



chapter

3

# Fibre to Fabric

Clothes are an important part of our life. Clothes protect us from heat, cold and dust. We wear different types of clothes according to different seasons, different places or at different times. Clothes are made up of different materials. We get these different materials from plants as well as from animals.

**In this chapter, we will learn about :**

1. History of clothes or how were clothes invented?
2. What are clothes made of?
3. Types of fibres, i.e. natural and synthetic fibres.
4. Cloth materials or fibres obtained from plants and animals.

## INTRODUCTION

After looking images shown in the figure, can you imagine that the clothes you wear come from these sources?



### Discover

Cotton is the most commonly used fabric in making our clothes. We get wool from sheep. The journey of clothing has been very interesting. Have you ever wondered what materials people used in ancient times for clothes? It appears that in those times people used the bark and big leaves of trees or animal skins and furs to cover themselves.



Cotton plant



Sheep

After people began to settle in agricultural communities, they learnt to weave twigs and grass into mats and baskets. Vines, animal fleece or hair were twisted together into long strands. These were woven into fabrics. The early Indians wore fabrics made out of cotton that grew in the regions near the river Ganga. Flax is also a plant that gives natural fibres. In ancient Egypt, cotton as well as flax were cultivated near the river Nile and were used for making fabrics.

In those days, stitching was not known. People simply draped the fabrics around different parts of their body. Many different ways of draping fabrics were used. With the invention of the sewing needle, people started stitching fabrics to make clothes. Stitched clothes have gone through many variations since this invention. But, is it not amazing that even today saree, dhoti, lungi or turban is used as an un-stitched piece of fabric?

## WHY DO WE NEED CLOTHES?

Clothing serves many purposes: it can serve as protection from the elements and can enhance safety during hazardous activities such as hiking and cooking. It protects the wearer from rough surfaces, rash-causing plants, insect bites, splinters, thorns and prickles by providing a barrier between the skin and the environment. Clothes can insulate against cold or hot conditions, and they can provide a hygienic barrier, keeping infectious and toxic materials away from the body. Clothing also provides protection from ultraviolet radiation.

The most obvious function of clothing is to improve the comfort of the wearer, by protecting the wearer from the elements. In hot climates, clothing provides protection from sunburn or wind damage, while in cold climates its thermal insulation properties are generally more important.

There are five main reasons why we wear clothing.

1. **Adornment** : Added decoration or ornamentation.
2. **Protection** : Clothing that provides physical safeguards to the body, preventing harm from climate and environment.
3. **Identification** : Establishing who someone is or what they do.
4. **Modesty** : Covering the body according to the code of decency established by society.
5. **Status** : One's position or rank in comparison to others.

## WHERE DO CLOTHES COME FROM?

Hey, look around yourself in your room. Do you see your clothes, table cover, curtains, school bag, bed sheet, sofa cover, pillow cover, etc.? All these items are made from fabrics. The fabrics are used to make clothes as well as various other things like, school bags, tour bags, canvas shoes, banner, raincoats, blanket, machine cover, etc. Various types of fabrics are used to make all these things. In above things some are made from natural substances and some are man-made. Earlier, men used only natural fabrics like wool, jute, cotton, linen and silk.

Today a variety of synthetic and blended fabrics is easily available. Different types of fabrics have different feel or texture such as jute is rough whereas silk is smooth.



Activity

1

**Aim** : To learn about different types of fabrics and their texture.

**Procedure :** Go to a tailoring shop in your neighbourhood. Request the tailor to show you different types of fabrics. Touch them and feel the difference in their texture. You can ask for the following fabrics : nylon, cotton, polyester, silk, linen and jute. Request him to give you a small piece of each fabric. Paste these pieces in your notebook and label them.

## WHAT ARE FABRICS MADE OF?

You might have observed something similar when you try to thread a needle. Many a time, the end of the thread is separated into a few thin strands. This makes it difficult to pass the thread through the eye of the needle. The thin strands of thread that we see, are made up of still thinner strands called fibres. Fabrics are made up of yarns and yarns are further made up of fibres. Where do these fibres come from?



Linen Cotton



Jute



Wool

### Types of Fabrics

## WHAT ARE DIFFERENT TYPES OF FIBRES?

Our clothes are made out of different materials.

Natural fibres are fibres made by nature. Typical examples are cotton and wool, which are mainly used in textile clothing but there are many natural fibres produced in smaller quantities such as silk, flax or hemp.



Cotton



Wool

### Types of Yarns

Man Made Fibres (MMF) are fibres made by man. MMF can be organic or inorganic. Organic MMF can be made from natural materials like wool, or are made from synthetic polymers.

## Natural Fibres

Natural fibres are also classified into plant and animal fibres.

## Plant Fibres

Category	Description
Seed fibre	The fibres collected from the seeds of various plants are known as seed fibres.
Leaf fibre	Fibres collected from the cells of a leaf are known as leaf fibres, e.g. pina, banana, etc.
Bast fibre	Bast fibres are collected from the outer cell layers of the plant's stem. These fibres are used for durable yarn, fabric, packaging and paper. Some examples are flax, jute, kenaf, industrial hemp, ramie, rattan and vine fibres.
Fruit fibre	Fibres collected from the fruit of the plant, e.g. coconut fibre (coir).
Stalk fibre	Fibres from the stalks of plants, e.g. straws of wheat, rice, barley, bamboo and straw.

**Animal Fibres :** Animal fibres generally comprise proteins such as collagen, keratin and fibroin; examples include silk, sinew, wool, catgut, angora, mohair and alpaca.



Sheep



Yak



Silkworms

### Animal Fibres

- ❖ **Animal hair (wool or hair) :** Fibre or wool taken from animals or hairy mammals, e.g. sheep's wool, goat hair (cashmere, mohair), alpaca hair, horse hair, etc.
- ❖ **Silk fibre :** Fibre secreted by glands (often located near the mouth) of insects during the preparation of cocoons.
- ❖ **Avian fibre :** Fibres from birds, e.g. feathers and feather fibre.

## Common Natural Fibres

1. **Cotton :** Cotton is a plant that produces fibres, which are used to make clothes and other products, like towels, carpets or sheets. Clothes made out of cotton are especially light and comfortable .

Every part of the cotton plant can be used. The long cotton fibres are used to make cloth, the short fibres can be used in the paper industry. You can make oil or margarine out of the seeds of the cotton plant. The leaves and stalks of the cotton plant are plowed into the ground to make the soil better. Other parts of the plant are fed to animals.

Cotton plants are usually grown at places having black soil and warm climate. Can you name some states of our country where cotton is grown? The fruits of the cotton plant (cotton



Cotton bolls



Cotton bales



Ginning process

bolls) are about the size of a lemon. After maturing, the bolls burst open and the seeds covered with cotton fibres can be seen.

From these bolls, cotton is usually picked by hand. Fibres are then separated from the seeds by combing. This process is called ginning of cotton. Ginning was traditionally done by hand. These days, machines are also used for ginning.

2. **Linen** : Linen fabric is obtained from the flax plant. It is a fibre that has been used in the textile industry since ages. The properties of linen fabric are very much similar to cotton fabric. Like cotton, linen fabric is also highly moisture-absorbent and durable. It creases easily and requires ironing. However, it is stiffer as compared to cotton. Linen is usually used in the manufacture of summer clothes and home linen.

3. **Jute** : Jute is a natural fibre that has been used in the textile industry since centuries. It is obtained from the jute plant and is popularly known as Golden Fibre on account of the golden sheen that it possesses. On account of its high strength, it is perfect for use in packaging material. Jute is sometimes blended with other fabrics or even used individually in the production of apparel. However, it does not have as good a drape as cotton and creases easily. West Bengal is one of the major sources of jute in India.



Jute plant

4. **Silk** : Silk, again, is a natural fibre used in the textile industry since ages. It is obtained from silk worms. The most popular kind of silk is obtained from the mulberry silk worm. The silk that is obtained from other varieties of silk worms is called wild silk. China, India, Nepal and Europe have been traditional producers of good quality silk on a large scale. Silk fibre has a unique sheen. It is very smooth to the touch, at the same time being strong. These qualities made it the fabric of choice for sarees and dress materials. Apart from this, silk is also used for nightwear, bed linen, underwear as well as home furnishings.

### Interesting Fact

Silk was first made in 300 B.C. in China.

5. **Wool** : Wool is a fibre that has traditionally been used in the textile industry, commonly obtained from sheep. Wool fabric is soft to the touch and provides warmth to the wearer, due to which it is the preferred choice for winter apparel. Wool has other features such as elasticity

and good drape. Moreover, it can be easily dyed in different colors, thus making it suitable for use in fashionable winter apparel.

The common type of wool used for the production of apparel is Merino wool, obtained from the Merino sheep. Merino wool is the softest wool in the world.

The wool industry in the world is largely spread out in Australia, China and New Zealand. Australia contributes nearly 25% of the world's wool production.

6. **Corn Fibre :** Corn fibre is a comparatively new innovation in the textile industry. Cargill Inc. and The Dow Chemicals joined together to form Cargill Dow Polymers LLC, which developed corn fibre.

The fabric made from corn fibre is easy to care for, cheap and very comfortable to wear. Moreover, it is stain-resistant and UV resistant. This fabric can be used for several applications such as readymade apparel, diapers, bedding, carpets and upholstery. Moreover, the production of this fabric requires the use of less fuel and is hence environment-friendly as well.



Corn Fibre

7. **Spider Silk :** Silk is commonly obtained from silkworms. However, in recent times, scientists have come up with an innovation wherein silk is produced from spiders. As opposed to silkworms, spiders produce silk at normal temperature, due to which the process is environment-friendly as well. Spider silk is useful for the production of light-weight apparel.

8. **Coir Fibre :** Coir fibre is a natural fibre that is obtained from the coconut tree. Coir fibre is thick and strong and is hence ideal for use in rugs, sacks and brushes. If the coir is harvested while the coconuts are tender, the fibre is white in colour; however, it is brown-colored if harvested on maturity. The coir industry in India is largely concentrated in Kerala. Apart from India, Sri Lanka is a major producer of coir fibre.



Coir Mattresses

9. **Yak Fibre :** The yak is an animal that is largely found in the Himalayas in India and Tibet. The hair of the yak is very useful in the production of warm clothes, mats and sacks. This is because of its qualities such as warmth and strength. Yak fibre is usually found in black and piebald. In rare cases, white yak hair is also obtained. This fibre has been used in the textile industry since long.



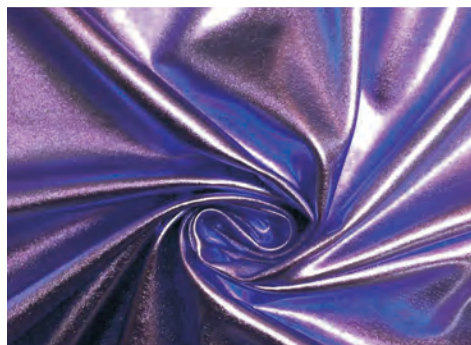
### Activity

2

Take a piece of cloth made of cotton fabric. Pull out a loose thread (yarn) from one of the edges. Place the thread on a flat surface. Holding one end of the thread, rub it between your fingers to separate the fine strands. These strands are called fibres.

## Synthetic or Man-made Fibres

Man-made fibres are spun and woven into a huge number of consumer and industrial products, including garments such as shirts, scarves and hosiery; home furnishings such as upholstery, carpets and drapes; and industrial parts such as tire cord, flame-proof linings and drive belts.



Nylon Fabric



Acrylic Fabric

Man-made fibres are used daily, and our daily life would look quite different without man-made fibres. These are not only used in all kind of textiles and apparel, but also in a wide range of technical applications. Transport or mobility (road, air) would be quite different and primitive if no man-made fibres were available.

### Differences between Natural Fibre and Man-made Fibre:

Sl.No.	Natural Fibre	Man-Made Fibre
1.	The fibers which we get from nature are called natural fibre.	The fibers which are developed by man are called man-made fibre.
2.	Generally fibers are hydrophilic.	Generally fibers are hydrophobic.
3.	Number of molecule is controlled by nature.	Number of molecule is controlled by man.
4.	Length of the fiber is nature given.	Length of the fiber is controlled by man.
5.	We get fibres as staple or filament.	No question about short or long staple fiber. It depends on men's will.
6.	Less strength and durability.	More strength and durability.
7.	No need to spinneret for spinning process.	Spinneret is essential for filament production.
8.	The fabric made from natural fibre is comfortable and good for health.	Man-made fibre is not comfortable and not good for health.
9.	Natural fibre is not favourable for finishing.	Man-made fibres are favourable for finishing.
10.	Comparatively less durable than synthetic fibre.	Man-made fibres are more durable than natural fibres.
11.	Fineness varies from one fiber to another fibre.	Fineness depends on the manufacturers.

Sl.No.	Natural Fibre	Man-Made Fibre
12.	Natural fibre has a great demand as humans' wear.	Synthetic fibre is widely used in everyday life except humans wear.
13.	Natural fibre is called environment friendly.	Man-made fibres are not environment friendly. Some fibres are harmful for the environment like: Polypropylene.
14.	Natural fibre needs to scouring and bleaching process before wet processing.	Scouring and bleaching is done in very few cases.
15.	It is not possible to change in fibre structure.	It is easy to change in fiber structure.
16.	It is expensive.	It is cheaper.
17.	Bears crimp naturally.	We have to give crimp manually.
18.	It grows with its natural color.	Colors are added in the solution bath as required.
19.	It is easy to dye the fibre.	Colouration is not so easy in man-made fibre.
20.	Dust and impurities could be in natural fibre.	No dust or impurities contained in synthetic fibre.
21.	The use of natural fibres are limited than man-made fibre.	Man-made fibers are used in more tasks than natural fibre.

## HOW DO WE GET FABRICS FROM YARN ?

### Yarn to Fabric

There are many ways by which fabrics are made from yarns. The two main processes are weaving and knitting.

#### Weaving

A fabric is made up of two sets of yarns arranged together. The process of arranging two sets of yarns together to make a fabric is called weaving.

#### Knitting

In knitting, a single yarn is used to make a piece of fabric. A single yarn gets pulled out continuously as the fabric gets unravelled. Socks and many other clothing items are made of knitted fabrics. Knitting is done by hand and also on machines.



Weaving



Knitting



 **Activity** **3** 

**Aim :** To study weaving.

**Procedure :** Take two A-4 size sheets of paper of different colours.

Draw straight lines on one sheet at 1 cm distance. Cut out the strips along the lines. On the other sheet, draw a small margin and again draw lines from this margin at a distance of 1 cm. Now cut along the lines till the margin. Take one of the paper strips and weave it into the second sheet, between the cuts perpendicularly. Similarly, weave the rest of the strips. Observe and admire your handwork of weaving.

## Key Words

<b>Fabric</b>	: the material used to make clothes.
<b>Fibre</b>	: a long hair-like structure which is the basic unit of a fabric.
<b>Ginning</b>	: separation of cotton seeds from cotton fibre by comb like structure called gins.
<b>Retting</b>	: separation of jute fibre from jute stems.
<b>Weaving</b>	: making a piece of fabric from two perpendicular sets of yarns.
<b>Cotton bolls</b>	: fruits of cotton plants from which cotton is obtained.
<b>Yarn</b>	: a long strand made of fibre.
<b>Shearing</b>	: cutting off fleece from the skin of a sheep.

## Important Points

1. Clothes protect us from heat, cold and dust.
2. Clothes are made of fabric.
3. Fibres may be natural or synthetic.
4. There are different kinds of clothes representing different place, gender and climate.
5. Cotton is the most important fibre of India.
6. Silk is obtained from the silk moth. It is an expensive fibre.
7. Fibres may be natural or synthetic.
8. Fibre is spun into yarn and yarn is either woven or knitted into fabric.
9. Natural fibres may be plant fibres or animal fibres.
10. Jute is the cheapest fibre.

## Exercise



### Multiple Choice Questions (MCQs)

#### A. Tick (✓) the correct option :

1. Cotton is obtained from :

- (a) cotton bales  (b) cotton bolls  (c) cotton balls  (d) none of these



2. The most important plant fibre of India is :  
 (a) jute  (b) silk  (c) flax  (d) cotton
3. Which of the following is not a natural fibre ?  
 (a) jute  (b) hemp  (c) rayon  (d) cotton
4. Spinning can be done manually by :  
 (a) handloom  (b) charkha  (c) retting  (d) none of these
5. Fibre is spun into :  
 (a) yarn  (b) fabric  (c) both (a) and (b)  (d) none of these
6. The process of retting is done to obtain :  
 (a) wool  (b) jute  (c) cotton  (d) silk
7. The silk moth breeds on the leaves of :  
 (a) grape  (b) neem  (c) mango  (d) mulberry
8. Which of the following is a property of jute?  
 (a) it can retain water  (b) it is very smooth  (c) it is the cheapest fiber  (d) all of these

### B. Fill in the blanks :

1. \_\_\_\_\_ is the basic unit of fabric.
2. \_\_\_\_\_ is called the golden fibre.
3. Nylon is a \_\_\_\_\_ fibre.
4. \_\_\_\_\_ are important part of our life.
5. \_\_\_\_\_ is a fibre used widely in India.
6. \_\_\_\_\_ clothes are good for wearing in hot weather.
7. \_\_\_\_\_ is the most commonly used fibre.
8. \_\_\_\_\_ clothes are good for wearing in cold weather.

### C. Match the following :

#### Column A

1. Synthetic fibre
2. Coir
3. Plant fibre
4. Flax
5. Bobbins
6. Animal fibre

#### Column B

- (a) Nylon
- (b) Cotton
- (c) Stuffing in mattresses
- (d) Silk
- (e) Reels of yarn
- (f) Linen

### D. Very Short Answer Questions :

1. Which is obtained from the fleece of sheep?
2. What is the removing the wool from sheep called?
3. Which is used to make clothes?
4. What silkworm make around itself?

5. Which country is the leading producer of jute?
6. What part of the cotton plant gives fibre?

### E. Short Answer Questions :

1. Define a fibre.
2. What is spinning?
3. Write the various uses of cotton.
4. What is retting?
5. What is shearing?
6. How is weaving done?
7. What is ginning?

### F. Long Answer Questions :

1. Write the history of clothing.
2. Write the processing of cotton.
3. Explain why cotton clothes are worn in summer and woolen clothes in winter.
4. Explain the following.  
(a) weaving                      (b) spinning                      (c) knitting
5. Explain how silk is obtained from the silk moth.



## Assignments

### A. Read the passage and answer the following questions.

Fabric is a pliable, strong sheet made from fibres or yarns. You must have heard names such as poplin, khadder, mulmul, denim, rubia, terrycot, etc. All these 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 are the two most popular methods of fabric construction.

1. By which the fabric is made of?
2. Name some fabrics.
3. Write two techniques of making fabrics.
4. By which the human was inspired to weave?

### Project

Go to a tailor and collect pieces of different types of fabrics. Paste them in your project file and write a few lines about each of them.