



GCSE Textiles

Revision Guide

Revision: the absolute basic checklist

Basic key facts to learn in Textiles Technology.

1. Natural Fibres

Plant – cotton, flax, coir, sisal.

Animal – Silk, wool, Angora, Mohair.

2. Manmade fibres

Synthetic (made from oil) – Acrylic, polyester, polyamide (nylon)

Regenerated cellulose (made from wood pulp) – Viscose, Acetate, Modal

Smart fibres – materials that change when exposed to change in temperature, pressure or light.
i.e. liquid crystals in coated fabrics, thermochromic dyes, pressure sensitive fabrics (Electex);

3. **Fibres** are spun into yarn that can be knitted or woven into fabric.

FIBRES - YARN - FABRIC

4. **Woven fabric** – Strong, does not stretch, frays, cool, does not lose shape. Eg. denim, corduroy.

5. **Knitted fabric** – Made from loops, stretches, loses shape, unravels easily, warm. Eg. Jersey, sweatshirting, fleece.

6. **Non woven fabric** - made from fibres which have not been spun, weak, easily torn cheap to produce.eg. felt, interfacing.

7. **Performance characteristics of fibres** are durability, strength, elasticity, flexibility, absorbency and insulation these characteristics decide the performance of the fabric they are made into.

8. **Fibres can be mixed or blended** before spinning to get a yarn/fabric with the performance characteristics that you want. Eg. Mixing polyester and cotton makes a fabric that doesn't crease much. As polyester stops cotton creasing. Different yarns can also be mixed, during knitting and weaving, to get a fabric with the performance characteristics that you need.

9. **Finishing processes** are applied to improve the final appearance, handle (feel) and wear of fabrics.

Mechanical finishes (using a machine to produce a finish):

Brushing – uses rollers with wire brushes on to raise the pile (fluff) of the fabric.

Calendering – uses heated rollers to smooth and shine the surface of a fabric.

Chemical finishes (using chemical solutions to change the properties of fabric)

Stain resistance – Silicone or synthetic resin sprayed onto the fabric surface.

Flame resistance – Applied mainly to furnishings, childrens nightwear and protective clothing.

Water resistance – silicones are sprayed onto fabric. Different chemicals are used depending on how long the product has to be water repellent for.

Other finishes include Anti static, Anti pilling, Easy care, Moth proofing.

10. **Special finishing treatments** include –

Anti bacterial –to sterilize surgical gowns and masks.

Light sensitive – fabric changes colour to signal different conditions.

Deodorant – to reduce body odour.

To block ultra violet rays – acts as a sunscreen.

11. Fabric decoration techniques

Methods which would be good to use to get a detailed pattern effect include: embroidery (in small areas) screen printing, transfer printing, fabric pens.

Methods for a less detailed pattern include: Tie dye, batik (both resist dyeing techniques), appliqué, stencilling, block printing, quilting, and patchwork.

Make sure that you can explain how to do a couple of these techniques.

12. Fixing makes sure that the dye stays in the fabric (doesn't run when washed). It can be done with heat, salt or other chemicals.

13. Components – Separately manufactured items that are added to a product. E.g. Buttons, zips, lace, braid, buckles, iron on or sew on logos or motifs, rivets, studs, eyelets, ribbon etc.

14. Shaping of garments – There are 4 main ways of getting a garment to be the right shape to fit a body.

Darts – folds of fabric that end in a point at the fullest part of the required shape.

Tucks – A fold in the fabric held by the sewing in the seam.

Gathering – Draws in the fullness of the garment evenly.

Elastication – Uses elastic to gather the fabric.

15. Seams –

Plain seam – The seam that is used the most. Gives a flat result. Used on non fraying fabrics and thick fabrics. Seams need to be neatened to prevent fraying.

French seam - Used on fine fabrics, lingerie and children's clothes as the raw edges are concealed. A strong seam but can be bulky.

Double stitched seam – Strong seam.

Flat felled seam – Strong and can be seen. Can be bulky.

Overlocked seam – Overlocking sews, trims and neatens the seam in one process. This stops fraying. Good to use on knitted fabrics as the seam stretches with the fabric.

16. Production methods

Job production - this involves producing 'one off' products. Every item produced is different. It is labour intensive – also known as jobbing/'jobbie' or 'one off'.

Batch production - involves the production of a specified quantity of a product. Batches can be repeated as many times as required. This type of production method is flexible and can be used to produce batches of similar products with only a small change to the machinery – also known as progressive bundle system.

Mass Production

1. Repetitive flow; also known as flow line production - involves producing large numbers of identical products for a relatively low cost. The production is usually broken down into sub assemblies of smaller components. This form of mass production can be labour intensive or completely automated depending on the product being manufactured.

2. Continual flow process - this involves uninterrupted 24hrs/day production of a basic commodity such as steel, chemicals, oil or basic food products. This type of production continues because it is expensive to shut down and restart. Only a small workforce is needed to maintain the process.

17. Commercial manufacturing systems

Cell production- this is a number of work stations (machinists) grouped to produce a single component.

In-line assembly - this is used to mass-produce many everyday items especially cars. Many In-line assembly systems are fully automated and only require people to ensure that they don't break down.

Just in time- this requires materials, components and sub-assemblies to arrive from other factories 'just in time' for production at one factory. Finished products are sent out immediately they are made. This system reduces any storage of stock and allows for changes to the product to be made quickly without the need to use up stock items first.

Off the peg' manufacture - textile items which are cheaper because they are made to fit standard average sizes, not the exact measurements of a particular individual. When making 'off the peg' clothes the standard size template can be used for a production run. E.g. 8,10,12,14 etc. This allows a batch of items to be made at one time, spreading costs and making each item cheaper.

Logistics - Organising the availability of materials and components so that they arrive at the factory when they are needed.

18. Systems and control -A system has three parts, input, process and output.

The basic features of a control system are

input sensors, process decisions, output feedback.

For example when sewing a seam the input is pushing the fabric through the machine, process decisions are making sure that the fabric goes in straight and the output is the straight sewn seam.

19. Quality Assurance – the way the production system is managed to ensure that a quality product is made. Strict procedures and specifications are laid down for each stage of production and these should be kept to, therefore making sure that there are no faults in the product.

20. Quality Control – the tests and inspections that are used at certain points of the production process to make sure that the product is of the correct quality. E.g. checking for holes in seams, faults in the fabric.

21. CAD – Computer Aided Design – Computers used to design products, with these you can design fabrics, clothes and patterns. Advantages are that they speed up the design process and you can make changes quickly. It is cost effective. You can change colours, size, scale and features of the design. You can plan out stitches so that designs can be sent straight to the machine that will manufacture it.

22. CAM – Computer Aided Manufacture – Computers which control the machines which make the products. Knitting machines are computerized so that the CAD design can be sent straight to the knitting machine that knits it exactly as the design. It is very quick and cheap to change designs and therefore very good for batch production. Each product also always comes out the same. In school the computerized sewing machine that can write your name is an example of CAM.

Also when answering the questions remember:

1. If a question says 'annotate' it means that you should label the design, diagram etc. Details of fabrics, design ideas, components, explanations etc. can be written on.
2. Questions that contain words such as state, list, identify, name, only require one or two word answers.
3. Questions containing words such as explain, justify, analyse, describe require a more detailed answer.
4. Avoid using phrases such as 'quick and easy', 'nice effect' and 'strong' Be much more precise.
5. Design features are a particular aspects of a design e.g. the pockets on a shirt. The embroidery round a hem of a skirt.
6. Performance characteristics are what a fibre, fabric or product can do. It could be crease resistant, durable or very absorbent etc.
7. The exam will contain questions about aspects of our project work such as research, designing, product analysis, specifications, testing, and evaluation.
8. Take drawing equipment to the exam, you may have to draw a design.
9. There will be a question on the following: Accessories especially ones associated with Winter Sports.

1. Types of Material

Natural and Manufactured Fibres

Fibres are the small hair like structures that are used to make fabrics. On their own they are very weak but when twisted to make yarn they become stronger. (Spinning).

Different types of fibres have different properties (things that they do such as strength, durability, elasticity, crease resistance) and if different fibres are twisted together they form yarns with combined properties.

There are two main groups of fibres Natural and Manmade, these are also divided into sections:

1. **Natural Fibres** These are from animals or plants all are **biodegradable** (rot away) and are **sustainable** as they will grow again so are environmentally friendly if they are produced **organically**.

Animal fibres - [wool \(sheep\)](#), [silk \(silk worm\)](#), angora (rabbit), mohair (goat), alpaca (alpaca)



silkworms

Plant fibres - Cotton, flax (makes linen), jute, hemp.

- Produced from plants. To be totally environmentally friendly plant fibres must be produced **organically**. Most cotton is produced using pesticides which as well as killing the insects or diseases is also bad for the environment and makes the workers ill.



Cotton picking

2. Manmade Fibres

Synthetic fibres - Polyamide (nylon), polyester, acrylic, elastane, microfibers

These are made from chemicals which come from oil or coal.
These fibres are not environmentally friendly.



- **Regenerated fibres** - Viscose, triacetate, acetate, modal
- These are made from a combination of chemicals and cellulose (tree products)

Trees make fibres



Fibres and their performance characteristics

Each fibre has different properties (things that they do) that makes them more or less suitable for different products. Exam questions often ask you to suggest a fibre for a particular product so it is useful to know what their properties are. Sometimes fibres are blended or mixed together to make a yarn with the best properties of both fibres. eg. Cotton and polyester are mixed to make Polycotton. Crese resistant but more absorbent than polyester alone would be.

Cotton (natural, plant fibre)

Performance characteristics

Cotton fibres:

- Are fine, flexible and lie close together making cotton cool to wear.
- Crease easily
- Strong and absorbs water easily
- Washes well

Possible products

Good for anything that might have to absorb water or keep you cool.
Shirts, cool summer dresses, sheets, towels.

Linen (Natural plant fibre)

Performance characteristics

Linen fibres:

- Linen is a poor insulator making it cool to wear.
- Creases very easily
- Strong and absorbs water easily, is stronger when wet.
- Hardwearing
- Washes well and dries quickly
- Less comfortable to wear than cotton as less flexible.

Possible products

Good for anything that might have to absorb water, keep you cool or be very hardwearing. Often used for tablecloths and jackets or trousers but these crease easily which can be part of the design.

Wool (Natural animal fibre)

Performance characteristics

Wool fibres:

- Are resistant to creasing and quite elastic. This makes them comfortable to wear.
- Insulate well because the fibres trap air between them.
- Are very absorbent but also slightly repel water.
- Can be felted together when warm and wet. So care must be taken when washing.

Possible products

Good for products that keep you warm such as jumpers. Also good for coats or uniforms as warm and repel water.

Silk (Natural animal fibre)

Performance characteristics

Silk fibres:

- Are cool fibres but can also keep you warm.
- Are absorbent and dye well.
- Are long and smooth fibres which give a lustrous and soft finish.
- Does not crease easily
- Are very strong

Possible products

Used for tops and blouses, often lingerie and nightwear.

The conversion of fibres into fabrics

All fabrics are made from fibres.

Fibres are twisted together by spinning to make yarn.

Yarn is knitted or woven to make fabrics.

Different ways of knitting or weaving change the type of fabric, altering the look, properties and feel.

Fibres can also be joined together by felting, stitching or chemicals (missing out the spinning process) to make non woven fabrics.

Woven fabrics

Woven fabrics are made by interlacing yarns on a loom.

Fray easily when cut

Don't stretch much.

A close weave gives a strong and firm fabric.

Are strongest along the straight grain of the fabric.

Cool in temperature

Industrial weaving

Types of woven fabric

Satin

Twill fabrics such as denim

Pile fabric such as velvet, towelling.

Plain cotton, polycotton or canvas.



Products made from woven fabrics

Products that you don't want to lose shape by stretching.

curtains
trousers
shirts
towels
carpet

Knitted fabrics

Made by interlocking loops of yarn

Are stretchy

Unravel

Are warm

Industrial circular knitting machines

Industrial flat bed knitting machines



Types of knitted fabric

Jersey

Double jersey

Velour

Fur fabric

Fleece

Products made from knitted fabrics

Products that you want to stretch and have some give.

T shirts

Jumpers

Track suits

Cuddly toys

Non Woven Fabrics

- Made by sticking fibres together by heat, glue, needle punching or felting.
- Cheap fabrics as by using fibres the process of spinning the fibres into yarn is missed out, saving money.
- Weak, easily torn fabrics as fibres are not held together in any structured, secure way.
- Break rather than stretch.
- Shouldn't be used as the base fabric of a product as will not wash or wear well due to structure.



Types of Non Woven fabrics

Interfacing (vilene)

Bondaweb

Felt

Wadding

Products made from Non Woven fabrics

- Often used to make disposable items such as disposable knickers, fabric on sanitary towels.
- Cleaning cloths such as Jeye cloths.
- Support or strengthening for garments - interfacing, bondaweb.
- Childrens toys - Fuzzy Felt, Finger puppets.

Finishing Processes

What is a Fabric Finish?

A fabric finish is applied to a fabric once it has been made to improve its appearance, feel or other properties.

The main types are:

- Physical
- Chemical
- Biological
- Coated

Why are fabric finishes used?

Fabric Finishes are used to improve the fabric in some way. This could be:

- improve the appearance - colour, pattern or sheen.
- change the texture of the fabric - embossing, brushing or smoothing
- improve the feel - softer, crisper, firmer.
- improve the drape (how the fabric hangs) - weighted
- improve wearing qualities - crease resistance, stain resistance, flammability, waterproof etc.
- modify care requirements - easy wash, quicker drying times, colourfast, less shrinkage.

Fabric Finishes you should know:

Mechanical Finishes

Name of Finish	Fabrics used on	Method, result	Disadvantages	Products applied to.
Brushing	Cotton, wool, nylon, polyester	Fabric passed through wire rollers which brush the fabric to leave it soft and fluffy.	Fabric is weakened, fabric becomes more flammable.	Fleece, nightwear, bedding.
Calendering	Cotton	Heated rollers press the surface of the fabric to compact it giving it a shine.	Fabric needs dry cleaning to keep the finish, not a permanent finish.	Furnishing fabric such as Chintz.
Embossing		Engraved rollers press a relief pattern into the fabric		Dress fabric, furnishing fabrics
Shrinkage		Fabric is steamed and placed over a vibrating conveyor belt. Reduces the chances of shrinking later on.		

Chemical Finishes

Name of Finish	Fabrics used on	Method, result	Disadvantages	Products applied to.
Mercerising	Cotton	A sodium hydroxide solution is added to fibres whilst they are stretched. This makes the cotton stronger, smoother and shinier. This is a permanent change.	Adds cost to the fabric or yarn mercerised.	Sewing thread, dress fabrics and furnishing fabric.
Flame Proofing	Cotton, linen, rayon	Chemicals are applied to the yarn or fabric to slow down or prevent burning.	Stiffens fabric, needs to be washed carefully.	Furnishing fabric.
Water Proofing	All fabrics	Silicon based chemicals are sprayed onto fabric to give it a waterproof finish. This is renewable	Wears off.	Outdoor products such as tents, jackets
Stain Resistance	All fabrics	A silicon based finish is applied to fabric to stop the absorption of water or dirt. E.g. Scotchgard	Often have to pay extra for it to be applied.	Carpets, furniture, shoes.
Easy Care	Cotton, viscose, linen	Chemicals added to fabric to make it easier to wash and iron, make it crease resistant and stop shrinking.	Eventually washes out.	Clothing
Anti Static	Synthetic fibres, acetate, silk	Chemicals applied to the fabric to stop it clinging and attracting dust.	Eventually washes out.	Carpets and lingerie
Anti Felting	Wool	A treatment softens the wool scales to stop them pilling (small balls of fibres)	-	Clothing
Moth Proofing	Wool	Chemicals applied to the fabric make them inedible to moths.	Eventually washes out.	Blankets, clothing

2. Pre-Manufactured Components

Components: their uses and purposes

Components are pre manufactured items added to textile products that are not the fabric.

Components can be functional eg. zip, velcro or decorative eg. fringed edging, sequins.

Thread

Sewing up products, decoration. Comes in different sizes and fibres.

Interfacing (Vilene)

Strengthening and stiffening fabric. Sew in or iron on. Non woven. Used in collars and cuffs, to reinforce embroidery.

Wadding

Used as flat padding for quilting. Often used to pad playmats

Bias binding

Used on the edges of products to cover raw edges and create a decorative effect.

Other items that are components are: zips, press studs, hook and eye, ribbon, buttons, sequins, eyelets, lace, toggles, etc.

Pockets are not components as they are usually made from the fabric of the product.

Labelling

Information commonly found on labels on textile products.

- Fibre content - listed in order of the highest fibre content first.
- Country of origin - tells you where the product was made.
- Product details - type, size and style of garment.
- Safety advice - Used especially on childrens toys or clothing. 'Keep away from fire' 'For children 36 months and over'. The CE mark and Lion mark show that a product meets safety standards.
- Retailers logo - Retailers store and product number used for tracing products if they have a fault.
- Barcodes - Used to track the movement of the garment from the factory to the shop.
- Care labels - how to look after your product to keep it looking good Washcare labels
- Environmentally friendly, cruelty free or Fairtrade - The label will often say if the garment was ethically produced.

Legally textiles products must have care labels, safety instructions, size and fibre content.

Substances such as dyes and paint are labelled to make people aware of how dangerous they can be.

- COSHH - Control of substances hazardous to health. All chemicals that could be hazardous have to be labelled to explain what the chemicals are, how to use them safely and what to do if there is an accident with them. Dyes, paints and glue are labelled.
- Other labels act as a quick guide as to whether a product is poisonous, flammable or hazardous.

3. SMART and Modern Materials

Smart materials and modern materials have many different uses and are developed to meet modern needs.

Smart Materials

Can sense and react to environmental conditions and are produced to perform a particular function. Some of them:

- alter according to external stimulus (change when something happens to them or around them)
- change when the temperature changes, either hotter or colder - Thermochromatic
- are activated by internal or external power sources.
- Examples of smart textiles and fabrics are:
- Fabrics which can create a sense of well being through anti stress properties. These include tights impregnated with moisturisers or vitamins

- Wrinkle free fabrics and garments
- Activity regulated clothes which change temperature in response to extreme conditions.
- Sanitized fabrics for sportswear that contain anti bacterial properties to combat smell and sweat.
- Synthetic fabrics with moisture management properties that can regulate and absorb sweat.

Interactive Textiles

Involves including a circuit and micro chip in a fabric so that it can act like a computer or store energy.

Interactive textiles include

- Hats and gloves that generate power through movement and then produce energy to keep the wearer warm.
- Fibre optics woven into garments to act as radios or mp3 players.
- Lights incorporated into clothing for safety purposes.

Other modern materials

Micro encapsulation

Where a smell is contained in fibres. The smell is released when the patch is scratched. Used in logos on T-shirts. Can also be used in bandages and dressings for wounds.

Kevlar

An incredibly strong material which is 5 times stronger than steel. It is used for bullet proof vests and other protective garments such as motorcycle clothing.



Polartec

A biodegradable polyester fabric made from recycled plastic bottles. It is warm, lightweight and breathable often used to make fleece fabric.



Nomex

A heat proof fabric which is used to make garments for firefighters, astronauts and racing car drivers. Also used for oven gloves.

Neoprene

Used for wetsuits and sportswear. It is made of synthetic rubber that resists water, is soft and warm. It is environmentally friendly as can be recycled.



4. Decorative Techniques

Applique

- The cutting out of shapes from one fabric and then sewing it on to another background fabric. Applying/applique, fabric to fabric.
- The cut out fabric is usually backed with interfacing (vilene) to strengthen it, prevent stretching and fraying.
- A close machine zigzag stitch (satin stitch) is used to sew the shape to the background.
- Adds texture and interest to a product.
- Strengthens and reinforces the fabric.
- Can be padded to raise surface even more.



Stage	Process
Preparation	Apply interfacing to fabric to be cut out. Cut out shapes using a template
Applying	Pin or tack into position on base fabric
Sewing	Sew around edge with satin stitch (zigzag)
Finishing	Take out pins / tacking thread. Cut off loose thread. Press with iron

Molar (Reverse Applique)

- Several pieces of fabric are placed on top of each other in layers.
- A design is sewn onto all the fabrics
- Sections of the design are cut out to reveal fabric in the different layers.
- Adds texture
- Good for bold designs



Resist Techniques

Tie Dye

- Traditional technique
- Fabric is folded and tied with string or elastic bands to stop dye getting to the fabric.
- Used on Natural fabrics
- Can add buttons or pebbles to create interesting effects.



Stage	Process
Preparation of fabric	Wash any finish out of cotton fabric so that dye can penetrate the fabric. Fold or scrunch up fabric. Tie with string/elastic bands
Preparation of Dye	Mix up dye with salt and fix.
Applying	Place in dye
Finishing	Remove from dye. Rinse out excess dye. Dry. Take off string. Press with iron

Batik

- Traditional technique using natural fabrics.
- Resist dyeing where the wax stops the dye reaching the fabric.
- Hot wax applied with a paint brush, Tjangting or stamp to create a design.
- Colour layered to produce the design.
- Wax removed by ironing between newspaper or putting the fabric in boiling water.



Stage	Process
Preparation of fabric	Wash any finish out of cotton fabric so that dye can penetrate the fabric.
Preparation of Dye	Mix up dye with salt and fix.
Applying	Apply wax onto design where you want to keep the colour.
	Apply dye to fabric by painting or dipping.
	When dye is dry apply the next layer of wax onto next colour. Repeat stages to build up pattern.
Special effects	Scrunch up fabric and crack the wax. Apply dye to the cracks.
	Or Scratch away wax and apply dye.
Finishing	Melt wax off the fabric by placing fabric between wallpaper and ironing.

Machine Embroidery

Patchwork

- Small sections of fabric sewn together to form a design.
- Often geometrical designs
- Traditional method, often hand sewn.
- Good way of recycling fabric.
- Time consuming to do.

Quilting

- Texture created by sewing through layers of fabric and wadding often in geometrical patterns.
- Soft, strong and protective.
- Traditional technique often combined with patchwork.
- A quilting foot on the sewing machine help you keep to the pattern.



Embroidery

- Creating a design by sewing thread into the fabric.
Can be done in three main ways.

Hand Embroidery

- Slow to do, time consuming.
- Can be very detailed.
- Uses a variety of thread
- Uses a variety of stitches such as: Cross stitch, blanket stitch, chain stitch, french knot, straight stitch.



Sewing machine Embroidery

- Embroidery done on the sewing machine using the set decorative stitches
- Stiches can be adjusted by changing the stitch width or length dials.
- Quite quick to do.

Free machine Embroidery

- Done on a normal sewing machine.
- Dog teeth disengaged so that the fabric can be moved in any direction.
- Enables you to draw with the machine.
- Requires interfacing behind fabric to strengthen and support.

CAD/CAM Embroidery

- Uses a special computerised machine
- Designs can be built into the memory or designed using special software.
- Advantages - Repeatable, good quality, quick to do.
- Disadvantages - Expensive to buy machine, if it goes wrong you may wreck the whole product.

Beading

- Sequins or beads sewn onto a fabric to add colour and texture.
- Slow to do by hand.

Shisha Mirrorwork

- Small mirrors are sewn onto garments and held on with a special embroidery stitch
- Slow and intricate work.



Printing onto fabric

There are several ways of printing patterns onto fabric or garments. You could be asked about any of them in the exam or you could use it in a product analysis question.

Screen printing

- Most widely used method of printing onto fabric.
- Fine mesh stretched over a wooden frame. The dye is moved over the mesh with a squeegee and forced through it onto the fabric to produce a pattern.
- The pattern on the screen is blocked out with a paper stencil or chemicals.
- A separate screen is needed for each colour in the pattern to be printed. Therefore a pattern with 10 colours would cost a lot to produce as it would need 10 screens, one for each colour.

Block Printing

- Traditional method
- Block made of wood has a design carved into the surface.
- Dye is applied to the carved surface which is then pressed onto the fabric.
- This can then be repeated.
- Separate blocks are needed for each colour in the pattern.
- Care is needed in aligning blocks

Roller printing

- This process is like mechanised block printing.

- Rollers, with the design engraved on them, apply the dye onto the fabric.
- It is an extremely quick way of printing and 250m of fabric can be printed every minute. This makes it a cheap process.
- There is a separate roller for each colour in the design.
- Therefore designs with a lot of colours are more expensive to produce as they need more engraved rollers.
- Better for simpler designs.

Heat Transfer Printing (Sublimation Printing)

- The design is printed onto special paper, it is then transferred onto the fabric using heated rollers.
- Can only be used with manmade fibre fabrics.
- Suitable for detailed, intricate designs.
- Quite a quick process.
- Cheap as only printed paper needs to be changed to change pattern.

5. Industrial Applications and Production Methods

Production Methods

You need to understand the different production methods, their disadvantages and advantages as well as the type of products made by them.

One Off (Job Production)

What it is	What it involves	Type of product	Advantages	Disadvantages
<ul style="list-style-type: none"> · A traditional method of production · Only one unique item is made 	<ul style="list-style-type: none"> · One operator or small team making all of a product · Highly skilled, expert workers 	<ul style="list-style-type: none"> · Theatre costumes · Haute couture outfits · Wedding dresses 	<ul style="list-style-type: none"> · Complicated detailed products · Versatile machinery used to cover any textile process · A high quality, expensive product. 	<ul style="list-style-type: none"> · Takes a long time to make the product · Labour intensive, needs skilled workers · Very expensive to produce

Batch Production

What it is	What it involves	Type of product	Advantages	Disadvantages
<ul style="list-style-type: none"> · The production of a specific number of a product · Each batch (specific amount) can be repeated as many times as needed 	<ul style="list-style-type: none"> · Several reasonably skilled workers or teams of workers · Workers join together to make the whole product each worker doing a specific job. 	<ul style="list-style-type: none"> · Fashion items that would be sold in High street shops such as Primark, Mothercare, M&S, New Look 	<ul style="list-style-type: none"> · It is flexible and can be easily changed for new orders · A variety of styles can be made quite quickly · Flexible working conditions · Staff can be trained · Lower production costs 	<ul style="list-style-type: none"> · Equipment needs to be restarted after a production run · Time is lost making changes to the production run · Stock needs to be stored.

Repetitive Flow Production

What it is	What it involves	Type of product	Advantages	Disadvantages
<ul style="list-style-type: none"> · A large number of identical items are produced at a relatively low cost 	<ul style="list-style-type: none"> · Production is broken down into sub assemblies of smaller components 	<ul style="list-style-type: none"> · T shirts · Socks · Sheets 	<ul style="list-style-type: none"> · Materials can be bought in bulk · Costs are quite low · Semi skilled and unskilled labour can be used · Can be quite automated 	<ul style="list-style-type: none"> · Expensive to set up initially · Storage of raw materials and products · Workers can become bored

Continuous Flow

What it is	What it involves	Type of product	Advantages	Disadvantages
· Production of an identical simple, textiles item 24 hours a day, 7 days a week without stopping.	· Uninterrupted production of an identical textiles product · Often highly automated	· Thread · Fabric	· Very low cost · Small workforce needed	· Expensive to shut down and restart production if something goes wrong. Only very simple products can be made.

Manufacturing Systems

You should understand how the following manufacturing systems operate as they are often part of an exam question.

Cell Production

- Teams (or cells) work on different sections of a product that are eventually combined to make the product.
- All teams are situated close together
- Workers are quite skilled in a variety of processes.
- Product changes are easy to do.

In-line Assembly

Products that have many components are produced on a continuous assembly line. In-line assembly lines are fully automated to ensure that they are quick, efficient and produce quality products.

'Just in time'

- A type of production that requires all materials and components to arrive at the manufacturers 'just in time' so that they can be used straight away. However if the materials are not delivered ontime then the production has to be stopped and money is lost.
Advantages of this system if it runs smoothly are:
- Costs are low due to not having to store the materials and components.
- Production is fast.
- Materials and components are usually fault free
- It is easier to maintain the quality of the product as materials are not damaged in storage.
- Off the Peg Manufacture
- 'Off the Peg' garments are made to fit standard average sizes, not a particular individual. One standard size template is used for a production run and no fitting is needed. This allows a batch of products to be made at one time and most production methods will use this method to produce garments.

Logistics

This is the organisation of the transportation of materials and components into a factory and finished products out again. Efficient delivery of materials and components can increase the speed of production thus reducing costs to the manufacturer.

6. ICT Applications

Computer Aided Design

CAD is any designing done using or with the help of a computer. Most designing in industry is done this way these days. Before computer drawing systems were invented all designing, including different colourways, changing size, motifs etc was done by hand, drawing or painting each change, it was a very slow and costly process. These days designs can be completed very quickly and changed almost instantly.



Advantages of Computer Aided Design

- Quick to change colours of a design
- Quick to change the scale of a motif on the design
- Quick to change design details of a design - sleeve type, collar type, length of skirt etc.
- A design can be 'mapped' onto a figure so that you can see all round it and how the fabric would drape, how a pattern repeats.
- Repeat patterns can be created quickly.
- Saves time of the designer as designs can be done so quickly, thus saving money, and potentially more designs created.
- Reduces the amount of repetitive work that designers have to do.
- Designs can be saved and used again.
- Designs can be sent to the buyer for instant approval.
- Can be linked to machinery to create a CAD/CAM machine, which designs and then makes the product. (CAD/CAM embroidery machine)

Disadvantages of CAD

- Specialist Computer Aided Design software is very expensive to buy often in the tens of thousands of £'s range.
- Designers have to be trained to use the software.

Computer Aided Manufacture

The making of textile products where the machine is controlled by the computer.

Advantages of CAM

- Reduces the time required to make the textile product.
- Is very accurate, all products are made to the same specification
- Decreases cost of manufacture as not so many workers have to be paid
- Less waste as no mistakes therefore decreases costs
- Reduces repetitive work
- Can work 24/7

Disadvantages of CAM

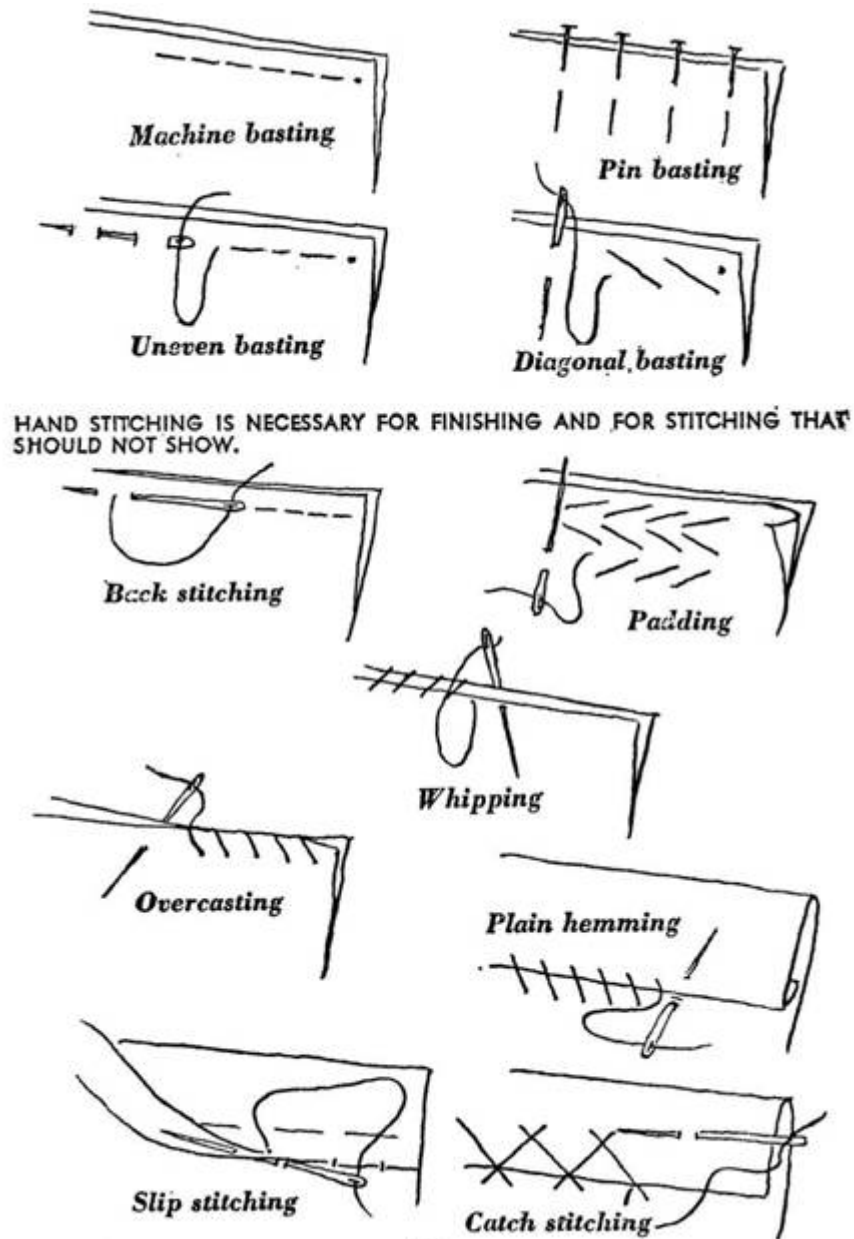
- Very expensive to buy the machines and software that controls them.

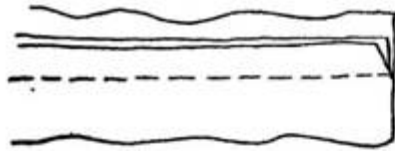
- Workers have to be trained to program the machine.
- If the machine breaks it will probably need specialist parts to repair it and a long time to repair when it's not manufacturing products.

Processes carried out by CAM

- Spreading and cutting out of fabric: Cuts many layers of the fabric at one time.
- Embroidery machine: Embroidering many products at once. Improves productivity

7. Different Construction Techniques

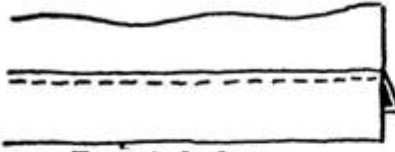




Plain seam



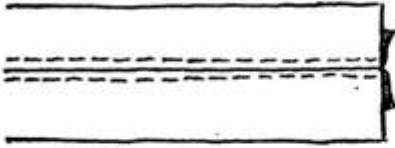
Eased seam



Top-stitched seam



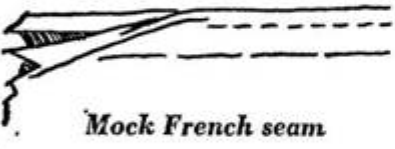
Lapped or tucked seam



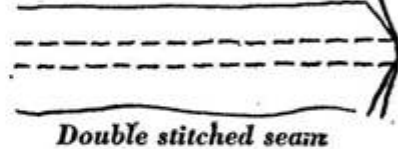
Double stitches seam



French seam



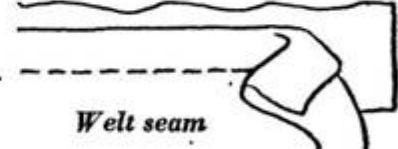
Mock French seam



Double stitched seam



Flat felled seam



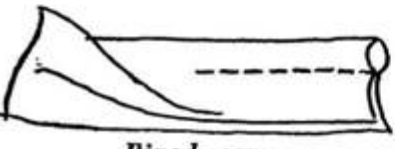
Welt seam



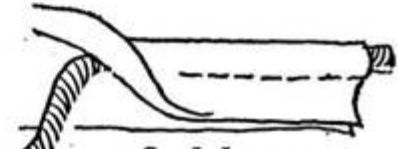
Double welt seam



Slot seam



Piped seam



Corded seam

8. Quality Control

Quality Control checks are carried out when manufacturing a product to ensure that is fit for purpose, well made and safe. All stages of production are checked, as the sooner a mistake is spotted the less products will have to be remade or discarded, thus saving the manufacturer time and money.

Checks

- Raw materials and components are checked for faults, correct colour, fibre content, if they are clean.
- During production products are checked against specifications (seals) to ensure that they are correct.
- Construction methods, seam types and allowances, are checked to ensure that they are correct with no holes, loose ends or applied incorrectly as well as component and fabric checking.
- The final product is checked against a 'gold seal' prototype to ensure that it is the correct size, colour and fit made to the appropriate quality.








Quality should be designed into a product.

A good quality design would: be fit for purpose, be attractive, match the design specification, be easy to manufacture, suitable for the target market, be safe and environmentally friendly.
Good quality manufacturer would include: technically accurate, safe to user and the environment, made within a cost limit, durable, use an efficient and safe production method, fit its specification.

Quality Standards, British Standards, European Standards should all be met by your product.

Garment Care

SYMBOL GUIDE

Washing	
	Max Temperature 60C/140F - Bedlinen, towels, and some underwear
	Max Temperature 60C/140F, gentle cycle - Bedlinen, towels and some underwear
	Max Temperature 50C/122F, gentle cycle - Polyester, cotton/polyester, polyester/cotton
	Max Temperature 40C/104F - Cotton
	Temperature 40C/104F, gentle cycle - Acrylics, acetate, nylon, tri-acetate, cotton/acrylic, poly/viscose
	Max Temperature 40C/104F, gentlest cycle - Wool and wool mixtures
	Max Temperature 30C/86Fm gentle cycle



Hand wash



Do not wash



A short line under any of the above indicates reduce cycle, moisture, and/or heat

Drying



Tumble Dry



Do not Tumble Dry



Drip Dry



Hand dry after removing excess water



Dry flat after removing excess water

Ironing



Hot 220C/392F - Cotton, linen, viscose



Warm 150C/302F - Polyester mixes



Cool 110C/230F - Acrylic, nylon, acetate, tri-acetate



Do not iron

Bleaching



Chlorine bleach may be used







Do not use chlorine bleach

Dry Cleaning



Dry cleaning

	Dry clean in any solvent
	Use fluorocarbon or petroleum solvent only
	Do not dry clean
	In all cases, if an X is through the symbol it means DO NOT USE

9. Environmental Issues

There is always a question about environmental or moral issues and the textile industry on the exam paper. This could cover any of the following areas.

Ethical and Fair Trading

- To make cheap clothing/products companies have to produce their products abroad where wages are a lot less than in the UK
- Companies should make sure that all areas of manufacturing and production meet certain standards and that poor working conditions and exploitation of workers should not be allowed, including sweat shops and child labour.
- Fairtrade means that producers get a fair, realistic price for their product that covers the price of producing it.
- The production of cotton is very hazardous with the use of poisonous pesticides used frequently. The use of these pesticides poisons the cotton labourers, even killing some of them. Organic cotton is grown without pesticides so is better for the environment and the workers.

Eco label

The European Eco label can be used on products that contain no harmful substances and cause minimum damage to the environment.



Recycling

- All textiles products can be recycled by taking them to a Charity shop or collection bin in Recycling Centres. These clothes are often sent for use abroad.
- Some textiles are recycled and reused for patchwork or rag rugs.
- Plastic bottles are recycled to produce Polartec Fleece, often used for outdoor clothing.
- Recycling reduces the need for new materials and reduces waste going to landfill or incinerated.

Packaging

- Textiles companies are trying to reduce the use of packaging in order to make the Textiles industry more environmentally friendly.
- Packaging should be recyclable or biodegradable (rot away)
- Waste from Textiles Processes

- Dyeing produces contaminated water and poisonous chemicals, it also uses energy to heat water and power machines.
- To reduce waste the dyeing industry could use natural dyes or cold water dyes to reduce chemicals and energy costs.
- Finishing of fabrics uses a lot of different chemicals in the processes which are a hazard to the environment.
- Waste from production processes should be reduced to prevent it going to landfill.



Laundry and Aftercare of Textiles

Washing textile products has a huge impact on the environment - use of energy powering the machines and heating water, detergents going into the drains and chemicals used in Dry cleaning.

Solutions are to wash at lower temperatures, avoid dry clean only and to use non bio detergents.

You should always buy an A rated washing machine as these are more efficient and save energy.



Transportation Costs

Products made abroad in countries such as India and China have to be shipped back to the UK to be sold. The shipping of these products causes pollution and damage to the environment whether it is by air or sea. Despite the cost of shipping it is still cheaper to produce clothing abroad than in this country.

10. Health and Safety

You need to be aware of safety issues in the classroom as well as in the Textiles and Clothing industry.

Classroom

- In the classroom there are rules that you need to follow in order to work safely.
- Know the safety clothing to use when using dyes or chemicals. - gloves and aprons
- Correct safety procedures for using equipment such as sewing machines, irons and overlockers. - Set up correctly, turn off when not in use, make sure that cords are not tangled.
- Risks from equipment such as scissors and needles.
- Risks from trip hazards such as bags on the floor.
- Consideration of how any product that you make can be used safely.