



## 24

## FABRIC CONSTRUCTION

When you see the clothes you wear or fabric you use for curtains or bedsheet, have you noticed something different in them? Some fabrics are thick, others are thin, some are plain, others have self-design and some are stiff and others limp. If you examine your clothes, you will find that your inner clothes or underwear are very different from outer clothes. These differences in fabrics are because of their construction. You have already learnt in the previous lessons that the fibers and yarns affect the properties, appearance, and wearability of the fabric. Similarly, fabric construction methods also influence the appearance, properties and performance of the fabric. In this lesson you will learn about this aspect of fabrics.



### OBJECTIVE

After reading this lesson you will be able to:

- describe briefly the methods of fabric construction;
- explain the process of weaving and knitting;
- describe types of basic weaves;
- distinguish between woven and knitted fabrics.

### 24.1 WHAT IS A FABRIC?

In the earlier lesson you have learnt about fibres and yarns but still when you are asked about the meaning of textiles you think of fabrics, clothes or garments. Actually, in order to use the fibers and yarns for apparel and household textiles and other end uses, there is a need to convert them into a fabric.

**Fabric is any piece of cloth**

What do you see when you go to the market? The shops are full of different types of fabrics. Let us now see how a fabric is made or constructed.



Notes

**How is fabric constructed?**

Fabrics can be made or constructed by using a number of techniques as given below:

- i) Weaving
- ii) Knitting
- iii) Non-woven
- iv) Braided
- v) Nets
- vi) Laces

Now, let us enumerate some of the important features of these techniques.

**i) Weaving :** Weaving is the most commonly used method of fabric construction. You must have seen a chatai being made. Weaving is similar to it, where two sets of yarns are interlaced with one another at right angles. Weaving gives a firm fabric. Have you heard of fabrics like poplin, denim and cambric? Yes, these are available in all the cloth shops and you must have used them to make your garments.

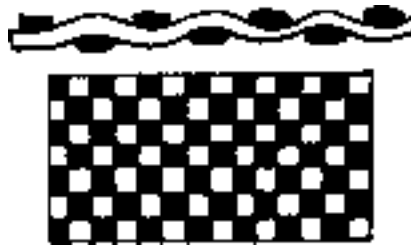


Fig. 24.1: Weaving

**ii) Knitting :** When you knit a sweater, there is normally one ball of yarn which is interlooped to get a fabric. This technique is called knitting and it gives a lot of stretch and easy-care properties to fabric. Knits are mainly used for hosiery. Knit fabrics are specially useful for garments like underwear, T-shirts, socks etc.

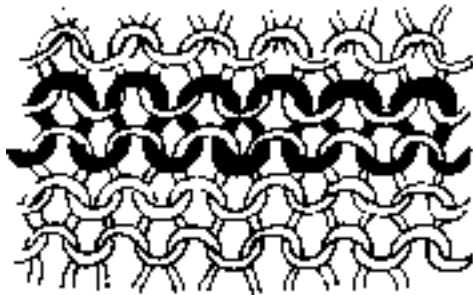


Fig. 24.2: Knitting

**iii) Non-Woven:** These fabrics are made directly from fibers without weaving or knitting. Fibers are held together by mechanical forces, gum or heat.

Namada is a traditional Kashmiri piece of a non-woven type of fabric.

**iv) Braided Fabrics:** Braided fabrics are created in a fashion similar to braiding of hair. These fabrics are mainly used to make trimmings and shoe laces.

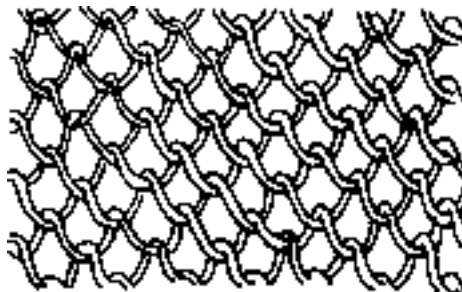


Fig. 24.3: Braided Fabric



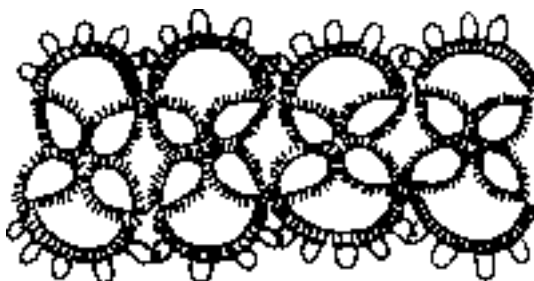
**Notes**

- v) **Nets:** They are open-mesh fabrics with geometrical shapes. These yarns may be knotted at the point of intersection. You notice it being used very commonly for mosquito nets.



**Fig. 24.4: Net**

- vi) **Laces:** Yarns are criss-crossed to create intricate designs. Yarns may be interlooped, interlaced or knotted to give open-mesh structure. Beautiful decorative designs can be created through lace making. Laces are very important trimmings that are used to decorate a garment.



**Fig. 24.5: Lace**



**Activity: 24.1** Collect one sample each of woven knitted, non-woven, braided, net and lace fabrics. A trip to your neighbourhood tailor will be very helpful in collecting these samples. Stick these samples in your record book and note down the observations as per the example. This exercise will enable you to choose the appropriate fabric for a specific use.

S.No	Sample	Name	Commonly used for making the following articles.
1.		Net	mosquite net, frock, lehngas, dupattas etc



## INTEXT QUESTIONS 24.1

Q1. Identify the following methods of fabric construction:

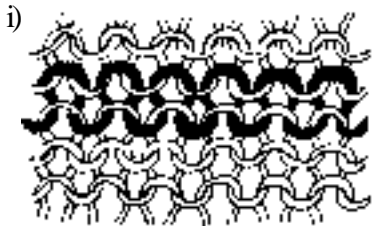


Fig. 24.6



Fig. 24.7



Fig. 24.8

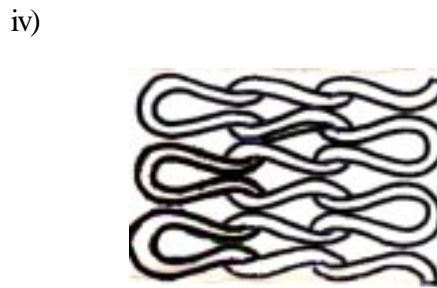


Fig. 24.9

## 24.2 WHAT IS WEAVING?

In weaving two sets of yarns are interlaced at right angle to one another in an established sequence.

Have you ever seen a 'charpai' being made? On the frame, first one rope is taken and interlooped on two parallel edges and after that a second rope is interlaced perpendicular to it going once over the rope and once under it. This kind of an interlacement gives an even check effect and the weave is quite firm.

The weaving of a fabric is also done in a similar way, except for the fact that yarns are used for interlacing and a loom is used to hold the thread instead of a frame. There are some terms which are frequently used, you see them on the table also.

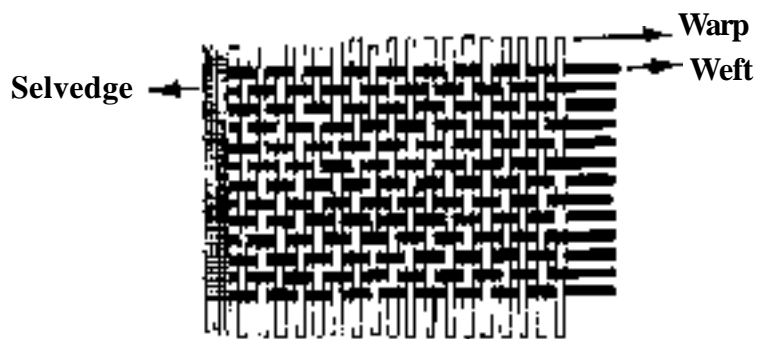
**Selvedge:** When you examine a fabric, you see two long finished edges, one on each side along the length of the fabric. These edges are called selvedge and give strength to the edges which is important in further processing of the fabric.



Notes



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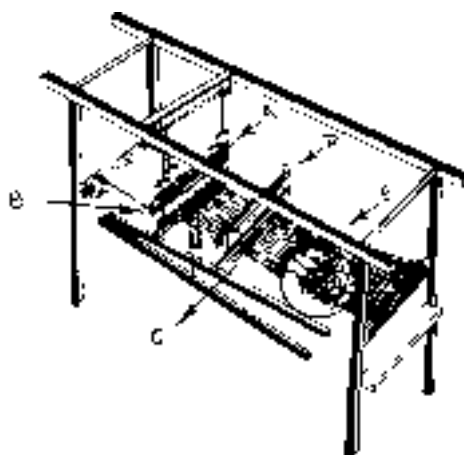


**Fig. 24.10** Common terms in textiles

**Warp:** They are the yarns along the length of the fabrics or parallel to the selvedge. They are also called ends.

**Weft:** When you see a woven fabric, besides warps, another set of yarns move perpendicular to warps. They are called wefts. They are interlaced with warps in a crosswise direction to make a fabric. They are also called picks or fillings.

**Thread Count:** You must have noticed that some woven fabrics look dense and compact whereas others open. This difference is due to the thread count which refers to the total number of warps and wefts per square inch of a woven fabric. Thread count tells us about the fabric quality and durability. Fabric with a higher thread count is better than fabric with lower thread count. Also, for good quality fabric, warps and wefts should be more or less equal in number.



**Fig. 24.11:** Loom showing different parts A – harness B – warp C – shuttle D – reed E – thread count

**24.2.1 Process of Weaving**

The weaving operation can be compared to ‘chatai’ making. When a chatai is made, some ropes are held parallel to one another on a frame. The chatai maker lifts some strands with his fingers and passes another rope perpendicular to it and pushes it down with a blunt knife to make a compact chatai.

**Notes**

In weaving also, a similar process is carried out on a loom. Warp yarns are laid parallel and very close to each other. Then, with hands or some other device some warps are lifted and others remain as such and the weft on a shuttle is then passed through them to complete the interlacement. For example alternate warps could be lifted to get a plain weave fabric. To make the weave compact, the wefts are beaten with a comb like device called reed.

In handloom these activities are done manually. But now-a-days power looms are being used to do weaving at a fast rate.

### 24.2.2 Types of Weaves

You must have seen that the clothes that you wear have different woven designs. Designs can be due to -

- use of different types of yarns like simple, ply, complex and textured.
  - use of different ways of interlacement of warp and weft yarns
1. **Plain Weave:** - It is the simplest weave and therefore inexpensive to produce. Many fabrics that you commonly wear like mulmul dupattas, organdy and chiffon sarees are all plain weave. Each and every weft yarn goes alternately under and over the warp yarns across the width of the fabric. If the yarns are close together, the plain weave has a high thread count and the fabric will be firm and will wear well.



**Fig. 24.12 Plain Weave**

Plain weave is of two types-

#### **Rib Weave**

Rib or line effect is created by using thin yarns with thick yarns or single yarns with doubled yarns in any one direction of the fabric.

#### **Basket Weave**

Two or more weft yarns are interlaced as a unit with corresponding number of warp yarns to give a basket like effect. Mattee fabric commonly used for cross stitch embroidery is an example of such a weave.



Notes



Fig. 24.13 Basket Weave

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

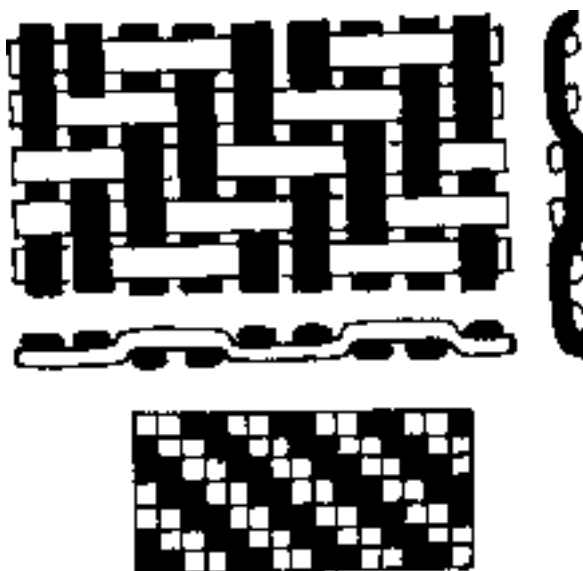


Fig. 24.14 Twill Weave

3. **Satin Weave** - This basic weave has a beautiful shiny surface because of long floats on the surface of the fabric. In the satin weave warp yarns float over several weft yarns before interlacing with a weft yarn and so on. However, the long floats snag easily therefore satin weave is not as strong as plain or twill weave.

Besides the basic weave you must have seen the fancy, decorative design weaves like the booti design woven in the fabric. Corduroy has raised parallel vertical lines. A towel has loops covering its both sides. All these fabrics are made using special looms and weaving techniques. They are obviously expensive fabrics.



Notes



Fig. 24.15 Satin Weave



**Activity : 24.2** Collect samples of different type of woven fabrics. Stick them in your Record Book. Observe these samples carefully, identify their weaves and note down in your record book.

Sl.No.	Sample	Weave
1.		
2.		



**INTEXT QUESTIONS 24.2**

- Give one word for the following sets of words:-
  - Interlacing of two sets of yarns at right angle \_\_\_\_\_.
  - Only one set of yarns is interlooped to get a fabric \_\_\_\_\_.
  - Total number of yarn per square inch of fabric \_\_\_\_\_.
  - Weave that has long floats on the surface which give it a shine \_\_\_\_\_.
- Label the diagram given above.



Fig. 24.16





**Notes**

3. Give single word for the sentence in bold.

Read the lesson carefully to find these words.

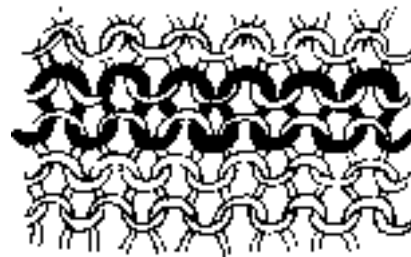
- a) **Open mesh fabrics with large geometrical shapes** was used to make Munni’s frock.  
.....
- b) We bought a fabric which was made **using two sets of yarn** in green colour.  
.....
- c) Why don’t you attach **criss cross yarn making intricate design** on your shirt?  
.....
- d) He bought a trousers having **dominant diagonal lines** in it.  
.....
- e) She made a cross stitch wall hanging on a fabric with **two or more weft yarns interlaced as a unit with corresponding number of warp yarns.**  
.....

**24.3 KNITTING**

Knitting is making of cloth with the help of needles to create a series of interlocking loops with a single yarn.

You already know that there is only one ball of knitting yarn and with the help of two needles, loops are made and when one row of loops are made, the next row is formed by interlooping with the previous loops.

This fabric making method gives us a very comfortable and stretchable fabric which does not wrinkle. Due to its elasticity, it can fit various sizes. Knitted fabrics are used not only for sweaters but also for hosiery articles like vests, socks, underwears, etc. It is specially suited for winter wear. Knitted wool keeps as warm since it has many air spaces which trap the body heat and provide warmth.



**Fig. 24.17 : Knitting**



**Notes**

In a knitted garment you will see the following:

**Courses:** These are the series of successive loops lying in crosswise direction.

**Wales:** These are the lengthwise or vertical columns of loops.



**Fig. 24.18 : Wales**




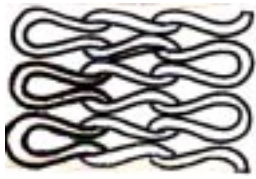
**Fig. 24.19 : Courses**

You must have seen that the size of the knitting needles is chosen keeping the thickness of the wool in mind. Garment edges like borders are usually done with fine needles so that the borders retain their shape.

**24.4 WEAVING VS KNITTING**

As you have seen both weaving and knitting are the popular methods of fabric making and depending upon the end use and properties needed either of them can be chosen. The following table gives a comparative picture of the two.

**Table 24.1 Weaving Vs Knitting**

Property	Weaving	Knitting
	 <p><b>Fig. 24.20</b></p>	 <p><b>Fig. 24.21</b></p>
1. Number of yarns	Two sets of yarns interlaced at right angles.	One set of yarn interlooped with itself.
2. Equipment required	A loom-could be a handloom or automatic loom.	Needles - could be hand knitting or machine knitting.

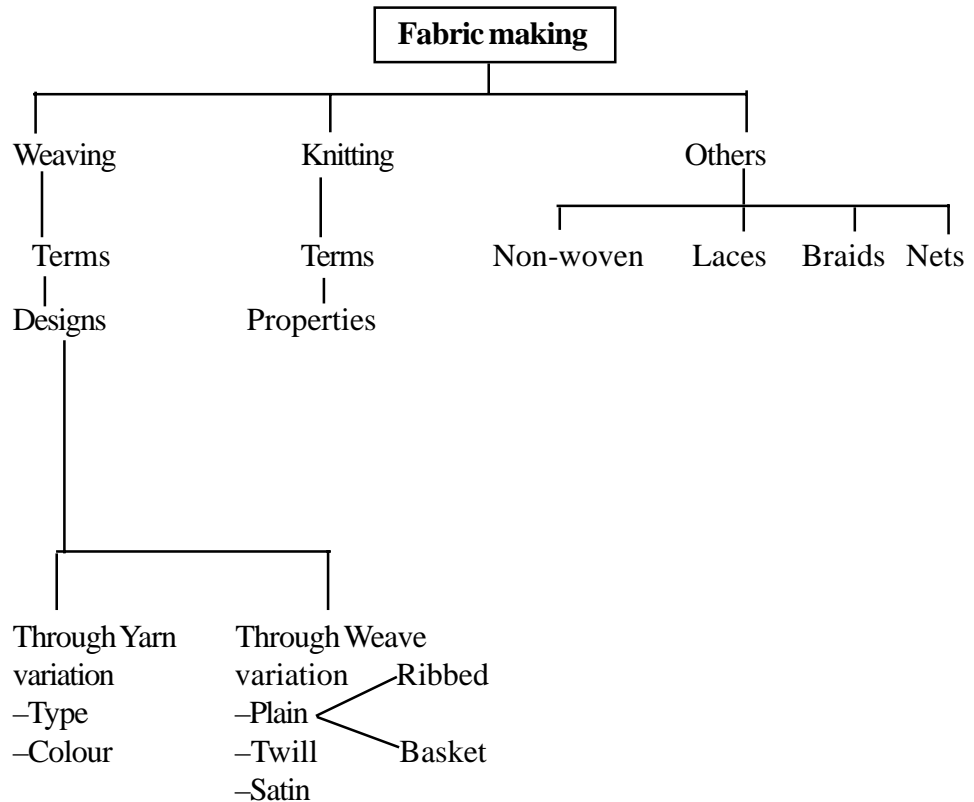


**Notes**

3. Fabrics are	Firm, smooth, stable and maintain their stiffness.	Wrinkle resistant, stretchable, limp and fit the body.
4. Care and maintenance	Need proper washing and ironing before re-use.	No ironing required but while drying have to be dried flat on ground.
5. Designs	Can be created by using different yarns (types and colours) and also weaves.	Are created by using various knitting yarns and by changing stitches or colour
6. Used for	Apparels, upholstery, curtains, draperies, table linen, bed linen, etc.	For undergarments, hosiery, sweaters, T-shirts socks, stockings, etc.



**WHAT YOU HAVE LEARNT**



**TERMINAL EXERCISE**

1. Enumerate the various methods of fabric making.
2. Discuss how designs can be created by weaving.
3. Compare and contrast weaving and knitting.



4. Why are knitted garments considered appropriate for winter wear?
5. Why is satin weave not as strong as plain or twill weave?
6. Why is twill weave used for your jeans?



**ANSWERS TO INTEXT QUESTIONS**

- 24.1**
1.
    - i) knitting
    - ii) lace
    - iii) net
    - iv) weaving
- 24.2**
1.
    - i) weaving
    - ii) knitting
    - iii) thread count
    - iv) satin
  2.
    - a) warp
    - b) weft
  3.
    - a) net
    - b) woven fabric
    - c) lace
    - d) twill weave
    - e) basket weave

Notes

*For more information*  
*<http://www.fabriclink.com>*  
*<http://www.Rallnet.com/weavehtml>*