

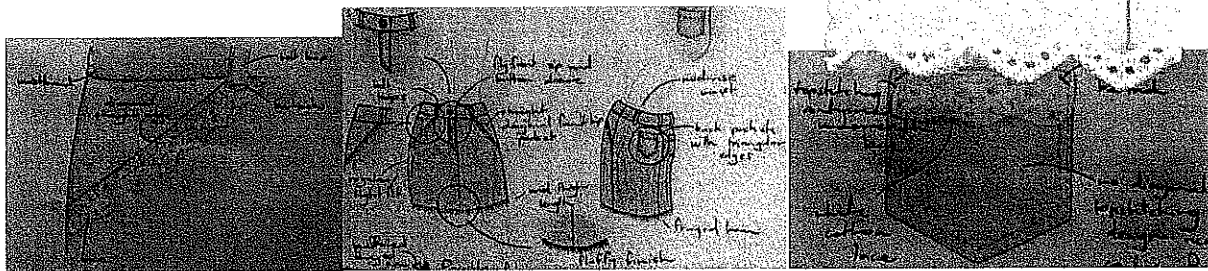
No part of the candidate evidence in this exemplar material may be presented in an external assessment for the purpose of gaining credits towards an NCEA qualification.

91359: Demonstrate understanding of the role of material evaluation in product technology.

Introduction: Once any textile item has been designed it is important that the best materials and notions are chosen for the construction of this product. By testing and trialling different fabrics and their properties we can determine if these materials will allow us to produce a quality product that is 'fit for purpose'. The product that I have made is a skirt that is designed to be worn year round in warm weather. This skirt is made from a medium weight stretch denim that is a dark blue/navy colour, with soft white cotton lace trim on the pockets. The final product was a fitted skirt that was a little shorter than knee length. So that I could produce a garment that was functional and fit for purpose, I carried out a series of tests so that I could choose a denim fabric that was safe, comfortable, would wear well and would be easy to care for (objective notions). To do this I did a burn, bleach, abrasion and sunlight/ fading test.

FINAL DESIGN:

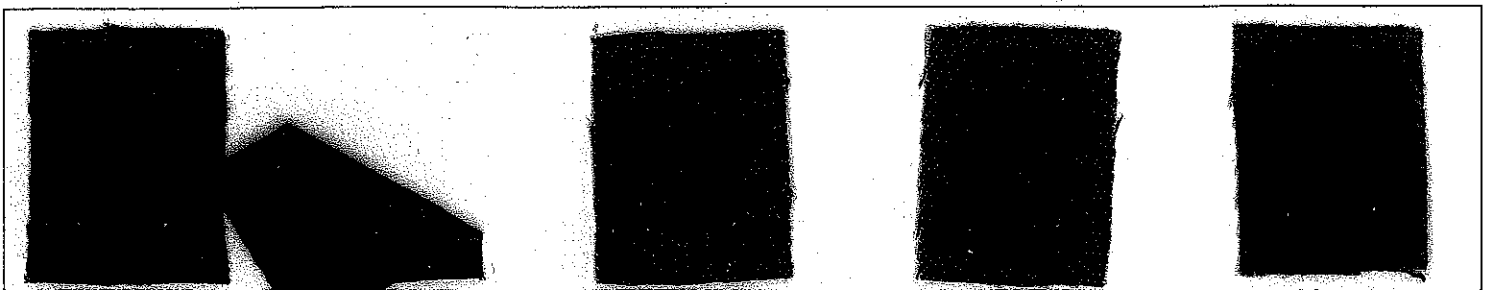
LACE FABRIC used for trim:



POSSIBLE FABRIC CHOICES:

In the production of this garment I wanted to use sustainable resources so that the production of materials for my skirt and the disposal of my skirt later on would not have a great effect on the environment. To do this I decided to use cotton fabrics as these are plant based and fewer chemicals are used to make them. If I were to use an organic cotton fabric the expense would be much greater, and because I also wanted to make an economical garment I did not consider using an organic cotton with absolutely no chemicals used to make it. The main fabric I decided to use after testing different fabrics was a stretch denim, therefore meaning that a small percentage of the fibres used in the production of the denim were elastane-a man-made fabric. Even though this was the case, to make a fitted garment that was comfortable and therefore 'fit for purpose', I needed to use a stretch denim. Because of this and the fact that a proportion of the fabric was made from man-made fibres was very small, I could overlook this as it was necessary to make a fully functional and comfortable garment.

These are the fabrics I decided to investigate in my testing:



## GARMENT ATTRIBUTES:

**EASY CARE-**As my garment was being made as a functional skirt it would need to be able to be worn well and be able to be cared for easily and efficiently. This means that I wouldn't need to take any extra measures to ensure my skirt wouldn't be damaged when washing, and would look good after washing. Because my fabric is a stretch denim I knew when I bought it that I wouldn't need to iron it as the elastane in the fabric and my body heat would cause creases to naturally straighten. Because my fabric is a medium weight I knew that it would also be durable and wouldn't need to be washed on a special machine cycle. The dark colour I have chosen for my skirt also causes dirt and stains to be less visible.

**COMFORTABLE-** Because my skirt needed to be fully functional meaning it will be worn often I needed to choose a fabric that would be comfortable to wear and easy to move around in when walking and sitting down for example. The fact that my fabric is a stretch denim, and the 'above the knee' length of my skirt makes this garment comfortable and easy to move in. The fact that this garment will be custom fit also contributes to making the garment comfortable.

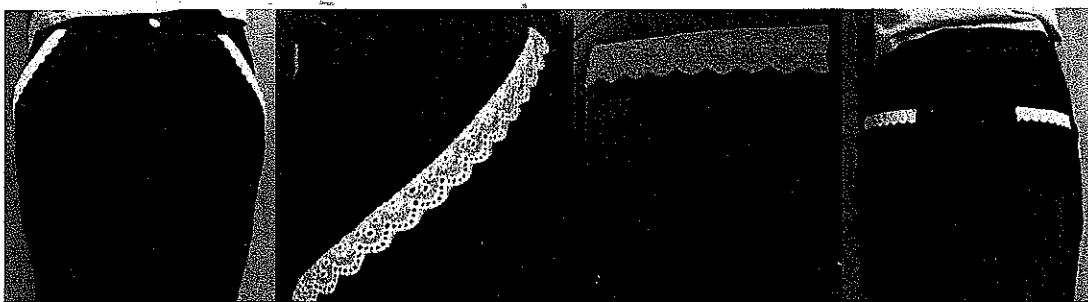
**DURABLE-** Because this skirt will be worn frequently it also needed to be durable and able to be worn well without getting damaged. The skirt needs to continue to look good for a long period of time so that I can get the most wear out of it as possible. This reduces the waste, as the time and materials I have used in the construction of the skirt are worth it, in the wear of my skirt.

**FASHIONABLE/ON TREND-** To make this skirt fashionable as well as functional in the environment I have intended it for, I needed to make the skirt from suitable materials and processes. To do this I first investigated existing prototypes in stores people my age would normally shop at, and the conventions and materials existing denim skirts were made from.

**ECO-FRIENDLY-** When deciding on materials and conventions to use in the production of my skirt I wanted to take into account the effect they would have on the environment during construction and later when disposed of. Therefore I decided to use cotton denim and lace fabrics when possible as this is a plant based fibre and doesn't release man-made chemicals into the environment when manufactured and disposed of, like polyester for example, does.

Some of these attributes-such as 'fashionable' and 'comfortable'- are subjective (my personal opinions) and I will not be able to test my possible fabrics against these attributes. The other attributes are objective and I will be able to test my fabrics for their ability to meet these attributes and produce a fully functional garment.

## FINAL PRODUCT:



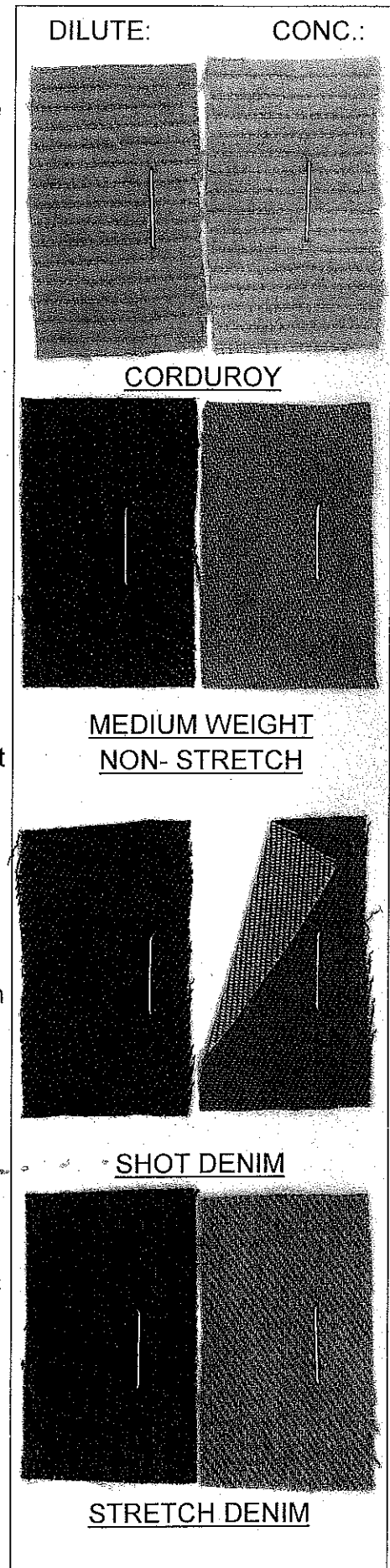
## BLEACH TEST-CARE AND FASHION:

**AIM:** To investigate the effects of concentrated and diluted bleach on my possible fabrics and the way this would affect the care I would need to take when washing my garment and the possibility of creating a fashionable effect using bleach to create a light, summery, distressed look.

**HYPOTHESIS:** I think all these fabrics will be affected quite dramatically by the concentrated bleach and a little bit by the diluted bleach as all these fabrics are made from mainly cotton which is a very absorbent fibre. Because of cotton's high absorbency the bleach will be absorbed well into the fabric, lightening its colour.

**METHOD:** To carry out this test I cut two samples of each fabric and added one to each different concentration of bleach-one container containing 50% bleach and 50% water and the other containing 100% bleach. I left them all, completely submerged, for 10 minutes before taking them out and allowing them to dry. I did not carry out this test on my lace fabric as it is already white and if I were to ever spill bleach on my garment by mistake it would most likely not get on the lace as it does not cover a large part of the garment.

**RESULTS/CONCLUSION:** After completing this test I came to the conclusion that all my fabrics changed to a lighter colour when I bleached them. The concentrated bleach changed the fabrics colours more dramatically than the diluted bleach. The corduroy fabric turned an almost white orange/pink colour when concentrated bleach was used-This was the fabrics that was most changed by the bleach. I think this is because the corduroy has a fluffy feel therefore bleach is easily absorbed into the fibres and difficult to wash out. All the other denims changed to a lighter shade of their existing colour, the concentrated bleach having more effect on the fabrics. I think that the fact that bleach could spill on my garment while washing is not a major issue as I don't usually use bleach when washing clothes. This test was effective in letting me know that all my fabrics stayed the same kind of colour rather than changing to an ugly colour such as brown. This means that I could use this fabric to effectively create a faded, distressed style if I chose to make a more light and summery garment.





## ABRASION TEST-WEAR, CARE:

**M:** To investigate the extent to which these possible fabrics resist abrasion. From this I will be able to choose the fabric that will make this garment most durable and able to be worn well without fear of damaging it. This test is particularly important in allowing me to choose a fabric that will produce a garment that will be able to be worn well without damaging it- be durable.

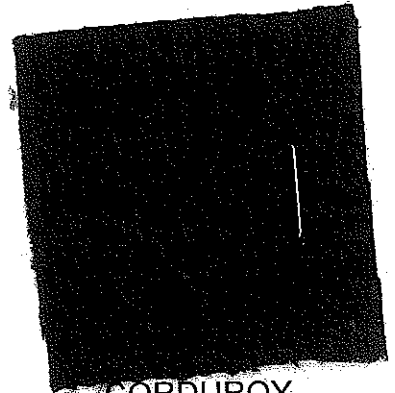
**YPOTHESIS:** I think that the corduroy will have the best resistance to abrasion as it is thick and heavy. It also has a very fluffy surface which I think will make damage due to abrasion less evident because fluffy threads will be able to hide the damage. I think that the shot denim will have the worst resistance to abrasion as it is the thinnest and lightest fabric.

**ETHOD:** To carry out this test I used both course and fine sandpaper. I rubbed each fabric quite hard with both types of sandpaper and in different places on the fabric. I did this 10 times on each piece of fabric.

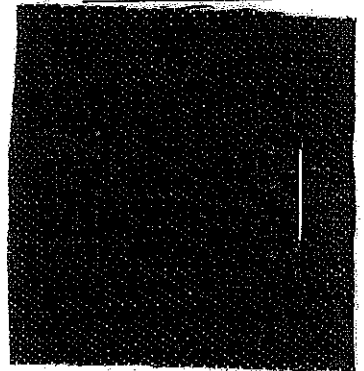
**ONCLUSION:** After carrying out this test I can conclude that the corduroy had the best resistance to abrasion both when using course and fine sandpaper. The abrasion was noticeable on the corduroy fabric but after rubbing the threads over each other the damage was hidden quite well. Other than the visual damage the fabric didn't seem to show any signs of thinning or weakening. Therefore I can conclude that the corduroy would be most effective in creating a garment that is durable and will not fall apart. Both the medium weight stretch and the non-stretch denims had less resistance to the abrasion than the corduroy fabric. The thinner shot denim had quite bad resistance to abrasion and the grains of the course sandpaper snagged and pulled the threads causing the fabric to distort out of shape. This only happened when rubbing very hard with the course sandpaper therefore I will not be eliminating this fabric from my testing as it will still produce a durable skirt. The grains of the course sandpaper are a good resemblance to concrete and this test showed that the lighter shot denim would not withstand sitting on concrete etc. very well. Both the stretch

FINE:

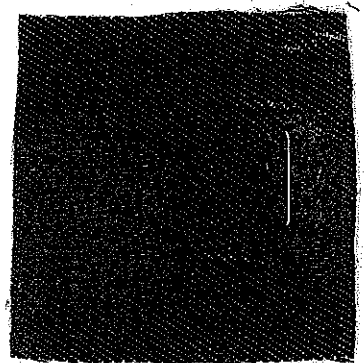
COURSE:



CORDUROY



MEDIUM WEIGHT  
NON- STRETCH



SHOT DENIM



## DISCUSSION:

Post construction: wear and care of my skirt, disposal-recycling, upcycling.

The fabric I have chosen- the medium weight stretch denim- has allowed me to make a garment that will be easily cared for and disposed of once I grow out of it or when it gets worn. Because this garment is functional it is important that it will need only minimal care, both when wearing the skirt and when washing and drying it. Washing; Before constructing my garment I washed my fabric at quite a high temperature so that it would pre-shrink before I made my garment. Because of this I will be able to wash my garment easily at a high temperature without worrying about shrinking my garment. Washing this garment at a high temperature is quite important as this is a functional garment that will be worn frequently therefore may get quite dirty. The preshrinking I have done also ensures that I can dry my fabric in a drier without worrying that it will shrink. When I am washing my garment, because I don't usually use bleach in my household, I would not need to worry about spilling bleach onto my garment while washing it.

Drying; The fade test I did caused me to find that the stretch denim will not fade and lose colour extensively after long periods of time left in direct sunlight. This means that, because my skirt will mainly be worn in warm sunny weather, I can hang it outside in the sun for short periods of time such as a few hours without worrying about it fading. If the skirt does begin to fade after a very long period of time continually washing and drying it, it will not be a big issue as fading can provide a more casual worn distressed look to my skirt which would be desirable as it is quite fashionable today in denim garments. If, at some point during the lifetime of my garment, trends change or I decide I would not like this kind of look I can decide to hang my skirt inside out on the washing line so that fading is prevented. Because my garment is fit to be worn all year round in warmer weather it may still need to be washed in the wintertime when it is more likely to be raining outside. If this is the case I would hang my skirt to dry inside by the fire/ heater. I have found that the stretch denim burns quite easily, but because most fabrics do, there is not much I can do about this other than to make sure my skirt will not get too hot or near an open flame. The stretch denim I have chosen is more suitable than a polar fleece for instance as it will not melt and will burn more slowly giving me more chance to put out the flame if my garment were to catch fire. The smoke that is produced when the stretch denim burns is advantageous in caring for my skirt as it is thick and white and smells quite strongly. If my skirt were to catch fire I would be alerted to it quite quickly and possibly be able to put it out before too much damage was done to the garment.

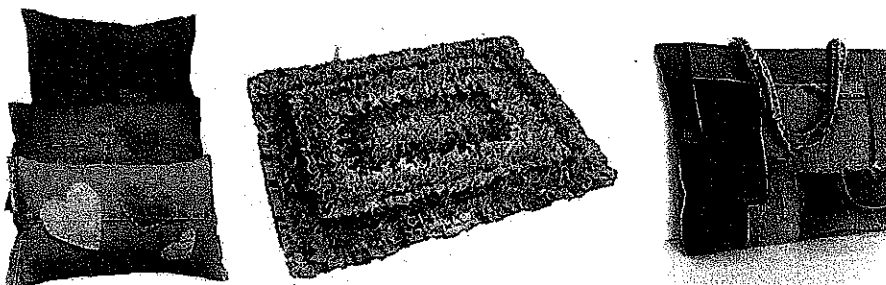
Storage; After washing and drying my garment I will not need to iron my garment as the fabric I have chosen has lots of stretch therefore creases are automatically straightened by my body heat when I am wearing it. Due to the fact that I do not need to iron my skirt, I will not need to worry about melting or burning my skirt if it is ironed at a high temperature. Because my fabric may fade after very long periods of time I will need to make sure to store my garment in a place where it will not be in

direct sunlight. If my skirt is left folded in direct sunlight it will eventually become faded in certain places and a strange pattern will be faded into the skirt. Because my skirt will be worn all year round, this will not be a major problem as the skirt will not be left for very long periods of time in one place without wear.

**Wearing;** When I am wearing my garment I will not need to take so much care not to damage my garment as I have found that my fabric has quite good resistance to abrasion. If I had used a fabric that did not have this property I would constantly need to take care when putting things into pockets etc. as this is a place where abrasion would be significant as rubbing is frequent. The thin cotton rayon fabric I have used to make the inner lining of my pocket probably does not have good abrasion resistance because it is so thin but as this is only used in the front pockets and I usually put my phone in my back pocket this will not be a major issue. Therefore I did not feel the need to test this fabric.

#### Disposal:

To ensure that this garment will be durable and therefore able to be worn for a long time without becoming damaged, I have also carried out tests to find the most suitable and durable methods of construction. The fact that the stretch denim is a very durable fabric means that this garment will last a long time and not get damaged by abrasion when sitting down or brushing against things. Because of this I will most likely grow out of my skirt before it gets too worn and when this happens I may be able to pass the skirt on to someone else or give it to an opp-shop etc. When my skirt does get worn I will be able to easily dispose of my garment as it is mainly made from mainly cotton fabrics which are bio-degradable. To make the most economic use out of my garment, rather than throwing it away when it gets too worn to wear any longer, I could recycle parts of the garment that are not badly damaged. There are many easy ways in which to use parts of a worn denim garment to make things like bags, pencil-cases, rugs, cushions etc. Often these ideas are very easy to do and instructions and things are easily accessible on the internet. The lace I have used on my garment would make nice designs for recycled products such as these.



I could also take the garment apart so that I may be able to use things such as buttons and zippers to make other garments I may make in the future. All these ideas would cause me to receive the most use I can get out of my skirt and reduce waste, also reducing the effect on the environment caused by the disposal of fabrics and other materials I have used to make my skirt.

**Assessment Schedule. AS 91359**

**Demonstrate understanding of the role of material evaluation in product development**

Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria.

**Issues from the Specifications**

Where a candidate has provided a brief answer, the answer should not be penalised because of length.

Candidate work in excess of 10 pages must not be marked.

Where a candidate has used a small font markers should make a judgement about where to stop marking. This judgement should be made relative to 14 pages at Ariel font

Where work is illegible, it cannot be marked.

Digital submissions that cannot be read cannot be marked.

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of the role of material evaluation in product development involves:	Demonstrate in-depth understanding of the role of material evaluation in product development involves:	Demonstrate comprehensive understanding of the role of material evaluation in product development involves:
explaining the relationship between the performance properties of materials selected and the performance specifications of a product describing different material evaluation procedures undertaken to determine the suitability of materials for use in the development of a product describing the knowledge and techniques underpinning the material evaluation procedures that were used to support the material selection decisions in the development of a product. Refer to exemplar #	explaining why different material evaluation procedures were undertaken to determine the suitability of materials for use in the development of a product explaining how knowledge and techniques underpinning material evaluation procedures were used to support the material selection decisions in the development of a product. Refer to exemplar #	discussing how the relationship between the evaluation of materials and a product's design (including maintenance and disposal considerations) influenced material selection decisions during the development of the product.  Refer to exemplar #

Well explained.  
 Solid disposal, and care and maintenance of the final products  
 Used information about properties & testing to explain decisions made.

E1