, is decided according to season, climate, age, occasion, marital status, gender, community, happiness and sorrow. The religion and occupation of a person can also be judged by the clothes a person wears. Lastly and most importantly, clothes also tell us about the habits of the wearer and his / her approach to hygiene. If the clothes are dirty and crushed we tend to think the person is careless, shabby and poor. Crisp, freshly washed and well ironed clothes lend a well groomed appearance to the wearer.

You have just learnt about the functions of clothes. Two examples are given below. List three more functions of clothes.

I	To look smart.
ii.	To show individuality.
iii	
iv	
v	

Other Uses of Fabrics

Think and write some of the other uses of fabrics in your house. Besides clothing, you are using fabrics in the house for bed linen, curtains, upholstery, cushion covers, etc. In the kitchen, you need dusters, mops, covers, etc. which are also produced from fibres. You use old cloth for dusting, wiping and covering, etc. So you see you have varied uses of fabrics in the house. Generally cotton fabric is suitable for most of the purposes. Once you learn about the properties of various fibres available, you will know why cotton is preferred to other fibres.

10.2 FIBRES AND THEIR SOURCES

We have talked about fibre as the basic unit of fabric. Do you know what a fibre looks like? To understand, this take a small amount of cotton and pull out the smallest part from it. Study carefully. These may be long or short strands with a smooth structure that looks like white hair. Actually, these are fibres. A single fibre of cotton is difficult to locate but can be easily recognized in a mass of cotton.

Now, consider the structure of wool fibres. You know these are hair of animals like sheep, goat, rabbit, camel etc. Sweaters, socks, gloves, scarves, shawls and coats etc., are made from these hair/fibres. You can check this by opening a thread pulled out from a pure woolen fabric, or knitting wool. What do you see?

Similarly, there are many other fibres available to us, which can be used to make cloth and we will learn about these in the next section. A fibre is a fine hair like strand and is the basic unit of textiles from which we make yarns and then the fabric.

ACTIVITY 10.1

Take out some of your garments, pull out a yarn from the inner side of each and try to take out fibres. Study the similarities and differences among fibres in respect to their length and feeling.

The actual widthwise and lengthwise structure of fibres cannot be seen with naked eyes but can be recognized easily under the high power microscope. Here is the longitudinal (lengthwise) shape of some of the common fibres as visible under the high power microscope. Fig. 10.1 shows the longitudinal view of some fibres.

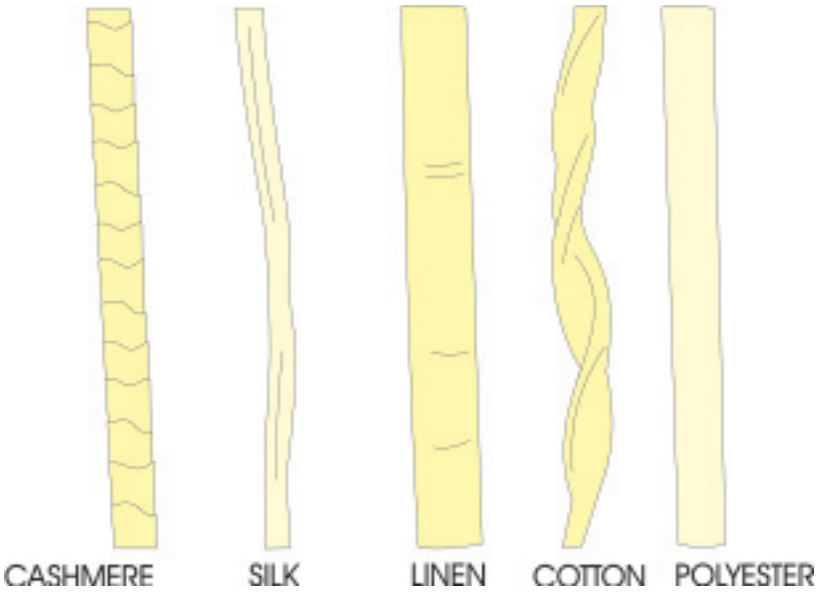


Fig. 10.1 The longitudinal view of cotton, wool, silk and polyester fibres.

10.2.1 Sources of Fibres and their Classification

There are many different sources from which we can obtain fibres and therefore, we classify them accordingly.

i) **Fibres from Natural Sources:** All the fibres obtained from nature, i.e., plants or animals, are known as **natural fibres**. e.g. cotton, wool, linen, silk, etc. Fibres obtained from plant source are called **cellulosic fibre** e.g., cotton and linen. The fibres that come from **animal sources** are also known as **protein fibres**, e.g., wool and silk.

Sources of commonly used natural fibres are shown below in Fig. 10.2.

		
Cotton pods and ball	Sheep	Silkworm
Cotton	**Wool**	**Silk**

Fig. 10.2: Sources of natural fibres – Cotton, Wool and Silk

ii) Man-Made fibres: The fibres which are made in laboratories using chemicals are known as man-made fibres and these are of following two types:

a) Regenerated fibres – These fibres are made from extremely small cotton fibres or any other fibre source such as wood pulp, milk protein, etc. Chemicals are used to dissolve these and the solution is then converted into solid fibres. Examples are rayon (cellulose out of viscose/acetate/triacetate) of different types, casein fibre (from milk) and soya bean fibre.

b) Synthetic fibres - These are made using various petrochemical products. Nylon, acrylic and polyester are all synthetic fibres.

It is advisable to use garments made of natural fibres which are eco-friendly in nature. Sometimes synthetic fibres may cause allergies if worn next to skin. Sources of commonly used natural and man made fibres are presented in Table 10.1.

Table 10.1 Commonly used natural and man-made fibres

Type of fibres	Name of fibre	Sources
NATURAL FIBRES		
Plants (cellulosic)	cotton	cotton ball
	linen	bark of flax stalk
Animal (protein)	wool	hair of sheep, goat, rabbit, llama etc.
	silk	silk worm
MAN-MADE FIBRES / MANUFACTURED		
Regenerated	rayon (viscose, acetate)	cotton linters or wood pulp + chemicals
Synthetic	nylon	chemicals
	polyester	chemicals
	acrylic	chemicals

10.2.2 Classification according to the Length of Fibres

The fibres we have listed above are short or long. The short length fibres are called **staple fibres** and are measured in inches or centimeters, e.g., cotton, wool and linen. The long fibres are known as **filaments** and are measured in yards / meters, e.g., silk and all man-made fibres.

	Length of fibre	Class	Appearance	Unit of measurement
FIBRE LENGTH	long	filament fibres		yards / meters
	short	staple fibres		inches/ centimeters

10.3 COMMON CHARACTERISTICS OF DIFFERENT FIBRES

i) **Cotton**: Cotton fibre is the smallest of all the textile fibres. They are white, cream or light brown in colour and fine and strong. These are absorbent, porous and cool and allow the body heat to go out. Hence, fabrics made out of it are used as summer wear as cotton wrinkles very easily. Fabrics made from cotton are strong, durable and easy to wash and are used to make towels, sheets, pillow covers, etc., that require frequent washing.

ii) **Flax**: It is a 'bast fibre' and fabric made from it is called linen. It is a staple fibre though its length (20-30 inches) is more than the other staple fibres available. Linen fabric is shiny, smooth, durable and easy to wash. Like cotton, it wrinkles very easily, is cool, absorbent and is suitable for summer wear.

iii) **Jute**: Like flax jute is also a bast fibre. Maximum production of jute is in India. The fibres are short and lusturous but weaker than flax. The fibres are hairy and generally rough. It is used for making gunny bags and cords.

Jute Garments

As jute is a rough fibre, so these days jute is mixed with other soft fibres for fabric construction. Also increasingly these days accessories like slippers and bags made out of Jute are in popular demand.

iv) **Wool**: It is obtained from the fleece of domestic goats, sheep, rabbits, etc. The colour of wool fibres may vary from off-white to light cream. Fabrics made from wool are soft, smooth, absorbent and do not wrinkle easily. These do not allow the body heat to go out and act as insulators. This is why the fabric made out of these fibres is used as winter wear. Wool is a weak fibre and is easily affected by common washing soaps, powders and friction.

v) **Silk**: Silk is a natural, protein filament produced by silk worm. Fabrics made from silk are soft, fine, smooth, lustrous, warm and stronger than wool. It is called 'Queen of the Fibres' and is used for formal wear.

vi) **Rayon:** It is a man-made filament fibre which is lusturous, smooth, cool and absorbent but is weak in nature. It wrinkles very easily. Because of its close resemblance to silk, rayon is also called 'artificial silk' or 'art silk.' It is used as a summer wear. These fibres are **thermoplastic** in nature i.e., they are heat sensitive and soften and melt on application of heat.

vii) **Synthetic fibres**: Synthetic fibres are made from petroleum products. Nylon, polyester, acrylic, etc., are the examples of synthetic fibres. Like rayon these are also thermoplastic fibres. Since these fibres catch fire easily and can stick to the body, they should not be worn while working in kitchen and near a flame. Synthetics do not wrinkle and can be made dull or shiny. They have good strength and are easy to wash and dry quickly. In other words, these fabrics are easy to care and maintain.

INTEXT QUESTIONS 10.1

1. Match column A with column B and fill in the given blanks-

A		B	
_____	i) Jute	a)	Plant fibres
_____	ii) Cotton	b)	Man-made fibres

_____	iii) Wool	c)	Bast fibre
_____	iv) Rayon	d)	Regenerated fibre
_____	v) Silk	e)	Natural fibre
_____	vi) Nylon	f)	Animal fibre
_____	vii) Cellulosic fibres	g)	Silkworm
		h)	Flax

10.4 IDENTIFICATION OF FIBRE THROUGH NON–TECHNICAL TEST

10.4.1 Identification of fibres by visual test and feel of the fabric

By now, you know the names and some basic properties of fibres obtained from different sources. On the basis of this knowledge can you identify the fabric you are buying? Yes, to some extent you can. If you remember the characteristics of a fibre then you will also know the properties of the fabric made out of it because the fabric will have the same properties. Look for these properties in the fabric and add to this your personal experiences like touch, feel and visual inspection of the fabric. Chances are that you will be able to name the fabric.

In the following Table 10.2 we are presenting to you some of the typical characteristics of different fabrics. If you examine visually, these will help you to recognize the fabric/ fibres.

Table 10.2: Characteristics of Different Fabrics which help Identification

Fibres	*Appearance*	*Touch*	*Feel*	*Care required*
Cotton	dull in appearance but lustrous when starched	feels smooth and soft to touch	gives a cool feeling	wrinkles easily more if it is starched
Linen	low to medium luster	soft and smooth texture	gives a warm feeling	wrinkles easily
Jute	dull	Rough and hairy texture	gives a warm and rough feeling	does not wrinkle easily
Wool	medium to low luster; poor quality has no luster	soft, smooth and absorbent; also bulky to look at.	warm to touch	does not wrinkle easily

Silk	delicate looking and lustrous	smooth, soft and light	warm to touch	does not wrinkle easily
Rayon	can be lustrous or without it	soft and shiny but heavier than silk	gives cool feeling	wrinkles easily
Synthetic fibres	can be dull or semi dull or lustrous acrylic fibres look like wool	heat sensitive soften and melt on application of heat	most fabrics feel warm	able to withstand friction and do not wrinkle hence easy to care.

To test the information given in table 10.2, select various items of clothing you are using and observe the nature of the fibre in terms of appearance, touch and feel.

10.4.2 Identification of fibres using Burning Test

Burning test tells us about the composition of fibres. i.e., whether the fibres of a fabric are from a plant / animal source or are man-made. Follow the steps mentioned below to conduct the burning test:

Take out a few strands of fibres from a yarn or a fabric and then burn them with the help of a candle flame or a match stick. Observe the following points and record your observations :

- The behaviour of the fibres **on approaching the flame, in the flame, on burning, and the residue left after burning.** Since different types of fibres have specific burning pattern, one can recognize them accordingly.

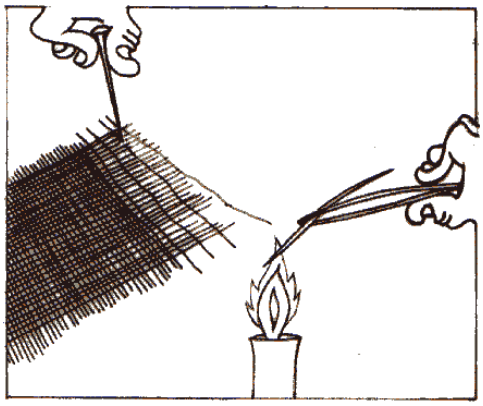


Fig. 10.3 Burning Test

Table 10.3 Describes the Burning tests for identification of fibres

Fibre	*Near flame*	*Type of burning / flame*	*Odour of burning*	*Residue*
cellulosic fibres – cotton, linen, jute, rayon, etc.	catches fire easily	continue to burn with a bright flame; have an afterglow	burning paper like smell	light, feathery, grayish /black smooth ash
protein fibres – wool, silk	smolder and burn	slow flickering flame; sizzle and curl	Burning hair or feathers like smell	silk-crisp dark ash; wool- dark, irregular, crushable bead

synthetic fibres –nylon, polyester, acrylic, etc.	shrink on approaching flame	soften, melt and burn	mixed smell of chemicals	hard, black uncrushable bead

Limitations of the burning test - The result of the burning can be confusing if the fabric is made by mixing two or more types of fibres or yarns.

ACTIVITY 10.2

Identify yarns made from different fibres by breaking test – Collect samples of fabrics made from different fibres. Take out yarns from each of these and keep each one separately. One by one, hold each yarn in both the hands and break it. You will observe the following:

1. cotton - breaks easily, has brush like tips and slightly curled fibres.
2. flex - stronger then cotton, needs more strength to break.
3. jute - yarn breaks easily.
4. wool - yarn stretches and breaks with a brush like tip.
6. silk - yarn breaks with a jerk.
7. rayon - yarn breaks easily and does not have brush like tip.
8. synthetics - yarn stretches and does not break easily.

INTEXT QUESTION 10.2

1. One evening, Geet was busy cooking dinner and her father was in the garden. Suddenly, Geet saw her *dupatta* had caught fire. She shouted loudly and ran out of the kitchen. Her father saw flames and rushed towards her with a cotton sheet. He quickly wrapped it around Geet to put off the flames.

   He immediately took her to hospital. Doctor said Geet had received burns because the *dupatta*, made from polyester, had melted and stuck to her skin. Her father had received only a few scalds while wrapping Geet with cotton sheet and putting off the flames. Since he was wearing cotton *kurta, pyajama* he was saved.

   The doctor appreciated her father's presence of mind in wrapping a sheet that helped in extinguishing the fire immediately. Fortunately the burns were not very severe and Geet recovered soon.

Notes

Answer the following questions:

i) Why did the *dupatta* catch fire?

ii) Why did the *dupatta* get stuck to the body after catching fire?

iii) Why was Geet's father relatively safe from burns?

iv) What type of fabric should you prefer to wear while working in the kitchen?

v) List three other fabrics which can be worn while working near fire.

vi) People know that synthetic fabrics catch fire easily yet most of them wear these clothes while working in the kitchen. Convince them in about 30 words about merits of changing into cotton clothes before working in the kitchen.

2. Fill in the blanks -

i) If wool: winter, then _____ : summer

ii) If bark: flax, then _____: wool

iii) If cotton: king of fibres, then silk : _____

iv) If regenerated fibres : wood pulp, then synthetic fibres: _____

v) If linen: cotton, then acrylic : _____

3. Put a tick mark on the right option. Justify the chosen option.

True/False a) Cotton is a filament fibre.

_____

True/False b) Length of staple fibres is measured in inches.

_____

True/False c) Acetate is a man made fibre.

_____

True/False d) Natural fibres can be made from chemicals.

_____

True/False e) Wool is a plant fibre.

_____

4. Search names of fibres in Wonder box. Hints are given below.

a. I am soft and look like silk.

b. I become lustrous by starching.

c. I look like wool.

d. I am smooth and lustrous.

e. I am rough to touch.

f. I give warmth in winters.

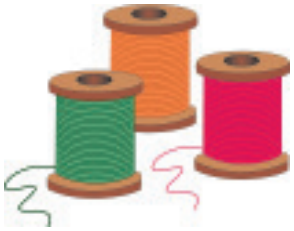
g. I am easily washable.

h. I wrinkle easily.

WONDER BOX

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

10.5 YARNS, YARN MAKING AND FABRIC CONSTRUCTION



A **yarn** is a long continuous length of interlocked fibres. Strands of fibres are brought closer to each other by twisting. Twists impart strength to the fibre strand which is then termed as a yarn. It is suitable for the production of fabrics, thread for sewing, crocheting, knitting, embroidery and/or rope making. A **thread** is a highly twisted and smooth strand of fibre. It is used for sewing, embroidery, etc.

10.5.1 Process of yarn making

a) Spinning of yarns

Do you know how a yarn is made? Yes, you guessed it right, a yarn is spun. Spinning is the process by which a group of fibres is pulled, drawn and twisted together to make a yarn. Do you remember Mahatma Gandhi and his *charkha* or the spinning wheel? Mahatma Gandhi, would daily take a hand full of cotton and spin it into a yarn on his *charkha*. He promoted *charkha* during India's freedom struggle as a symbol of self-reliance and a source of income.

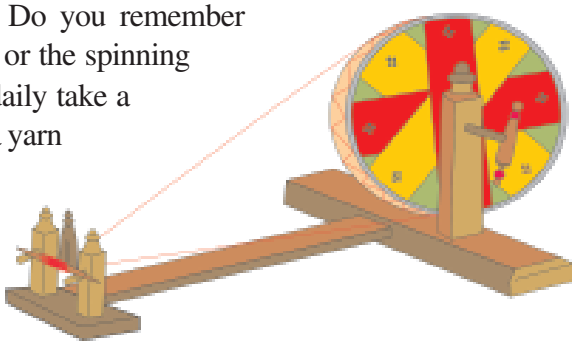


Fig. 10.4: A traditional spinning wheel *(charkha)*

A *charkha* is for hand spinning. The yarn spun on a *charkha* can have different thickness. Thick yarn is used for floor coverings, medium thickness for upholstery items and fine quality yarn is used for making dress material. Different types of fibres - cotton, wool, hemp and silk are spun on *charkha* in the villages in many states of India.

Twists given to fibre strands for formation of a yarn can be either **'S-twist'** (clockwise) or **'Z-twist'** (anticlockwise). The quality and strength of yarn is affected by the number of twists in inch. Lesser the number of twists per inch, bulkier and less strong is the yarn and more the number of twists, finer and stronger is the yarn. Figure 10.5 shows S and Z twists and Figure 10.6 shows number of turns in a yarn.

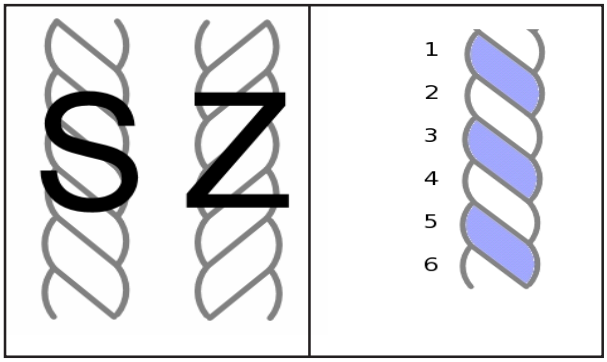


Fig. 10.5 S and Z twists

Fig. 10.6 Number of turns in a yarn

b) Spinning by Machine

Both, the fibres as well as filaments are spun into yarns that are then used for different end uses. Fibres available in the filament form are first cut into short lengths and then made into yarns called spun yarns. Various steps followed for making yarns are :

i) **Cleaning:** When the natural fibres are harvested or collected, these contain dry leaves, stems, seeds, dirt and unwanted materials that are removed during cleaning.

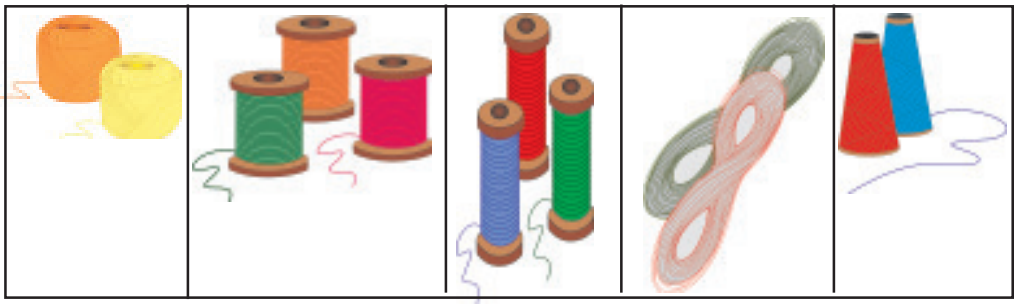
ii) **Carding:** The fibres sometimes get matted and stick to each other. Carding machine opens and arranges the fibres in a parallel manner. The carded web of fibres is turned into a soft rope called **sliver**.

iii) **Combing:** It is an optional step used for making fine quality yarn. Carded slivers are combed to separate long and short fibres with the help of series of combs.

Cleaning, carding and combing steps are omitted while making spun yarns from cut filaments of synthetic fibres. For these synthetic fibres only spinning and winding is done.

iv) **Spinning:** Carded and combed slivers are further drawn and spun into yarns. The yarn is a single strand but may be plied into several strands:

v) **Winding:** The yarn is wound into various packages according to the weight or length of the yarn and its end use. Some of the common yarn packages for fabric construction are- ball (yarns for hand knitting), reels or bobbins for sewing; embroidery and hanks, cones, etc. Figure 10.4 shows some packages of yarns.



balls | reels of sewing thread | reels of embroidery thread | yarn hanks | cone

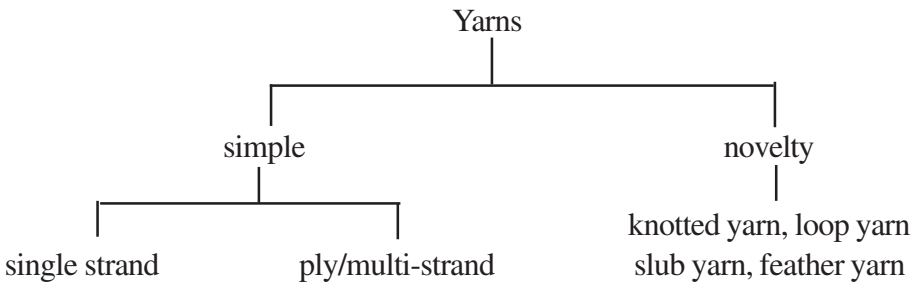
Fig. 10.7: Packaging of yarn in balls, reels, hank and cone

After spinning, a specific length of yarn is wound in the form of packages called balls, reels, hanks, cones, etc., depending on the weight or length of yarn and its end use.

ACTIVITY 10.3

Collect some sewing thread reels and knitting yarn balls lying at home. Check the length of the yarn printed on sewing thread reel. You can also collect reels and balls of yarn of different lengths and weights. Are some reels available with 50, 100 and 200 meters thread? You may observe that knitting yarn balls are available with the weight of 25 and 50 grams.

10.5.2 Classification of Yarns



The yarns may be classified into two groups: i) simple yarns and ii) novelty yarns

i) **Simple yarns:** A simple yarn has uniform thickness, smooth surface and equal number of twists per inch along its length. Most standard fabrics for clothing and household use are made with these yarns.

- **Single strand:** fine quality single strand is used for constructing light weight and fine fabrics. Thick and rough quality single strand is used for making thick fabrics

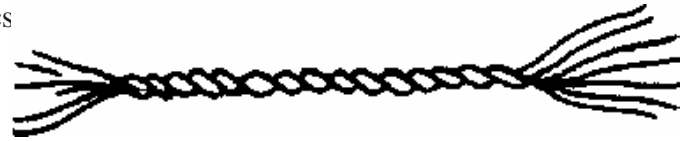


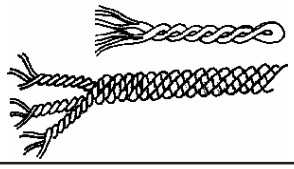
Fig – 10. 8 Simple single yarn

- **Ply yarn:** Two or more than two simple yarns are twisted together to form a ply yarn. These yarns are also known as multiple strand yarns. These can be termed as two-ply, three ply, and so on according to the number of strands used in the construction. These are more durable than simple yarns and are used for making fabrics for suiting, knitting, floor coverings, etc.

ACTIVITY 10.4

Lets make ply yarns

Follow the steps described below. Paste sample of ply yarns in the space provided.

Pictures of ply yarn	Method	Sample of ply yarn
Fig – 10.9 Double or Two ply yarn 	**Two ply** or double ply yarn can be made by knotting two separate single yarns at both the ends or one long single strand plied by holding both ends together.	
Fig – 10.10 Three ply yarn 	**Three ply** can be produced by twisting a long single strand yarn. Fold it twice to get three parallel strands. Twist these together and put small knots at both the ends.	
Fig – 10.11: Four ply yarn 	**Four ply** are also known as cable yarns. These are usually made by plying two strands of two-ply yarns together.	
Fig –10.12 Cord yarn 	**Cord yarn** is a multiple strand yarn. Take 3/4/5 ply yarns and twist together and knot both the ends to get cord yarn. These are generally used for making ropes.	

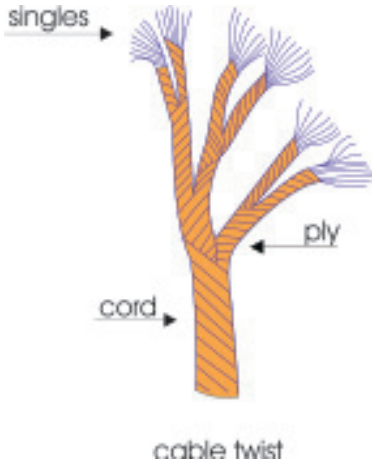
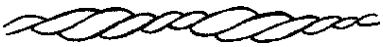


Fig –10.13 Types of yarns

ii) **Novelty yarns:** Carefully observe the curtains, upholstery (sofa) material or sweaters. Take out the yarns from these and study the construction of an individual yarn. You will see that these are of a complex nature and have unusual appearance and texture which are produced during spinning.

Depending upon their appearance, these are given different names like: loop yarn, knot yarn, slub yarn, feather yarn, etc. different types of novelty yarns are shown in figure 10.4 – 10.7

Types of Novelty Yarns

Yarn	Diagram
Loop yarn has loops, placed continuously along its length. Example- woolens	**Fig. 10.14** 
Knots/knops are made along the length of a yarn. Example- woolen and scarves	**Fig. 10.15** 
Slub yarns have ornamental effects in the form of soft untwisted (thick and thin) and twisted areas at frequent intervals throughout the length. Example- curtains	**Fig.10.16** 
Feather yarn also called chenille yarns, these have soft and fuzzy surface. Example- rugs	**Fig.10.17** 

Fabrics made from novelty yarns are bulkier, softer to touch and have beautiful unusual textures but are not as durable as fabrics made from simple yarns.

INTEXT QUESTION 10.3

1. State whether the following statements are true or false. Encircle the right answer.

   True / Flase i) Silk yarn breaks easily.

   True / Flase ii) Bulky yarns need less number of twists in one inch length.

   True / Flase iii) Slub yarns have thick and thin places.

   True / Flase iv) Cord yarn is made from single yarn.

2. Fill in the blanks with appropriate words. Choose the words from the box given along.

   i) A simple yarn has uniform _____in per inch length.

   ii) Cord yarn is a _____.

   iii) Flex is stronger than _____ .

   iv) Synthetic yarns stretch and _____.

cotton
multiple strand yarn
fibres
do not break easily
thickness
synthetic

10.6 FABRIC

Fabric is a pliable, strong sheet made from fibres or yarns. You must have heard names such as poplin, *khadder*, *mulmul*, denim, rubia, terricot, etc. All these are fabrics are prepared by weaving the yarn. Human beings learnt to weave by taking inspiration from nature by observing the nests of birds and entangled branches of trees.

Fabrics are manufactured by many techniques such as weaving, knitting, felting, nets, etc. However, **weaving and knitting, the two most popular methods of fabric construction** have been discussed in detail here.

10.6.1 Weaving

Weaving is interlacing of two sets of yarns –warp and weft at 90° angles to each other. Straight yarns in fabric are known as **warp** yarns. Horizontal yarns are known as **weft** yarns. Along the length of the woven fabric, on both sides, end yarns are woven very densely and the portion is named as **selvedge**. It does not allow the fabric yarns to come out from the lengthwise edge. The portion between the two selvedges is the body of the fabric.

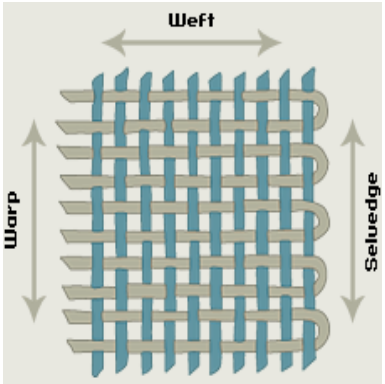


Fig. 10.18 Woven fabric

Merits of weaving

– Weaving gives a firm fabric.

– Woven fabrics do not stretch and are thus easy to handle.

– Woven fabrics are easy to print and embroider.

– Weaving is most commonly used method of fabric construction.

10.6.1 i) Basic Weaves

Weaves are broadly classified as **basic and novelty weaves.** Most of fabrics are produced in **basic weaves**, which are of three types- **plain, twill and satin weave.** Their construction is explained in figure 10.19

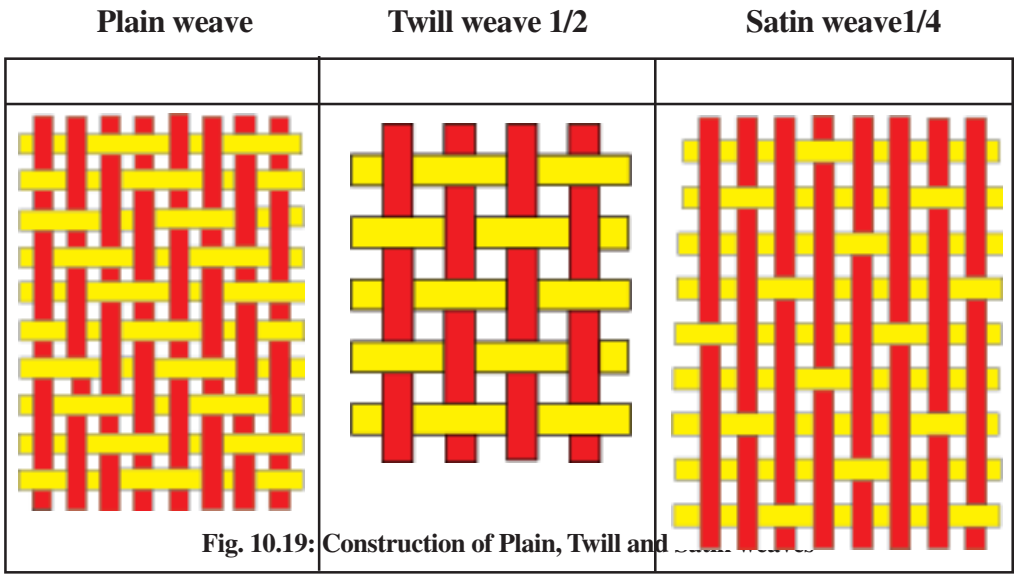


Fig. 10.19: Construction of Plain, Twill and

a) Plain weave - Plain weave is also known as homespun, tabby or taffeta weave. It is the easiest to weave where one weft yarn alternatively moves over one and under another warp yarn. Maximum production of fabric is done in plain weave. It is inexpensive weave, most suitable for printing and embroideries. To see the variations of the weave, note the fabrics like muslin, cambric, hand spun and hand woven khaddar, organdy, poplin, voile, etc.

b) **Twill weave -** It is woven on three to four harness loom. In this, one weft yarn moves over two and under one warp yarn. Twill woven fabric is distinguished by a continuous diagonal line called wale. Variation in diagonal lines produces various designs of twill. Twill weave is woven tightly, that is why it is suitable for work clothes and for men's clothes. Examples of Twill woven fabrics are gabardine, tweed, denim, jean, etc.

c) Satin weave - It is woven on five to twelve harness loom. If woven on a five harness loom, one weft yarn passes under 4 warp yarns and goes over one warp

yarn. It differs from Twill weave as it has long yarns floating on the surface. There is no design visible on the face of the fabric but it has a smooth and shiny surface. Satin fabric is an example of satin weave. Fabrics woven in this weave are suitable for making formal wear garments.

Handlooms are the second largest employer of the rural population in India, next only to agriculture. Handloom fabrics are made from either hand spun or mill spun yarn that has been woven on a handloom. In India, do you know *khadi* is a term given to a fabric which is made from hand spun yarn and is woven on a handloom. *Khadi* has a coarse texture and rough feel. However, many varieties of *khadi* like *khadi* cotton, *khadi* wool, khadi silk, heavy and light weight *khadi* are available on retail outlets of *khadi*. These fabrics always remain in fashion with consumers and have a large export market. *Khadi* movement in India was started by Mahatma Gandhi during the freedom struggle primarily as a symbol of self-reliance and a means of livelihood for the unemployed rural population.

ACTIVITY 10.4

Interview the weavers in your area to know how do they weave and what do they weave? What type of yarns do they use? What is their average daily/monthly income? Where do they sell their products? Are they able to sell their products easily?

OR

Visit a tailor in your area and ask which type of fabrics does he or she stitch most often? Which fabric is easy to handle while stitching and why? How does he or she decide on the type of needle and thread to be used for stitching? How does he decide on the cost of stitching a garment (salwar kurta/blouse/shirt/trousers)?

10.6.2 Knitting

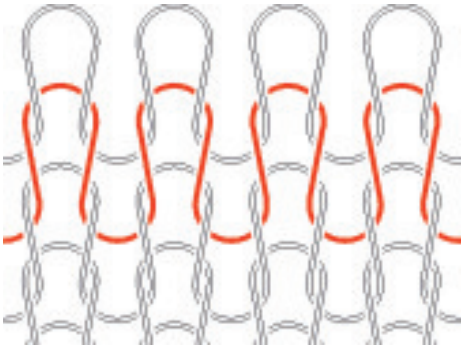


Fig.10.20 Formation of loops

Knitting is the process of formation of loops of yarns and drawing of new loops through those formed previously (interlooping). Depending on the types of knitting, it either moves right to left or left to right (weft knitting) or the yarns run lengthwise (warp knitting). Hand knitting is the most common example of weft knitting, though it is also done on machines to make many types of sweaters, T-shirts, and socks, etc. Warp knitting is only possible on machines. Knitted fabrics are

Fig. 10.21 Knitted fabric

used to make casual wear, party wear, sportswear, undergarments as well as household articles such as bed sheets, bed covers, blankets, etc. See figure 10.20 which shows the formation of loops while knitting. Figure 10.21 shows a knitted fabric.

Knitted fabrics are well known for their fit, comfort, stretchability, warmth, absorbency, and wrinkle resistance.

INTEXT QUESTIONS 10.4

1. Fill in the blanks with appropriate words.
   1. Hand knitting is known as _____ (warp knitting / weft knitting)
   2. *Khadi* Movement in India was started by _____ (Mahatma Gandhi / Jawaharlal Nehru)
   3. Selvedge refers to _____ (width / length of fabric)
   4. Woven fabrics _____ (stretch / do not stretch)
2. Unscramble the following jumbled words to identify the names of some fabrics–
   i) _____ niemd
   ii) _____ bargadine
   iii) _____ ydnaorg
   iv) _____ twelo

10.7 END USES OF DIFFERENT FABRICS

When you go to a shop, you give specification of the fabric you want, to the salesperson. Often you go to different shops to buy fabric or ready made garments. In other words, shops usually specialize in the type of items they sell. This way it is easy for you to find what you want and the shop can also stock good variety of related products.

Since you have already studied about the properties of various types of fibres, yarns, fabrics and weaves, it will be easy for you to use this knowledge to recognize fabrics and choose them for the end use in your mind.

Cotton fabrics are available in the form of muslin, khadi, poplin, rubia, organdy lawn and denim. Similarly, wool is available in the form of felt, knits and woven fabric silk fabric is available as raw silk, crepe and satin silk.

INTEXT QUESTIONS 10.5

Choose the correct answer of the four given at the end of each statement

1. 1. Muslin is a fabric which is _____.

   (a) light weight and loosely woven

   (b) transparent and crisp

   (c) heavy weight and thick

   (d) medium weight and plain

2. Denim is a fabric which is _____.

   (a) light weight and loosely woven

   (b) transparent and crisp

   (c) heavy weight and thick

   (d) medium weight and plain

3. Organdy is a fabric which is _____.

   (a) light weight and loosely woven

   (b) transparent and crisp

   (c) heavy weight and thick

   (d) medium weight and plain

4. Poplin is a fabric which is _____.

   (a) light weight and loosely woven

   (b) transparent and crisp

   (c) heavy weight and thick

   (d) medium weight and plain

WHAT YOU HAVE LEARNT

- Clothes → Their functions and importance
- Fibre → Yarn → Fabric
- Textile Fibres

Classification of fibres

– On the basis of origin → Natural fibres – Cotton, Wool, Silk
→ Man-made fibres-Nylon, Polyester

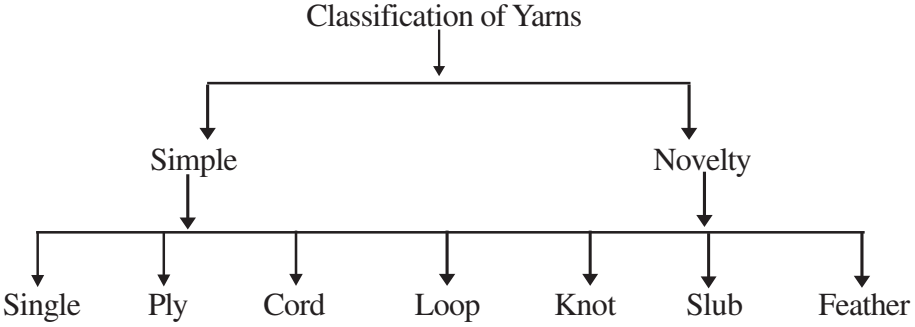
– On the basis of fibre length → Staple – Cotton, Wool
→ Filament – Silk, Man-made

– Identification of fibres → Visual inspection and touch
→ Burning Test

- Yarns

– Process of spinning → Cleaning, Carding, Combing, Spinning, Winding

Classification of Yarns



- Fabric

Weaving	Basic weaves – Plain, Twill and Satin
Knitting	Warp and Weft knitting

- End uses of different fabrics

TERMINAL EXERCISE

1. Give one difference between the following-

   i) Coarse and fine yarn

   ii) S and Z twist

   iii) Four ply and cord yarn

   iv) Spun and filament yarns

2. Why do Nylon, Polyester and Acrylic catch fire easily?

3. Read the case study given below and answer the questions given at the end:

Ginni was extremely unhappy because a red rash was spreading all over her body and was very painful. She had tried many local applications to get rid of them, but nothing helped. The rash was causing irritation and made her feel uncomfortable.

She discussed her problem with her friend Shyama who suggested her to consult a doctor in the village dispensary. In the dispensary the doctor looked at her skin problem and noticed the fabric of her dress. She asked Ginny if she wore the same dress often. Ginni said yes because she liked the dress very much. It was a fashionable dress, easy to wear, carry and maintain.

The doctor advised Ginni not to wear the dress again for sometime. In warm climate it did not allow the skin to breathe fresh air, caused sweating which led the skin to become irritable and cause the red rash.

But Ginny was not convinced. She thought, everybody wore dresses made from similar material and had no complaints. If nobody else had any problem in wearing such clothes why she should have any. Surely she thought that her problem could not be due to the clothes she wore. So she did not stop wearing her favourite dress.

Some questions to ponder (if possible discuss with peer group or with people at home)

If you were Ginni's friend what would you advise her to do? How would you convince her?

ANSWER TO INTEXT QUESTIONS

10.1 1. i) c ii) a iii) f iv) d

v) g vi) b vii) e.

10.2 2. i) Cotton ii) Fleece iii) Queen of fibres iv) Petroleum products v) Wool.

3. a) False – Cotton is a staple fibre

b) True

c) False – Acetate is a Regenerated fibre

d) False – wool is a protein fibre

e) True.

3. Wonder box -

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

(a) RAYON
(b) COTTON
(c) ACRYLIC
(d) SILK
(e) JUTE
(f) WOOL
(g) NYLON
(h) LINEN

10.3

1. i) False - Silk yarn breaks with a jerk.

ii) True

iii) True

iv) False - Cord yarn is made from 3/4/5 ply yarns. It is multiple strand yarn.

2. i) Thickness ii) Multiple strand yarn
iii) Cotton iv) Do not break easily.

10.4

1. i) Weft knitting ii) Mahatma Gandhi
iii) length of fabric vi) do not stretch
2. i) Denim ii) Gabardine
iii) Organdy iv) Towel

10.5

1. a 2. c 3.b 4. d