

Introduction to Textile and Clothing Science

Introduction to Textile and Clothing Science
Key concepts, terminology, and foundational principles

1. What Is Textile and Clothing Science?

Aspect	Definition
Textile Science	The study of fibers, yarns, fabrics, and their properties, processing, and performance.
Clothing (Apparel) Science	The application of textile science to the design, production, fit, function, and care of garments.
Goal	Create comfortable, durable, and aesthetically pleasing clothing while meeting economic, environmental, and social requirements.

2. Basic Building Blocks

Level	Description	Examples
Fiber	The smallest structural unit; natural or synthetic.	Cotton, wool, polyester, nylon
Yarn/Thread	Continuous strand made by twisting fibers together.	Single-ply, plied, filament yarn
Fabric (Material)	Interlaced yarns (woven, knitted, non-woven).	Denim, jersey, felt
Garment	Finished product made from one or more fabrics.	T-shirt, coat, sportswear

3. Types of Fibers

Category	Sub-type	Origin	Key Properties
Natural Fibers	Cellulosic: cotton, linen, rayon	Plant	Good absorbency, breathable
	Protein: wool, silk, alpaca	Animal	Warm, elastic, flame-resistant

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Category	Sub?type	Origin	Key Properties
Synthetic Fibers	<i>Polymer?based:</i> polyester, nylon, acrylic	Petrochemical	Strong, quick?dry, low cost
Regenerated (Semi?synthetic)	Viscose, modal, lyocell	Reprocessed natural polymers	Soft, drapey, moisture ?manage
Specialty Fibers	Aramid (Kevlar), carbon, glass	Engineered	High strength, heat resistance

4. Yarn Production & Classification

Process	Main Steps	Typical Uses
Spinning	Opening ? cleaning ? carding ? drawing ? roving ? drafting ? twist	Woven & knitted fabrics
Texturizing (synthetic)	Melt?extrusion ? air?jet or false?twist ? crimping	Stretch fabrics, activewear
Classification	<i>By fiber content:</i> 100?% cotton, cotton?poly blend <i>By twist:</i> S?twist, Z?twist <i>By count:</i> Tex, Denier, Ne	Determines strength, hand, drape

5. Fabric Construction Methods

Construction	How It Works	Typical Characteristics
Weaving	Interlacing warp (longitudinal) & weft (transverse) yarns at right angles.	Stable, less stretch, good for denim, shirting
Knitting	Interlooping yarns; can be weft (single jersey) or warp (tricot).	Stretchy, soft, suited for T?shirts, sportswear
Non?woven	Bonding fibers mechanically (needlepunch), chemically (spunbond), or thermally (meltblown).	Lightweight, disposable, used for interfacing, medical textiles
Braiding & Lacing	Intertwining three or more yarns in a diagonal pattern.	High tensile strength, used for ropes, cords

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Construction

How It Works

Typical Characteristics

Composite

Layers of different fabrics/laminates bonded together.

High performance (e

Fabrics