

Elective 2 – Textiles, fashion and design

1 Contemporary clothing and fashion



What you will learn...

- ❖ Fashion terms
- ❖ Social, economic and industrial developments which influenced design and the clothing industry
- ❖ Fashion trends
- ❖ Elements and principles of design

Over the centuries fashion has changed enormously. This can be attributed to a number of factors such as cost, style, availability of fabric, social changes, etc.

CLOTHING

- Clothing is an important factor in most Western societies.
- What people choose to wear can depend on availability, religion and budget.
- Contemporary fashion is often worn by people who have the necessary money and the choice in clothes.

FASHION TERMS

Fashion

- Fashion is the clothing that is acceptable at a particular time.
- It is constantly changing according what is shown on the cat walk.
- Fashion can refer to shape, fabric and finish.

Style

- Style can refer to the overall look of an outfit, e.g. a casual, smart or trendy style.
- It can also refer to a person and how and what they wear and the way they wear it.
- Some styles can be classed as classic.

Trend

- Trend refers to fashion taking a particular direction. For example, the trend in the sixties was long flowing skirts, mini skirts and the hippie look.

- One of the trends in the twenty-first century is body decoration such as piercing, tattoos, etc.

Trendsetter

- A trendsetter is a person or a group of people who create a fashion trend. Pop stars, movie stars and royalty can all be trendsetters due to the media exposure they receive.

Haute couture

- Haute couture is made-to-measure clothing by designers which is seen at fashion shows in Paris, Milan, New York and London at the beginning of each season.
- It is extremely expensive.

Prêt-à-porter (ready to wear)

- These clothes are designed by the designers of haute couture but are more affordable and manufactured in a range of sizes.

Off the peg

- These are mass-produced clothes based on the designs of the haute couture ranges. They have no hand finishes and use cheaper fabrics.



Fact...

Functions of clothing

- Modesty
- Protection from weather
- Identification, e.g. police uniforms, school uniforms
- Self-expression, e.g. Goths, bikers
- Approval from others
- Status, e.g. judge, royalty
- Other criteria for choosing clothes: Cost, function, suitability, age, fashion trends, cultural, social and religious acceptability, advertising and merchandising

H INFLUENCES ON DESIGN AND THE CLOTHING INDUSTRY

Over the last 100 years social, economic and industrial developments have had a major influence on design and the clothing industry.

Social factors

| Factor | Influence |
|--|--|
| End of World War I | The whole structure of society changed and the conformity of the 1800s was discarded. |
| Emancipation of Women/ Women working outside the home | Women required more comfortable and functional clothing. The business suit for working women emerged. |
| People in the public eye | Due to media exposure the haute couture ranges worn by film stars, singers and royalty were imitated by other groups within society. |
| Fashion houses and designers | The type and style of clothing produced by fashion houses such as Chanel reflected what the public desired. |
| Cruelty to animals | Animal rights movements as well as top models protested against the use of fur in fashion. |
| Dance and music crazes | Music and dance have had a major impact on fashion as clothes were adapted to suit the dances of the era. For example, the Charleston of the 1920s required low waist dresses and the hip hop dancing of the 2000s favours leisure wear. |
| Increase in travel | Interest in ethnic fabrics and styles |

Economic factors

| Factor | Influence |
|--|---|
| Available income | The amount of disposable income influences the type of clothes people can afford to buy. For example, during the World Wars very little money was available for clothing. |
| State of the economy/ Employment and unemployment | The level of employment, taxes to be paid, etc. affect the amount of money which can be spent on clothes |
| Availability of raw materials | Clothes reflect whether raw materials are difficult or expensive to obtain. For example during World War II when fabric was limited as factories had to work towards the war effort women wore knee length, straight skirts and fitted jackets. |
| Fashion houses | The fashion houses are influenced by the factors above. For example, if people don't have money to buy haute couture the fashion houses have to reduce their work force or close. |
| Functional and decorative clothing | Whether functional or decorative clothing is desired is influenced by the state of the economy. For example, during the World Wars the clothing was functional whereas in the 1950s it was decorative and excessive. |
| Imports and exports | How much fashion is imported into a country can influence the country's clothing industry as can the export of clothing from the country. |

Industrial factors

| Factor | Influence |
|--------------------------|---|
| Industrial Revolution | The development of power driven machines such as the spinning jenny and the sewing machine had a huge impact on the textile industry as it was now less labour intensive and cheaper to produce textiles. |
| New fabrics | In America during the twentieth century a wide range of fabrics were created using synthetic materials such as nylon, polyester, etc. This provided cheaper fabric for a wide variety of consumer goods. |
| Microfibres | The development of microfibres allowed the mass production of fabrics. |
| Improvement in transport | The different forms of transport such as air, rail and sea transport have made the importing and exporting of fabric and clothes more feasible. |
| Computerisation | The use of computers, e.g. CAD, in textile design and manufacturing has reduced labour and production cost as machines can now be pre programmed to cut and sew garments. |

FASHION TRENDS

- Fashion trends have always been influenced by colour, shape, line, proportion, pattern and texture.
- Fashion trends are a combination of what designers produce and what the public accepts.
- Trends can often take some time to get established. However, once trends have been established they can last for years.
- Certain fashion trends can evoke a particular era in history. For example, in the Victorian era women typically wore large cumbersome dresses and were covered from head to toe.

! Fact...

A fad is a fashion trend that develops quickly, lasts for just one season and is gone. The garments are often aimed at younger people, e.g. poncho, leg warmers and men's skirts.

@ Web link...

www.style.com

1920s

- After the First World War fashion changed dramatically and clothing became more functional and less restrictive.
- The trends in the 1920s were loose functional clothing, e.g. tailored suits, loose corsets and silhouettes, and simpler designs with shorter skirts.
- Women dressed similar to boys in a look referred to as the *garçonne* look (short hair style, close fitting cloche hat and loose fitting drop waist dress with knee length).
- The influence of music and the dance craze of the tango and the Charleston required less constricting clothing.
- Sportswear and swimming suits were introduced.
- Coco Chanel designed clothes for simplicity, comfort and chic appearance.
- Men's clothes saw a less dramatic change. The trends were looser fitting jackets and a narrower hemline on the trousers.
- The Great Depression in 1929 meant that wealthy clients could no longer afford haute couture and the fashion houses went into decline.
- After the Great Depression clothing was predominantly made at home.

@ Web link...

www.chanel.com

! Fact...

The fashion magazine *Vogue* was established in 1892 which signalled the beginning of media impact on fashion.

Second World War (1939–1945)

- Fashion houses had to close due to the conservation of fabric for the war.
- The style was very simple military fashion – straight skirt with no pleats and shorter lengths. Suits and jackets had square padded shoulders; the waist was pronounced with a belt.
- In 1947, after the war, the 'new look' was released in Paris by Dior. The skirts had a narrow waist and were full and long.

@ Web link...

www.dior.com

1950s

- The development of manmade fibres, e.g. nylon and polyester, meant that reasonably priced clothes of good quality could be mass-produced.
- Prêt-a-porter fashion came into existence while haute couture fashion became more elite.
- In 1954 the Chanel suit which was simple in structure yet functional, was created. This design is still used today.

1960s

- The sixties were a period of liberation for young people. For the first time they wanted to be seen as different from the older generations.
- The sixties brought the topless bathing suit (Rudi Gernreich), the mini skirt, pants and pant suits.
- Men wore brightly coloured clothes in hippie style with frills and lace.
- Designers such as Pierre Cardin were experimenting with futuristic designs and different materials such as plastic and metal.

1970s

- During the 1970s trends returned to a more natural look. Hippie style and folklore fashion (long skirts and loose fitting clothes) became very popular for both men and women.
- Worn out jeans became a staple of any wardrobe.
- Street fashion, e.g. clothes worn by punks, surfers, skaters, musicians and sports people, started to influence designer styles.

1980s

- The eighties saw power dressing, tailored suits and shoulder pads, but also leg warmers and pedal pushers.
- Underwear, e.g. bras and corsets, became outer wear.

@ Web link...

www.jpoggaultier.fr

1990s

- An obsession with brand names and the further decline of the haute couture fashion typified the nineties.

! Fact...

The shape of the human body limits styles and they tend to reappear again and again with slight variations.

- Due to wasting energy resources and their effect on the environment recycled materials and remade clothes are used in fashion.
- The internet and TV spread fashion ideas and trends.
- Ancient arts of body decoration, e.g. tribal make-up and ear and body piercing, have become fashionable. Tattoos are the latest trend.

! Fact...

Women's wear categories are casual, work, evening and underwear. Menswear is classed as casual, work and formal wear. Styles can be casual, classic, work, special occasions, leisure, outdoor, teenager.

@ Web link...

www.fashion.net

**What you have learned...**

- ❖ Fashion terms
- ❖ Social developments
- ❖ Economic developments
- ❖ Industrial developments
- ❖ Fashion trends from the 1920s to the present day
- ❖ Elements and principles of design
- ❖ Fashion, style, trend, trendsetter, haute couture, prêt-à-porter, off the peg
- ❖ End of World War I, emancipation of women, people in the public eye, fashion houses, dance and music crazes, travel
- ❖ Level of income, state of economy, availability of raw materials, fashion houses, functional and decorative clothing, imports and exports
- ❖ Industrial Revolution, new fabrics, microfibres, improvement in transport, computerisation

QUESTIONS

- 1 Outline the development of fashion trends since the 1920s. (10)
- 2 Discuss how the Industrial Revolution affected the fashion industry. (12)
- 3 Outline the functions of clothing. (8)
- 4 Explain the following terms: style, haute couture, off the peg. (9)

2 Clothing and textile industries in Ireland



What you will learn...

- ❖ The clothing and textile sectors in Ireland
- ❖ Textile cottage industries
- ❖ Economic benefits of the textile industry
- ❖ Factors which have contributed to the growth of the textile industry
- ❖ Factors which prevent growth of the textile industry
- ❖ Potential within the textile industry
- ❖ Career opportunities

- The Irish clothing and textile industry has changed dramatically in recent years.
- The industry is no longer based on traditional Irish crafts such as lace, crochet, knitting and weaving.
- It is now nearly impossible to identify a specific Irish style as it has integrated with European style.
- The stereotypical Irish fashion of Aran knits and tweeds which are sold, for example, by Blarney Woollen Mills and Quills, are primarily fashions for tourists nowadays.
- The Irish clothing industry now has a huge number of internationally recognised designers such as Louise Kennedy, Paul Costello and Quinn and Donnelly.
- The existence of the traditional textile industry helped to form a stable base for the development of the clothing industry as it is today.

THE CLOTHING AND TEXTILE SECTORS IN IRELAND

- | | |
|-------------------------|-----------------------------|
| ■ Menswear (outer wear) | ■ Women's wear (outer wear) |
| ■ Leisure wear | ■ Hosiery and lingerie |
| ■ Children's wear | ■ Fashion knitwear |
| ■ Underwear | ■ Shirts |
| ■ Business clothes | ■ Accessories |
| ■ Shoes | |

Facts about the clothing industry

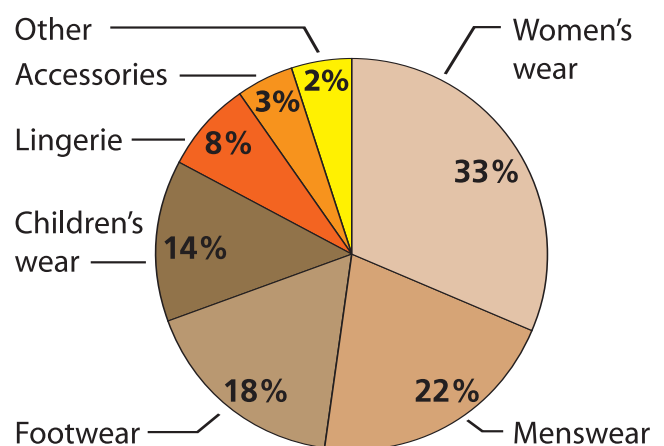
- There are approximately 350 firms in Ireland involved in the clothing industry.
- The majority of these are small family-owned businesses.
- These small businesses account for about 70% of the overall clothing and textile production.
- The majority employ 25 people or less.
- Many are based in rural locations and are utilising the skills of the traditional industries.

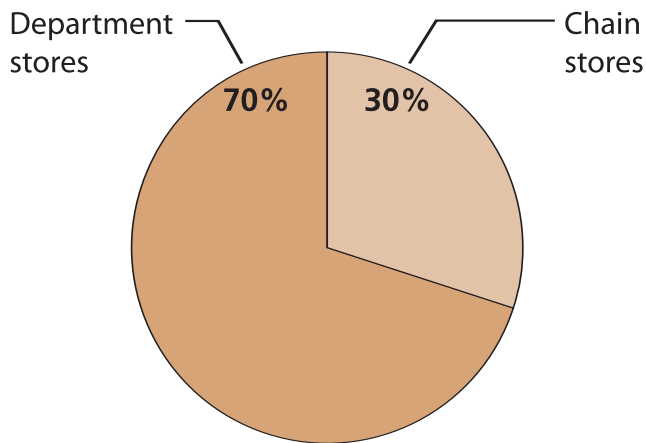
Textile cottage industries

- The textile cottage industries in Ireland are small and based on crochet, knitting, lace and weaving.
- Their market is the tourism industry which they supply with crafts products.
- The linen and wool which they produce are exported to design houses abroad.

ECONOMIC BENEFITS OF THE TEXTILE INDUSTRY

- The retail industry is worth about €3 billion a year.
- This is an increase of 59% since 1995.
- Women's wear accounts for 33% of total sales and this includes knitwear, casual wear, tailoring, teen high fashion and outside.





The retailing sector can be divided into:

- Chain stores: 30% of purchases from the lower to the middle end of the market are made in chain stores
- Department stores, UK retailers, specialist multiples, e.g. Dixons, PC world, independent Irish retailers: share 70% of purchases from the middle to upper end of the market

Factors which have contributed to the growth in the textile industry include:

- Overall economic growth in Ireland and an increase in disposable income
- The influence of fashion trends, media and lifestyles
- The availability of designer branded clothing at affordable prices such as John Rocha's lines at Debenhams
- The development of the export market
- Increase in sales of branded names
- The demographic trends based on age, gender and location. A large percentage of the Irish population is under 35 years of age and in full employment with a large disposable income.
- Skilled workforce within the industry
- Excellent design education courses

Factors which prevent growth in the textile industry include:

- A labour intensive industry with high wage costs
- Expensive raw materials
- A cheaper workforce and raw materials in Far Eastern and Eastern European countries such as China and Poland. Many industries are attracted to these locations due to lower production costs.

- Increase in competition from other countries providing a wide choice of designs and fabrics
- Discerning consumers who expect quality, design and value for money and who often have the choice to purchase imported goods
- Time consuming and expensive staff training
- Poor market research and use of technology within the industry

Potential within the textile industry which could contribute to further growth

Fibre production

Creation of new fibres, e.g. microfibres

Yarn production, weaving and knitting

Use of technology, e.g. spinning, automation and computer aided design (CAD)

Dyeing and finishing

New dye applications and finishes

Textile products

Design: fashion designers design clothes, shoes, hats, etc.

Manufacture: factories and skilled workers needed for constructing the garments

Product control: implementation of ISO in the fashion industry, control of quality and cost (raw materials, workforce, etc.)

Retailing

Market research investigates, for example, what the consumer would like to buy

DESIGNERS AND BRANDS WITHIN THE IRISH CLOTHING INDUSTRY

Designers

| | |
|----------------|--------------------|
| Paul Costello | Quinn & Donnelly |
| Louise Kennedy | Philip Tracey |
| Marc O'Neill | Deirdre Fitzgerald |
| Lainey Keogh | |

A number of designers also work in conjunction with larger retail outlets. For example Quinn & Donnelly design a special line of clothes for A-Wear.

Leading clothing brands in Ireland

Women's wear

| | |
|---------------|--------------------|
| A-Wear | Brian Tucker |
| Carraig Donn | Libra |
| Lyn mar | Michael H |
| Paul Costello | Quinn and Donnelly |
| Principles | Primark |
| Sasha | Next |
| St Bernard | Traffic |

Men's wear

| | |
|---------------|------------|
| Magee | John Rocha |
| Paul Costello | Remus |
| Euro style | Uomo |
| Tricot Marine | St Bernard |
| Primark | Next |
| Boss | |

CAREER OPPORTUNITIES

- Textile design
- Clothing design
- Pattern design
- Product line operator
- Colourist
- Stylist
- Buyer
- Retail operator
- Marketing
- Quality control
- Health and safety
- Model
- Fashion journalism



What you have learned...

- ❖ The clothing and textile sectors in Ireland
- ❖ Textile cottage industries
- ❖ Economic benefits of the textile industry
- ❖ Factors which have contributed to the growth of the textile industry
- ❖ Factors which prevent growth of the textile industry
- ❖ Potential within the textile industry
- ❖ Career opportunities
- ❖ Menswear, women's wear, leisure wear, etc.
- ❖ Crochet, lace, knitting, crafts for tourism industry
- ❖ Annual worth €3 billion, employment
- ❖ Economic growth, influence of fashion trends and lifestyle, media influence, development of export market, demographic trends, skilled workforce, design education courses
- ❖ Labour intensive industry, expensive raw materials, cheaper alternatives abroad, increase in competition from abroad, time consuming staff training, poor market research and use of technology
- ❖ In fibre and yarn production, dyeing and finishing, textile products, retailing
- ❖ In textile, clothing and pattern design, product line operator, colourist, stylist, buyer, etc.

QUESTIONS

- 1 Discuss the impact traditional crafts had on the formation of the Irish textile industry today. (16)
- 2 Discuss the growth potential in the Irish textile industry. (10)

3 Design evaluation



What you will learn...

- ❖ Elements and principles of design and their application to garment construction
- ❖ Evaluation of a garment
- ❖ Relationship between design and function
- ❖ Relationship between comfort and aesthetic appeal

ELEMENTS OF DESIGN

The design elements for garments are:

- Colour
- Line
- Shape
- Texture
- Pattern

Colour

- Colour is one of the initial attributes that attract a person to a fabric or a piece of clothing.
- The colour of a garment can change the perception of the person wearing the garment, e.g. the person can appear taller, thinner, rounder, etc.
- Darker colours can reduce the size of a person while light colours can increase it.
- Colour can be used to highlight details of a garment, e.g. the pleats, cuffs, etc.
- Warm colours are stronger than pale colours.
- Neutral colours such as black, white and cream are easy and comfortable to wear; they also blend easily with other colours.
- Repetition of a colour will emphasise direction and line.
- Harmonising colours are easy to wear and to look at.



Criteria for choosing colours

- The size and shape of the body
- The colour of eyes and hair and the skin tone
- The occasion
- The texture and weight of the fabric
- The other garments and accessories that will be worn with it
- The time of year

Line

The line of the garment is its silhouette and its structural lines.

Silhouette

- This is the outside line of the garment.
- Each garment has a basic silhouette line based on a rectangle or a triangle.
- There are some variations in shape depending on whether a garment is fitted, semi-fitted or loosely fitted.
- A silhouette can have the following effects:

Narrow rectangular shapes have a slimming effect.

Boxy rectangular shapes will increase width and reduce height.

In a triangular shape, i.e. where the garment is wider at the top than at the bottom, the width on the top half can have a slimming effect on the overall appearance.



Fact...

The fabric will affect the silhouette of the garment. For example, think of a garment made in wool and then image it in silk. How will it drape?

Structural lines

- These are the lines within the design.
- There are four main types of structural lines: curved, diagonal, horizontal and vertical.
- The structural lines can be used to enhance balance and to direct or focus the eye.



- Structural lines can divert attention from less attractive features and enhance the body.
- Curves in a garment make an appearance look softer but can give the illusion of more weight.
- Diagonal lines can help improve the appearance of height and width depending on the size of the line.
- Horizontal lines will widen and shorten the body.
- Vertical lines will create an impression of height and reduce width.
- However, two or more vertical lines on a garment can have the opposite effect.

Shape

- The shape of the garment will depend on personal preferences and the chosen pattern.
- The shape of a garment should accentuate positive body features and detract from negative ones.

Texture

- The texture refers to the feel of the fabric. It can be rough, smooth, silky, shiny, fine, thick, etc.
- Rough texture will absorb light while smooth shiny texture will reflect it. This can affect the colour and the visual impact of the garment.
- Shiny smooth fabrics can make a person appear heavier.
- Dull fabrics will have the opposite effect.
- Rough texture will make the weave appear heavier.

THE PRINCIPLES OF DESIGN

The principles of design are:

- Emphasis
- Balance
- Rhythm
- Proportion and scale
- Harmony

| Principle | Application |
|-----------------------------|--|
| Emphasis | <p>Draws the eye to a specific point and creates interest.</p> <p>Emphasis may be created by buttons, neckline, waistline, etc.</p> |
| Balance | <p>Balance is achieved when the details in a garment are evenly distributed.</p> <p>Balance can be created symmetrically (formal design), e.g. when a pair of trousers has two pockets, or asymmetrically (informal design), e.g. when a pocket is on one side of a shirt.</p> <p>A design can be visually balanced but need not be exactly symmetrical (informal design).</p> |
| Rhythm | <p>Rhythm is achieved if the eye can move smoothly and easily over the garment.</p> <p>It ensures all points of interest are connected without jerking the eye from detail to detail.</p> |
| Proportion and scale | <p>Proportion is the spatial relationship between line, colour, pattern, length and size.</p> <p>If proportions are harmonious the garment is in scale.</p> <p>Proportion and scale are connected to a person's height and size.</p> <p>Small print looks better on a petite frame than a large print.</p> <p>A pattern in bold bright colours will be more dominating than a smaller one.</p> |
| Harmony | <p>A well-designed garment will have balance between proportion, emphasis, balance and rhythm.</p> <p>Everything in the garment should work well together.</p> |

EVALUATION OF A GARMENT

When a garment is completed it is necessary to evaluate the choices that were made regarding:

- Fabric
- Shape
- Function
- Aesthetics
- Pattern
- Style
- Comfort

Design and function

- The function of each garment will vary depending on what it is intended for.
- Design and function may be determined by a social occasion, e.g. a wedding, or by fabric performance, e.g. a fire-proof fabric.
- The garment can only be evaluated on what it is supposed to do. For example, a tracksuit will not fulfil the function of an evening dress.
- How functional a garment is will also depend on materials, finishes, etc.
- The garment, apart from being functional, should also be comfortable to wear and decorative (if appropriate).

Comfort and aesthetic appeal

- Garments should be aesthetically pleasing but they also should be comfortable.
- In Victorian times corsets were worn to accentuate a tiny waist. However, this was most uncomfortable and unhealthy for the wearer.
- A garment should allow for easy movement. This would be particularly relevant for, for example, sportswear as opposed to a dress suit.
- The aesthetics will be more important for some garments than others.
- Line, shape and texture will all contribute to the comfort and the aesthetic appeal of a garment.
- The overall appeal of a garment will be determined by the choice of fabric, colour, shape, finishes, pattern and texture.



What you have learned...

- ❖ Elements of design in garment construction
- ❖ Principles of design
- ❖ Evaluation of a garment
- ❖ Relationship between design and function
- ❖ Relationship between comfort and aesthetic appeal
- ❖ Colour, line, shape, texture, pattern
- ❖ Emphasis, balance, proportion and scale, rhythm, harmony
- ❖ Evaluate fabric, pattern, shape, style, function, comfort, aesthetics

4 Garment construction



What you will learn...

- ❖ The design process of garment construction
- ❖ Prescribed processes
- ❖ Making a garment using a commercial pattern

THE DESIGN PROCESS



Definition...

A design brief is an account of what you are asked to do, e.g. you could be asked to design sports wear, refer to the function of the garment, its cost, etc. At the start of the design process you need to analyse the specifics of the design brief.

The following table contains all the stages which are part of the design process.

| Stage | Application |
|------------------------------------|--|
| Analysis of brief | This is the individual's interpretation of what they are asked to do. A number of tasks can be set with regard to budget, time, skills, comfort and function of the garment, etc. |
| Investigation/ Research | During the investigation process gather information concerning a number of aspects of the garment construction. For example, regarding: The type of design: check out photos, magazines, catalogues, etc. The fabric and fabric suitability: collect samples and carry out fabric tests Stitches and finishes: try out sample stitches and finishes on chosen fabrics The budget: how much money is available for pattern, materials, etc. |
| Possible ideas/ solutions | Pick two or more ideas which answer the brief. Sketching an outline of the garment and the finishes can give you a good indication of the overall finish. Consider all possible alternatives and then choose one. |
| Implementation/ Realisation | At this stage you have to make decisions regarding fabric, shape, finish, etc. A design board/story board is an ideal way to analyse how the complete garment will look. As the next step you have to make the garment and, if necessary, make alterations. |
| Evaluation | Analyse the finished garment. The following areas should be evaluated: Construction Cost Aesthetics Design Comfort Fabric Suitability Meet brief Any changes |

PRESCRIBED PROCESSES

Note: OL students must know two fabric construction techniques and two finishes. HL students must know three of each.

Knowledge of a certain number of construction processes is necessary before commencing garment construction. These include:

- Stitches
- Seams and seam finishes
- Darts
- Sleeves
- Waistbands
- Collars
- Inserting a zip
- Making a button hole

Stitches

- Stitches can be hand- or machine-based.
- Hand stitches include tacking, hemming, overcasting, top sewing, etc.
- Machine stitches include a straight machine stitch, zigzag, interlocking and embroidery stitches.

Seams

- A seam is a method of joining two pieces of fabric together. The raw edges can be seen or concealed depending on the garment.

Types of seam

Plain/flat seam This is the simplest and most popular seam.
It is pressed flat when finished and no stitches can be seen on the right-hand side of the fabric.

This seam is used in shirts, blouses, sleeves, etc.

French seam This is generally used on thin fabrics.
The raw edges are completely concealed.
It is used in silk and organza and in the construction of lingerie, blouses and underwear.
It is more time consuming but gives a good finish.

Lapped/overlaid seam This type of seam is used for attaching yokes, panels and frills.
Stitching is visible on the right-hand side of the garment; this can often be used as a decorative feature.

Machine fell seam

This is a combination of a double machine stitch and a run-and-fell seam.

It is used when a flat narrow seam is required e.g. in jackets, jeans and sportswear.

Seam finishes

Seams need to be finished to prevent the fabric from fraying or unravelling.

| Seam finish | Description |
|-------------------------|---|
| Pinking | This is used on non-fraying fabrics. A special scissors with a serrated edge will cut the fabric in a zigzag shape. |
| Zigzag machining | Suitable on most fabrics except really light ones. Set the machine stitch setting to zigzag. |
| Edge machining | Turn the edge of a seam a few millimetres under, press out flat and machine stitch. |
| Bias binding | Bias binding is placed on the edge of the seam and sewn on. Choose a bias binding in the same colour as the fabric. Lengths of bias binding can also be made to match the colour of the fabric exactly. |
| Other finishes | Blanket stitch, overcasting, etc. |

Darts

- Darts are used to deal with excess fullness in a garment and to shape the garment to the body.
- Darts are generally located at the waist, shoulders, bust and hips.

Darts can be:

- Single pointed (on waist and bust)
- Double pointed, e.g. below the bust line or on the waist of a dress

- Contour darts are used for waist shaping.
- Curved darts are used for fitted bodices.
- Long darts/French darts are used for bust shaping.






Fact...

Tucks, pleats, gathering and frills can also be used to distribute excess fabric.

Sleeves

- Sleeves can be long, short or three-quarter length. The garment can also be sleeveless.
- The sleeves in a garment will be determined by the design, the function and fashion trends.

Types of sleeves

| Type | Description | Diagram |
|------------|--|--|
| Set in | It fits into a circular arm hole. Puff sleeves are also fitted in this way. |  |
| Raglan | It joins the bodice with a slightly curved seam, running diagonally to the neckline. |  |
| Kimono | It is cut in one piece with the bodice. |  |
| Gathered | This sleeve is gathered before it is attached to the bodice. |  |
| Sleeveless | No sleeves are attached and interfacing is used to neaten the arm hole. |  |

Collars

- Collars are used to neaten the raw edges of the neckline.
- Collars can be flat, rolled, stand, shawl or shirt collars.

Flat collar Turns away from the neckline and lies flat on the shoulders, e.g. Peter Pan style collar

Roll collars Stands up above the neck at the centre back and folds over half or less than half the width

Stand collars This type of collar is upright in line and stands towards the chin. It is seen on Chinese style garments.

Waistbands

- Waistlines are neaten using a casing or a waist band.
- A waistband should fit snugly on the waistline; it shouldn't be overtight or strained.

Common fastenings

Fastenings include:

- Zip fasteners
- Buttons and button holes
- Press studs
- Hooks with bars or eyes
- Eyelet holes tied together with lace or fabric

Zip fasteners

Zips are available in a wide range of sizes and colours.

If you can't find the exact length you need use the next length up from the one you require.

Zips are also available in various weights (light weight or heavy weight). Use the appropriate one for the fabric.

How to insert a zip

- Prepare the seam beforehand.
- Finish the seam and reinforce below the position of the zip.
- Tack the length of the seam opening together and press flat.
- Position the zip on the wrong side behind the tacked seam. Allow 2 inches from the top.
- Ensure the zip teeth are aligned with the seam.
- Pin and tack the zip into place 5mm from the teeth.
- Ensure that the zip is correctly positioned before sewing on the right side along the tacking line.
- At the end of the first vertical line, leave the machine needle in the fabric, lift the presser foot and turn the fabric. Replace the presser foot and stitch horizontally along the tacking line.
- Leave the needle in the fabric, lift the presser foot, turn fabric and continue stitching along the tacking line.
- Complete with a back stitch and remove the tacking.

! Fact...

The waistband is applied after the zip has been inserted.

! Fact...

A button hole can be horizontal, e.g. in waistcoats and cuffs, or vertical, e.g. in waistbands, blouses and skirts.

How to make a machine worked button hole

- Decide on the button and measure its diameter.
- Allow between 2-6 mm extra depending on the thickness of the button.
- Tack the outline of the button hole.
- Place markings within the centre of the button hole foot.
- All modern sewing machines have a preset programme for button holes.
- Follow the manufacturer's instructions as machines may vary.
- Sew buttonhole.
- Slit the button hole down the centre, using a stitch ripper.

Button holes

It is vital to know the size of the button before making the button hole.

- Allow between 2–6mm extra depending on the thickness of the button.
- Buttonholes are cut on the straight grain across and with a double layer of fabric.
- Button holes on female garments fasten right over left and the opposite on male garments (left over right).
- Button holes can be hand stitched or machine stitched.

Types of button holes

Hand stitched The opening is edge stitched with bar tacks at each end for reinforcement.

Machine stitched A preset programme on the sewing machine stitches two rows with bar tacks.

Bound button holes Strips of fabric are stitched to the opening.

Hems

Hems are the last part to be made in a garment.

The main types of hems are stitched, turned up and faced hem.

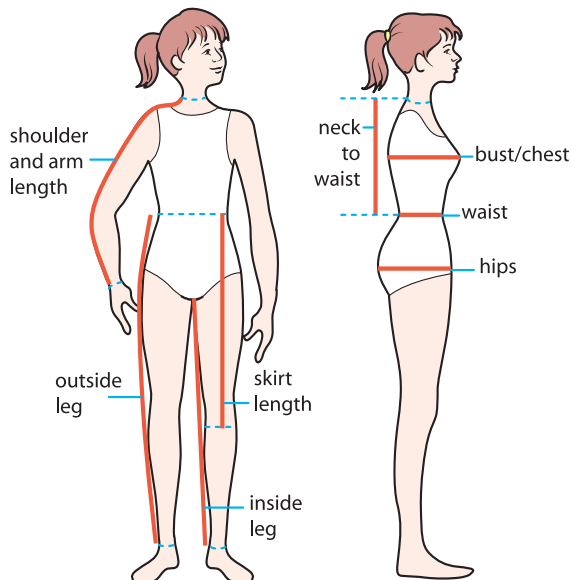
The type of hem which is chosen will depend on the weight and type of the fabric, the function and style of the garment and personal preferences.

MAKING A GARMENT USING A COMMERCIAL PATTERN

Commercial patterns are generally used for making garments as they provide detailed instructions and pattern layouts for the particular item. Using a commercial pattern is quicker and easier than making your own patterns.

1 Finding your body measurements

- Before purchasing a commercial pattern it is imperative to have the correct body measurements.
- Stand up straight, shoulders back and feet on the ground.
- Wear a leotard or tight fitting underclothing. Remove bulky outer clothing to get correct measurements.
- The following measurements are needed:



| | | | |
|-------------------------|----------------------|------------------------------|----------------------|
| Waist | <input type="text"/> | Hip | <input type="text"/> |
| Bust/chest | <input type="text"/> | Neck to waist | <input type="text"/> |
| Shoulder length | <input type="text"/> | Sleeve length | <input type="text"/> |
| Trouser or skirt length | <input type="text"/> | Crotch length (for trousers) | <input type="text"/> |

2 Deciding on which pattern to buy

- There is an extensive range of commercial patterns to choose from, e.g. from Simplicity or Vogue.
- The patterns can be single-sized (e.g. size 12 only) or multi-sized (e.g. size 8-14).
- Patterns are chosen from a catalogue.
- Check the measurements on the back of the pattern envelope against your own

measurements to decide on the size and the quantity of fabric required.

- A simple design with few pattern pieces is easier to make than a complicated one, especially for somebody with little experience.

3 How to read the pattern envelope

The pattern envelope contains the following information.

| | |
|--|---|
| <p>Envelope front</p> <p>Manufacturer's name</p> <p>Pattern number (sketch)</p> <p>Size or sizes measurements</p> <p>Image of garment</p> <p>Any variations on design</p> | <p>Envelope back</p> <p>Style number</p> <p>Front and back views</p> <p>Standard body</p> <p>Measurements of finished garment</p> <p>Suggested fabrics</p> <p>Quantity of fabric needed</p> <p>Notions, e.g. buttons, zips, etc.</p> <p>Other requirements, e.g. interfacing</p> |
|--|---|

Fact...

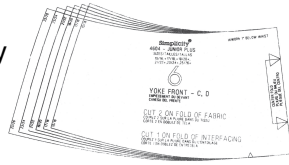
Buying the fabric

- Buy only recommended fabrics.
- Avoid stripes or plaids which may need to be matched.
- Avoid fabrics with a nap, e.g. velvet.
- Fabrics are available in number of widths, e.g. in 115 or 140cm.

4 Using the pattern

Inside the pattern you will find:

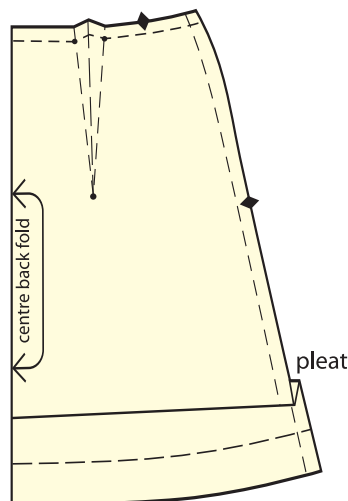
- Detailed instructions regarding the layout and construction of the garment
- A tissue pattern with markings which identify the pattern piece by number or letter



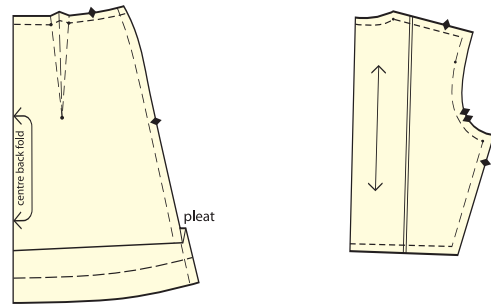
On the pattern pieces you will also find:

- Cutting lines: These are continuous black lines.
- Multi-size cutting lines: Follow the line which corresponds to your size.
- Instruction 'Place on the fold': The pattern piece with this instruction has to be placed on a fold line.
- Centre front/back: This information needs to be transferred onto the fabric.
- Alteration line: This line indicates where to best make alterations on the piece.
- Position of darts: Transfer these marks onto the fabric for sewing darts.
- Buttonholes/zip: Transfer this information onto the fabric
- Notches (single, double, triple): Diamond-shaped symbols which are used for matching and joining pieces, e.g. for side seams, shoulder and bodice.
- Grain line position: This indicates where the pattern piece must be placed straight on the grain line.
- Hemline position of finished length: Transfer markings onto back and front.

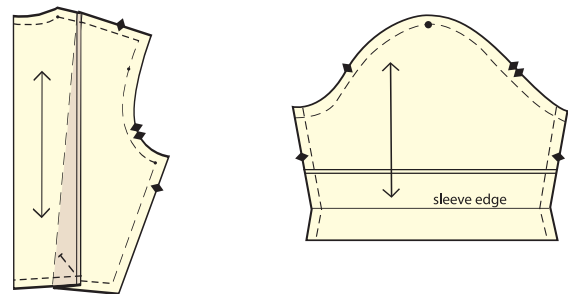
- Cut out the pattern pieces for the garment you are making.
- Follow the guidelines for the pattern piece layout and place the pattern onto the fabric.
- Transfer any necessary markings.



5 Modifying patterns



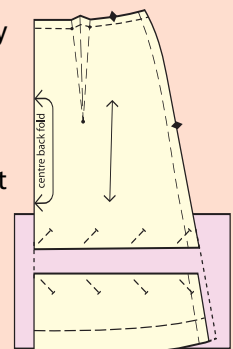
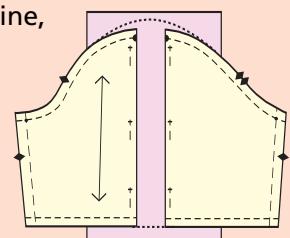
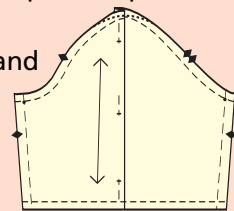
- A pattern piece can be altered to change its length (longer or shorter) and its width at waist and hips (enlarge or reduce).



- These alterations can also be made to the bodice and sleeves.

How to lengthen or shorten a sleeve, bodice, lower hip line and hem line

- To lengthen a part cut the pattern piece on the alteration line.
- Separate out the pieces and insert the extension tissue paper between the two pieces (see diagram).
- To lengthen the hem line, insert extension tissue paper and tape into position to the required length.
- Extend the markings for seam lines, cutting lines, etc.
- The length is shortened by pleating away the unwanted length (see diagram)
- Ensure the pleat is at right angles to the straight grain line and equal in width to half the amount to be shortened.



H

How to modify the width of a skirt

! Fact...

Remember to make the adjustments to both the back and front pieces.

- 1 Increase the waistline**
 - If an increase of 2cm or less is required add this to the side seams, cut extension paper and tape in place.
 - Redo the cutting line, sewing line, etc.
 - If a wider increase is needed widen the darts or use a larger size.
- 2 Reduce the waistline**
 - Extra darts can be added to reduce the waistline. Ensure the darts are well balanced at either side.
 - Alternatively reduce width by 2cm at the side seams and redraw the markings as before.

- 3 Increase the hipline**
 - An increase of up to 5cm can be added to the seam line
 - If an increase of 8cm is needed remember that only 2cm can be added at each seam line back and front.
- 4 Reduce the hipline**
 - Take away one-quarter of the reduction on each side seam and redraw the marking lines as outlined before.
- 5 Laying out the pattern pieces**
 - When the pattern pieces have been cut, press your fabric and follow the pattern layout instructions.
 - Transfer the pattern markings, using tailor tacks, dressmaker's carbon paper and wheel or tailor's chalk.

H



What you have learned...

- | | |
|---|--|
| <ul style="list-style-type: none"> ❖ The design process of garment construction | <p>Analysis of design brief, research, ideas and solutions, implementation, evaluation marketing and advertising</p> |
| <ul style="list-style-type: none"> ❖ Prescribed processes | <p>Stitches, seams, darts, sleeves, waistbands, collars, inserting a zip, making a button hole</p> |
| <ul style="list-style-type: none"> ❖ Making a garment using a commercial pattern | <p>Body measurements, patterns and how to read and use them, modifying patterns (lengthening and shortening, enlarging and reducing)</p> |

QUESTIONS

- 1** Outline the elements of design and discuss their application to garment construction. (12)
- 2** What factors should be considered when choosing colour? (6)
- 3** Discuss the need to evaluate the design and function of a completed garment. (10)
- 4** List the information found on commercial pattern envelopes. (10)
- 5** What is a design brief? (6)
- 6** Outline how to prepare a pattern piece for modification (shorten skirt length and widen a hipline). Include a diagram in your answer. (12)

5 Textile science



What you will learn...

- ❖ Classification of fibres
- ❖ Profiles of natural, manmade and blended fabrics
- ❖ Fibre properties
- ❖ Fibre production
- ❖ Fibre identification tests
- ❖ Yarn production
- ❖ Yarn modification
- ❖ Fabric construction techniques
- ❖ Fabric finishes
- ❖ Colour applications
- ❖ Design applications
- H ❖ Fabric performance testing

1 CLASSIFICATION OF FIBRES

- Fibres are classified according to their source which can be natural, regenerated or synthetic.
- There is an enormous variety of fibres available.

Natural fibres

| Fibre | Source | Uses |
|---------------|---|---|
| Cotton | Cotton plant (Genus <i>Gossypium</i>) | Curtains, clothing, sewing thread, bed linen |
| Linen | Flax plant | Table cloth, clothing, curtains |
| Wool | Sheep, e.g. Merino (USA) | Blankets, clothes, jumpers, knitted items, carpet |
| Silk | Silk worm (<i>Bombyx mori</i>) | Clothing, curtains, cushions |

Regenerated fibres

| Fibre | Source | Uses |
|----------------------|--|---|
| Rayon | Cellulose (refined wood pulp) | Cushions, clothing, curtains |
| Viscose rayon | Cellulose (wood pulp) and viscous liquid | As above |
| Acetate | Ester of cellulose and acetic acid Acetic anhydride and sulphuric acid | Clothing, curtains, filter of cigarettes |
| Triacetate | Generic description of the acetate fibres Same source as but acetate manufactured differently | Knits, pleats, curtains, clothing |



Fact...

Synthetic fibres are based on oil, coal, petroleum, air and water. These raw materials are used in different proportions and combinations which produces different polymers and different synthetic fibres.

Synthetic fibres

| Fibre | Uses |
|-------------------|---|
| Nylon | Hosiery, lingerie, knitted fabrics, carpet, upholstery fabric |
| Polyester | Thread, home furnishings, clothing, curtains |
| Acrylic | Used as a substitute for wool and silk Blended with wool or cotton or other fibres, e.g. rayon blankets, carpet, sportswear, hosiery |
| Modacrylic | Used in blends Curtains, knitted products, blankets, fake fur Pleats and creases are preset |
| Elastomer | Rubberlike substance with excellent elastic recovery Swim wear, lingerie, underwear, bed clothes |

2 FABRIC PROFILES

Fabric can be produced from three main types of fibres:

- Natural fibre, e.g. cotton
- Manufactured fibre, e.g. nylon
- Blended fibre, e.g. polycotton, a mixture of polyester and cotton

H

The historical development of fabrics

5000 BC Flax is one of the first known fibres. The burial shrouds for the Egyptian pharaohs were made from flax.

3000 BC (Stone Age) During the Stone Age the Egyptians discovered cotton and started using it for clothes.

2600 BC The Chinese discovered the production of silk and its use for garment construction.

Manmade fibres The following fibres were developed in the USA since the 1900s. Research is ongoing and new fibres and finishes are constantly being researched.

| | |
|-------------|--|
| 1910 | Rayon |
| 1924 | Acetate |
| 1939 | Nylon |
| 1950 | Acrylic |
| 1953 | Polyester |
| 1954 | Triacetate |
| 1959 | Spandex (can stretch 100%) |
| 1961 | Polypropylene (Nobel Prize winning fibre) |
| 1989 | Microfibres |
| 1993 | Lyocell (made from wood pulp) |

Natural fabric – cotton



Fact...

The origin of cotton is unsure but there is archaeological evidence to suggest that it was grown in Egypt as early as 12000 BC.

Fibre production

| Procedure | Description |
|----------------------|---|
| Harvesting | 180 days after planting the cotton fibre is taken from the plant with machines. |
| Ginning | The cotton is taken to the ginnery where the cotton lint is separated from the seed. Any unwanted foreign matter such as dirt, twigs and leaves is also removed. |
| Baling | The cotton is packed into large bales. |
| Grading | The cotton is then graded for sale. The grading will depend on staple length, colour, brightness, amount of foreign matter and fineness. The quality is affected by the type of plant and the growing conditions. |
| Milling | When the cotton bales reach the mill, they are opened up and any foreign matter is removed. The bales might be blended at this stage. |
| Final process | Huge machines with fans and beaters clean and loosen the material which will then form continuous soft fleecy sheets called laps and which look like large rolls of cotton wool. |



Fact...

The seeds are used in cattle feed and cotton seed oil.

Properties of cotton

Durable
 Inexpensive
 Good conductor of heat
 Absorbs water
 Wet stronger than dry
 No build-up of static electricity
 No elastic properties
 Attacked by mildew, bacteria and insects,
 e.g. silverfish
 Changes to yellow and degenerates in strong
 sunlight

Uses

Clothing
 Bed linen
 Uniforms
 Sewing thread
 Curtains
 Upholstery material

Identification tests

1 Burning test

- Cotton burns readily and quickly.
- It smells of burning paper.
- It leaves a residue of fluffy grey ash.



Fact...

Cotton will scorch if ironed at too high a temperature. The use of starch increases the tendency to scorch.

2 Microscopic evaluation of cotton



Fact...

Microscopic evaluation involves studying the fibre under a microscope. The fibre can be observed from a longitudinal or cross-sectional perspective.

Use undyed fibre on a black background for best results.

- Procedure:
 - 1 Remove a tuft of fibre.
 - 2 Place it on a black background and place a cover slip over it. The fibres should be packed tightly together.
 - 3 Place under the microscope. A cross-section view will show flat elongated kidney-shaped fibres. A longitudinal view will show ribbon-like shapes with a twist at irregular intervals.



Yarn production

The production of cotton yarn involves the following processes:

1 Carding

- This cleans and sorts out the fibres.
- Fibres which are too short are removed.

2 Combing

- Combing is used if high quality, smooth, fine fibres are required.
- The slivers from the carding machine are processed in the break drawing machine which smoothes out the slivers and combines them.
- The slivers are straightens out in a lapper and wound into rolls.
- Shorter fibres are removed which, at this stage, might be up to 20% of the fibres.

3 Finisher drawing

- The slivers are drawn out and combined to produce even, regular slivers.
- A roving frame winds the slivers onto bobbins ready for spinning.

4 Spinning

- The drawn out strands of fibre are twisted together during spinning to form yarns. This is completed in three stages:
 - Drawing out the roving: The slivers are fed between two rollers to reduce the diameter of the fibre by one-eighth. After that they are wound onto bobbins.
 - The strands are twisted.
 - The twisted yarn is wound onto a bobbin.

H Yarn modification

! Fact...

The modification of yarn involves a change in its basic structure.

- In cotton modification the cellulose forms a derivative which produces different types of fibre with different properties.
- Mercerisation is one type of cotton modification.
- Mercerisation adds lustre, improves dyeing ability and increases strength.

Process of mercerisation

- 1 The cotton is wetted in water.
- 2 It is placed in a caustic soda bath.
- 3 It is fed between two rollers to ensure even distribution and penetration of the chemicals (caustic soda/sodium hydroxide NaOH).
- 4 Any excess of the caustic solution is removed.
- 5 A tenter frame (this holds the fabric under tension) is used to maintain the specific dimensions of the fabric.
- 6 The cotton is washed, neutralised, washed again and dried.

Manufactured fabric – nylon

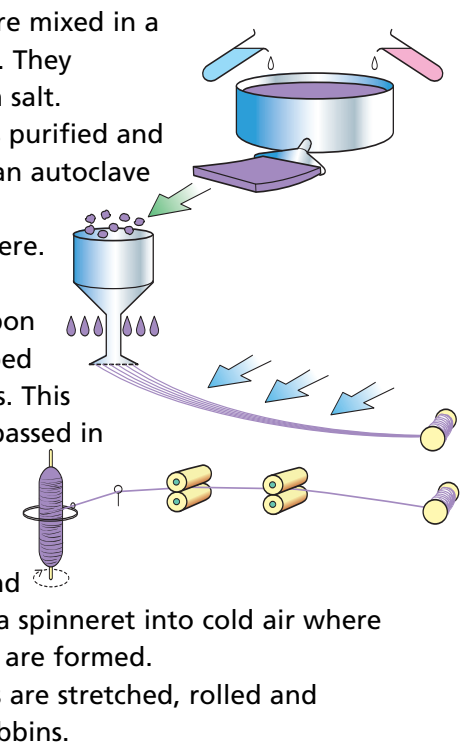
Fibre production

! Fact...

The basic raw materials of all synthetic fibres are oil, petroleum, coal, air and water.

- The chemicals used in the production of nylon are adipic acid and hexamethylene diamine.

Adipic acid + hexamethylene diamine = water + hexamethylenediamineadipide

- 1 The chemicals are mixed in a cold water tank. They produce a nylon salt.
 - 2 The nylon salt is purified and polymerised in an autoclave with a nitrogen-based atmosphere.
 - 3 The nylon is extruded in ribbon form and chopped into small pieces. This step may be bypassed in some nylon productions.)
 - 4 The nylon is melted again and passes through a spinneret into cold air where the nylon fibres are formed.
 - 5 The nylon fibres are stretched, rolled and wound onto bobbins.
- 

Properties of nylon

Strong and durable
Elastic
Crease and wrinkle resistant
Lightweight
Absorbs hardly any moisture
Can be blended successfully with other fibres
Can have a number of finishes applied
Produces static electricity
Has the ability to permanently set
Poor resistance to acids, sunlight and heat
Attacked by ants, crickets and cockroaches

Uses

Home furnishings, e.g. cushions, bed clothes, curtains
Hosiery and lingerie
Upholstery fabrics
Clothing

Identification tests

1 Burning test

- When nylon is placed near a flame it shrinks away.
- It forms a fine grey residue that will harden on cooling.
- It smells like burning plastic.
- It is self extinguishing.



2 Microscopic test

- For procedure see Cotton page 20
- Nylon fibres are smooth and shiny.
- A cross-section view will show that they are round, trilobal or square.
- A longitudinal view will show that they consist of transparent fibres of uniform diameter and a slightly speckled appearance.



Yarn production

- There are two types of yarn production processes:
 - Continuous
 - Discontinuous
- The nylon filament is wound onto spools.
- It is extruded and then drawn out to develop its strength, molecular orientation and fineness.
- The yarns are twisted and wound onto bobbins.

Yarn modification

Due to its versatility nylon can be modified in a number of ways:

- 1 The lustre of nylon can be altered by the addition of titanium dioxide which can produce any lustre from a dull to a bright finish.
- 2 A change in texture is brought about by modifying the cross section of the fibres which can become hollow filaments or triangular, irregular and trilobal shapes. One type of modification which changes texture is adding bulk to make nylon suitable, for example, for crimping. Another type produces a silky, crisp-like finish with reduced pilling, a sparkle effect and greater resistance to soiling.
- 3 Graft polymerisation: Other chemicals can be added to the fibre molecules which increase moisture absorbency and reduce the build-up of

static electricity. This can make the fabric more comfortable to wear.

- 4 The addition of antioxidants and light absorbant chemicals can help reduce damage from UV rays and sun light.

Blended fabrics – polycotton

- Fibres are blended to improve the overall qualities and aesthetic of the fabric.
- Each fibre when it is blended maintains its own properties which benefit the new fibre.
- Fibres can be blended with natural or manufactured fibres.
- In general, however, blended fibres consist of a combination of manufactured fibres or manufactured and natural fibres.
- One of the most popular blends of fibres is cotton and polyester (polycotton).

Fibre production

1 Polyester

- Polyester production is based on the reaction of ethylene glycol and terephthalic acid which are polymerised by condensation.

! Fact...

Condensation polymerisation eliminates a water molecule during the link-up.

- The repeat unit of the polymer is referred to as polyethylene terephthalate (PET).
- The polyester is cooked and solidified.
- It is melted, placed in a spinneret, cooled and wound onto a spool.

! Fact...

Dacron and Terylene are commercial brands of polyester.

2 Cotton

See page 19

! Fact...

Shorter fibres are called staple fibres.

3 Blending of fibres

- Manmade fibres such as polyester have long continuous fibres which, unlike the shorter cotton fibres, are unsuitable for blending.
- They need to be cut before blending.

Properties**Uses****1 Polyester**

- Strong
- Resists shrinkage and stretching
- Dries quickly
- Easy to dye, wash and dry
- Abrasion resistant
- Resistant to acids and oxidising agents

2 Cotton

See page 20

3 Polycotton

It has the desirable properties of both cotton and polyester, e.g. it is breathable, strong, easy to dye, inexpensive, etc.

Clothing
Household furnishings
Towelling

Identification tests**Polyester****1 Burning test**

- When near a flame polyester will melt and shrink away from the flame.
- It will melt slowly and produce black smoke.
- It is self extinguishing.
- It leaves a grey coloured hard residue.
- It produces an acrid odour.

**2 Microscopic test**

- For procedure see cotton page 20.
- Cross-section view: round shape; variations: T-shaped, pentalobal, trilateral
- Longitudinal view: rod-like appearance, smooth and uniform in diameter

**Cotton****1 Burning test**

- See page 20

2 Microscopic test

- See page 20

Yarn production

- 1 Cotton and polyester fibres are used to make polycotton.
- 2 The polyester fibres are shortened so that both fibres are the same length.
- 3 The fibre bales are opened, cleaned and blended.
- 4 The fibres are blown (put into a collecting cylinder where air is forced through) and collected in another cylinder about half to three-quarter inch thick.

Fact...

Cotton fibres will require more opening (separating) and blending than manmade fibres as they contain more impurities.

- 5 The fibres are carded and slivers produced.
- 6 Cotton fibres are generally combed before carding if used in a polycotton blend.
- 7 After carding the slivers for the different fibres are drawn together to provide drawn sliver. A 50/50 blend of cotton and polyester will equal one sliver of cotton and one sliver of polyester.
- 8 The roving frame pulls out the fibres and reduces the size of the diameter.
- 9 The fibre is wound onto a bobbin and drawn out to the required thickness.

H Yarn modification

1 Polyester

- The cross section which can be trilobal or pentalobal etc. and which has different characteristics can be altered to change the drape and appearance of the fibre.
- Dyeing chemicals can be added to improve the dyeability of the fibre.
[end]

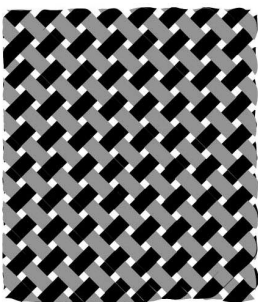
2 Cotton

- See page 21

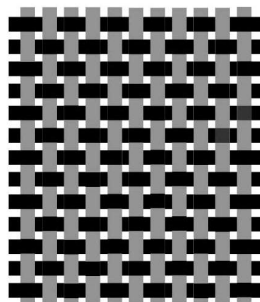
3 FABRIC CONSTRUCTION TECHNIQUES

- There are three primary types of fabric construction:
 - 1 Woven fabrics
 - 2 Knitted fabrics
 - 3 Non-woven fabrics

Woven fabrics



▲ Warp



▲ Weft

Weaving

- Weaving consist of a warp (vertical) thread and a weft (horizontal) thread.
- The weft threads run across the fabric's width.
- A roller is used to hold the warp threads in place and a shuttle is used to carry the weft thread across the warp.
- A batten is used to push each line of weft closer together.
- The shuttle will change direction each time it passes over.
- The edge of the fabric where the shuttle returns is called the selvedge.



Definition...

A woven fabric consists of yarns interlaced at right angles in an established sequence or pattern.



Fact...

In the nineteenth century Joseph Jacquard and Edmund Cartwright developed the first mechanical looms.

There are many different methods of weaving but the most common ones are:

- Conventional warp preparation
Sectional warping
- Using a rapier loom instead of a shuttle loom

Types of weaves

| Weave | Uses |
|--------|---------------------------------------|
| Plain | Gingham, chiffon, muslin |
| Figure | Jacquard damask, brocade, table cloth |
| Basket | Oxford fabric |
| Pile | Corduroy, velveteen, velour |
| Twill | Denim, gabardine |
| Double | Blanket, upholstery |
| Satin | Moleskin, slipper satin |

Knitted fabrics

- Knitted fabric is stretchy and warm.
- It can lose its shape if not cared for properly.
- It is affected by acids and alkalis.



Fact...

Knitted fabrics date back to AD 256.

Knitting

- Knitting involves forming a fabric by inter looping yarns.
- Knitting can produce chunky, thick or fine fabric.
- Knitting can be carried out by hand or machine.
- Knitting with a machine is quicker and less labour intensive.

Types of knitting

Weft knitting

A single yarn is used on a flat or circular machine to produce a continuous row of horizontal stitches.
Examples: double knit, single knit, patterned knit

Warp knitting

This produces vertical loops which interlock horizontally. More than one yarn is used.
Warp knitting is fast and ideal for large quantities.
Examples: crochet, tricot knit (lingerie), raschel knit (upholstery fabric), milanese knit

Non-woven fabrics

- Not all fabrics are made using interlacing yarns.
- Felt is produced from wool fibres. The process involves heat, moisture and pressure.
- The connection between the fibres isn't very strong so the fabric can pull apart easily.
- Felt, however, will not fray or unravel. It is used in slippers, hats, arts and crafts.
- Felt fabric can vary in thickness, e.g. from 1/32 inch to over 3 inches, depending on the function.
- Felt cannot be washed but it can be sponged clean with warm soapy water.



Fact...

Felt can also be made from rayon, cotton, fur or a combination of fibres with wool.

Felt production – bonding

- Felt can be made from natural or manmade fibres.
- The fibres are laid out in sheets.
- An adhesive is applied under heat and pressure.
- The excess solvent is removed by evaporation.
- This is a cheap method of production. It is used for disposable dish cloths and stiffening clothing.

4 FABRIC FINISHES

- Fabric finishes are used to improve the handling, appearance and performance of a fabric.
- Finishes can be applied at any stage of production. For example, fabric is mercerised at an early stage of the production process.
- There is a huge variety of finishes available to make fabrics, for example:
 - Colourfast
 - Shrink resistant
 - Crease resistant
 - Stain resistant
 - Pleated
 - Pre-shrunk
 - Antibacterial
 - Antistatic
 - Shower-proof
 - Easy care, etc.

Examples of finishes

Abrasion resistant finishes

Natural fibres and some manmade fibres can be damaged by rubbing. A soft thermoplastic resin which improves the abrasion resistance is applied to the fabric. It is often used on trouser pockets, waistbands linings and hat linings.

Water-repellent finishes

Water-repellent finishes are based on silicone, pyridinium, ammonia compounds, fluorochemicals and methylol stearamides.



Fact...

The fluorochemical Scotchguard is available in aerosol form for applying a temporary water-repellent finish to shoes etc.

Some water-repellent or water resistant fabrics are porous which means the fabric is still breathable and more comfortable to wear. Other waterproof finishes are non-porous and uncomfortable to wear.

Flame-proofing finishes

An organic compound containing phosphorus and chlorine is applied to the fabric. This compound reacts with ammonia and produces an insoluble polymer and flame-proof finish. Fabrics with a flame-proof finish have to be laundered carefully so as not to remove the finish.

5 COLOUR APPLICATIONS

Colour can be applied to fabrics by:

- Dyeing
- Printing

Dyeing

- Dyeing is the addition of colour to a fibre or fabric.
- Dyes can be natural or synthetic.
- The colour can be added at different stages of fabric manufacture. For example, it can be added to the fibre, the yarn or the fabric.



Fact...

A good dye should be colourfast, lightfast, perspirationfast, salt-proof, chlorine-proof and insoluble in dry cleaning fluids.

Methods of dyeing

| | |
|---------------------|--|
| Fibre dyeing | The loose fibres are placed in a vat containing the dye dissolved in water. The water has to be warm to ensure that the dye will penetrate the fibres. |
| Yarn dyeing | The bobbins or cones with the yarn are placed on perforated steel rods which are placed in the dye bath. |
| Piece dyeing | The fabric is first made and then placed in the dye bath. Sometimes the dye does not reach all the fibres which can leave some of them undyed. |

There are numerous types of dyes, e.g.

- Direct dyes
- Acid dyes
- Disperse dyes
- Azoic dyes
- Basic dyes
- Vat dyes

Direct dyes

- Direct dyes are water soluble and are generally applied to cellulose-based fibres.
- The dye is dissolved in a water bath.
- Salt is added to control the rate of absorption of the dye by the fabric.
- The fabric is then placed in the water bath.
- The colourfastness is inferior to other types of dye.

Printing

- Printing is applying a coloured pattern, motif or any other design to the surface of a fabric.
- After the application the print is heated by steaming to fix the colour.
- There are a number of different methods of printing, e.g.:
 - Direct printing
 - Dyed printing
 - Resistant printing
 - Discharge printing

Methods of printing

Resistant printing The principle of this method is to protect parts of the fabric from the dye. It is used, for example, in tie dyeing, batik and screen printing.



Web link...

www.fabriclink.com

Discharge printing This method of printing involves the removal of dye from a fabric so that a pattern is formed. The area where the dye has been removed can be left white or another colour can be applied. To remove the dye a design roller is coated with bleach which will remove the colour.

6 DESIGN APPLICATION

Designs can be added to fabric in a number of ways, e.g.

- By weaving (basket weave, satin weave, etc.; see page 24)
- By printing (discharge printing etc.; see left column) or
- By fabric/fibre applications (appliqué, embroidery, etc.)

Fabric or fibre applications include:

- Embroidery
- Appliqué
- Quilting
- Embossing

Embroidery

- Embroidery applies a design to the surface of a fabric.
- Embroidery can be hand or machine made.
- The design is applied with a thread.
- A fabric of any weight can be used. Sheer backing fibre becomes invisible when the design is completed.
- Embroidery thread is usually cotton, silk, polyester or wool.
- There are a number of commonly used stitches, e.g. stem stitch, satin stitch, lazy stitch, daisy chain stitch.

Appliqué

- In appliqué a piece of fabric is decorated with cut-out pieces of fabric.
- The cut-out pieces are attached to a fusible web and stitched into place.
- The appliqué can be applied by hand or machine.
- It is used for children's bed coverings, school badges, etc.

7 FABRIC PERFORMANCE TESTS

Fabric performance tests are used to analyse the various properties of fabrics. They test:

- Abrasion resistance
- Tearing resistance
- Flame resistance
- Colourfastness
- Wrinkle recovery
- Pilling and snagging
- Resistance to water

Abrasion resistance test

| | |
|------------------|---|
| Equipment | A wooden block Pieces of fabric – natural and synthetic Record sheet |
| Procedure | Stretch the fabric across the wooden block. Rub the fabric vigorously for a few minutes. Record any changes in the fabric. To compare two types of fabric, e.g. a natural and a synthetic fabric, count the number of rubs for each fabric and ensure they are the same to allow an accurate analysis. |

Colourfastness test

| | |
|------------------|---|
| Equipment | Coloured and white fabric Warm/hot water Record sheet |
|------------------|---|



Fact...

Colours can be removed or affected by rubbing. This is referred to as croking.

Procedure

| | |
|--------------------|--|
| Dry rubbing | Place a small square of white cotton, e.g. muslin, over your finger. Rub the coloured fabric with the white fabric at the same spot |
|--------------------|--|

with even pressure.
Repeat at least ten times.
Observe whether the colour rubs off.

Wet rubbing

Wet a piece of fabric with warm water.
Rub the fabric as before.
Observe if there is any colour transfer.

Washing

Wash the test fabric together with a white piece and check whether the dye transfers.
Record your results.

Complete an analysis of the test fabric with regard to colourfastness.



What you have learned...

| | |
|---|--|
| •••❖ Classification of fibres | Natural fibres (wool, silk, linen, cotton), regenerated fibres (rayon, viscose rayon, acetate, triacetate), synthetic fibres (nylon, polyester, acrylic, modacrylic, elastomers) |
| •••❖ Profiles of fabrics | Natural fabric (cotton), manufactured fabric (nylon), blended fabric (polycotton) |
| •••❖ Fibre properties | |
| •••❖ Fibre production | |
| •••❖ Fibre identification test | Burning test, microscopic test |
| •••❖ Yarn production | |
| •••❖ Yarn modification | |
| •••❖ Fabric construction techniques | Weaving, knitting, bonding |
| •••❖ Fabric finishes | Abrasion resistant finish, water-repellent finish, flame-proofing finish |
| •••❖ Colour applications | Dyeing, printing |
| •••❖ Design applications | Embroidery, appliqué |
| H •••❖ Fabric performance testing Abrasion resistance test, colourfastness test | |

QUESTIONS

- 1 What is a natural fibre? Give two examples. (8)
- 2 Differentiate between a regenerated fibre and a manmade fibre. (12)
- 3 Outline the properties of cotton. (8)
- 4 What is carding and combing? (10)
- 5 What is a blended fabric? Give one example. (6)
- 6 What are the main advantages of blended fabrics? (8)
- 7 List two ways of applying colour to a fabric. (12)