

GCSE in Manufacturing (Double Award).

**Unit 2: Manufactured Products
Textiles**



Proposed marks for Unit 2 - Textiles

			Location of evidence	Allocated mark
a1 describe a simple manufacturing process, using ICT as appropriate. 0 1 2 3	a2 produce a production plan that identifies the manufacturing processes and quality control. 4 5 6	7 8 9	Manufacturing processes (pages 1 and 2) and production plan (page 3) are identified. More detail is required quality control procedures. The work in this section also needs to be evaluated in depth.	5
b1 describe the importance of accurate production planning and of meeting the product specification. 0 1 2 3	b2 identify in their production plan the schedule for manufacture and allocate roles to team members. 4 5	6 7	A schedule of manufacture is shown in the form of a Gantt chart (page 4). Roles for team members are allocated on page 5 and basic key features of making the hat are listed.	4
c1 identify key control points during manufacture and describe the importance of health and safety. 0 1 2 3 4	c2 use quality control tests and carry out work with due regard to health and safety, including reference to appropriate safety systems. 5 6 7	8 9	A plan of making including quality control checks and safety issues are outlined on page 6. General health and safety issues are given on page 7. Page 8 describes product quality and systems used for testing and inspecting in general, specific checks relevant to the product are shown on pages 9, 10, and 11. Page 12 touches on how the production plan could be improved but needs to be developed further explain and justify how the production planning and scheduling could be improved. To encompass TQM and appropriate safety systems.	7
d1 describe the features of good teamwork in the manufacture of a product. 0 1 2 3 4 5	d2 identify effective teamwork for different aspects of manufacture, identify key roles during the preparation of materials, components, equipment and machinery in the manufacture of their product. 6 7 8	9 10	Page 13 organises the team and shows the key roles that they are to undertake page 14 outlines features that make a good team. Methods of improving the production are identified on page 16, the buying in of components to make improvements is also considered.	7
e1 describe how they produced their product using appropriate tools and equipment. 0 1 2 3 4 5 6 7	e2 explain why the tools and equipment used were appropriate to the task and identify any changes they have made to their production plan. 8 9 10 11	12 13 14 15	A diary to show the making of the product is given on page 17. Views of the hat with explanations as to why components were used are shown on page 18. The product is evaluated by the candidates on page 19. How the hat would be made in bulk in an industrial situation is described on page 21. More discussion/evaluation about tools and equipment should have been included along with changes to the production plan.	9
Total mark				32



An industrial situation can be seen where a machinist is joining the seams of a garment being mass produced.



In school electric sewing machines are used to produced items but CAD and CAM systems can also be used to design and make items. A Poem sewing machine and computer controlled sewing machine are shown above.

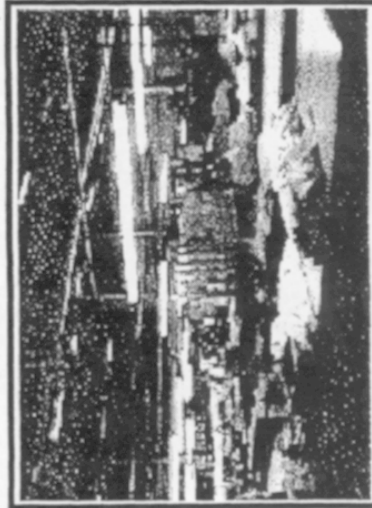


Types of Production.

Individual Production - is a traditional way of producing garments when an individual operator produces the complete item. Each item is only made once and the process needs highly skilled, experienced operators and versatile machinery.



Jobbing production is also known as custom manufacturing. This system of manufacturing normally produces one product at a time, to an individual customers specification. Highly skilled workers and general purpose equipment are used. Problem solving and trouble shooting are a necessary requirement of staff working in this area because each product presents new challenges. Products which are custom manufactured are normally very expensive.



Continuous production or process production occurs where a factory may run its production line for twenty four hours a day for weeks on end. With the line stopping only for maintenance or when breakdowns happen. Products which are in have a short life span or are in high demand are often continuously produced. The initial cost of setting this sort of system up is normally high as equipment is very specialised, however labour costs are generally low as many of the assembly lines are automated.

PRODUCTION PLANNING

Making a hat

Design the pattern for the hat.

Purchase the fabric for making.

Prepare Fabric—lay the fabric (colours not important nor is pattern as layers of fabric could be different)

Put template on top of fabric.

Cut out pieces.

Interface all pieces.

Join the crown - seam at the centre back.

Machine top two layers together and secure.

Stitch outer seam on brim.

Press items.

Join top to crown.

Join brim to crown.

Apply binding to neaten and finish seam.

Turn hat correct way.

Add decoration if required.

Specification for hat

- The hat must be the correct size for the target audience - including the correct head diameter and depth.
- The finished hat should be washable and not shrink when it is cleaned.
- The hat should be cool when worn.
- The hat should be available in colours and if using a pattern should be one that is attractive.
- The hat should give protection from the sun.
- The fabric used should be hardwearing in order to withstand wear and tear and washing.
- The fabric used should be finished with colour fast dyes.
- The materials used should be carefully selected in order to keep costs to an identified budget.

GANTT CHART TO SHOW THE PRODUCTION PLAN FOR MAKING THE HAT.

Stage	Task	Month	Date	Dept.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	Design hat																			
2	Select and buy fabric																			
3	Produce a pattern for hat																			
4	Prepare fabric - lay fabric																			
5	Put template on fabric																			
6	Cut out hat																			
7	Interface all pieces																			
8	Join seam on crown																			
9	Machine top of hat																			
10	Stitch outer seam on brim																			
11	Press crown, top and brim																			
12	Join top to crown																			
13	Join brim to crown																			
14	Apply binding to neatens and finish seam																			
15	Test and check finished product																			
16																				
		Week Number			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

Quality control checks need to be carried out at regular intervals during the production stages in order to guarantee that the hat that is manufactured meets the requirements of the customer and the specification.

As well as testing samples at regular intervals main areas of checking will occur on -
SEAMS, GRAIN LINES (Pattern marking)
SHAPE OF HAT

+

**TEAM TO BE USED
TO PRODUCE THE
PRODUCT.**

Jane.

Enjoys working in textiles, she especially like using the computer controlled sewing machine. She loves making items outside of school and would like to study fashion design when she leaves school.

Clare.

Likes designing clothes items. She is excellent at art and always gets good marks in both areas. She is reliable and always seeks perfection, but by doing so she tends to take more time over her work than others in the group.

Bobby.

Would like to work in the textiles industry when he leaves school. He enjoys working at the sewing machine and likes carrying out other processes such as screen printing. He has a good attendance record and can be relied upon to complete tasks set on time.

Sue.

Is a good worker in class and enjoys making things. Her mother runs a small business making soft toys and Sue helps her in her spare time.

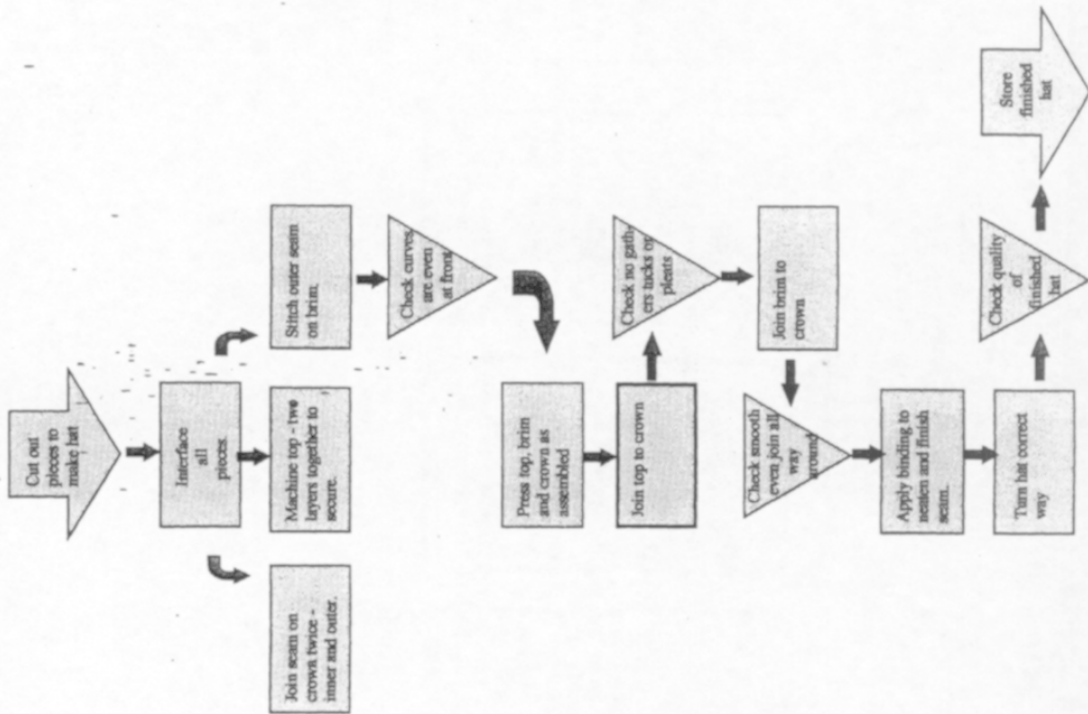
KEY FEATURES IN THE MAKING OF THE HAT

- Cutting out pattern
- Interfacing parts.
- Joining parts - machining.
- Adding binding.

CHECKING

It is necessary to ensure that a quality product is achieved and therefore checks and inspections should take place throughout the whole process of manufacturing.

Plan of making hat including quality control checks.



Safety issues

When working on project care must be taken when using the sewing machine—keep fingers away from sharp items such as needles or places where they could get trapped. Always switch off machine when making any adjustments.
 Take care when using the iron as it is very easy to get burnt from hot plate or from steam. Always check that the temperature control is at the correct setting.
 Keep work area tidy

Detailed outline of the product	
Areas to check	Points to watch out for
Seam on crown	Check that it is in correct position - check this against sample (first one produced)
Stitching on brim	Check shape of curve and notches
Stitching of top to crown	Check that there are no gathers or tucks on the join line.
Joining of brim to crown	Check that joint is smooth and even all the way around.
Check that binding is fitted to the hat correctly	No gaps in join, binding applied level and can not be seen when hat is used.

Health and Safety issues.



Take care when using sharp instruments especially scissors.



Some fabrics may create dust that could irritate the user



When using the iron take care that you do not knock it over or burn yourself.



Make sure that your seat position is at the correct height when working at the sewing table.

When using a sewing machine make sure that there is plenty of light on your work, take care to keep your fingers out of the way of the needle. Make sure that fingers do not get trapped.



Take care that all pins are returned into the container after use.



Wear protective clothing when carrying out tasks.



Take care to keep your work area clear and tidy. Avoid piling up rubbish as this may cause a fire hazard.

Product Quality.

How does the product perform?

Is it reliable and durable?

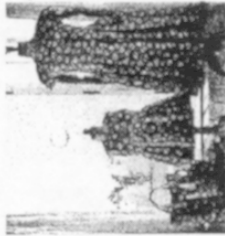
What does it look like?

What do people want from the product?

Whatever the item produced there is usually a minimum expectation level by people of its quality.

Appearance.

The appearance of a product will be affected by its shape, the choice and combination of colours and maybe how it is presented in its packaging.



Perceived Quality

This is the impression given to customers about how well made and reliable a product is. In reality this may not be true.

Examples of this may include:

Fake leather goods e.g. PVC produced to look and feel like leather.
Blending fabrics rather than using pure fabrics e.g. wool/acrylic blends for cardigans which are perceived to be not as good a quality as pure wool.



Higher quality often results in lower costs overall as poor quality goods may often result in:

Customer dissatisfaction.

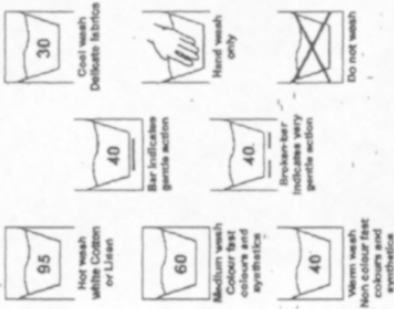
Difficulty in cleaning and caring for articles.

Premature failure of the article, e.g. split seams, missing buttons.

All of these result in extra costs to the manufacturer, which can easily outweigh small increases in production costs, such as that of higher quality thread. Customers are unlikely to buy the same product again if they feel that it has not met quality standards.

Quality

Good quality costs money, therefore when items are designed and made within certain budgets they will still be expected to meet certain requirements and standards.
Making sure that the standard is met is the job of the Inspection department.



Inspections are carried out on goods produced at various stages of the manufacturing process. These are done to assess quality and inspectors are there to spot problems so that they can be fixed. It involves comparing the component or product to its specification and making a decision about its quality match.
Is the product of acceptable quality?

Does the product need rework - on parts that can be fixed/changed.
Or should the product be rejected and be scrapped?

8

QUALITY CONTROL CHECK

STYLE NO.	DESCRIPTION	ALTERATION No.
1	Hat	1
<p>REASON FOR ALTERATION The sewing machine is not stitching correctly as the stitches are ending up too wide.</p> <p>Requested by: _____ Date _____</p>		
<p>ALTERATIONS Check the tension on the sewing machine is correct also check that the feed rate on the machine is correct.</p> <p>_____ Signed Date _____</p>		
<p>PARTS ALTERED Crown of hat.</p>		
<p>ALTERATION READY Machine has been rectified and should produce required stitches.</p> <p>_____ Signed Date _____</p>		
<p>ALTERATION CHECKED and APPROVED Sample pieces have been produced and tested, alteration has been carried out and production can be continued.</p> <p>_____ Signed Date _____</p>		

9

QUALITY CONTROL CHECK

STYLE NO.	DESCRIPTION	ALTERATION No.
1	Hat	2
<p>REASON FOR ALTERATION The seam is not straight when the crown is joined to the top of the hat.</p> <p>Requested by: _____ Date _____</p>		
<p>ALTERATIONS Check that the seam allowance is an even width throughout the assembly of the crown and the top.</p> <p style="text-align: right;">Signed _____ Date _____</p>		
<p>PARTS ALTERED Seam allowance checked and altered accordingly.</p>		
<p>ALTERATION READY Parts ready to be assembled.</p> <p style="text-align: right;">Signed _____ Date _____</p>		
<p>ALTERATION CHECKED and APPROVED Sample pieces have been produced and tested, alteration has been carried out and production can be continued.</p> <p style="text-align: right;">Signed _____ Date _____</p>		

19

QUALITY CONTROL CHECK

<p>STYLE NO. 1</p>	<p>DESCRIPTION Hat</p>	<p>ALTERATION No. 3</p>
<p>REASON FOR ALTERATION The brim is not lying flat on the curve.</p>		
<p>Requested by: _____ Date _____</p>		
<p>ALTERATIONS</p>		
<p>Check that the brim has been trimmed and notched correctly.</p>		
<p>Signed _____ Date _____</p>		
<p>PARTS ALTERED</p>		
<p>Pattern checked details of cut line and notching verified.</p>		
<p>ALTERATION READY</p>		
<p>Parts ready so that assembly can continue.</p>		
<p>Signed _____ Date _____</p>		
<p>ALTERATION CHECKED and APPROVED</p>		
<p>Sample pieces have been produced and tested, alteration has been carried out and production can be continued.</p>		
<p>Signed _____ Date _____</p>		

11

IMPROVING THE PRODUCTION PLAN

The production of the hats would be more effective if individuals were given a task to perform rather than each person working through the whole production plan and producing separate hats.

By carrying out individual tasks it is more likely that the end products will be very similar to each other. The production line will also be a lot quicker as by repeating the task over and over the worker will become very familiar with the task that they are carrying out and will be aware of any problems that occur when working on that particular aspect.

The team will therefore be given tasks according to their capability, they will also be expected to carry out checks on work carried out by other members of the team to ensure that a quality product is produced.

REVISED SCHEDULE FOR MANUFACTURE

Design a pattern for the hat.
Select best.
(All)

Order fabric.
(All)

Lay fabric.
(Jane & Clare)

Join crown seam - at the back.
(Bobby & Sue)

Put template on top of fabric.
(Jane & Clare)

Stitch outer seam of brim.
(Bobby & Sue)

Cut out fabric.
(Jane & Clare)

Join top to crown.
(Bobby & Sue)

Interface all pieces.
(Jane & Clare)

Join brim to crown.
(Bobby & Sue)

Press items.
(Jane)

Turn hat correct way.
(Clare)

Apply binding to finish seam.
(Bobby & Sue)

Teamwork

Team Organisation

During the preparation, manufacturing and assembly of the project my team has to work together and it is important that people carry out a variety of different tasks in order for the egg timer to be produced efficiently.

TEAMWORK - Allocating tasks.

Team members - 1. Jane
2. Clare
3. Bobby
4. Sue
5.
6.

Design and purchasing the material.

All the group will be responsible for designing a suitable pattern for the hat and ordering the fabric.

Preparation of the material.

Jane and Clare will be responsible for laying out the fabric and positioning the template onto its surface. They will also cut out the fabric and interface all the parts.

Equipment set up and basic assembly.

Bobby and Sue will set up all the equipment and will assemble the hats. They will join the crown seam at the back and then stitch the outer seam of the brim. Once these processes have been carried out they will then join the top to the crown followed by the brim to the crown.

Finishing.

Jane will press all the items prior to Clare turning the hats the correct way ready for inspection then despatch.

Quality Assurance.

When hats being manufactured they should be checked by members from the opposite working group to try and identify faults. Therefore Bobby and Sue will check all the layout and cutting while Jane and Clare will check the quality of all the assembly and stitching work.

Teamwork

What do I think is important in a good team ?

A good team needs to communicate with each other. They need to share ideas with each other and not be offended when others don't agree with or do not like their ideas. The individual members need to be reliable and be good timekeepers, they should attend school regularly.

When carrying out tasks they should always try to produce their best. They should support each other and if one member is having a problem with a particular task or process then other members should support that person showing them ways to carry out the task or helping them with it. If one member of the team is behind with their work schedule and another is up to date it may be better if they pool their resources and work together to get everyone back on schedule and allow the work to progress as planned.

Review of Group

Key - A = Excellent F = Poor

NAME	Contribution			STRENGTHS	WEAKNESSES
	Attendance	Punctuality	Contribution		
Jane	B	A	C	Was very good with the design of the hat as she could understand the layout of the pattern on the fabric so the girls was the correct way.	Missed one or two lessons and others had to cover for her.
Clare	A	A	A	Great at making up the hats was very accurate with the sewing.	Wanted to do all the work herself, didn't think that others were as careful as her with the work.
Bobby	A	A	B	Bobby is really good at using hand tools and cutting out produces first class accurate pieces of work.	Tends to be a little slow as he wants everything to turn out perfect.
<p>How does team communicate and overcome problems as they arise?</p> <p>Shouts have been produced which are used whenever a problem occurs. These are passed on to a supervisor so that advice can be gained and action carried out to overcome the problem and avoid the problem happening again.</p>					
<p>How does team carry out quality control tasks?</p> <p>The group have been organised so that they will cover for each other if absent, they will also check each others work at identified intervals to see that all pieces manufactured meet the agreed specifications.</p>					

Materials and components that may be used when making the hat

- Fabric -
 - Denim,
 - Cord
 - Drill (Heavy duty cotton)
 - Cotton
 - Cotton/polyester

MATERIALS

- Thread - Cotton (pure)
- Polyester

Both these components are a similar price to buy but polyester is stronger.

COMPONENTS

- Interfacing -
 - Paper
 - Card
 - Interfacing (Vilene)
 - Plastic

These components are all available in different thicknesses. Vilene can be bought ready glued so that it can be ironed into position or as a sew in material. Card may be too thick to use and will snap sewing machine needles. Paper and card are not waterproof components and therefore may be unsuitable to use on a hat design.

Binding - buy or make your own from scraps of fabric. Making your own binding is useful as it will blend in with the item produced and the white lining will not stand out especially if a dark material is used.

WAYS OF IMPROVING THE PRODUCTION SYSTEM.

Items could be bought in to be used when producing the hat:

- Motif could be used that would fit onto the front of the hat.
- Other companies could be used to prepare pieces used in making the hat e.g. the fabric pieces could be cut out to shape and/or the interface could be prepared in a similar fashion.

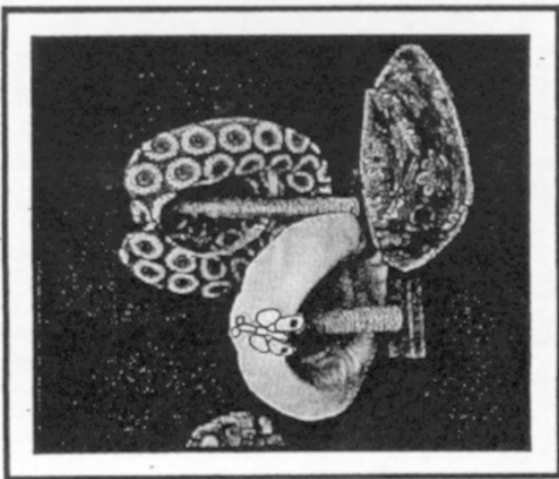
By carrying out the methods identified above the assembly line and assembly time would both be speeded up.

However these could make the cost of the manufactured items increase as the supplying companies would need to be paid and would include their own mark up on the cost. Transport and delivery expenses would also increase. Any delays in delivery would effect the smooth running of the production line and may influence the speed at which the customer receives the final item.

By subcontracting work to other firms it would keep the workforce numbers down at the main hat production factory and therefore a smaller unit would be needed and not as much paid out in wages or training.

DIARY OF MAKING

Week	Task	Successes	Problems and how I overcame them.
1	Design the pattern for the hat. Test out the design in paper or scrap card.	Hat went together well and gave the desired appearance.	Keeping pieces together in position - use of tacking. Making sure pieces go together correctly.
2	Calculate the amount of fabric required and components etc. that are needed. Visit shop to buy items.	Choosing and purchasing suitable fabrics and components.	Getting out of school to go to the shop. Had to use lunch time to visit (twice). When I got to the shop on my first visit they didn't have the correct items in and these had to be ordered.
3	Lay pattern onto fabric. Cut out fabric. Interface pieces.	Pattern laid with the grain.	Ironing the interface on the correct side. I had to keep checking that I had the correct side down not the "glued" side onto the iron as this kept sticking.
4	Assemble the pieces Join the crown to the seam. Stitch the outer seam to the brim. Neaten and trim the above sections.	Neat seams and straight.	Keeping outer seam even and smooth curve - marked a line with chalk to follow.
5	Join top of hat to the crown. Join the brim to the crown. Neaten all seams and clip curves.	The fitting of the pieces worked well with no "lumps" or "bumps" on the surfaces.	Lumps and bumps appearing on the surface of the pieces being joined - to overcome this I cut away a lot of the unwanted waste material. Uneven curves - work to the chalk line.
6	Apply binding to finish the seam. Final press of completed hat. Turn the hat the correct way.	Even width all the way around and covers raw edges. Crisp neat finish of hat meeting the identified specification.	

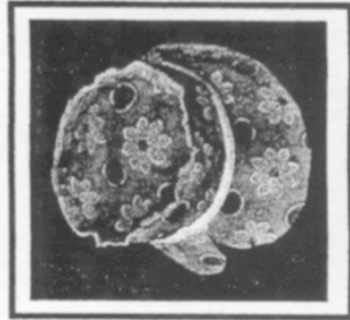


Completed hats - all items shown have been produced using different prints on the fabric. The white hat has a butterfly motif added to it for extra decoration and appeal.



Close up view of butterfly motif that was bought to add to the hat and enhance its appearance.

VIEWS OF THE BATCH OF HATS THROUGHOUT THE PRODUCTION PROCESS. DIFFERENT FABRICS WERE USED BUT THE PATTERN WAS CONSTANT.



HAT SHOWN INSIDE OUT WHICH ALLOWS BINDING AND METHOD OF JOINING THE SEAMS TO BE VIEWED. BINDING COULD HAVE BEEN MADE FROM THE SAME COLOURED MATERIAL AS THE MAIN PART OF THE HAT OR GREEN BINDING COULD HAVE BEEN USED.



EVALUATION

Overall I am very happy with the way that my project has turned out. The shape and style of the hat are good as the brim will help to keep the sun out of the users eyes.

The motif that was bought to go on the front of the hat is really good and sets of design. Lots of images could be bought to go onto the hats so that they will appeal to a range of customers.

I am not sure how many people would like the type of material that I have used as with it having flowers on and being bright yellow and green it may only appeal to female. If it was going to be used by boys it may have to be manufactured using a self coloured material. Light colours may also be not a very good choice as these will become dirty very quickly although hats made using these colours will help to keep the user cool (because darker colours are classed as hot and light colours cool).

In school we cut out the material using the card templates, that the group made, as a guide. Once all the pieces were cut out we divided up the tasks so that each person was responsible for the development of the hat until it was finally constructed.

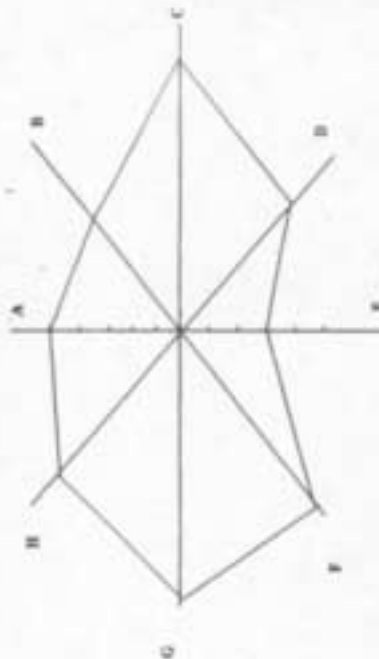
By interfacing the brim it made it a lot stiffer so that it could be folded to the required position. All the seams were neatened using the overlocker.

We checked each others work during the manufacturing stages to make sure that the quality of the end product was as the specification stated and therefore would live up to the customers expectations.

In the real world situation probably one machinist would be responsible for carrying out all the manufacturing stages in making the hat. However inspections at a variety of stages through taking samples would still be carried out.



Radar diagram on suitability of hat.



Key to radar diagram

A = Suitability of target group

C = Ease of making

E = Suitability of manufactured components

F = Overall appearance

G = Fitness for purpose

B = Suitability of batch production.

D = Suitability of chosen materials

H = Suitability of product to specification.

1 = worst/not successful

5 = best/extremely successful

Sample materials that may be used when manufacturing the hat.

I think that the patterned materials may be better to use as the plain colours will become dirty and show this after a while.

However if just patterned material is used this may limit the target audience just to females.

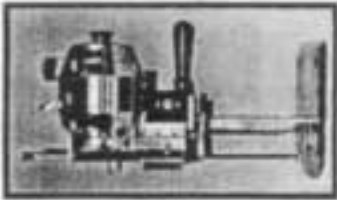


20

**Manufacturing the hats in bulk.
Industrial processes.**



The selected material will be laid and the patterns or template will be placed upon it. The fabric will be built up with many layers lying on top of each other. The template will be repeated many times on the top surface of the fabric so that when cutting out begins hundreds of pieces will be produced that can be used to manufacture many hats.



Hand knife is shown that is used for cutting out the layers of fabric.



After the material has been cut out it will be assembled by workers working on a production line. They will use industrial standard sewing machines, similar to the one shown above. The manufacturing process could be carried out by an individual worker or the it could be broken up into a number of tasks with the job being passed along the assembly line from worker to worker as the manufacturing stages progress.



During the manufacturing process samples of the product will be taken from the assembly line to carry out testing and inspections. This will be necessary to ensure that quality of the product is guaranteed and that the final product meets the specification laid down by the customer.

