

Flash Notes – Animal Fibre – Fibre to Fabric

Cloth is made from fibres.

FIBRES

Fibres are threads which are used to make various materials.

These thread like structures are either obtained from living things or are created artificially.

1. **Artificial Fibres / Synthetic Fibres** : Also called Man – Made Fibres. They obtained artificially.

Ex: Nylon (Use for making ropes / clothes), Rayon and polyester (for clothes etc.)

Advantages: Economical, Dry faster (do not soak/absorb water), Wrinkle free (hence easy to maintain), Durable. They are not limited and expensive as compared to natural fibres .

2. **Natural Fibres** : Natural fibres are obtained from living things that exist in nature. They are obtained either from plants and animal sources. .

There are 2 types of natural fibres –

1. Plant/ Vegetable fibres
2. Animal fibres

FIBRE	OBTAINED FROM
Flax, jute and Hemp(plant fibre)	skin surrounding the stem of the respective plant and hence called skin fibres.
Coir (plant fibre)	a coconut fibre which is obtained from coconut.
Tree Wood (plant fibre)	obtained from stocks of different plants like bamboo, straw of wheat or rice.
Wool(animal fibre)	obtained from a lot of animals like sheep
Silk(animal fibre)	Silkworm
Cotton(plant fibre)	obtained from seeds of cotton plants.

Advantages : Biodegradable, Comfortable to wear.

Disadvantages: Expensive (like Silk), Difficult to maintain (Wool shrinks too), Get wrinkled (Cotton), Non-durable (Jute hard).

WOOL

- The hair on the body of a few animals traps lot of air and since air is a poor conductor of heat, it shields the body from cold and keeps it warm.
- This thick coat of hair, present on bodies of animals, such as –sheep, goat, camels is called Fleece.
- Wool is a fibre that is obtained, from this fleece of animals. Fleece can be obtained from different animals like Sheep, Camel, Llama, Alpaca, Angora Goat, Angora Rabbit and Yak.

SHEEP WOOL

- The fleece of a sheep consists of two types of fibres – Coarse beard hair and Fine and soft hair that grows close to the skin of the sheep. The soft fine hair provides fibres for making wool.
- There are 40 different breeds of sheep in the world from which we get around 200 types of wool.
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- Lohi, Nali, Rampur bushair, Bakharwal, Patanwadi and Marwari are some names of Indian breeds of sheep that yield wool.
- Some exotic breeds of sheep that provide fine quality of wool are Merino and Rambouillet.

CAMEL WOOL

- Llama, and camel- hair yarns are spun from the fleece of animals that are members of the camel family.
- These fibres are soft and warm and lightweight.

GOAT AND RABBIT WOOL

- Cashmere is an extremely soft, resilient, and easy to dye fibre.
- This rare and expensive fibre is combed once a year from the bellies of the cashmere and other goats, which is found only in the mountains of China and Tibet.
- Angora, which is combed from the Angora rabbit, is an extremely soft, fluffy and warm fibre.
- Mohair, spun from the fleece of the Angora goat, is extremely lightweight. Angora goat is found in hilly regions such as Jammu and Kashmir.

YAK WOOL

- Yak wool is popular in Tibet and Ladakh.

Characteristics of Wool

- It is a poor conductor of heat; it traps the heat, & makes us feel warm.
- It is elastic in nature, can be stretched & wrinkled but it regains its shape, this feature makes it resistant to tearing.
- It dries fast.
- It is food.
- It is light in weight.
- It can be dyed in various different colours.
- It is soft.

Rearing of Sheep – The growing & taking care of sheep, to obtain wool, is known as rearing of sheep. Sheep are fed on grass, leaves, mixture of pulses, corn, jowar, oil cakes and minerals. After rearing comes the process of converting its fibre into wool.

PROCESSING FIBRE INTO WOOL

The process of converting fibre into wool involves the following steps:-

1. SHEARING
2. SCOURING
3. GRADING & SORTING
4. CARDING / CORDING
5. BURRING
6. DYEING
7. YARN MAKING

(HINT : Sheep Scared Goat & Sheep Cared Black Dog Yesterday)

1. SHEARING

- It is the process of removal of fleece along with a thin layer of skin from the body of the animal.
- It is done in early spring or early summer so that the animal is relieved from its warm covering during summers and so that fleece grows back by winters.
- It is a painless process since the uppermost layer of the skin is made up of dead cells.
- It is done by machines.

2. SCOURING

The process of removing impurities like sand, dust, dirt & grease from the fleece by washing it with a detergent is called Scouring.

3. GRADING & SORTING

The process of removing stained, damaged or inferior quality wool & sorting the rest of the wool on the basis of its quality like its fineness, length, waviness & colour is called Grading & Sorting.

4. CARDING / CORDING

- It is the process of passing the dried wool through rollers (with thin wire teeth) so as to detangle them.
- The teeth untangle them & arrange them into a flat sheet called the web.
- The web is then formed into narrow untwisted fibres known as slivers. This is the last stage which prepares the fleece for spinning.

5. BURRING

- Burrs or soft fluffy fibres (similar to those which appear on our sweaters) are removed manually.

6. DYEING

The natural fleece of sheep & goats is white, brown or black. The slivers are dyed to get wool fibres of various colours.

7. YARN MAKING

- Spinning is the twisting together of drawn-out strands of fibers to form yarn, and is a major part of the textile industry. The yarn is then used to create textiles, which are then used to make clothing and many other products.
- The wool is straightened, combed and spun into yarn.
- The wool is either woven or knitted depending upon the length of the fibres.
- The long fibres are converted into yarns for making sweaters and other garments.
- Short fibres are converted into special fibres called worsted yarn (Worsted is a high-quality type of wool yarn)

Properties of Worsted yarn

- Fine worsted yarn is used to make clothes for athletes since it absorbs sweat, is not very hot to wear & allows the body to breathe.

NOTE:

- The art of spinning wool into yarn developed in about 4000 B.C.
- The first wool factory was established in 50 A.D. in Winchester, England, by the Romans.

Health hazards associated with wool production

S.No.	Health Hazard	Reason / Caused due to
1.	Muscular & Skeletal Injuries	Bending and lifting of sheep during shearing
2.	Asthma and other respiratory problems	Due to breathing in dust and fine woolen fibres.
3.	Orf (Viral skin disease)	Caused by contact with infected sheep or goat. (It leads to blisters on the hands, wrist and face)
4.	Skin diseases	Caused by the use of chemicals like detergents and dyes in scouring and dyeing of the fibres

SILK

Silk is obtained from silkworms. Silk yarn is made from thread like filaments or fibres that a silkworm spins around itself to form its cocoon.

Properties of silk

- It is the strongest of all natural fibres
- It is shiny and soft
- It can be easily dyed into various colours
- Since, it does not conduct heat and is a good insulator it remains cool in the summer and warm in the winter
- It absorbs moisture

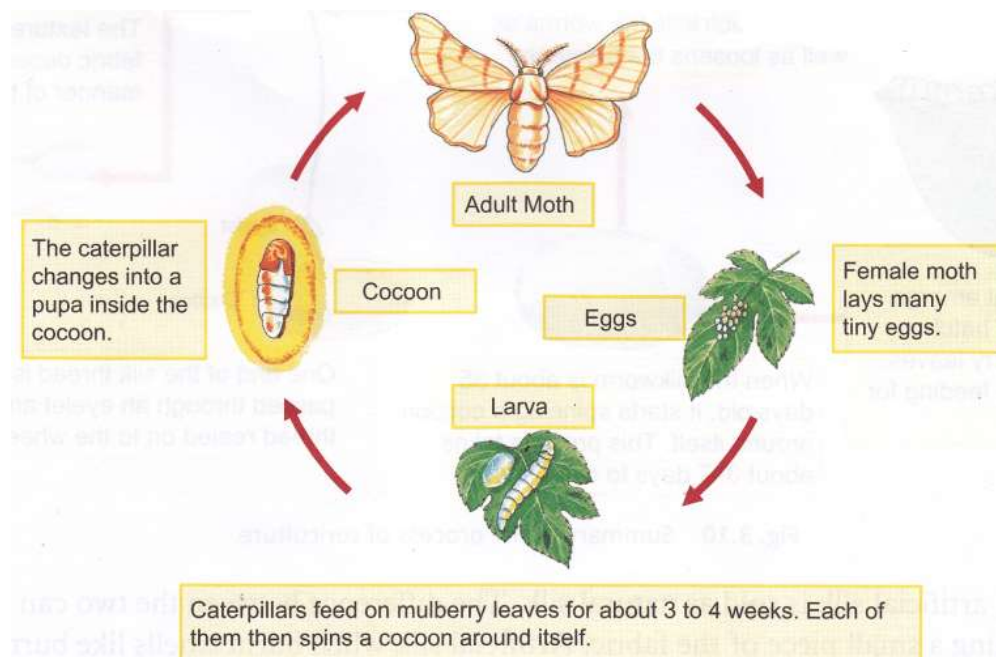
NOTE:

- The Chinese discovered the silk fibre and kept the art of silk making a secret for the next 3000 years.
- Chinese and Indian silk are popular throughout the world.
- Eggs of the silkworm were smuggled to India in the head – dress of a Chinese princess.

Sericulture

The art of rearing, growing and management of silkworms for obtaining silk is called Sericulture.

Life cycle of a silk moth



The Silk moth has a complicated life cycle:

Step 1

The female moth lays around 400 eggs at a time on the leaves of a plant.

Step 2

These eggs hatch after around 10 days and a silkworm larva, also called a caterpillar, emerges out of the egg. It grows about 3 inches long and feeds on the leaves for about 5 weeks.

Step 3

- The larva then gets ready to enter the next stage of its lifecycle and weaves a cocoon or case around itself (which takes around 3 to 7 days).
- The silkworm has a pair of glands which produce a liquid protein that solidifies when exposed to air.
- The outer part of the case thus becomes like a tough, coarse tissue-paper.
- The inner part of the case is a fine thread, about 1000 feet long, which is wound around the body of the worm.
- Inside the cocoon, the caterpillar changes into the pupa.

Step 4

Meanwhile, the pupa keeps growing and changing inside the cocoon. 10-12 days after the completion of the cocoon, a perfect adult moth emerges from the cocoon. In 4 - 6 days, the female moth lays around 400 eggs, and another life cycle starts.

VARIETIES OF SILK –

Different types of silk with different textures, is obtained from different varieties of silk moths. For e.g. Tassar Silk, Mooga Silk, Mulberry Silk are produced from cocoon of different varieties.

- **Mulberry Silk** → obtained from silk worms feeding on mulberry.
- **Tussar Silk** → obtained from silkworms feeding on the leaves of the Arjun, Sal & Saja trees.
- **Muga Silk** → obtained from silkworms feeding on polyanthus leaves.
- **Eri Silk** → obtained from silkworms feeding on other leaves.

Each different type of silk produces a different kind of yarn.

Health hazards of Silk

- Workers dealing with boiling water may get burns
- Arthritis of hands and fingers, may be caused by reeling
- Exposure to loud noise may lead to hearing damage

SILK PRODUCTION

- A female silk moth lays hundred's of eggs at a time.
- The eggs are placed in open containers of wood and cardboard.
- They are kept in a moist, warm and well ventilated area maintaining a temperature of 85° F. (which is also called incubation).
- Once they hatch into caterpillars they are fed on plenty of mulberry leaves or an artificial silkworm diet which they keep eating and keep growing big in size.
- The amount of food they eat will directly affect the amount of silk they produce.
- The caterpillars then start spinning a cocoon around them.
- Branches of trees or shrubs are placed in their rearing houses.
- The worms climb these branches and make their cocoons out of one continuous thread, taking about eight days for the process. This is called spinning of the cocoon.
- The cocoons are collected and put into very hot water, passed through hot air or exposed to the scorching heat of the Sun. This kills the silkworm and loosens the silk fibres.
- The silk fibres are then taken out and unwound from the cocoon. This process is called reeling or filature. This process is done by machines.
- Filaments from 4-8 cocoon are joined and twisted and are then spun into silk threads.
- These are then woven into silk fabric.
- It takes approx 630 cocoons to make a silk blouse.
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HEALTH HAZARDS AND CONDITIONS OF WORKERS IN THE SERICULTURE INDUSTRY

Sorter's Disease: People working in wool industry sometime get infected by a bacterium called Anthrax. This leads to a fatal blood disease called Sorter's Disease.

Respiratory Diseases: Inhalation of vapors coming out of cocoon during boiling and reeling produces various breathing problems like asthma etc.

Scabies and other skin infections: The first step in reeling is the boiling of cocoons in water to kill the worms. As a result of constant dipping in boiling water, the skin of the workers becomes raw and blistered, resulting in peeling of the skin of hands and feet.