ELECTIVE: Textiles, Fashion and Design

CONTEMPORARY CLOTHING AND FASHION

INFLUENCES ON THE DESIGN AND CONSTRUCTION OF CLOTHING

Social influences
- First and Second World Wars
- Status of women, working outside the home, equality
- Changes in leisure activities, new casual wear styles
- Social conformity, conforming to the latest fashion trends
- Socio-economic status, income, occupation, lifestyle
- Entertainment industry e.g. World Music Awards
- Media, fashion magazines, film-stars, pop idols
- Emphasis on youth and youth culture

Economic
- State of the economy is reflected in fashion trends
- Economic recessions influence consumer demands
- Family income affects consumer spending
- Employment/unemployment affect disposable income
- Cost of functional clothing versus decorative clothing
- Introduction of ‘off-the-peg’ and seasonal collections
- World events e.g. availability of raw materials

Industrial
- Inventions (Spinning Jenny, the sewing machine)
- Industrial revolution (power-driven machinery, mass production)
- Creation of new fabrics e.g. synthetics (nylon)
- Scientific advances e.g. new microfibres, and improved man-made fibres
- Computerisation e.g. computer aided design (CAD)
- Improved systems of communications and transport

Factors that influence clothing requirements
The main factors that influence clothing requirements are approval, identification, modesty, personality, protection and status. The following are also factors:
- Advertising and merchandising
- Appearance of design and fabric
- Availability
- Age of individual
- Care label
- Cost, value for money
- Cultural and social acceptability
- Fit and specific requirements
- Functions, suitability for purpose
• Fashion trends, trend setters
• New fabrics and finishes
• Personal preferences, image

Examples of styles: casual, classic, country, executive or work wear, special occasion, sporty or leisure, teenager or youth culture, outdoor e.g. hiking
Categories of design: designer, ready-to-wear, bridge, contemporary, childrenswear

**BASIC ELEMENTS AND PRINCIPLES OF FASHION DESIGN**

**Elements of design**
- **Colour** is the most prominent feature of a garment. Colours can be considered in terms of hue, intensity, value, tints, warm, cool, neutral, primary, secondary and tertiary.
- **Line** refers to body, silhouette and structural lines. Curved, diagonal, horizontal and vertical lines are used to influence the garment design and how it drapes on the wearer.
- **Shape** is the outline or silhouette of the garment.
- **Texture** refers to the softness or crispness of a fabric as determined by the type of fibre and weave used.
- **Fabric** is influenced by trends, drape, textures, colour, finishes and patterns.

**Principles of design**
- **Balance**: designs can be balanced vertically, symmetrically or asymmetrically
- **Emphasis**: creates a focal point or interest in colour, line, texture and design details
- **Harmony**: this is achieved when all elements and principles of design work well
- **Proportion**: relationship between different parts of the garment, equal or unequal
- **Repetition**: gives garments rhythm through colour, line and shape. It can be continuous line movement, graduated, radiated, unequal or uniform

**CURRENT FASHION TRENDS FOR WOMEN (2003)**

**Casual wear**: more feminine in design, emphasis on colour, fit and shape, variety of traditional and modern fabrics, trend towards feminine decorative prints

**Knitwear**: short, fine-knitted jumpers and cardigans, twin-sets, oversized jumpers

**Skirts**: short, knee or ankle length, gathered, pleated, ruffled, frilled or scalloped hems, A-line or tiered, casual or semi-formal in style

**Tops**: variety of colours, fabrics and styles, short, skimpy in length, camisole tops with spaghetti straps, one-shoulder tops, variety of sleeve lengths, beads, embroidery, fringes, frills, ruffles

**Trousers**: hipsters with straight, bootleg or wide designs, pockets on the side, side openings or classic front opening

**Work wear**: combinations of tailored jackets or coats with trousers, skirt, or dress, classic styles, nipped at the waist, variety of sleeve lengths, fitted zipped jackets or knee-length coats, classic shirts or ribbed tops

**Evening wear**: long or short dresses in luxury or blended fabrics, tailored or loose trousers, plain or embroidered in casual, semi-formal or formal styles

**Fabrics**: denim, luxury blends (cashmere, silk) leather, metallics (satin, leather), muslin, natural, synthetics and man-made and blended fibres
Womenswear labels

CURRENT FASHION TRENDS FOR MEN (2003)

Styles and colours are more limited for men’s clothing than for women, featuring traditional, classical, casual outdoor styles and semi-formal styles. A limited range of colours is used except for shirts, ties and socks. Colours tend to be dark for formal wear, with brighter colours for other ranges.

Casual wear: designs based on the functions of leisure activities, emphasis on practicality, fit, shape and fabrics, limited styles, adapted to everyday usage including work wear, comfortable to wear and easy care

Trousers: long with or without turn-ups, narrow or wide varies with season, made in wool, wool blends, chino, linen, baby cord

Jackets: single-breasted or double-breasted (depends on trend), sports jackets, casual blazers, out-door waterproof jackets, fabrics include wool, blends, cotton and linen

Shirts: fairly traditional, long or short sleeves, cuffs closed with buttons or cufflinks, large or small collars, plain stripes or prints, made in cotton, polycotton, silk, linen

Tops: casual sweatshirts, t-shirts with or without collars, tend to be plain or striped, natural and blended fabrics used

Knitwear: fine knits, chunky sweaters for outdoors, wool, cotton or blends used

Work wear: the tailored suit is an essential item for the majority of work places, unless protective clothing is a requirement, fabrics used include wool and wool blends

Formal wear: suits are most popular and are worn with traditional shirts and ties

Ties: variety of colours and patterns, little variety in shape (broad or narrow)

Menswear labels
Well-known menswear labels are Magee, Personal Tailoring (Donegal), Michael Mortell, O’Neills, Calvin Klein, Boss, John Rocha, Pierre Cardin, Ralph Lauren, Nike and Max Mara.

Irish designers (past and present)
Some famous Irish designers are Irene Gilbert, Sybil Connolly, Lainey Keogh, Louise Kennedy, Paul Costello, Philip Treacy, Marc O’Neill, John Rocca, Jen Kelly and Peter O’Brien.

TEXTILE SCIENCE

CLASSIFICATION OF FIBRES

Natural fibres
• Animal
  Animal hair: wool (sheep), short fibres, speciality hair fibres (cashmere)
  Animal secretions: cultivated silk (mulberry), wild silk (tussah)
• Vegetable
  Seed – cotton (short fibres)
  Bast – linen (short fibres, flax)
  Leaf – sisal
  Fruit – coir (nut husk fibres)

**Table 1 Types of fibres**

<table>
<thead>
<tr>
<th>Natural fibres</th>
<th>Origins</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>Cotton plant</td>
<td>Clothing, furnishing, household fabrics</td>
</tr>
<tr>
<td>Linen</td>
<td>Flax plant</td>
<td>Clothing, bed and table linen, soft furnishings</td>
</tr>
<tr>
<td>Silk</td>
<td>Silkworm</td>
<td>Clothing, soft furnishings, bed linen, rugs</td>
</tr>
<tr>
<td>Wool</td>
<td>Fleece (sheep)</td>
<td>Clothing, carpets/rugs, furnishing fabrics</td>
</tr>
</tbody>
</table>

**Manufactured**

*Regenerated (from cellulose) – man-made*

**Acetate**
- Origin: cotton linters/wood pulp treated with acetic acid, acetic anhydride and water
- Uses: blouses, dresses, lingerie, shirts, tops, linings

**Tri-acetate**
- Origin: wood pulp or cotton linters
- Uses: pleated skirts, sportswear

**Viscose**
- Origin: cellulose from spruce trees treated with caustic soda and carbon bisulphite
- Uses: blouses, lingerie, dresses, skirts, shirts, furnishings, table linen

**Modal**
- Origin: beechwood
- Uses: blouses, skirts, tops, bed and table linen

**Synthetic (from chemicals) – artificial**

Raw materials such as coal, petroleum, air and water are modified to produce different polymers and different types of synthetic fibres.

**Acrylic**
- Origin: acrylonitrile is co-polymerised with another chemical
- Uses: blouses, dresses, knitwear, sportswear

**Lycra**
- Origin: made from chemicals
- Uses: cycling wear, skiwear, swimwear, underwear

**Nylon**
- Origin: coal or oil mixed with air, chemicals and water
- Uses: blouses, thread, shirts, skirts, rainwear, swimwear
**Polyester**
- Origin: acid, alcohol and chemicals blended to form an ester and then polymerised
- Uses: blouses, dresses, jackets, lingerie, thread, trousers

**Linen – Profile of a Fabric Manufactured from Natural Fibres**

**Composition**
Linen is made from the inner fibres of the stem of the flax plant. It is composed of bundles of fibres held together by a gum-type substance. The stem is composed of a thick wall and a lumen.

**Fibre production**

*Processing*
Flax is allowed to flower and produce seeds. Stalks are pulled by hand or machine. Seeds are removed by machine.

*Retting*
Stalks undergo retting to allow fungi and bacteria to form (3–7 weeks). Fungi and bacteria attack the substance holding the fibres together. Flax fibres are dried and separated from the core.

The fibres undergo the following processes:
- Scutching: rollers and blades separate the woody material, fibres stay together
- Combing/hacking: long fibres separated by combing through a set of pins
- Carding: this process untangles the fibres and removes any traces of impurities
- Drawing: the linen threads are stretched, evened out and wound onto bobbins
- Spinning: drawn out strands of thread are twisted together to form yarns
- Bleaching
- Weaving

**Desirable properties**
- Absorbent and dries quickly
- Comfortable, non-allergic, non-static
- Cool to wear in summer, conducts heat
- Durable (wears and washes well)
- Good lustre, natural surface
- Resistant to mildew, moths, pilling
- Strength increases when wet

**Undesirable properties**
- Burns readily, poor resistance to fire
- Creases quickly unless treated
- Damaged by mildew, easily soiled
- Little elasticity, tendency to shrink

**Chemical properties**
- Easily damaged by concentrated acids and hot dilute acids
- Resistant to alkalis, cool diluted acids and dry-cleaning solvents
Table 2 Identifying linen – the burning test

<table>
<thead>
<tr>
<th>Fibre</th>
<th>Near flame</th>
<th>In flame</th>
<th>Out of flame</th>
<th>Residue</th>
<th>Smell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linen</td>
<td>No reaction to flame</td>
<td>Burns quickly with a yellow afterglow after flame.</td>
<td>Residue is a small soft grey removal from ash,</td>
<td>It smells like burning paper.</td>
<td></td>
</tr>
<tr>
<td>Brittles</td>
<td>Flame, brittle edges.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Identification – the microscopic view

Figure 1 Linen

(a) Longitudinal section: long, irregular bamboo-like structure held together by a gummy substance.

(b) Cross section: thick walls with a polygonal shape and a regular shaped lumen or canal though the centre of the flax stem, younger flax has oval shaped cells.

Methods of yarn production for linen

Filaments are connected end-to-end into long lengths and wound onto bobbins for spinning.

Two methods of spinning are used to produce linen yarn:
- Dry spinning: used for tow (short fibres) and produces a coarser yarn
- Wet spinning: used for high-quality finer yarns from tow or line (longer fibres)

Yarn or filament modification for linen

- Bleaching: to improve its colour, makes it whiter
- Blending with other fibres: blended with wool, cotton, silk or polyester

Fabric finishes for linen: beetling, crease-resistant, flame-resistant

Applying colour to linen: direct or vat method to apply vat, direct or reactive dyes

Applying designs to linen: block printing, roller printing, screen printing, weaving

NYLON – PROFILE OF A FABRIC MANUFACTURED FROM MAN-MADE FIBRES

Composition: nylon is manufactured from carbon, hydrogen, oxygen and nitrogen
Uses: carpets, clothing, curtains, home furnishings, lampshades, lingerie, raincoats, shirts, skiwear, snowsuits, underwear, windbreakers
Specialist uses: conveyor belts, fishing equipment, sails, sleeping bags, tents

Fibre production – Nylon 66
- Two chemicals, adipic acid and hexamethylene diamine, are used to produce Nylon 66. The chemicals are mixed in a stainless steel cylinder, heated and molecules link up to form a long filament
- Molten nylon is forced from the steel container onto a water-cooled revolving wheel
- Nylon sets, forms a ribbon-like filament, is chopped up into chips and dried

Melt-spinning nylon
- Nylon chips are melted and forced through holes in a spinneret
- Molten liquid leave the jets, cools and hardens in a stream of cold air
- Nylon forms filaments and filaments are twisted together to form yarn

Desirable properties
- Durable, strong, high tensile strength
- Easy to launder, dries quickly
- Does not shrink, retains its shape
- Good elasticity recovery (100%)
- Resilient, resists abrasion
- Resistant to mildew and most insects
- Crease resistant, can be permanently set
- Easy to dye in a variety of colours

Undesirable properties
- Poor moisture absorbency
- Uncomfortable in warm atmospheres
- Nylon pills easily, can be treated
- Develops static electricity
- Mildew attacks surface finishes

Chemical properties: weakened by acids and strong sunlight, resistant to alkalis, bleach, detergents, dry-cleaning, organic solvents and soaps

Table 3 Identifying nylon – the burning test

<table>
<thead>
<tr>
<th>Fibre</th>
<th>Near flame</th>
<th>In flame</th>
<th>Out of flame</th>
<th>Residue</th>
<th>Smell</th>
</tr>
</thead>
</table>
Identification – the microscopic view

Figure 2 Nylon

(a) Nylon longitudinal section: circular shapes with transparent fibres.
(b) Nylon cross section: circular shapes with smooth edges characteristic of melt spun fibres.

Method of yarn production for nylon
- Filaments are conditioned, twisted and wound onto spools
- Filament is ‘drawn’ by passing it between two rollers (slow and fast) to increase length and strength, and to improve lustre
- Filament is heat set in boiling water for two hours
- Wound onto bobbins as multifilament yarn

Yarn/filament modifications for nylon
- Blended with other fibres to improve durability
- Cut into lengths and twisted to make a fluffy yarn
- Extruded through smaller holes to produce finer filaments
- Use of trilobal filaments to allow water vapour to escape

Suitable fabric construction techniques
- Warp knitting, weft knitting, woven

Fabric finishes: anti-static finish, blending, brushing, heat setting
Applying colour: acid dyeing, disperse dyeing
Applying designs: embossing, roller printing, screen printing

POLYESTER/COTTON – PROFILE OF A FABRIC MANUFACTURED FROM A BLEND

Fibres are mixed or blended together to produce fabrics with particular characteristics. A blended yarn is one that is spun from two or more types of fibres e.g. cotton and polyester.
When natural and man-made fibres are combined, the fabric produced has the advantages of both fibres e.g. durable, strong when wet and dry, absorbent, crease-resistant, resilient. *Uses of polyester-cotton:* bed and table linen, blouses, shirts, outdoor wear, nightwear

**Fibre production**

*Cotton*  
The cotton plant produces green pods called ‘cotton bolls’ containing seeds and fibres. On maturing they produce a mass of white fluffy fibres. Cotton may be harvested by machine or by hand. Cotton fibres are separated from the seeds by a ‘ginning’ machine.

*Polyester*  
Polyethylene terephthalate (PET), a by-product of the oil industry, is created by reacting ethylene glycol with terephthalic acid in the presence of a catalyst. The viscous liquid is extruded through a spinneret into the cold air where it is cooled and stretched to form fibres.

**Desirable properties of polyester cotton**
- Easier to launder and press than 100% cotton
- Drip-dries, dries quickly
- Holds its shape, does not shrink or stretch
- Polyester provides added strength to cotton
- Polyester has increased abrasion resistance
- Cotton adds comfort, allows perspiration through
- Cotton reduces static levels of polyester
- Polyester provides added strength to cotton
- Polyester has increased abrasion resistance
- Cotton adds comfort, allows perspiration through
- Cotton reduces static levels of polyester
- Dyes well due to presence of cotton

**Undesirable properties of polyester cotton**
- Higher percentage of polyester increases static
- Easily damaged by heat, mildew and bacteria
- Higher percentage of polyester reduced absorbency

**Chemical properties**

*Cotton:* resistant to alkalis, detergents and organic solvents, damaged by strong acids, hot dilute acids and strong sunlight

*Polyester:* resistant to acids, alkalis and oxidising agents

**Table 4 Identifying cotton and polyester – the burning test**

<table>
<thead>
<tr>
<th>Fibre</th>
<th>Approaching flame</th>
<th>In flame</th>
<th>Out of flame</th>
<th>Residue</th>
<th>Smell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>Does not shrink,</td>
<td>Burns quickly</td>
<td>Burns with an afterglow,</td>
<td>Grey ash, light</td>
<td>Burning paper,</td>
</tr>
<tr>
<td></td>
<td>ignites upon</td>
<td>with a steady</td>
<td>can flame.</td>
<td>and be blown out</td>
<td>feathery.</td>
</tr>
<tr>
<td></td>
<td>contact.</td>
<td></td>
<td></td>
<td>easily.</td>
<td></td>
</tr>
<tr>
<td>Polyester</td>
<td>Fuses, melts and</td>
<td>Burns and</td>
<td>Self-extinguishing</td>
<td>Hard, tough black</td>
<td>Strong odour,</td>
</tr>
<tr>
<td></td>
<td>shrinks away from</td>
<td>melts slowly,</td>
<td>when flame is removed.</td>
<td>or brown bead.</td>
<td>a sweetish smell.</td>
</tr>
<tr>
<td></td>
<td>approaching</td>
<td>produces</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>flame.</td>
<td>black smoke.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Identification – the microscopic test

Figure 3 Cotton

(a) Longitudinal: ribbon-like shape with a twist at irregular intervals, lumen in centre.
(b) Cross section: three areas visible, outer skin, secondary wall and the lumen.

Figure 4 Polyester

(a) Longitudinal: uniform smooth surface and a rod-like appearance.
(b) Cross section: generally a round regular shape, trilobal variants possible.

Yarn production (blend)
- Two or more different fibres blended in varying ratios before spinning
- Polyester and cotton fibres cut to the same length
- Blending machine loosens and separates cotton fibres
- Fibres are blown to separate them and then cleaned
- Carding arranges fibres into thick ropes or slivers
- Combing removes the short fibres (noils), from the slivers
- Slivers are combined and fed into a drawing machine
- 50:50 blend represents one sliver of cotton and one sliver of polyester
- Mixture of fibres are drawn out and pulled to the required thickness

Yarn/filament modification
Cotton: mercerised to increase affinity for dyes, lustre, moisture and strength
Polyester: crimping produces a bulky form for hand-knitting yarns, jersey fabrics
**Fabric construction:** knitting, weaving

**Finishes:** brushing, flameproofing, napping, water repellence

**Applying colour:** disperse dyes, in direct or vat dyes, reactive dyes

**Applying design:** block printing, screen printing

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**SUITABLE FABRIC CONSTRUCTION TECHNIQUES**

**METHOD 1 – WOVEN FABRIC (WEAVING)**

Woven fabrics are made up of two sets of yarn forming lengthwise (warp) and crosswise (weft) thread running across the width. A roller holds the warp threads in place as a shuttle carries the weft back and forth between the warp threads, which are raised and lowered following a pre-set pattern. Each line of weft is pushed into place by a batten. The selvage edges are formed along the edges of the warp. The diagonal is called the bias.

*Figure 5 Woven fabric*

(a) Plain weave  
(b) Twill weave

The main methods of weaving are:
- Conventional warp preparation
- Sectional warping
- Using a rapier loom instead of a shuttle loom

*Types of weaves:* plain, basket, herringbone twill, rib, satin

**METHOD 2 – KNITTED FABRIC TECHNIQUES**

A series of interlocking loops are worked by hand or machine to produce a chunky, fine or thick fabric. Knitted fabric is stretchy and warm, lose their shape quickly and require careful laundering. Knitting can be divided into two main structures: weft and warp knitting.

**Weft knitting**

A single yarn forms continuous rows of interlocking loops in a horizontal direction. A dropped stitch will result in a vertical ‘run’ downwards.

*Examples:* double knit, patterned knit, plain jersey knit, purl knit, rib knit

**Warp knitting**

More than one yarn is used to form interlocking loops that run vertically and zigzag across each other. Warp knitting is produced only by machine.

*Examples:* crochets, double-warp tricot, single-warp tricot, raschel
FINISHES TO IMPROVE FABRIC PERFORMANCE – FUNCTIONAL

Easy care, minimum care, drip-dry, colourfast, shrink-resistant, crease-resistant, mildew resistant, mothproof, mercerised, water-repellent, waterproof, showerproof, anti-static, permanent press, permanent pleating, stain-resistant, anti-bacterial, pre-shrunk, flame-proofing and flame-retardant are examples of finishes.

Crease-resistant finish
Fabrics are immersed in a water bath with a solution of urea-formaldehyde and heated to 150°C for a few minutes. A resin forms an interlocking network, which is insoluble in water. The finish resists and recovers from creasing.

Water-repellent finish
Fabrics are treated with silicone and ‘baked’ to create a durable water-repellent finish. Fabrics are porous but resist the absorption of water.

COLOUR APPLICATION

Method 1 – dyeing
Dyeing or the addition of colour can be done using natural or synthetic dyes. Fabric may be dyed at different stages of manufacture, fibre, yarn and cloth:

- Stock dyeing: loose fibres are dyed before spinning in a vat containing a dye bath
- Solution dyeing: yarns on bobbins or cones are lowered into a dye bath
- Piece dyeing of fabric or garment: woven fabric or garment is put into a dye bath
Direct method: fabric is immersed in a salt and water-soluble dye solution with chemicals to set the colour. Without the chemicals the colours would fade. This method is easy to carry out, is inexpensive and provides a wide range of colours.

Method 2 – printing methods
• Direct printing: colour applied by blocks, rollers and screens
• Dyed printing: fabric printed with mordant and piece dyed
• Resist printing: fabric printed with chemical to form resist, then piece dyed, treated part does not absorb the dye, non-treated part is printed
• Discharge printing: to form printed areas on fabric colour is removed
• Others: batik, tie-dyeing, stencilling

Stencilling
A design is drawn onto a card and cut out using a sharp blade. The stencil is taped to the fabric. A sponge or a brush is dipped into fabric paint and pressed over the cut out design. The card is removed, the fabric dried and the paint heat set.

DESIGN APPLICATION

Method 1 – embroidery stitches

Stem
Uses: outlines, motifs, stems

Satin
Uses: leaves, motifs, petals

Chain
Uses: to fill in or outline designs

Long and short stitch
Uses: flowers, leaves, motifs

Lazy daisy
Uses: petals, daisy designs

Figure 7 Embroidery stitches

(a) Stem stitch
(b) Satin stitch
(c) Chain stitch
Method 2 – appliqué
Pieces of fabric may be cut into a variety of shapes and attached to garments as a decorative finish. Fabric may be applied by hand (blanket stitch, embroidery stitches) or by machine (zigzag). Cut out fusible web, attach to the back of the fabric piece and then iron into position on the garment. Stitch in place and press.

FABRIC PERFORMANCE TESTS
Test 1 – testing insulation
Equipment: calorimeters or metal cans or coffee jars, fabric samples, thermometer, warm water (60–80°C)
Method
Cut out fabric samples the height and dimension of the container to be used. Wrap samples of linen and another fabric, around separate calorimeters (or metal cans). Add water to each calorimeter, cover with an insulating material and insert a thermometer into each. Record the starting temperature and continue to record the temperatures every three minutes for 20 minutes. The fabric holding the heat longest provides the better insulation and would be warmer to wear.

Test 2 – testing colour fastness
Equipment: fabric samples (coloured and white), warm/hot water
Methods
• Dry rubbing: use a white piece of fabric to rub the test fabric, dye is poor if any colour transfers to the white fabric
• Washing: wash test fabric with a piece of white fabric and check if dye transfers
• Wet rubbing: use a white piece of fabric, wrung out in warm water, to rub the test fabric. If any colour transfer to the white fabric the dye is poor
• Record the changes to the different fabrics

DESIGN EVALUATION AND GARMENT CONSTRUCTION
THE ELEMENTS OF DESIGN
1. Colour

Visual impact of colour
• Warm colours advance, the figure appears larger
• Dark colours reduce size, pale colours increase size
• Warm colours are stronger than pale colours
• Harmonising colours are easy on the eye
• Colour can emphasise details e.g. collars, cuffs, etc.
• Colour repetition emphasises direction and line
• Neutrals add emphasis to garments

(d) Long and short stitch

(e) Lazy daisy stitch
Evaluating colour
Colours should suit the theme/design and function of the garment, be comfortable to wear and complement the skin tone and age of the person wearing it.

2. Line
Line refers to the silhouette and structural lines in all garments.
Silhouette: the outside line of garments, two main shapes (rectangle, triangle), variation in shapes (fitted, semi-fitted, loosely fitted)
Visual impact of silhouette: narrow rectangular shapes are slimming, boxy rectangular shapes increase width and reduce height
Structural: lines within the design, four types (curved, diagonal, horizontal, vertical)
Visual impact of structural lines: structural lines enhance balance, divert or draw the eye. They create illusions. Curves make the garment look softer and less formal. Diagonal lines contribute to height or width and add contrast. Horizontal lines widen and shorten. Vertical lines create height and reduce width

Evaluating line
Line should create interest, diverting the eye away from less attractive features, and enhance the person wearing the garment.

3. Shape
Shape is determined by the pattern chosen and personal preferences, which is based on the perception of one’s own figure type.

Evaluating shape
The shape should suit the figure type, drawing attention to the best features or diverting the eye away from less attractive features.

4. Texture
Fabric texture provides variation in how fabrics feel and reflect light. Textures are rough, smooth, thick and fine.

Visual impact of texture
Thick, rough textures add bulk making the wearer appear heavier. Fine, smooth soft textures create a softer look as they cling to the body. Dull textures absorb light and visually reduce size. Shiny, smooth textures reflect light and increase size.

5. Prints and Pattern
Patterns should suit the design and function of garments.

Visual impact of prints and pattern
Large prints look best on tall individuals. Large patterns do not suit small garments. Small prints suit smaller figures.

THE PRINCIPLES OF DESIGN
Balance
There are two types of balance: formal and informal. Formal balance is achieved when two halves of the design are exactly the same. Informal balance refers to two halves, which are visually balanced but are not identical.

Emphasis
This attracts the eye to a specific feature or detail and creates a central point of interest e.g. buttons, collar, cuff, neckline, waistline.

Harmony
If balance, emphasis, proportion and rhythm work well together harmony will have been achieved. The garment will look well designed.

Proportion and scale
Proportion refers to the space relationships between colour, line, pattern, texture, length and size. Scale refers to size relationships e.g. similar sizes are in scale with each other. Proportion and scale must be related to an individual’s height, figure type and posture in order to cater for individual needs.

Rhythm
A comfortable rhythm is created when the eye can move easily and smoothly across the garment connecting all points of interest without jerking the eye from point to point.

Relationship between design and function
- Garments must be comfortable, decorative and functional
- Consider what is required of the garment e.g. protection, safety
- Function is determined by design performance (zips, pockets)
- Design and function may be determined by a social occasion
- Fabric performance may influence design and function e.g. fire-fighting

Relationship between comfort and aesthetic appeal
- Garments should allow for easy body movement
- Comfort and aesthetic appeal can be created using line, shape and texture
- Consider the function of the garment e.g. hill-walking, warm/cold weather
- Aesthetic appeal must complement function and comfort
- Appeal is determined by construction techniques, decorative finishes, colour, pattern or texture

DESIGNING AND MAKING A GARMENT

DESIGNING A GARMENT

The design brief process
A design brief is a statement of what you are asked to do e.g. the type of garment, age group, function, cost, prescribed processes, etc. The basic steps involved are:
- Design brief
- Analysis of the brief – identifying the requirements
- Research or investigation (methods and sources)
• Possible ideas or solutions
• Choosing one solution – developing a storyboard
• Investigating and selecting pattern, fabric and notions
• Constructing the garment
• Evaluating the finished garment

MAKING A GARMENT

1. Taking body measurements – the basic rules
• Measure accurately, get someone else to measure
• Compare personal measurements against pattern measurements
• Wear well-fitting underclothes or leotards and leggings
• Do not take measurements over layers of outer garments
• Stand up straight, feet on the ground and shoulders back
• Hold tape measure straight and measure snugly, never loosely or tightly
• Double check measurements
• Create a personal measurement chart

Measurements
You will need the following measurements: bust/chest, waist, hips, back waist length (neck to waist), shoulder length, sleeve length, inside leg, outside leg, crotch length for trousers, skirt or trouser length.

2. Choosing and buying patterns
When choosing and buying patterns always:
• Look at a variety of pattern catalogues before making a choice
• Buy patterns before buying fabric
• Compare your measurements with those of pattern
• Buy a pattern in the correct size, never a size larger
• Buy a pattern with a variety of garments
• Choose simple designs with few pattern pieces

3. Reading the pattern information
Envelope front: manufacturer’s name, pattern number and size, sketch or photograph of garment/s, variations of main design e.g. with/without sleeves
Envelope back: style number, front and back views of garment (line drawings), written description of garment, measurements of finished garment, number of pattern pieces, pattern sizes and standard body measurements, suggested fabrics, amounts needed, details about extra requirements e.g. interfacing, extra fabric, notions e.g. buttons, zip
Note: Mark the size, view, width and amount of fabric.

4. Buying the fabric and notions
• Check envelope back for type and amount of fabric
• Avoid fabrics not on the recommended list,
• Avoid checks and fabrics with a nap
• One-way designs/patterns require extra fabric
• Fabrics are sold in many widths e.g. 90 cm, 115 cm, 140 cm
• Suitable fabrics will be easy to use and firmly woven
• Check the care label and specific recommendations for cleaning

Notions
Buy quality buttons, hooks and eyes, thread, trims, zips, etc. Interfacing may be required for collars, cuffs and facings.

5. Reading the pattern information and instructions
Pattern instruction sheet (inside)

(a) Layout and cutting out guide
• Identifies each pattern piece
• Gives instructions on preparing the fabric
• Identifies and explains the pattern markings
• Provides layout guide for fabrics of different widths
• Outlines special rules for using one-way or nap designs

(b) Construction guide
• Step-by-step format for assembling the garment
• Sketches explaining each sewing process
• Guidelines for construction techniques and alterations
• Suggestions on stitching, trimming

Pattern markings
There are different pattern marking: straight grain, place to fold, cutting line, stitching line, notches (single, double, triple), fold line, balance marks (to be transferred), dart, buttonholes and button, hemline, adjustment line, construction symbols e.g. tucks, direction of sewing.

Figure 8 Pattern markings

6. Preparing and cutting out the pattern
Preparing pattern pieces
• Select pieces for view chosen
• Press creased pattern pieces with a cool iron
• Cut out accurately on the bold line of the pattern

7. Modifying patterns – flat pattern adjustments
Use lengthening and shortening lines on the pattern to alter the length. Use vertical lines to insert to remove width. By adding to or taking away a small amount from seams minor adjustments may be made. Be careful not to over fit.

Length modifications
To add length (sleeves, bodices, lower hipline)
Cut pattern on alteration line. Separate pieces the required distance, insert extension paper between the cut pattern pieces, pin in place and redraw all pattern markings e.g. cutting lines, darts, hmlines and seamlines.

To increase hemline of skirt
Extend the pattern with paper and tape in position, redraw seamlines, cutting lines and the lower edge of pattern.

Figure 9 Modifications to lengthen

To reduce or shorten (sleeves, bodices, raise hipline)
Fold the pattern along the alteration line and make a pleat half the depth required. Pin in position. Redraw all cutting lines, dart lines and seamlines.

**Circumference modifications – general guidelines**

*Reducing and increasing waistlines*

*Increases* up to 2 cm can be added to side seams, add extension paper and redraw markings. If larger increases are needed, widen darts or consider buying a larger pattern size.

*For reductions* use a pencil to mark each pattern piece a quarter of the amount needed to be reduced at the waistline. Redraw pattern markings e.g. cutting lines, seamlines and zipline. Extra darts can be added on either side of the original darts if the reduction is greater.

*Figure 10 Modifications – circumference adjustments increase and decrease*

- **Reducing and increasing hiplines**

*Increases* up to 5 cm can be added at the hipline. For increases place an extension paper along the side seam from waist to hem. Add a quarter of the amount needed to the hipline and gradually draw a line from the hipline to the hemline along the side seams. Pin the paper in place. *For reductions* remove a quarter of the decrease from each of the front and back seams. Draw a new line from the waist seamline to the hemline.

**Trouser adjustments**

To achieve perfectly fitted trousers adjust the crotch depth and length.
To shorten depth make a pleat half the amount needed at the adjustment line on each pattern piece. Pin in place and redraw pattern lines.

To lengthen depth cut pattern along the adjustment line, insert extension paper, pin and redraw lines.

To decrease or increase length, add or subtract half the adjustment amount at the inner leg seam. Retain the curve shape and draw in the new seam lines.

Figure 11 Modifications trousers

(a) Crotch length
(b) Crotch depth

8. Preparing fabric
Press fabric to remove creases. Identify right side of fabric and selvage. Straighten fabric if it is off grain. Pin selvages together placing pins 1.5 cm apart.

Laying pattern on fabric
- Collect all equipment e.g. scissors, tailor’s chalk, etc.
- Fold fabric following the guidelines on the information sheet
- Keep grainline of pattern parallel to that of the fabric
- Use a tape measure to check grainline is in the correct position
- Position pattern pieces with ‘place-to-fold’ mark exactly on the fold
- For nap and one-way designs place the pattern in one direction
- Match fabric designs on seamlines and not on cutting lines
- Cut out each piece the right number of times
- Do not cut fabric until all the pattern pieces are in position
- For patterns without a seam allowance draw it in using tailor’s chalk

Cutting the fabric pieces
- Cut along the edge of the pattern
- Use sharp, bent-handled scissors, never use pinking shears
- Place the left hand (or right hand) over the pattern piece to hold it in place
- Do not lift fabric when cutting out, do not allow it to move
- Cut with long even strokes to ensure neat edges
- Cut notches outwards, never inwards

Transferring pattern markings
Transfer pattern markings using tailor tacking, dressmaker’s carbon paper and wheel or tailor’s chalk.
Useful pattern terms: clipping, layering/grading, notching, trimmings, trimming a point, understitching

PRESCRIBED PROCESSES FOR MAKING A GARMENT

Useful hand stitches
Tacking (straight, diagonal and slip-tacking), hemming (standard, slip-hemming, blind hemming), gathering, running, slip-hemming, over-casting, top-sewing.

Useful machine stitches
Straight machining, zigzag, embroidery stitches.

Seam types and uses
Plain (flat): fine, medium or heavy-weight fabrics, jersey fabrics, suitable for coats, jackets, skirts and trousers
French seam: fine, light-weight fabrics such as lawn, silk, muslin, organza, suitable for shirts, blouses, lingerie, underwear
Felled seam/self-finished seams: medium-weight closely woven fabrics such as cotton, denim and linen, suitable for shorts, jackets, jeans, sportswear
Decorative seams: Seams in medium-weight fabrics, for jackets, shirts, coats, jeans
**Figure 13 Plain flat seam**

**Finish and uses of plain flat seams**

*Pinking*: suitable for non-fraying fabrics e.g. flannel, use a pinking shears  
*Edge-machining*: suitable for light to medium-weight fabrics  
*Zigzag machining*: used on most fabrics except very delicate ones  
*Overcasting*: suitable for medium to heavy-weight fabrics  
*Binding*: sew bias binding on each of the raw edges

**Figure 14 Seam finishes**

1. Edge machining  
2. Zigzag machining  
3. Pinking  
4. Overcasting  
5. Blanket stitching  
6. Binding (i) Bias  
6. Binding (ii) Paris

**Darts**

Darts are used to arrange unnecessary fullness in garments at bust, elbow, shoulder and waist. Darts fit the curving shape of the body. The types of darts are standard single-pointed dart, double-pointed dart or contour dart and curved or French dart.

**Figure 15 Types of darts**
Gathers
Gathers draw in fabric and reduce fullness. They are used in cuffs, flounces, frills, ruffles, necklines, yokes, hem edges and on sleeve edges. They can be worked by hand or machine.

Facings
Facings are used to finish off raw edges around armholes, necklines and cuff openings. Interfacing is attached to the wrong side of the facing to prevent it from stretching.

Figure 16 Facings

Collars
Collars neaten the raw edges of a neckline. The main collar shapes are flat, rolled, jabot, shawl, shirt and standing.

Figure 17 Collar styles

Waistbands
Trouser and skirt waistlines can be neated using casings or waistbands.

Sleeves
The main types of sleeves are gathered, raglan, kimono, set-in, shirt and t-shirt. The main sleeve hem finishes are self-hem, facings (bias, shaped), casing and bands.

Figure 18 Sleeve styles
Buttonholes

*Types and uses*
- Bound: all types of fabrics and garments for a professional finish
- Hand-worked: fine or delicate fabrics for blouses and children’s clothes
- Machine-worked: fine to medium weight fabrics for shirts, children’s clothes
- Tailored: tailored jackets, dresses and suits

*Position and direction of buttonhole*

**Horizontal buttonholes:** used where the strain is on the horizontal e.g. cuffs, dresses, jackets and waistcoats

**Vertical buttonholes:** used where the strain is on the vertical, e.g. blouses, shirts, waistbands and loose fittings

*Figure 19 Hand-worked buttonhole and machine-worked buttonhole*

Zips

Zips can be used centred, concealed, fly-front, open-end and lapped.
The types of zips are:
*Conventional*: metal, synthetic
*Special purpose*: invisible, open-end, two-way

**Pockets**

Pockets can be decorative, functional or both and lined or unlined. The types of pockets are:
- **Patch pocket**: square, rounded or curved, pointed, rectangular
- **Bag pockets**: pocket in side seam, bound, flap, welt

*Figure 20 Pocket styles*

(a) square  
(b) round or curved  
(c) Pocket in side seam  
(d) rectangular  
(e) pointed  
(f) Flap pocket

**Hem finishes**

Hem finishes are used on the bottom of garments. The main types of hems are turned up and stitched, faced and enclosed. The choice of hem is determined by the fashion or trend, garment style and shape, personal preference and type of fabric e.g. crisp, soft, delicate.

*Figure 21 Types of hems*

1. Turned under to wrong side  
2. Zigzag raw edge of hem  

4. Edge machining  
5. Blind stitching garment seam  
6. Stitched and pinking
Hem finishes for fine and lightweight fabrics
Turned under and slip-stitched, zigzag raw edges and catch stitched in place, edge machining and slip-hemmed in place, blind stitching, pinking and slip-stitched, top-stitched.

Hem finishes for medium and heavyweight fabrics
Herringbone stitch, overcast and catch stitch, bias binding and slip-hemming, Paris-binding and slip-hemming, bonded or fused hems, top-stitched.

Hems for stretchy fabrics
Zigzag stitching is used to neaten the raw edges of jersey fabric to produce a ‘fluting’ effect or a flat finish. A narrow hem is then turned up and slip-stitched to the garment.

FITTING A GARMENT DURING CONSTRUCTION

First fitting checks
During the first fitting tack darts, shoulder, side and waist seams along fitting lines.
• Try on garment right side out over undergarments and shoes
• Pin shut openings e.g. cuff, neck, zip
• Check the hang on centre front and back lines
• Check length from shoulder to waist
• Check that the garment looks in proportion
• Check position of darts and closures, adjust as necessary
• Garment should drape smoothly without wrinkling
• Remove garment and make adjustments, try on again

Second fitting checks
During the second fitting machine and press darts and seams, attach collar/facing, tack sleeves into armholes.
• Check that seams are straight
• Check that sleeves are in the right position and fullness evenly distributed
• Check position of openings
• Make adjustments if necessary, try on again

Final fitting checks
All described processes except for hem finishes should be completed before the final fitting.
• Mark hem length using hem gauge and pins
• Pin up and check hem is parallel to floor
• Remove garment, complete hem and press
Design features – creative details
Garments may be made more original by: appliqué, quilting, hand embroidery, machine embroidery, fabric painting (puffa, silk, stencilling), braid, laces, ruffles, feathers, fur, fringes, beading, sequins, combination of both.

THE CLOTHING AND TEXTILE INDUSTRIES

STRUCTURE OF THE CLOTHING AND TEXTILE INDUSTRIES

Production sectors in the industry
Different sectors in the clothing and textile industries produce accessories, business wear, children’s wear, fashion knitwear, lingerie and hosiery, menswear, ladies outerwear, leisure wear, shirts and underwear.

CLOTHING RETAILING IN IRELAND – AN OVERVIEW

• Clothing outlets are dominated by chain stores
• Chain stores account for 30% of purchases
• Remaining 70% is accounted for by department stores, independent Irish retailers, specialist multiples and UK retailers
• Large chain stores serve the lower and middle end of the market
• Department stores serve the middle to upper end of the market
• Specialist outlets serve the middle and upper end of the market

Factors affecting growth (positive)
• Fashion trends (designer influences)
• Economic growth
• Increase in number of people at work
• Increase in disposable income
• Development of brand names
• Marketing based on demographic trends
• Development of export market
• Youth culture
• Media and lifestyles

Factors inhibiting growth
• Labour intensive business
• Increased cost of labour and raw materials
• Lower labour costs in other countries
• Cost of training in terms of time and people
• Increased competition from other countries
• Lack of language and computer skills

Strategies necessary to improve growth
• Improving competitiveness at production and retail levels
• Increasing the use of computer aided manufacture (CAM)
• Offering flexibility in relation to the size of orders
• Using quality management systems
• Developing strong links between industry and graduates
• Marketing the industry at national and international levels
• Promoting careers in the textile industry

Areas of potential growth include yarns and fibres, non-woven fabrics, woollen fabrics.

**Small clothing and textiles businesses and cottage industries**
This sector accounts for 70% of the clothing business and the majority employ fewer than twenty-five people. It has a history of sub-contracting work. It provides much needed employment in rural areas and has an impact on the cultural, social and the economic development of communities. Small firms contribute to the national economy.

Cottage industries supply a niche market. Cottage industries are associated with weaving, knitting, crochet, lace and the production of by-products associated with these skills. Linen and wool woven here are exported abroad to designers.

The Aran sweater is an example of an Irish craft. Crafts generate income from tourism. Other examples include Donegal tweed, Limerick lace and Foxford rugs.

**Current Irish designers**
Current Irish designers include Lulu Guinness, Paul Costelloe, Lucy Downes, Cuan Hanley, Jen Kelly, Louise Kennedy, Lainey Keogh, Marc O’Neill, Quinn and Donnelly, John Rocca, Philip Treacy and Mariad Whisker.

**Leading clothing brands in Ireland – some examples**
* Menswear: * Boss, Eurostyle, Magee, Remus Uomo, Ramsey, St Bernard, Tricot Marine
* Womenswear: * A-Wear, Paul Costelloe, Michael H, Michel Ambers, Quinn and Donnelly, Libra, Principles, Primark, Ramsay, Regine, John Rocca, Sasha, St Bernard
* Knitwear: * Carrig Donn, Tricot Marine, Magee, Joan Millar

**Agencies supporting the development of the textile industry**
FÁS, Forbairt/Enterprise Ireland, Irish Clothing and Textiles Association, Industrial Development Authority

**Career opportunities**
- Craft worker
- Textile designer
- Textile production
- Clothing designer
- Pattern designer
- Production line operator
- Quality controller
- Health and safety officer
- Research and development
- Marketing
- System analyst
- Fashion buyer
- Retail personnel in shops
• Image consultant
• Design/manufacture of accessories
• Tailors
• Fashion journalist/writers
• Model
• Stylists, hairdressers
• Photographer