

Materials and Components relevant to Fashion and Textiles

Teacher Notes

This unit covers the specification elements related to the characteristics and working properties relevant to fashion and textiles 2.3.3(b). It also relates to aspects of the classification of the main fibre groups 2.3.3(a). It is designed to provide a background to the topics but is not inclusive of all potential material required for examination purposes.

Both teacher and students will also need to undertake their own research/reading/practical activities in order to provide a fully comprehensive coverage of the specification content relating to materials and components.

Aims and Objectives:

Aim:

To support students in developing their knowledge and understanding of the materials used in fashion and textiles thus enabling them to make more discerning choices in material selection throughout their studies.

Objectives:

1. To develop an understanding of the characteristics and working properties of materials relevant to fashion and textiles.
2. To understand the processes involved in yarn production.
3. To understand key terms associated with fibre/yarn production and material construction.
4. To appreciate that the manufacturing process in material construction impact on their end use.

Work exercise session layout and order – Fibres and Yarns

The session should commence with a general introduction and discussion around the classification of the main fibre groups. It is expected that most students will have some prior knowledge from study at GCSE level.

The teacher should let students know that this session focusses on the manufacturing of fibre from its source to finished material.

It would be beneficial to students to have access to a wide range of different materials and yarns which could be disassembled whilst studying this section. Access to equipment such as magnifying glasses or microscopes might also be helpful when de-constructing materials and yarns.

Activity 1 – Key Terms

A yarn is defined as a continuous strand of threads composed of either natural or man-made fibres or filaments, spun together with or without twist into a variety of different types of yarn. Yarns are then used in weaving and knitting to form textile fabrics.

The fabric's weight, flexibility, handle, texture and appearance is determined by the thickness and tightness of the yarn. It is therefore important that students have some understanding of how the processes involved in spinning yarns impacts on the final fabric.

[Click to open activity](#)

See worksheet 1

Key term	Descriptor
Twist	Put into yarns to make them stronger.
	The number of turns is a deciding factor for the end-use of yarn.
	A lower number of turns gives a softer, weaker and more bulky yarn suitable for knitting.
	A higher number of turns give a much stronger yarn suitable for weaving.
Spun yarn	Made by mechanical methods of assembly, spinning and twisting staple fibres together.
Flat filament yarn	The assembly of continuous filaments; could be silk or manmade fibres.
Mono filament yarn	A single continuous filament.
Multi filament yarn	Twisting together two or more single yarns of the same type.
	Sometimes referred to as plied yarns or folded yarns.
Core spun yarns	Multi component yarns.
	The core stays at the centre; other staple fibre yarns are spun around it to cover the core.
Folded yarns	A single twisting process combining 2, 3 or 4 single yarns into one.
	2-ply or 3-ply yarn is achieved depending on the number of single yarns twisted together.
	Twisting yarns of the same or different types (or different fibre blends) improves the weight, strength of the yarns or achieves special effects e.g. fancy yarns.
Cabled yarns	Twisting together two or more plied yarns.

Activity 2 – Types of Yarns

[Click to open activity](#)

See worksheet 2

Core-spun yarns	Fancy yarns	Bulked & Textured yarns
Fabrics are enhanced by these yarns as they make them more comfortable to wear.	Often chosen for their appearance, but also for their functional characteristics such as strength and elasticity.	Often made by blending staple fibres with different shrinkage values to make thicker and softer yarns.
These yarns are used in both woven and knitted fabrics for a wide range of clothing.	Special spinning processes give rise to irregularities adding to the texture – slub, loop, chenille or bouclé.	Acrylic and cotton are a common combination – the heat process will bulk up the acrylic whilst fluffing up the cotton.
Strong sewing threads are often made by this method. The outer covering prevents the needle over heating in high volume sewing production.	Fibres of different colours are created during spinning or by plying 2 or more coloured yarns.	Acrylic and cotton combination gives an inexpensive yarn that is lightweight, easy-care, soft and warm, suitable for knitwear.
Elastane filaments are covered with another yarn. Knitting and weaving is difficult with elastic yarns.	Matt and bright fibres such as Lurex can be mixed for different effects.	A thermoplastic synthetic filament yarn such as polyester or nylon is finished using a heat process which adds crimps, coils and loops along the length.
These are multi component yarns; the core at the centre covered with either natural or manmade yarns.	Often used to create interest and improve the appearance of woven and knitted materials.	This process adds thickness to make yarns warmer, more elastic, absorbent and gives a softer handle.
		Suitable for tights, swimwear, underwear, outerwear, fleece jackets and carpets

To conclude this section examine a range of different fabrics and yarns.

- Cut a selection of different yarns to the same length for comparisons.
- Pull a few yarns off some woven fabric from both weft and warp.
- Study the yarns; how do they look and feel?
- Are the yarns the same? Compare the yarns and make notes.
- Can you untwist any yarns? What does this reveal?
- Can you identify any staple or filament fibres?
- Do the fibres all look the same or are there any blends?
- Considering the properties of different types of yarns, discuss why each has been used in specific fabrics. Consider the end purpose of the fabrics.

Session Conclusion

The session concludes with the teacher reminding students that the production of the yarn is only one factor that should be considered when making textile materials. The fibre source is equally important. The construction methods used later to create lengths of materials and the finishes that can be applied all affect and determine end-use.

Work exercise session layout and order – Woven & Knitted fabrics

The session commences with a general introduction and discussion around the power point presentation on the basics of fabric construction.

[Click to open presentation](#)

Activity 3 - Test Yourself

This activity can be completed on a computer or tablet or the teacher could simply ask the students the questions.

The interactive activity allows students to attempt an answer themselves by typing into the box before revealing a suggested answer and comparing with their own.

This could be completed as a whole class activity led by the teacher where the pen tool may be useful to note down in brief answers offered by the students before comparing with the suggested answer.

[Click to open activity](#)

See worksheet 3

Question 1 – Describe how the construction of a satin weave affects its appearance and use.

Answer: The warp yarns lie on the face of the fabric over the weft yarns. This creates a shiny smooth surface. The weft thread is only seen on the underside of the fabric. As warp yarns are strong in woven fabric together with how they lie over the weft, satin weave fabric drapes well.

Question 2 – What is meant by a pile weave? Describe different examples.

*Answer: A pile weave has a raised surface of either loops of yarn or small tufts.
Velveteen: has small tufts of yarn on the surface that are cropped and brushed for a smooth appearance.
Terry: has one loose warp yarn that creates loops when the fabric is beaten down.
Cord: created when tufts of yarn lie between the same warp yarns to form rows; they are cropped and brushed like velveteen.*

Question 3 – Describe the construction of ripstop nylon that make it suitable for kites or performance sportswear.

Answer: Ripstop nylon is a plain tight weave but with some warp and weft threads doubled up to add extra tear strength making them higher suitable for kites or performance wear which will come under pressure in use.

Question 4 – Describe ways in which a plain weave can be varied.

Answer: The use of different yarns allows for variations: different colours in the warp and weft or to create stripes or checks; texture could be added by using varying thicknesses of yarns; textured or fancy yarns could also vary the appearance, handle and texture; the weave could be looser as in a cloth like muslin.

Question 5 – Explain why knitted fabrics are usually wrinkle or crease resistant.

Answer: Creases (or wrinkles) are caused by heat or moisture which cause fibres/yarns to move into uneven or bent positions. The interconnecting loops and their elasticity allows knit fabrics to bounce back to their original shape maintaining a flat appearance.

Question 6 – Explain what a core spun yarn is and describe the benefits of using this type of yarn which includes elastane in the manufacture of woven fabrics particularly for garment construction.

Answer: A core-spun yarn has a central core, elastane for example, with other staple fibres spun around it. If the central core is elastane it allows the yarns to stretch and recover its original size. Woven fabrics have poor elasticity but with elastane incorporated into them it allows the fabrics to stretch and recover size in the same way as individual yarns. Clothing made from woven fabrics which include core-spun yarns with elastane stretch and fit the contours of the body and will be more comfortable to wear.

Question 7 – Explain how pilling occurs on fabrics and why it is worse on knitted fabrics.

Answer: Pilling occurs when loose ends of fibres detach from the yarn and become entangled. Rubbing and abrasion – through wear - increase pilling. Pilling is worse in knitted fabrics because ease of movement is far greater as well as the distance between yarns. Woven yarns are packed closer together preventing the yarns rubbing against each other. The looser the knit the more pilling is likely to occur.

Question 8 – List the advantages of using a warp knitted material in garment construction.

Answer: Warp knitted fabrics lie flat when cut and do not unravel or ladder, so cutting shapes and working with these fabrics is fairly straightforward. They have some stretch so would be comfortable to wear but also retain their shape well – this adds to the functionality and life cycle of the product.

Question 9 – Explain why a twill weave is considered a strong weave and is often used for workwear.

Answer: The strength of the twill weave is determined by the number of interlacing of yarns e.g. over two and under 1, displaced by one on the following row; this creates the diagonal line effect. Going over many yarns in one go allows the yarns to be packed tightly together, restricting yarn movement; this adds to the strength of the twill fabric. The greater the number of interlacing (going over and under more yarns in sequence) the stronger the fabric. Ideal for workwear helping it to resist wear and tear. Soiling and stains are less visible on an uneven surface (diagonal lines created by the twill weave) than on a smooth surface.

Question 10 – Describe the disadvantages of weft knitted fabric.

Answer: The main disadvantages of weft knitting are that the yarns can unravel easily as it is constructed from one continuous yarn; it will also run and create a ladder effect if it is cut; although weft knitting has some elasticity and recovery it can very easily lose shape.

Activity 4 - Characteristics of Woven and Knitted Fabrics

This activity can be delivered as a whole class activity led by the teacher on a whiteboard or screen or it could be used as a revision tool.

Students should be urged to justify their decisions. When complete the check button can be clicked to reveal how many answers are correct. Some may need to be relocated to achieve the correct answer, which should generate further discussion.

[Click to open activity](#)

See worksheet 4

WOVEN FABRIC	KNITTED FABRIC
Usually produced with two sets of yarn	Usually produced with a single set of yarn
Elastic properties are limited	High elasticity
Higher labour costs to manufacture	Less labour costs to manufacture
Lower recovery properties	Comfortable to wear
Lower extensibility properties	High extensibility and recovery
Quite stable	Not particularly stable
Easier to work with particularly when machining	Fabrics benefit from finishes
Holds a crease well	A specialist stitch is needed when sewing pieces together
Can hold pleat and sharp corners	Wrinkle and crease resistant
Can be less comfortable to wear	Seams do not always require a finish
Most stretch is along the bias	Edges can curl when cut
Edges can fray	Can unravel and run
Requires seam finishing	Stretch is either on the bias or cross grain
Can be wind resistant	Moulds to fit the body better

Session Conclusion

Session concludes by teacher reminding the students that the construction methods used to create textile materials impacts on end-use. This should not be considered in isolation; other factors – fibre source, yarn type and applied finishes – should also be considered when selecting materials for a textile product. It is often the intended end use of the product which will determine which material(s) can be considered.