

Materials and their properties– Textile Fibres & Fabrics

What you need to know:

- Know the primary sources of materials for textile fibres & fabrics.
- To be able to identify a range of textile fibres & fabrics.
- Understand their properties and the functions they provide and how they are used?

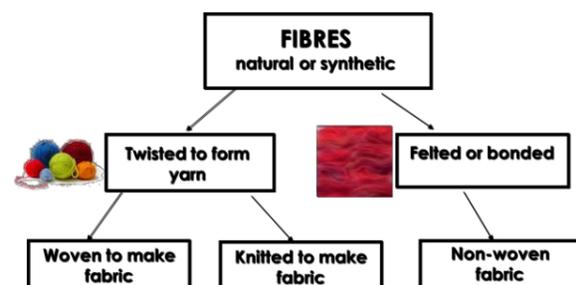
Natural fibres can come from plant or animal sources

	Origins	Example	Properties	Uses
Cotton	Cotton comes from the fine hairs on the seed pod of a cotton plant.		Soft and strong, absorbent, cool to wear and easily washable. Cotton fabrics can be given a brushed finish to increase their thermal properties	Most clothing, especially shirts, underwear and denim can be made from cotton. Also used for towels and bedsheets
Wool	Wool comes from a sheep the coat is known as fleece.	 	Warm and absorbent, does not crease easily and has low flammability. Has natural resilience to water, but when wet does take a long time to dry. Is difficult to launder as it can shrink (felt).	Jumpers, coats, suits and accessories worn for warmth. Specialist wools are very soft and expensive. Felt products and carpets
Silk	Silk comes from a cocoon of the silkworm.		Very soft and fine finish, gentle on skin, can feel cool in summer yet warm in winter, drapes well, absorbent, strong when dry (weaker when wet), tricky to wash, can crease easily and is usually expensive	Luxury clothing including nightwear and underwear, soft furnishings, bed sheets, silk paintings and wall hangings

Synthetic fibres are manufactured from oil based chemicals.

	Example	Properties	Uses
Polyester		Tough, strong, hard wearing, very versatile, holds colour well, non-absorbent so quick drying, machine washes well. Often blended with other fibres. Easily coloured	Clothing, fleece garments bedsheets, carpets, wadding, rope, threads, backpacks, umbrellas and sportswear
Polyamide (Nylon)		Good strength, hard wearing, non-absorbent, machine washes well, easily and frequently blended	Clothing, ropes and webbings, parachutes and sports material. Used as a tough thread on garments
Elastane (Lycra)		Added to fabric to enhance working properties, particularly to add stretch. Allows freedom of movement, quick drying, holds colour well, machine washable	Sportswear, exercise clothing, swimsuits, hosiery, general clothing, surgical and muscular supports

Fibres are the starting point from which all fabrics are made



Blended Fibres
This is a combination of two or more fibres spun together into a yarn.

Mixed Fibres:
This is where two or more types of yarn are used when the fabric is woven.

Reasons for blending and mixing fibres:

1. Improve the appearance of a fabric in terms of colour or texture.
2. Improve the quality of the fabric e.g. more durable, stronger and longer lasting.
3. Easier to wash and care for the fabric e.g. crease resistance.
4. Improve the feel (handle) of a fabric.
5. Improve the profitability of a fabric so that it is cheaper to produce and is more desirable to consumers.

Fabric Finishes

Once a fabric has been produced it often goes through a process to improve its appearance and/or properties. The main fabric finishes are:

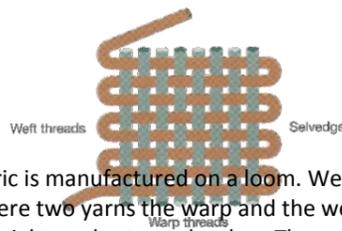
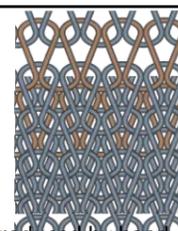
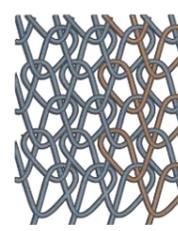
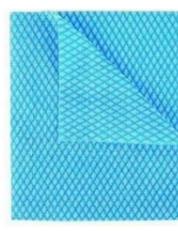
- Physical** – machines are used to change the fabric
- Chemical** – chemicals used to change the fabric
- Biological** – bacteria & enzymes used on regenerated fibres
- Coating** – where fabrics are coated on one side

Why are fabrics finished?

To enhance: colour, pattern, lustre, texture, softer, firmer, drape, care properties, stain resistance, waterproof, flammability, colour fastness.



Types of Fabrics

Fabric	Example	Properties	Uses
Woven fabric (Plain Weave)	 Woven fabric is manufactured on a loom. Weaving is a process where two yarns the warp and the weft are woven together at right angles to each other. The warp threads run the length of the loom with the weft threads being woven across. The edge that is wrapped around is called the selvedge.	Simple and cheaper to produce than more complicated weaves, stronger than other weave patterns	Used on textiles such as cotton calicos, cheesecloth and gingham, found on table cloths, upholstery and clothing
Knitted (Weft knitted)	 Knitted fabrics are produced by hand or by knitting machines. Knitting is produced horizontally. The loops above and below interlock holding the fabric together.	Warm to wear, different knits have different properties such as stretch and shape retention. Weft knits ladder and unravel more easily than warp	Jumpers, cardigans, sportswear and underwear fabrics, socks, tights and leggings, craft items such as soft toys
Warp Knitted	 Warp knitted fabric is produced on industrial knitting machines. Warp knitting has yarns that interlock vertically along the length of the fabric. Warp knitting is an industrial process only.	Fast production system (industrial process only). The fabric has stretch but can keep its shape and is hard to unravel, less likely to ladder. Complicated manufacturing so it is more expensive than weft knitting.	Sportswear, exercise clothing, swimsuits, hosiery, general clothing, surgical and muscular supports.
Non Woven	  Bonded – Fibre bonded fabric are produced by either adhesives gluing the fibres together. Or heat bonded which melts the fibres so they bond together. Felted – Felted fabric is produced by needles repeatedly pushing and bonding the fibres together.	Bonded fabrics lack strength, they have no grain so can be cut in any direction and do not fray. Felted fabrics can be formed with moisture and heat; once dry it has no elasticity or drape, and can pull apart easily. Woollen varieties can be expensive	Disposable products such as protective clothing worn for hygiene purposes, tea bags, dish cloths and dusters Hats, handicraft, pads under furniture to prevent scratching, soundproofing and insulation

The type of fabric used to make a product depends on the following factors:

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| <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Cost | <input type="checkbox"/> Lifetime of the product |
| <input type="checkbox"/> Size of product | <input type="checkbox"/> Size of material | <input type="checkbox"/> Desired properties. |
| <input type="checkbox"/> Where and how the product will be used? | <input type="checkbox"/> Weight | <input type="checkbox"/> Workability |
| <input type="checkbox"/> Stability | <input type="checkbox"/> Finish required | <input type="checkbox"/> Fabric availability |