

LPT- UNIT-II

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# Wool Technology Glossary.....

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- **Wool:** A cylindrical fibre of animal origin which is hygroscopic in nature, is crimped, elastic and grows in clusters. It is generally protein in nature and is non-inflammable. Structurally it consists of a cortex and cuticle, it is devoid of a medulla.
- **Mohair:** Natural fibre obtained from Angora goats. Has approx. 25-45 microns diameter and is both resilient and durable. It is notable for its high lustre and sheen, mohair has scales as wool but the scales are not fully developed, hence it doesn't felt like wool. Like wool mohair has no medulla
- **Fur/ hair:** A synonym for non-human hair. The term is sometimes used to refer to the body hair of animal as a complete coat, also known as pelage. Structurally it is similar to hair and it consists of cuticle, cortex and medulla.

## Slide 2

- **Kemp:** A coarser and brittle wool fibre. On cross-section it is found that it contains the medulla in an irregular manner.
- **Gare:** Partially medullated or heterotype mohair fibre which at times also arise from some secondary follicles.
- **Pelt:** The pelt of an animal usually refers to the undressed skin along with its hair/wool/fur. It is also sometimes used to refer to the untanned skin of an animal.
- **Fleece:** Fibre coat that covers a sheep.
- **Fleece density:** It is defined as the number of fibres grown per unit area of skin, usually per sq. cm.
- **Lock:** A group of fibres clinging together in fleece.

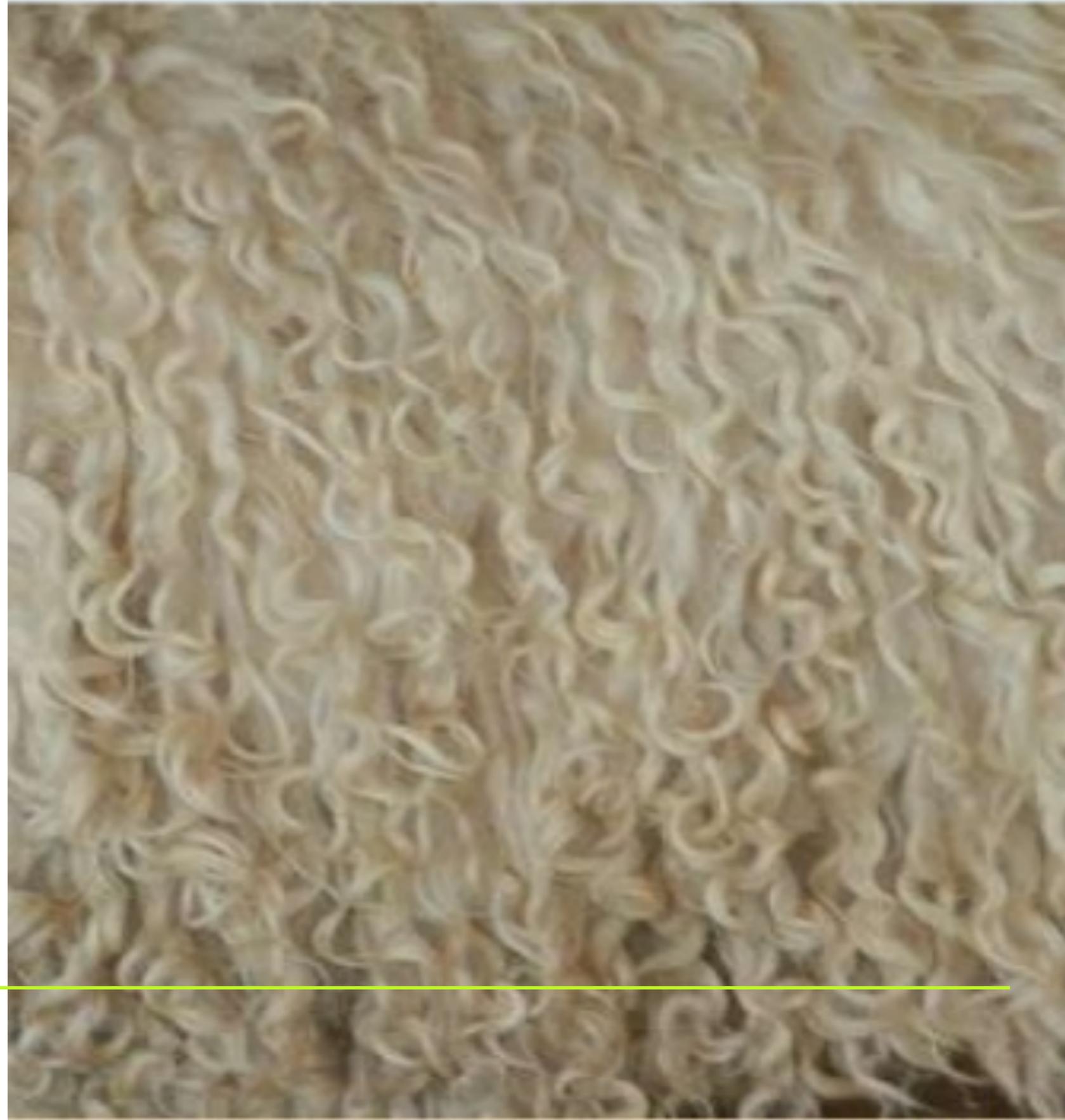
- **Crímp:** Natural waviness of a fibre. Finer the wool more is the crímp. It usually varies 2-12/cm.
- **Staple crímp :** The natural wave in a greasy lock.
- **Crímp width:** The distance between the mid point of the successive valleys of the projected crímp wave image.
- **Crímp amplitude:** It refers to crímp wave and is half the total depth from crest to trough.
- **Crímp depth:** The perpendicular distance between the pique of a crímp wave and the line joining the adjacent valleys of the projected crímp wave image.
- **Crímp character:** It refers to the regularity of crímp. It is badly affected by copper deficiency.



with  $n$  = number of crimp waves per fiber  
 $l_0$  = side length of one crimp bow  
 $l$  = width of one crimp bow  
 $\lambda = 2l$  = wave length of crimped fiber

$\phi$  = crimp angle  
 $L_0 = 2n l_0$  = extended length of fiber  
 $L = n l$  = crimped length of fiber  
 $A$  = crimp amplitude

## CRIMP OF A WOOL FIBRE



- **Crimp frequency:** Number of crimps per unit length.
- **Shearing/Clipping:** Manual removal of fleece either by scissors (k/a shears) or by shearing machine.
- **Greasy wool:** Shorn wool with grease and wax, prior to removal of impurities.
- **Burr:** vegetable matter present in the fleece of a sheep/goat.
- **Scouring:** washing treatment of wool with detergent (sodium carbonate) for removal of impurities from raw wool to obtain clean wool yield and is thus an indication of quality of wool.
- **Carbonization:** The process of chemical treatment of wool for removal of vegetable matter/burr.

- **Clean wool:** wool free from all impurities. It is expressed as percentage of total weight.
- **Fibrin:** The silk protein is known as fibrin
- **Suint:** Secretion of sudoriferous/sweat glands. It is mostly of alkaline nature and has potassium salts.
- **Wax:** A product of sebaceous glands which are present near the wool follicles.
- **Wool yolk:** wool wax with suint is known as wool yolk. It is water soluble and is present in raw wool. It is more in finer wool and it increases in winter season.
- **Rise in wool:** seasonal increase in flow of wax.
- **Hunger Fineness:** wool of under nourished sheep as of nutritional scarcity producing lighter but finer fleece.

\*\* The alkalinity of the suint helps in emulsification of the wool wax coating on the fibre and thereby allows the suint pigments to penetrate in the fibre.

- **Keratin:** Wool protein is basically known as keratin.
- **Keratinization:** The process of hardening of previously soft fibrous protein.
- **Medulla:** The hollow central core found in coarse and medium wool fibre as well as in kemp.
- **Medullation:** The condition of formation of medulla.
- **Staple length:** length of one lock without disturbing the natural waviness of the lock, which is a measure of wool quality consisting of an average lock or bunch of fibre without extension of its natural form.
- **Fibre length:** Length of a wool fibre in its stretched position such that all the crimps are flattened to a straight line .
- **Scale:** Flattened cuticular cells which are present in the outer most surface of a fibre. Its function is to protect the cortex of a wool fibre. They are arranged in corona, reticulate or corona-reticulate fashion.

- **Scouring:** washing treatment of wool with detergent for removal of impurities from raw wool to obtain clean wool yield. It is an indication of wool quality.
- **Carbonization:** The process of chemical treatment of wool for removal of vegetable matter called burr.
- **Sweating:** The process of removal of wool from its follicles either by bacterial digestion or by application of depilatory agent to the under surface of the pelt.
- **Rooving:** Plucking of fleece from indigenous sheep having double coat undergoing partial mounting or loosening of fibres
- **Fellmongering:** The process of removal of wool fibre from sheep skin through application of chemicals like sodium sulphide or by administration of artificial moulting agents such as thallium.

- **Felting:** It is defined as the ability of a textile material to undergo irreversible increase in bulk density when subjected to friction and pressure under suitable physical conditions.
- **S:P ratio:** It is the ratio of secondary to primary follicles present in a unit area of skin.
- **Average number of secondary follicles:** It is obtained by multiplying the S:P ratio by average number of primary follicles in the group/triad.
- **Hank:** A unit defining the length of the yarn or thread. It is also a measure of wool quality mainly in case of worsted system. A worsted hank is 560 Yds for 1 pound of clean wool and for cotton it is 840 Yds/lb of cotton fibre.
- **Lea:** It is the measure of length and is  $\frac{1}{7}$  of a hank. Thus a worsted Lea is 80 Yds and cotton Lea is 120 Yds.

- **Grains:** It is also a unit for the measure of length of wool fibre. 1 Lea = 1000 grains thus one 1 Hank = 7000 grains.
- **Handle:** It is the measure of fine-ness of wool. A subjective assessment of diameter of the fibre with respect to tactile qualities.
- **Count:** It is an index of thickness of yarn. It is the number of Leas that weigh 1000 gms. It is expressed as deniers and denoted by numbers followed by letters.
- **Metric number:** It is defined as length of fibre in metres per gram of weight.
- **Grex or Tex system:** It is a system of expressing fibre diameter based on 1000 metres of fibre for yarn count.

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## Woolen Yarns

1. Spun from short fibres(1-3 inches) .
2. Spun from medium/ coarse wool.
3. Lower tensile strength .
4. Twist in yarn is low to medium.
5. Heavier in weight.
6. Knitwares made are less durable.
7. Woolen fibres are washed, scoured and carded.
8. Hand feel is bulky, uneven and has softy fuzzy appearance.

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## Worsted Yarns

- Spun from fibres > 3 inch length.
- Spun from fine wool fibre.
- Higher tensile strength.
- Twist in yarn is tight.
- Lighter in weight.
- Knitwares are more durable.
- Woolen fibres are washed then scoured, carded, combed, drawn
- Handfeel is fine, smooth. It has a crisp appearance

SR#	Worsted Processing	Woolen Processing
1	Spun from wool fibres of: Length : longer than 3" Diameter: fine diameter Fibres are washed, scoured, carded, combed and drawn	Spun from wool fibres of; Length : spun from short fibres of 1-3" Diameter: medium or coarse The fibres are washed, scoured and carded.
2	<b>Yarn</b> 1. Fine 2. Smooth 3. Even 4. Tighter twist 5. Higher tensile strength	<b>Yarn</b> 1. Bulky 2. Uneven 3. Low to medium slack twist 4. Tensile strength lower than worsted
3	<b>Characteristics</b> 1. Fewer insulators 2. Holds creases and shape 3. More durable than woolens	<b>Characteristics</b> 1. Insulator due to trapped air 2. Does not hold a crease well 3. Less durable than worsted
4	<b>Uses</b> 1. Suits 2. Dresses 3. Gabardines 4. Crepes	<b>Uses</b> 1. Sweater 2. Carpets 3. Tweeds

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Woolen	Worsted
<p>Spun from wool fibres of:</p> <ul style="list-style-type: none"> <li>Length : spun from short fibres of 1-3"</li> <li>Diameter: medium or coarse</li> </ul> <p>The fibres are washed, scoured and carded.</p>	<p>Spun from wool fibres of:</p> <ul style="list-style-type: none"> <li>Length : longer than 3"</li> <li>Diameter: fine diameter</li> </ul> <p>Fibres are washed, scoured, carded, combed and drawn</p>
<ul style="list-style-type: none"> <li>Bulky</li> <li>Uneven</li> <li>Low to medium slack twist</li> <li>Tensile strength lower than worsted</li> </ul>	<ul style="list-style-type: none"> <li>Fine</li> <li>Smooth</li> <li>Even</li> <li>Tighter twist</li> <li>Higher tensile strength</li> </ul>
<ul style="list-style-type: none"> <li>Insulator due to trapped air</li> <li>Does not hold a crease well</li> <li>Less durable than worsted</li> </ul>	<ul style="list-style-type: none"> <li>Less insulator</li> <li>Holds creases and shape</li> <li>More durable than woollens</li> </ul>

- **Skirting:** Removal of objectionably dirty or stained and matted wool such as tags, bellies locks from fleece after shearing.
- **Carding:** The type of processing which is made through the short wool so as to open the wool by individualising the fibres through cardwise which work in different directions. This process involves combing and paralleling of fibres prior to spinning in order to remove short undesirable fibres and produce a sliver.
- **Sliver:** A strand of long untwisted fibre produced in carding.
- **Roving:** A soft strand of fibre that has been twisted, attenuated and freed of foreign matter, preparatory to its conversion into yarn.
- **Drafting:** Attenuation of condensed sliver from the carding to the desired weight or thickness with-in the final wooden yarns.

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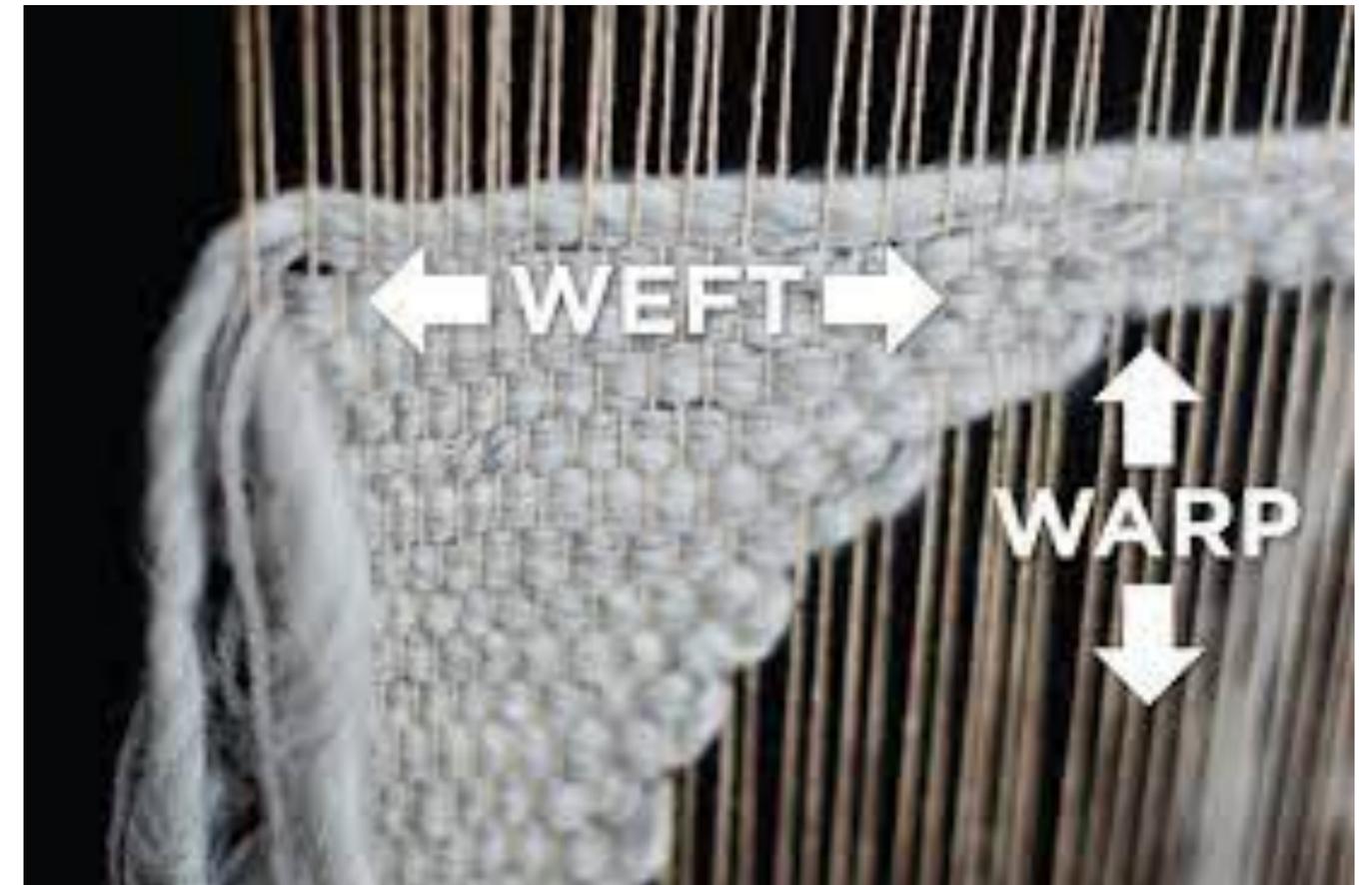
# Warp, Weft & Weave

**WARP:** THE LONGITUDINAL SECTION OF FABRIC/FIBRE ARRANGED IN LONG SHEETY FORM FOR THE PURPOSE OF INTERLACING WITH THE LATITUDINAL SECTION OF THE FABRIC/FIBRE IN A PARTICULAR MODE.

**WEFT:** THE LATITUDINAL SECTION OF FABRIC/FIBRE WHICH IS WEAVED INTO THE WARP.

**WEAVE:** THE PARTICULAR MODE OF INTERLACEMENT OF WARP AND WEFT.

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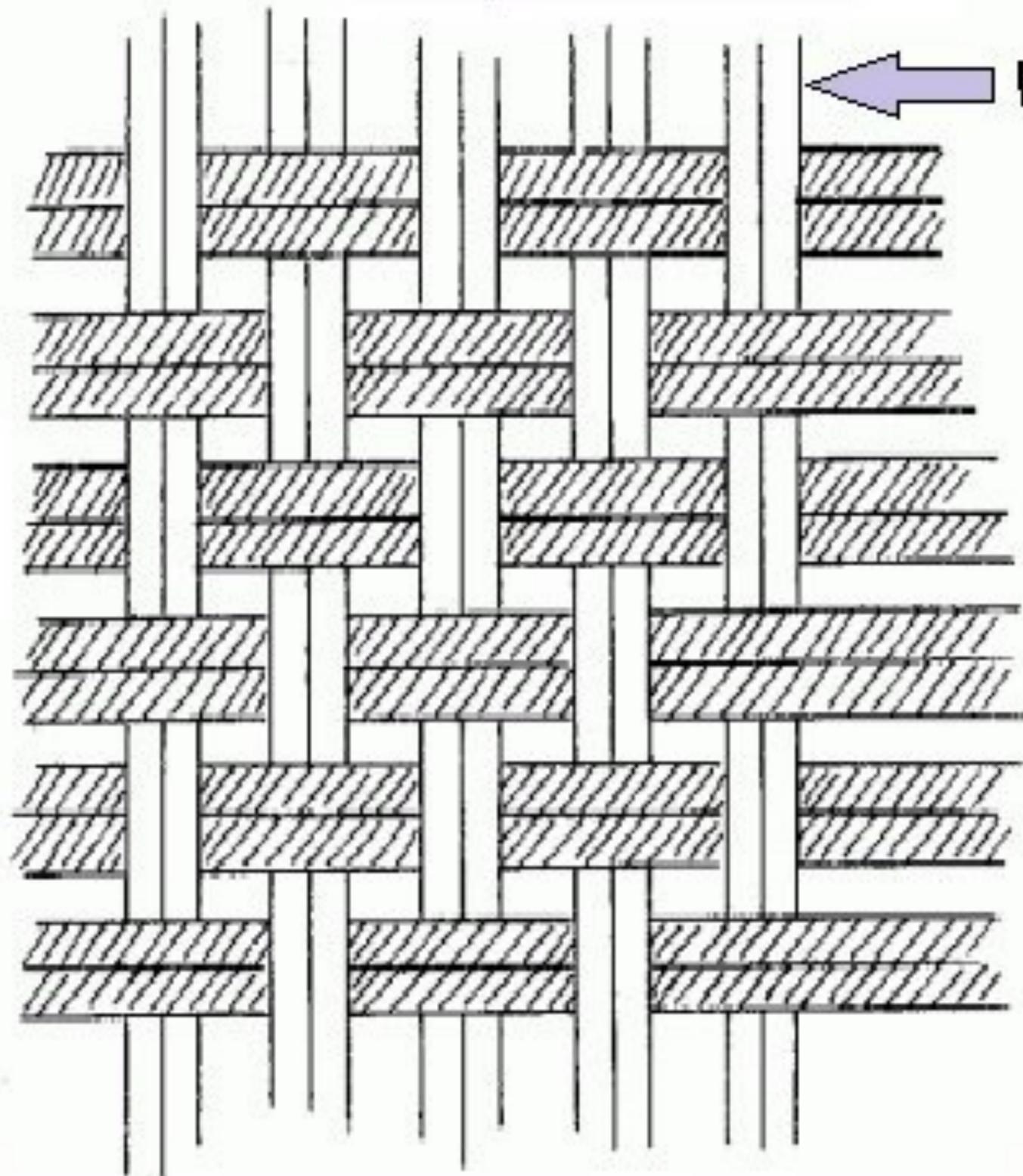


Warp Threads run  
from Top to Bottom

← Warp Threads

Weft Threads run  
from Left to Right

Weft Threads →

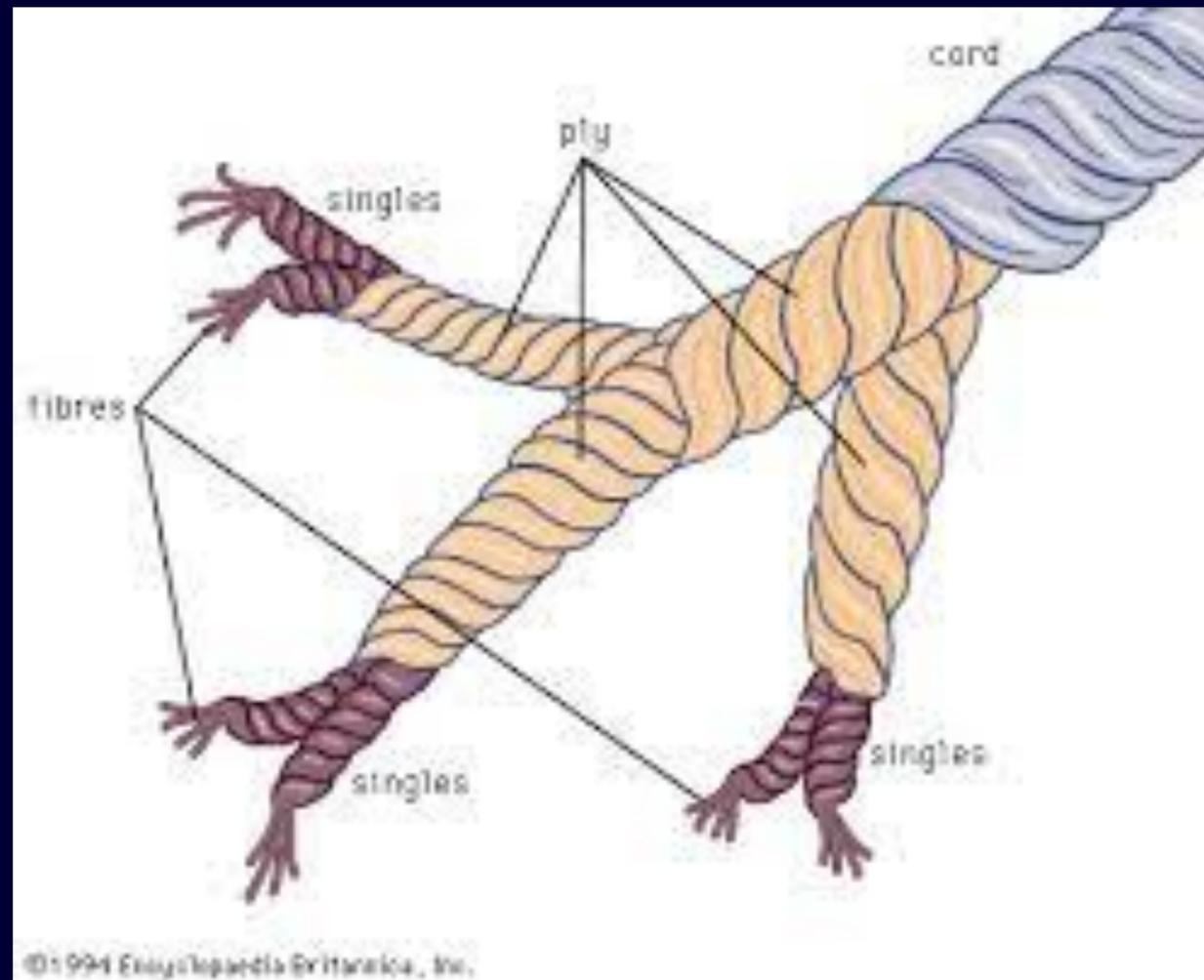


- **Ends:** The individual threads of a warp is known as ends.
- **Picks:** The individual threads of a weft is known as picks.
- **Weaving:** The technology in which two series of threads are used to produce a fabric one running longitudinally and other latitudinally. It is the interlacement of two set of threads to form a fabric.
- **Knitting:** The technique in which only one series of thread is used to produce a fabric . It may be warp knitting when only one warp series is used to increase the fabric length longitudinally or weft knitting when only latitudinal series is used.
- **Design:** The outcome of the interlacement of warp and weft together.

- **Loftiness:** spongy feeling of fabrics on touch.
- **Cotting:** Occurrence of loose fibres in fleece resulting from break.
- **Tipiness/Wispy:** The thinness of fibre owing to poor nutrition at the time of previous shearing which is associated with rapid rate of growth of coarse fibre.
- **Swift:** An adjustable device upon which a handoff yarn is placed to wind into skeins or balls.
- **Skein:** A length of yarn or thread wound on a reel or swift
- **Breaking strength :** The force required to rupture a fibre or bundle of fibres.

- **Milling:** A process essential in wool manufacturing to impart fullness and body to the material.
- **Denier:** It is the mass in gram of 9000 metres of the yarn.
- **Kilotex:** It is the mass in kilogram of 1 km of yarn used to denote in case of cord and coarse yarns
- **Millitex:** It is the mass in milligram of 1 km of the yarn. It is used to express fine-ness of the fibre.
- **Tex :** It is defined as the mass in gram of 1000metres/1 km of yarn.

- **Ply yarns:** They are two or more single yarns twisted together. Two-ply yarn, for example, is composed of two single strands of wool; three-ply yarn is composed of three single strands of wool.
- **Cord Yarn :** They are produced by twisting ply yarns together.



- **Primary colours:** As per pigment theory of colour primary colours are Red, Yellow and Blue. They are bright.
- **Secondary colour:** Mixture of any two primary colours. They are orange green and purple. They are bright.
- **Tertiary colours:** Mixture of any two secondary colours. They are duller than secondary colours.
- **Quaternary colours:** Mixture of any two tertiary colours. They are duller than tertiary colours.
- **Hue :** It is pure spectrum of colour without any black or white.
- **Tint:** It is hue with white added.

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**Thank....  
....You**



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**BY: DR. GARGI MAHAPATRA**