



National Certificate of Educational Achievement  
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

## **Exemplar for Internal Achievement Standard Technology Level 2**

This exemplar supports assessment against:

**Achievement Standard 91357**

Undertake effective development to make and trial a prototype

An annotated exemplar is an extract of student evidence, with a commentary, to explain key aspects of the standard. It assists teachers to make assessment judgements at the grade boundaries.

New Zealand Qualifications Authority

To support internal assessment

	Grade Boundary: Low Excellence
1.	<p>For Excellence, the student needs to undertake effective development to make and trial a justified prototype.</p> <p>This involves:</p> <ul style="list-style-type: none"> <li>• synthesising evidence from ongoing testing and stakeholder feedback to inform the making and trialling of the prototype</li> <li>• justifying any decisions to accept and/or modify the prototype.</li> </ul> <p>This student has made and trialled a justified prototype for a dress.</p> <p>The student has undertaken extensive trialling and testing to enable the interpretation of the design and to fit the wearer (1). The initial testing was on 'mock' fabric. Once close to the decision making, the student used the chosen materials to ensure that the techniques and processes were suitable (2).</p> <p>As the prototype developed, the stakeholders were involved to confirm decisions made earlier in the trialling (1).</p> <p>Throughout practice, the student justified and synthesised decisions as a result of research, functional modelling and stakeholder feedback (1) (2) (3).</p> <p>The prototype was judged and justified as fit for purpose and therefore accepted. The student provided evidence of how the style, materials, components, techniques and processes contributed to a garment that addressed the student brief and the stakeholder expectation (3).</p> <p>For a more secure Excellence, the student could have more strongly incorporated the social and physical environmental considerations she had determined into her prototype.</p>

Please note: The evidence presented in this exemplar provides snapshots of student evidence.

**Context: "Raising your profile"**

Each year the school holds a fashion show profiling local businesses and showcasing our work. The show will be held in September at the local theatre which holds 500+ people.

You will need to evaluate and select suitable materials, components, techniques and processes for use in making a prototype. You will also need to provide evidence of how you have used the evidence from ongoing testing and stakeholder feedback to inform the making and trialing of your prototype in the intended social and physical environment and its ability to address your brief. Justify any decisions to accept or modify the prototype.

The starting point of evidence for this standard was the students refined brief. The student decided to show her design to a local named retailer who also designs wedding gowns and ball dresses. He challenged her design and asked her to think about the circular bust feature and the design element of line. The student further developed the bodice of her garment to include a princess cut bodice and converging diagonal lines to soften a horizontal line under her bust. She used her stakeholders opinion as to 'flattering' lines for her body shape as she made these decisions.

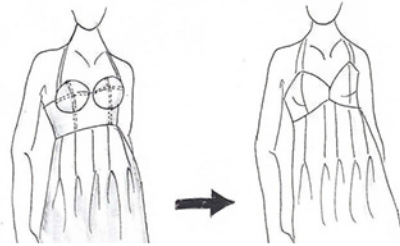
**Refined Brief**

To develop a garment that will profile my style and will be suitable to wear to the school ball in March at our local theatre. The garment will have two looks, that is, a short version that can be worn to the pre and after ball and to start the runway walk and the second will be full length for the actual ball and to leave the runway so that there is an element of surprise at the fashion show. The two looks will be useful at the ball as I can go to the pre and after ball in the short version and comply with the dress code by wearing the full length version at the actual ball. The garment will need to be completed in 20 weeks in order to be ready for both occasions and be able to be made using school equipment.

**Specifications**

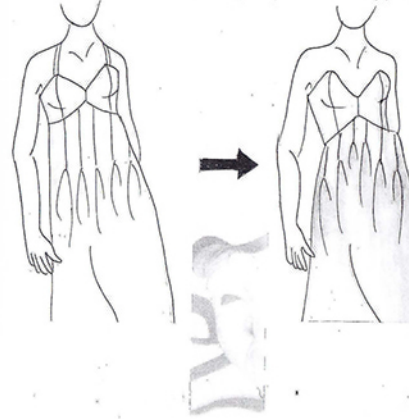
- fits me (bodice is secure)
- be eye catching
- be easily adaptable (the skirt will be able to be pulled up in to a short bubble skirt by a ribbon)
- easy to move in for dancing and on the runway (comfortable for my dance moves and to stride on to the runway)
- be respectable as it is a school function (meets the school dress code of formal)
- princess cut bodice and pleated skirt to create illusion of height and slenderness
- uses a firm fabric to hold the shape and create a formal structure
- lined with a soft fabric to create soft bubble effect
- crease resistant from sitting down to standing up
- within a budget (\$200)

The chosen concept was modified by altering the shape of the bust and waistline according to experimentation with lines and shape. The rounded bust was altered to a bust with diagonal lines and a princess seam, drawing the eye down the body causing a longer slimmer look.



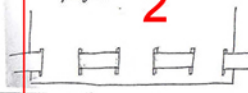
development development

The design was modified further after more considerations on line, proportion, shape and the overall appearance of the garment. The waistline was altered further by making the pleats all the same length which resulted in them falling in a diagonal line corresponding to the lines in the bodice, again drawing the eye down the body and adding interest. The line of the bodice was brought down further to fall at my natural waistline. The top of the bodice was changed to a smoother line without straps to add interest and make the garment more aesthetically pleasing.

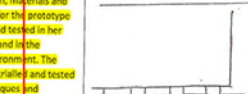


Several different techniques can be used to secure the hem of the dress to the waistline using a ribbon. The different ways are explored below. After consulting with my stakeholders, the last concept was chosen for reasons specified.

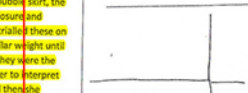
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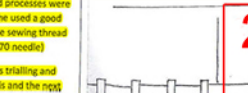
Slits (using a buttonhole technique) are cut along the hem of the dress. The ribbon is then inserted and out of each slit and the two ends come together on the right side to tie in a bow. The problem with this concept is the slits will be seen on the evening side of the dress when the ribbon is taken out.



This one was made to go into the hem of the dress (like a tab top curtain). The ribbon is then threaded through the tabs and the two ends come together on the right side to tie in a bow. The problem with this concept is that the tabs will sit at the bottom of the hemline when the dress is done however this could be a feature.



A casing is made to replace the hem of the dress. The ribbon will thread through the casing twice and the ends will come out at the right side to tie into a bow. This concept will work really well to pull the ribbon tight at the waist however there may be a problem with pulling the ribbon out easily and threading it back through.



This is the chosen concept. Belt loops are sewn along the hem of the dress and the ribbon threads through each one with the two ends coming out at the right side to tie into a bow. This concept works best as the belt loops are unobtrusive on the evening dress and they allow for ease.

Having made decisions with the help of her stakeholders as to a suitable design, materials and components for the prototype to be worn and tested in her various roles and in the intended environment. The student then trialed and tested various techniques and processes. The key problems to be solved were sewing the pleats for the bubble skirt, the pleating, zip closure and finishing. She trialed three fabrics of a similar weight until satisfied that they were the best way for her to interpret her design and then she conducted small samples on her selected fabrics and found the techniques and processes were all suitable if she used a good quality machine sewing thread and a fine (No 70 needle). Evidence of this trialing and testing is on this and the next page.

1 fabric justification

Different fabrics were considered and evaluated before my stakeholders and I chose the final fabrics to ensure we were choosing a fabric that would be best suited for the final garment.

For Day Exterior	Fabric Specifics	Fabric Performance
	Leve Chiffon Fibre Content: 100% polyester \$12.99/m with width: 114cm	The polyester qualities of this fabric mean that it is easy cleaned and very strong. It is durable, crease resistant and lightweight.
	Textured Chiffon Fibre Content: 100% polyester \$24.99/m with width: 122cm	The polyester qualities of this fabric mean that it is easy cleaned and is very strong. It is durable, crease resistant and lightweight. The texture will aid with crease resistance.
	Double Georgette Fibre Content: 100% polyester \$10.99/m with width: 145cm	The polyester qualities of this fabric mean that it is easy cleaned and is very strong. It is durable and lightweight however this particular fabric is not crease resistant which will be problematic.
For Evening Exterior	Fabric Specifics	Fabric Performance
	Silk Dupion Fibre Content: 100% silk \$34.99/m with width: 112cm	This fabric will crease extremely easily which will be a problem however it is heavy which will be helpful when the dress needs to drape. Its rough texture will be a problem as it won't glide over the skin.

	Satin Deluxe Fibre Content: 94% polyester, 6% spandex \$12.99/m with width: 112cm	The polyester qualities of this fabric mean that it is easy cleaned and is very strong. The stretch qualities of the spandex may be helpful for fit and comfort but will be a problem when evening pleats.
	Delustrated Satin Fibre Content: 100% polyester \$35.99/m with width: 150cm	The polyester qualities of this fabric mean that it is easy cleaned and is very strong. Its delustrated quality will flatter and its smooth texture will aid the drape. It's also very crease resistant.
	Satin Lining Fibre Content: 100% polyester \$20.99/m with width: 122cm	The polyester qualities of this fabric mean that it is easy cleaned and is very strong. Its smooth surface will be comfortable to wear for long periods of time.

**Chosen Fabric for Day Exterior: Textured Chiffon (polyester)**

The student researched a range of fabrics suitable for her design (not all the research is shown in this exemplar.) Her comments linked the performance properties to the aesthetics and function of the garment within the intended environment.

The student selected the delustrated polyester satin for the main garment, textured chiffon for the bubble skirt and polyester satin lining fabric. The student justified each choice as shown in this example for the textured chiffon.

Textured Chiffon is a 100% polyester material with a semi-transparent finish. The polyester qualities of this fabric mean that it is easy cleaned and is very strong. It is durable and therefore will cope with the physical expectations of the garment. The fabric is very lightweight which means it is cool and will be less bulky when the dress is done and up which will flatter my figure. Also the light properties will aid the drape when the ribbon is removed and needs to float to the ground. The polyester fibres are also crease resistant therefore there will not be any worries as to the appearance of the garment after being stored in a car for lengths of time. Also the crinkled texture of the fabric will not only allow for any accidental creases but gives the garment shape and increases the desirable aesthetics of the garment.

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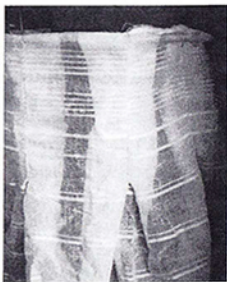


The pattern pieces that were cut out still contained seams from the base shape. These seams would be distracting for me when I cut the final bodice pieces, also these pieces didn't have seam allowances so they had to be added as well. To fix these problems I transcribed the lines for the pieces on to new calico to give clear pattern pieces. I then sewed these pieces together to ensure that the pieces were functional. For the final these pieces would be cut out twice to give a right and left side. These pieces will then be attached to the back pieces cut earlier.



This picture shows the full view of the skirt. It shows how perfectly the skirt falls to the ground in long vertical rivets. This skirt was made from a rectangular piece of material so for it to fit the bodice I've made, then it will need to have a diagonal line at the top. This can be achieved by laying the bodice over the top of the skirt and drawing in the line of the bodice and then cutting the skirt to fit. The pleats will then have to be measured and re-sewn to ensure they were all of the same length giving a diagonal line from the bottom of each pleat also to correspond with the diagonal lines of the bodice.

The following is the functional modeling of the skirt section of the dress. The pleats were put in place (i.e. they had been measured and calculated to ensure they were the same width, and then sewn together to give inverted box pleats) and then secured across the top with tacking to ensure the pleats sat flat and didn't move in order to efficiently model the skirt for functionality.



This picture shows the inverted box pleats and how they needed to be tacked to ensure they sat flat against my body. These pleats were chosen because of the way they sit against the body minimizing bulk, which is especially important with this particular dress because of the many layers the dress consists of, maintaining a flattering look for my body shape.



This picture shows the functional modeling of the tabs on the bottom of the dress. This belt loop concept, chosen by my stakeholders and me from previous development, needed to be tested for functionality. Separate pieces of calico were cut and sewn to the skirt and ribbon put through the centre to ensure the dress would stay securely up like the garment is intended. The 'belt loop' concept worked perfectly and therefore coupled with the most efficient fabric, the garments function should work perfectly.

Refined Brief

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Specifications

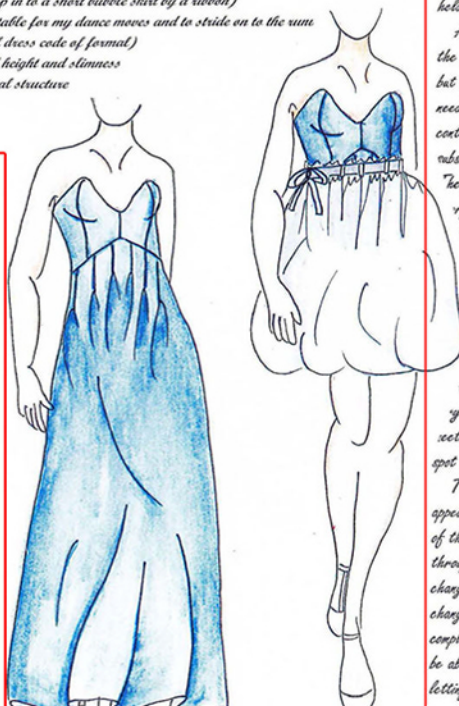
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3



This page shows the final brief, testing of the prototype and part of the evidence to justify the acceptance of the final outcome.



3

very easily adapted it to an evening gown from a day dress. The quick turning evening gown that can be worn without any worries or adjustments. As the organiser of the event, I will be rushing around from place to place in order to be ready for the evening gown. The weight and texture of the surface of the delustrated satin allows it to fall to the ground (slipping over itself) very neatly, securing it to the ground without any worries over the dress being held up in any places.

Again, the fabric used for the final garment is perfect for the issue/brief. The exterior fabric for the day wear, being textured chiffon, allows room for any accidental creases as the texture will hide them but also the texture of the chiffon makes the garment much more aesthetically pleasing, which is also needed as I am meeting with important funders and suppliers of the event. The 100% polyester fibre content of the chiffon means that it is easy cleaned which is important as my job involves me carrying food substances that may accidentally spill and therefore I need to remain presentable for the people I meet. The polyester fibres are also very strong which means that fabric will be durable for when I move and carry large objects; the dress can't get ripped, and again must remain presentable for the people I meet. The lightweight quality of the garment will allow it to stay grounded by the heavier satin material therefore only the delustrated satin will be seen in the long evening gown also it will decrease bulk to the flattery of the garment.

The exterior fabric for the evening gown, being a delustrated satin is very fit for its purpose. Its heavy nature means that it will drop to the ground without any concerns and the smooth texture of the surface that it will easily glide over itself without any friction catching it and holding it up off the ground using grey chiffon). The 100% polyester fibres of the garment mean that it is easy cleaned and very strong. This is important because, just like the grey chiffon, the fabric is exposed while I am working with funders/suppliers and carrying out my jobs during the day therefore needs to be resistant to spot cleaning in case of spillage and durable for when I'm carrying different objects.

The lining fabric chosen was satin lining. The satin weave meant that the fabric has a smooth lustrous appearance and texture and therefore it comfortable against my skin. This coupled with the fibre nature of the other fabrics and the comfortable design of the garment meant that I will remain comfortable throughout the day and into the long evening. This is important as there is no opportunity for dress changes therefore if I am uncomfortable at any point during the day or evening I will not be able to change a and relieve any irritations. The garment must also be comfortable during the day because I am completing jobs where I will be walking and carrying objects therefore if I am not comfortable I will not be able to concentrate at the job at hand and therefore decreasing my work efficiency and ultimately letting my head organizer down.

	Grade Boundary: High Merit
2.	<p>For Merit, the student needs to undertake effective development to make and trial a refined prototype.</p> <p>This involves:</p> <ul style="list-style-type: none"><li>• evaluating practical techniques and processes to determine their suitability for use in making a prototype</li><li>• using evidence from ongoing testing and ongoing stakeholder feedback to inform the making and trialling of the prototype.</li></ul> <p>This student has made a refined prototype for a mobile chilly bin.</p> <p>This student has evaluated practical techniques and processes to determine their appropriateness for use (1), and used evidence from ongoing testing and stakeholder feedback to inform the making and trialling of the prototype (2).</p> <p>To reach Excellence, the student could synthesise the on-going testing and stakeholder feedback. Often decisions seemed to be made on the basis of '<i>what my stakeholder and I decided</i>', and the justification for this decision making could be more apparent.</p>

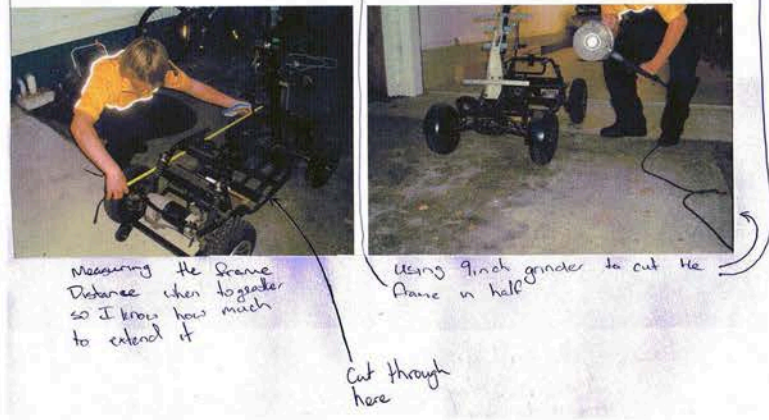
1

## Motorised Cooler

My stakeholder (Steve) wants to be able to move the chilly bin back and forward from the clubhouse to the caravan easily when we are at the lake.

Evaluating practical techniques and processes to determine their appropriateness for use in making a prototype

# My scooter will have the batteries at the back and be held by a steel brace going over the top. My stakeholders and I decided I should extend the frame to allow more space

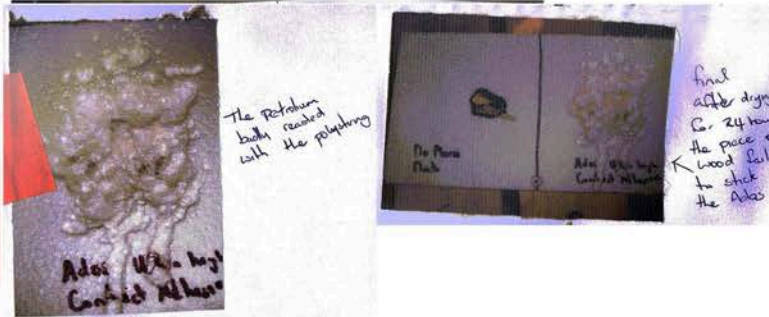


# I could attach the steering wheel by building a boss kit or I could use washers. I decided that washers would be more effective.

# As the base of the scooter is not flat, I put two slits in my plywood chilly bin base and splashed some water on it so I could bend it into place. Once it had dried, I put a coat of fibreglass over it.



# I did a test to see which glue would work the best to stick polystyrene to wood. When I used Ados, it reacted with the polystyrene. This is because it is a petroleum based glue.

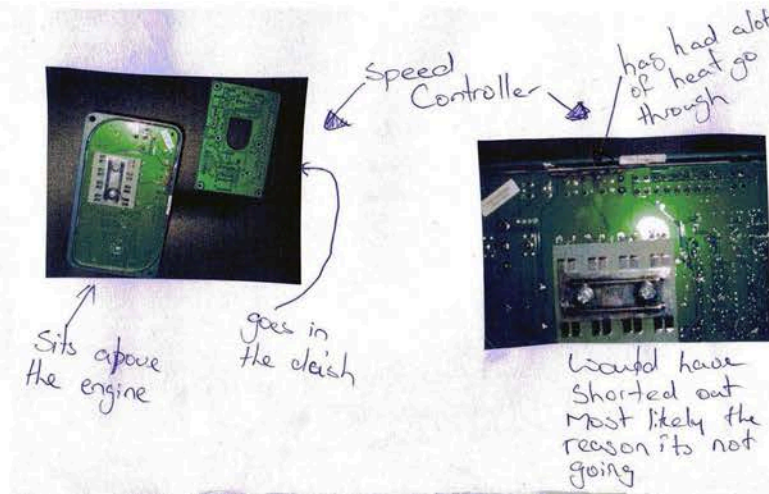


Using evidence from ongoing testing and stakeholder feedback to inform the making and the trialing of the prototype

# After talking to Steve and also looking at what the creator of a go-cart motorised chilly bin had done, I decided that the thickness of my steel tubing should be 2.0mm (as opposed to 1.6, 1.8, 2.5) as it will be strong enough but also light enough.

# I stripped the scooter to test the engine and the speed control with the help of one of my stakeholders, Jarrod (an electrician).

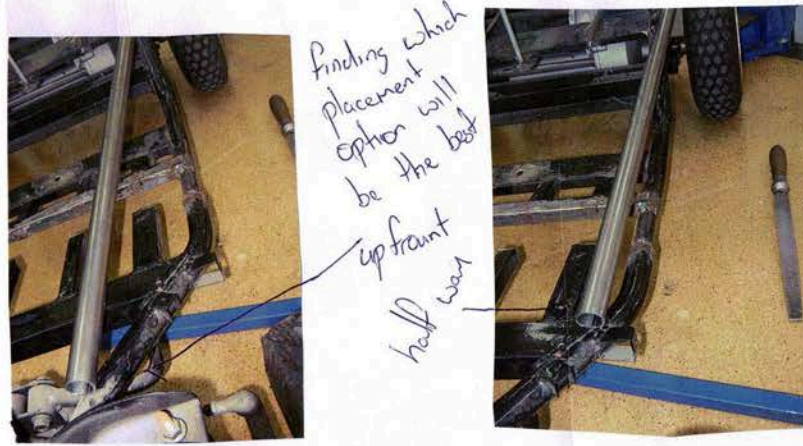
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Using evidence from ongoing testing and stakeholder feedback to inform the making and the trialing of the prototype (Continued from previous page)

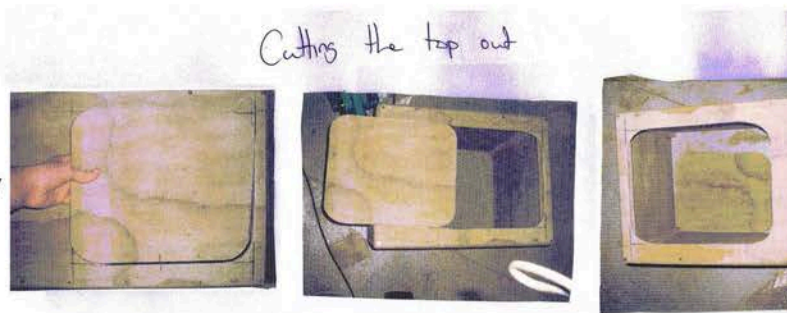
# Jarrod and I tested to make sure the engine will go if powered directly from the battery. # When weight is applied to the back of the frame, the shocks compress too easily and the battery holder hits the engine. My stakeholders and I decided the best solution was to raise the rear suspension by cutting off the shock lifting the back up and welding it back on

# I did some testing to work out which placement option will be the best for the frame extension



# This week I plan to make a mock up and build a wooden base for my chilly bin. I completed a paper model of the front then projected it on to a full scale model of the wooden base. # I tested the electronics and have isolated a few problems – thermal outback, proc/wiring fault, brake on fault, HPD

# When I went to make my chilly bin, I needed to work out how it was going to open because the steering wheel is in the way. My stakeholders suggested a double lid. I decided to cut a hole in the ply and then attach that to another piece of ply for the lid.



**Evaluation**

I have designed my motorized chilly bin so that it incorporates the specifications that myself and my stakeholders chose.

Specification	
Steel frame	I extended the steel frame with thinner tubing but same size wall thickness. The side guards are made out of steel checker plate.
Electric engine	I used the electric engine off my second mobility scooter. I did have to sort out a few electrical problems with the speed controller. Once repaired, I rewired everything so that it was hidden in the tubing and under the frame to make it more aesthetically pleasing.
Cools drinks	The chilly bin I made is sealed with silicon that will allow ice to be placed in it without leakage. There is also a bung in the bottom of the chilly bin which allows the user to empty when the ice turns to water.
Able to support rider	It's strong enough to support the rider and still manage a fun semi fast speed. I have reinforced the top of the chilly bin as you sit on the lid.
Enough ground clearance	I raised the rear suspension to make it sit higher. Because it has a short wheel base and has been raised, the chilly-bin is now able to manoeuvre the rough ground where it will be used.

	Grade Boundary: Low Merit
3.	<p>For Merit, the student needs to undertake effective development to make and trial a refined prototype.</p> <p>This involves:</p> <ul style="list-style-type: none"> <li>• evaluating practical techniques and processes to determine their suitability for use in making a prototype</li> <li>• using evidence from ongoing testing and stakeholder feedback to inform the making and trialling of the prototype.</li> </ul> <p>This student has made a refined prototype for an outfit of top and pants.</p> <p>This student has researched a range of materials and components from dressmaking and soft furnishing sources. The effect of the materials in the physical environment was prioritised over factors such as comfort (1).</p> <p>The student trialled and tested possible techniques and processes to enable the design to fit the wearer. The student explained the decisions made in relation to the developing prototype (2).</p> <p>The student provided some written evidence of stakeholder feedback for their ongoing testing, but also sought verbal feedback and used this feedback to make changes and improvements, and the resulting decisions were recorded (4).</p> <p>The garment was worn at the fashion show. As the photograph shows, the garments had stage impact and met the requirements of the brief. The material choices were suitable for the design but also complemented the effect of the stage lighting. This on-stage impact was a major consideration during development (3).</p> <p>For a more secure Merit, the student could show more evidence of linking the prototype to its purpose within the physical and social environment to inform the prototype, rather than mainly focussing on the construction details.</p>



Please note: The evidence presented in this exemplar is illustrative of student evidence.

**Context:** "Raising your profile"

Each year the school holds a fashion show profiling local businesses and showcasing our work. The show will be held in December at the local theatre which holds 500+ people. You will need to evaluate and select suitable materials, components, techniques and processes for use in making a prototype. You will also need to provide evidence of how you have used the evidence from ongoing testing and stakeholder feedback to inform the making and testing of your prototype in the intended social and physical environment and its ability to address your brief. Justify any decisions to accept or modify the prototype.

**Brief**

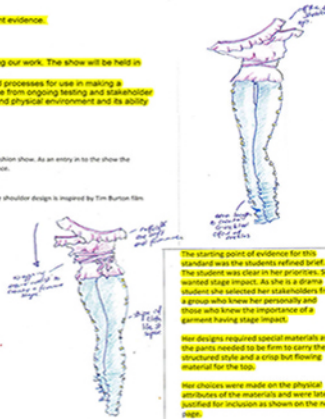
To develop and construct a high quality event garment outfit within 20 weeks to be modelled at the school fashion show. As an entry in to the show the garment must have stage appeal and respond well to stage lighting especially when viewed from the audience.

The pants will be inspired by Tim Burton's film 'M' and have unique detailing down the left leg.

The fabric must be layered and soft but not transparent to meet senior stakeholder expectations. The off the shoulder design is inspired by Tim Burton film 'Alice in Wonderland' which is the theme of the show.

The garment must fit the model and not restrict movement on stage.

- Specifications**
- suitable for modelling in a school fashion show (teacher and organizer approval)
  - has an impact on stage (audience show their appreciation for the modelled outfit)
  - fits in with Alice in Wonderland theme (inspired by Tim Burton film)
  - both garments fit size 32 top and size 12 pants)
  - comfortable (allows ease movement on stage)
  - drapes in suitable for an hour glass figure
  - pants style is tailored (pants are structured and custom fit body)
  - top is of a draped style (top is layered, draped and ruffled to give the illusion of more drapes)
  - shades of blue (responds well to stage lights and suits wearers skin colour)
  - a high quality finish (chosen according to acceptable codes of practice)
  - completed by 24th September



## Fabric Justification: 1

Garments: Top + Pants  
Semi-formal garments (avant garde x streetwear)

Purpose: The purpose of the top and pants is to look amazing and create impact on a catwalk while still being transformable to streetwear (of an avant garde style)

Fabrics: Top: glass - Nylon, bodice and ruffel organza - cotton polyester blend, bodice and ruffel nylon - cotton satin, edging and tie.  
Single knit - cotton, unsel bodice.

Pants: contains - acetate rayon & metal effects. main fabric. Sargued step - detailing.

**Fibre Properties:**

Property	Acetate	Cotton	Nylon	Polyester	Rayon
whitely navy	poor	poor	good to v good	good to v good	fair
draps	fair	fair	good to v good	good to v good	good
absorbency	fair	v good	poor	v poor	v good
conductivity	poor	fair to good	poor	poor	poor to good
heating temp	warm	warm/hot	warm	warm	medium
Flammability	Burns, melts	Burns	Burns, melts	Burns, melts	burns
Sunlight resistance	fair to good	v good	fair	very good	v good
laundrying temp	Cold to warm	medium	cold to hot	cold to hot	cold to warm
durability	poor	good	good to v good	good to v good	poor
Comfort	fair	good	fair may become hot	fair may become hot	v good
Cost	low to moderate	low	moderate	moderate	low to moderate

(G1, C.P.G and Vilensky, L.D. (1993). Textiles for Modern Living. (5th edition) Melbourne: Logman Cheshire Pty Ltd.

## Fabric Justification:

**Fabric Properties:**

The Nylon glass and cotton polyester blend organza have a good light draping quality that was essential to the design of the top, they would have to softness for the ruffel as well as the durability I was looking for. The Nylon glass has a different drap property to the cotton polyester blend organza as the Nylon fibres are more rigid than the cotton or polyester fibres, this means the glass has softer less defined folds within the drapes.

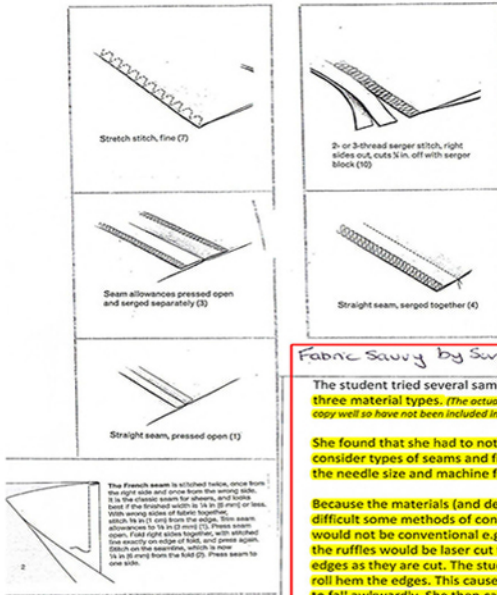
The cotton underlay is a knit fabric so it resists creasing more than a woven cotton. It is soft and comfortable to wear next to my skin and is also very absorbent which is good for Hanakes bay summers! The knit of the fabric meant it fit my body closely and gave support to the rest of the bodice.

The acetate rayon blend of the curtain fabric for the pants has the strength and structure necessary for my tight fitting high waisted pants. The good drapes of the rayon allowed enough flexibility for the extra length to give the ruffel. I wanted from the design, the blend also has a high level of comfort which was an essential quality for me. Unlike woolly neither acetate or rayon has good durability.

All of the fabrics and fibres I have chosen are very cost effective which is good as that means my budget can be smaller.

**Conclusions:**

The many different fabrics and their properties combined in a way to create two distinctive garments, they also provided an aesthetic look and functionality that I needed for the design. The content for the design was project runway and the material's each were effective and had good in a runway setting. The main reason for my fabric choices were availability in the colour palette, I wanted aesthetic functions and cost functionality was not as important.



**Fabric Savvy by Sandra Betzina**

The student tried several samples on her three material types. (The actual samples do not copy well so have not been included in this exemplar) 2

She found that she had to not only consider types of seams and finishes but the needle size and machine foot.

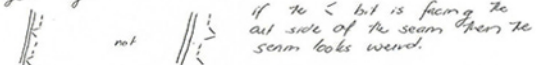
Because the materials (and design) were difficult some methods of construction would not be conventional e.g. In industry the ruffles would be laser cut to seal the edges as they are cut. The student tried to roll hem the edges. This caused the ruffles to fall awkwardly. She then carefully singed the nylon by holding the very edge of the ruffles to a candle flame and this sealed the edge of the thermoplastic fibre.

## Construction techniques: 2

The fabric for the pants had a pattern so I had to make sure the pattern wasn't the same way on each piece as much as possible although this was not essential as the pattern was hard to distinguish whether it was upside down or not.

The glass and organza are sheer fabrics which pull and catch easily, they also fray very quickly after cutting. To compensate, singeing the edges, using a sharp needle and french seams steps pull in the fabric from occurring and prevents fraying.

The stretch knit will break to stretch a plain seam so I will have to use a stretch stitch. This will allow the fabric to stretch around my body as though it were one solid piece of fabric. One problem will be caused by the asymmetry and form of the stretch. I will have to ensure that the same pattern faces the outside on both edges.



The curtain fabric had a loose weave so it frayed very quickly as a consequence I overlooked all raw edges of all the pattern pieces or seam as I had cut them out. I also had to use a small stitch, sharp needle and take care with my placement of pins and seams to prevent pulling or holes in my fabric and to prevent wrinkling as that would be difficult due to the nature of the weave.

**Care:**

All of my garments require hand washing in cool to medium water and the pants need pressing on a low to medium iron. The top should not need to or be ironed.

# Manufacture: Pants

2

ensure that it followed grain as it is an unseen part of the pattern. I did cut it so it loosely followed the grain. I overlapped the edges to prevent fraying.

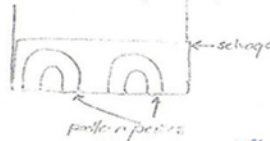
bottom section of eyelet strip (fully attached) at sides but not at top for movement purposes

top section of eyelet strip (left partially unattached to better mobility)

Then I attached the piece that shapes the fly shape on the outside. I then placed the zip on. on the other side, (the left leg) I attached the zip into the waist band for neatening. because of this I found attaching the back part of the fly that protects the zip from catching on the inside to be too bulky so I left it off. then I neatened the inside of the waist band (slipstitch) and hemmed my pants (with hemming bone stitches). I took extra care around the side seams.

# Manufacture: Top

To make the top I firstly focused on the under top, the stretch knit bodice that would hold my top up. because I had made this during my functional modelling I checked the fit and then left it alone. next I cut out the ruffel pieces because the glass had a loose weave to the organza it stretched more when it was straightened to form the ruffel. I cut the ruffel pieces out as circles by cutting a half circle on the fold after I cut out the pieces I would fold until I had a new fold similar to the original. this allowed me to work from only one end of the fabric and therefore be the most efficient. to form the ruffel I attached the organza and the glass to the ribbon after I singed all of the edges with a candle flame. in a factory setting this could be done when the pieces were cut using a hot knife. my method while effective was very time consuming. once I had one side of the ruffel attached to the ribbon I folded the ribbon over to neaten the edges of the top once I had done that I trialled how I would attach and wrap the ruffel.



ruffel back

ruffel front

ruffel side

To create the volume in the rest of the top I made a tube of both of the glass and organza fabrics. I then cut the tube to the length I wanted and singed the bottom edges. I made two small seams, singed the rough edges of these and then pinned them to the organza in to create very small neat french seams. finally I put three rows of shirring thread through the top of the tube. I then attached the right side of the tube to the wrong side of the bodice. to attach the ruffel I placed both on



## Final Brief

To develop and construct a high quality avante garde outfit within 20 weeks to be modelled at the school fashion show. As an entry in to the show the garment must have stage impact and respond well to stage lighting especially when viewed from the audience.

The pants will be inspired by Tim Burton's film '9' and have unique detailing down the left leg.

The fabric must be layered and soft but not transparent to meet wider stakeholder expectations. The off the shoulder design is inspired by Tim Burton film 'Alice in Wonderland' which is the theme of the show.

The garment must fit the model and not restrict movement on stage.

## Specifications

- suitable for modelling in a school fashion show (teacher and organiser approval)
- has an impact on stage (audience show their appreciation for the modelled outfit)
- fits in with Alice in Wonderland theme (inspired by Tim Burtons film)
- both garments fit (size 10 top and Size 12 pants)
- comfortable (allows easy movement on stage)
- design is suitable for an hour glass figure
- pants style is tailored (pants are structured and smoothly fit body)
- top is of a draped style (top is layered, draped and ruffled to give the illusion of more drape)
- shades of blue (responds well to stage lights and suits wearers skin colour)
- two or more textures used in the outfit (embossed and smooth fabrics chosen)
- top is made in nylon organza 'glass' and cotton double knit
- pants are made from acetate rayon curtain fabric
- a high quality finish (finished according to acceptable codes of practice)
- completed by the 2nd September

Top: I feel that my top is of a good quality. I do not think it is of as good a quality as my pants however. The fit and finishing are very good. The ribbon around the ruffel should have been bias cut for technique excellence and the seam between the floaty bodice and stretch knit bodice could have been neatened although this is not essential as it is not seen nor is it in contact with my body. the ruffel itself is not attached to the top very much to allow maximum movement unfortunately the attachment points do not look very neat nor are they as perfectly placed as I would like. the ruffel that sits up on my shoulder is slightly too long and frequently falls down as I am walking. I do not think the french seams on the bodice are

3



The student modelled her garments at the fashion show and gained informal feedback as to the garments fitness for purpose. Her evaluation focussed more on the construction details rather than linking the prototype to its purpose within the physical and social environment. Excerpts from the evaluation are shown on this page.

## Stakeholder feedback:

I do not have written stakeholder feedback on the implementation of my final design. I do however have feedback from conversations with my Stakeholders after the fashion shows. The feedback was:

"The top and pants worked well together. It looked really amazing on the catwalk"

"The lights caught and reflected off the detailing as you walked out"

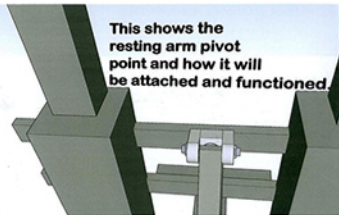
"The whole outfit looked amazing and you looked amazing."

	Grade Boundary: High Achieved
4.	<p>For Achieved, the student needs undertake effective development to make and trial a prototype.</p> <p>This involves:</p> <ul style="list-style-type: none"> <li>• evaluating materials and/or components to determine their suitability for use in a prototype</li> <li>• trialling practical techniques and processes to determine their suitability for use in making a prototype</li> <li>• selecting appropriate materials and/or components, tools and equipment; and applying practical techniques and processes to make the prototype</li> <li>• using results from testing and stakeholder feedback to inform the making and trialling of the prototype</li> <li>• undertaking prototyping to gain specific evidence of the outcome's fitness for purpose in its intended physical and social environment</li> <li>• explaining any decisions to accept and/or modify the prototype.</li> </ul> <p>This student has made a prototype for a massage table trolley.</p> <p>This student has used an analysis of important environmental considerations, stakeholder consultation and materials to develop the trolley (1) (3).</p> <p>The student has trialled practical techniques and processes using cardboard and functional modelling, and considers stakeholder feedback, to inform the manufacturing and trialling of the trolley prototype (2).</p> <p>The modelling helped to confirm at an earlier stage that the prototype would be accepted and explains decisions (2).</p> <p>The student used the appropriate tools to make the trolley (3) (4).</p> <p>The student loaded the massage table onto the trolley to show that it is fit for purpose (4).</p> <p>To reach Merit, the student could have shown the trolley being used in all of the intended environments.</p> <p>Considering the wheel size, the weight of the material and the shape of the handle could show more evidence of the ongoing testing and stakeholder feedback.</p>

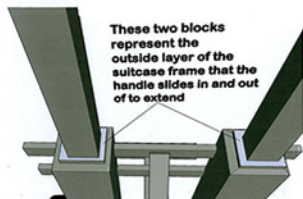
1

I would like to find a material that is fairly cost effective so I am able to spend a little more on things like better quality wheels. However my stakeholder has agreed that she is willing to pay a little over budget to get the required quality. I want material that will be fairly light as well as strong. It will need to be able to be powder coated to make it weatherproof. In consultation with my dad (an engineer), I have decided to use EWS light guage square steel tubing for most of my project as it is easier to weld than aluminium. And it will also cost less. One of my possible supplies also confirmed this and helped me determine sizes. My mum does most of her massaging on the beach. Because steel and iron corrodes with salt water (see my research below), I will need to paint it with rust proof paint.

2



This shows the resting arm pivot point and how it will be attached and functioned.



These two blocks represent the outside layer of the suitcase frame that the handle slides in and out of to extend



THE RESTING ARM WILL SWIVELL ON A BAR THAT WILL ACT AS THE PIVOT POINT.



WIDE SHOT OF THE PRODUCT IN FULL USE ON RESTING ARM AND THE CARRIER EXTENDED.



THE TWO WHITE PIECES OF PERSPECTS REPRESENT THE CLIP THAT THE RESTING ARM WILL CLIP INTO WHEN NOT IN USE.



WIDE SHOT OF THE CARRIER WITH THE ARM NOT EXTENDED AND IN ITS SMALLEST FORM.

# When I cut out the shell, I found that the inside extendable arm was too weak and breakable to fit inside. I will now make my own stronger device.  
 # I cut out all the materials and made sure they could slide without being too sloppy.  
 # I was able to lathe the 19mm tube to fit tightly inside my wheel fitting (after a few tries where I made it too thin).  
 # I cut out and lathed my handle to size but after welding the handle in place I found out that I had drawn the 2 bars too close to each other and they were no longer able to fit inside the casing. After 2 days the problem was solved and the handle is now perfectly in place.  
 # I will now design a system that will stop the extension from coming all the way out.

# Are there any changes you would like made to the model before I order materials and begin manufacturing? Yes - I see that you built the support leg facing up. I want it across to suit different sized tables. Also I think one support bar should be sufficient instead of the two shown - will cut down on materials and look aesthetically better.  
 # I have placed two stub axels on either side for the wheels. Will this be alright or would you like one long axle? This is good as one day I may need to take off the wheels and I couldn't do that with a long axle. With the two stub axels I just need to unscrew a nut to take the wheels off.  
 # I notice that when seen to scale, the holder where the massage table sits is too long and sticks out too much. I think it should be hinged to cut down on size restrictions and it will still be strong enough to hold the massage table.

Planning Guide

AFTER A BRIEF CONSULTATION WITH STEEL AND TUBE AS WELL AS MY STAKEHOLDER WE HAVE COME TO AN AGREEMENT THAT I WILL USE TWO PIECES OF 700mm IN LENGTH, 25.4mm IN WIDTH AND 12.7mm IN DEPTH EWR RECTANGULAR TUBE, AS WELL AS ONE PIECES OF 130mm IN LENGTH, 25.4mm IN WIDTH AND 12.7mm IN DEPTH AND ALSO TWO PIECES OF 130mm IN LENGTH, 51mm IN WIDTH AND 25.4mm IN DEPTH.

EVALUATION OF THIS ACTION: I WAS ABLE TO COMPLETE THE ORDERING OF MY MATERIALS AND THEY WERE DELIVERED ON MONDAY (WHEELS ON TUESDAY). I WAS ABLE TO CUT OUT THE SHELL HOWEVER I FOUND THAT THE INSIDE EXTENDABLE ARM IS TOO WEAK AND BREAKABLE TO FIT INSIDE DUE TO THIS COMPLICATION I WILL NOW SIMPLY MAKE MY OWN STRONGER DEVICE.

WHERE TO FROM HERE: NOW THAT I HAVE CONSULTED WITH MY STAKEHOLDER ABOUT MAKING MY OWN EXTENDABLE SHE SAID THAT SHE COULDN'T HAVE A WEAK PRODUCT DUE TO THAT I GOT THE GO AHEAD I WILL NOW ADD THIS TO A REVISED BRIEF AND START ON THE MANUFACTURE OF MY NEW EXTENDABLE ARM.

3

EVALUATION OF THIS ACTION: I WAS ABLE TO GET EVERYTHING I NEEDED FROM STEEL AND TUBE FOR MY PROJECT. DUE TO THE LAITHE BEING USED, I FINISHED THE RETRACABLE HANDLE SO THAT BOTH BALL BEARING LOCK INTO PLACE AS THEY HIT THE HOLES. WITH THE LAITHE BEING FREED UP, I WAS ABLE TO LAITHE THE 19mm TUBE TO FIT TIGHTLY INSIDE MY WHEEL FITTING (AFTER A FEW TRIES MAKING IT TO THIN) AND ALSO LAITHE ONE SIDE DOWN TO 8mm FOR THE THREAD TO BE DONE. I WAS ALSO ABLE TO GET THE SUPPORT BAR WELDED ON.

WHERE TO FROM HERE: I WILL NOW USE THE HAND THREAD TOOL TO CUT A 24mm THREAD ON THE STUB AXELS. I WILL ALSO WELD TOGETHER THE DEVICE FOR THE MESSAGE TABLE TO SIT ON AND WELD IT ONTO MY PRODUCT. LASTLY I WILL MAKE A HANDLE OUT OF 16mm ROUND TUBE.

EVALUATION OF THIS ACTION: I WAS ABLE TO COMPLETE THE RESTING ARM AND IT SEEMED TO WORK PERFECTLY, HOWEVER I FORGOT TO GET THE CLIP TO RIVET ON SO I MADE A TRIP TO MITER 10 MEGA WHERE I NOT ONLY GOT THE CLIP BUT ALSO SOME SPRAY PAINT AS I WOULD HAVE EXTRA TIME. WHEN I GOT BACK RIVETED THE CLIP ON AND THE ARM CLIPPED IN AND OUT OF IT VERY WELL, I WAS THEN ABLE TO GIVE MY PRODUCT ITS FIRST TWO COATS OF BLACK PAINT AND LEAVE IT UNTILL I GOT BACK FROM HOLIDAYS.

WHERE TO FROM HERE: I WILL NOW GO BACK TO MY FOLDERS AND CHANGE OR ADD ANYTHING THAT NEEDS TO BE DONE. WHEN I GET BACK FROM HOLIDAYS I WILL GIVE MY PRODUCT ANOTHER 2 COATS OF PAINT AND THEN SPRAY PAINT IN BLUE THE COMPANY NAME AND LOGO. I WILL ALSO NEED TO RETURN TO BAY ENGINEERING BECAUSE I LOST A BALL BEARING.

ACTION THAT I PLAN TO DO: THIS WEEK I PLAN TO START THE MANUFACTURE OF MY RETRACABLE HANDLE. I PLAN TO CUT OUT THE SUITABLE LENGTHS FOR MY ARM. I THEN WILL CUT TWO PIECES OF 19mm SOLID STEEL PIPE AND PLUG WELD IT INTO THE SQUARE TUBE. I WILL THEN DRILL A HOLE THROUGH THE STEEL TUBE AND HALF WAY THROUGH THE SOLID PIPE AS WELL AS THE OUTSIDE CASES. I WILL PLACE A SMALL BALL BEARING INSIDE THAT WHEN I PULL THE HANDLE OUT THE BALL BEARING WILL SLIP INTO THE HOLE AND LOCK INTO PLACE.

RESOURCES/SPECIAL REQUIREMENTS THAT I REQUIRE: I WILL NEED TO ENSURE AGAIN THAT I HAVE ALL OF THE MACHINES SUCH AS THE M.I.G AND DRILL PRESS. I WILL ALSO NEED TO BE ABLE TO GET TWO SPRINGS AND BALL BEARINGS.

ESTIMATED TIME: I BELIEVE THAT WHOLE PROCESS OF MAKING THIS RETRACABLE HAND SHOULD TAKE ME AROUND A WEEK AND A HALF DUE TO THE COMPLEXITY OF THE SYSTEM.

EVALUATION OF THIS ACTION: I WAS ABLE TO START THE RETRACABLE HANDLE. I CUT OUT ALL OF THE SUITED MATERIALS AND MADE SURE THAT THEY COULD BE WELDED TOGETHER. I CUT OUT TWO PIECES OF 40mm SOLID TUBE AND PLUG WELDED IT INTO MY INSIDE CASE. HOWEVER I WAS NOT ABLE TO GET TO BAY ENGINEERING TO PICK UP THE SPRING AND BALL BEARINGS TO FINISH THE HANDLE.

WHERE TO FROM HERE: I WILL GO DOWN TO BAY ENGINEERING AND PICK UP THE SPRINGS AND BALL BEARINGS AS WELL AS TWO CIRCLIPS FOR MY STUB AXELS TO HOLD ON MY WHEELS. UNTILL I GO TO BAY ENGINEERING I WILL MAKE TWO STUB AXELS FROM A 19mm PIECE OF STEEL TUBE. THAT WILL LAITH TO 12.87mm TO FIT THROUGH THE BALL BEARING THAT WILL HAVE A SLEEVE AND THREAD AT EACH END TO BE BOLTED ON.

RESOURCES/SPECIAL REQUIREMENTS THAT I REQUIRE: I WILL NEED TO ENSURE THAT I HAVE ACCESS TO A 8mm THREAD TOOL. I WILL ALSO NEED TO MAKE SURE THAT I HAVE THE HELP OF THE TEACHER TO BE ABLE TO ASSIST ME IN MAKING A TOOL FOR THE CIRCLIP RUTS. I WILL ALSO NEED TO HAVE ACCESS TO VARIOUS OTHER MACHINES SUCH AS THE MITER SAW, M.I.G WELDER AND LAITHE.

ESTIMATED TIME: ONE TO ONE-AND-A-HALF WEEKS

EVALUATION OF THIS ACTION: I WAS ABLE TO COMPLETE BOTH THE THREADS AND MAKE THE TOOL AND LAITHEING THE CIRCLIP RUTS ON THE STUB AXELS. I WAS ALSO ABLE TO FIND 8mm NUTS THAT I USED TO ATTACH THE WHEELS TO THE FRAME. I WAS ABLE TO WELD ON THE RESTER ON WHICH THE MESSAGE TABLE SITS. LASTLY I WAS ABLE TO CUT OUT AND LAITHE MY HANDLE TO SIZE BUT AFTER WELDING THE HANDLE IN PLACE I FOUND OUT THAT I DREW THE INSIDE BARS TOO CLOSE TO EACHOTHER AND THEY WERE NO LONGER ABLE FIT INSIDE OF THE CASING. AFTER ANOTHER TWO DAYS THE PROBLEM WAS RESOLVED AND THE HANDLE IS NOW PERFECTLY IN PLACE.

WHERE TO FROM HERE: I NOW HAVE THE SCHOOL HOLIDAYS, HOWEVER A DAY HAS BEEN ORGANISED WHERE WE ARE ABLE TO COME INTO CLASS AND FINISH OFF OR GET FURTHER AHEAD IN OUR PROJECTS. I WILL BE USING THIS OPPORTUNITY TO COME IN AND MAKE THE RESTING ARM THAT THE PROJECT WILL SIT ON WHEN IT IS NOT IN USE. I WILL DRILL A 400mm PIECE OF ALUMINIUM PIPE TO AND SLIDE IT ON A 160mm IN LENGTH 6mm IN DIAMETER STEEL PIPE THAT I WILL THEN WELD TO MY WASHER AND DRILL A HOLE FOR A SPLIT PIN ON EITHER SIDE. I WILL THEN RIVET A CLIP FOR THE RESTING ARM TO CLIP INTO WHEN NOT IN USE.

Material	Quantity	Length	Width	Depth	Wall Thickness	Code	Price
EWR rectangular Tube	2x	700mm	25.4mm	16mm	1.6mm	3181616R	\$40.00(5.5m)
EWR rectangular Tube	1x	142mm	25.4mm	16mm	1.6mm	3181616R	
EWR rectangular Tube	2x	240mm	38mm		25.4 1.6mm	3825416R	
Steel Plate	2x	500mm	30mm		3mm	12122(mm)P	\$85.00(per sheet)
Steel Plate	1x	40mm	40mm		3mm	12122(mm)P	
EWR Round Tube	1x	600mm	16mm OD		1.2mm	1612T	\$20.009(5.5m)
Wheels	2x	200mm Diameter	25mm tread width			Ball Bearing	GC200BB \$44.00 Total



**THE CARRIER AT FULL EXTENSION WITH HANDLE UP AND THE RESTING ARM EXTENDED.**

**4**



	Grade Boundary: Low Achieved
5.	<p>For Achieved, the student needs undertake effective development to make and trial a prototype.</p> <p>This involves:</p> <ul style="list-style-type: none"> <li>• evaluating materials and/or components to determine their suitability for use in a prototype</li> <li>• trialling practical techniques and processes to determine their suitability for use in making a prototype</li> <li>• selecting appropriate materials and/or components, tools and equipment; and applying practical techniques and processes to make the prototype</li> <li>• using results from testing and stakeholder feedback to inform the making and trialling of the prototype</li> <li>• undertaking prototyping to gain specific evidence of the outcome's fitness for purpose in its intended physical and social environment</li> <li>• explaining any decisions to accept and/or modify the prototype.</li> </ul> <p>This student has made a prototype for a dress for a fashion show.</p> <p>The student purchased suitable materials after evaluative discussions with the stakeholder (1).</p> <p>The student trialled and tested possible techniques and processes to interpret the design and to fit the wearer. The student begins to explain the decisions made (2).</p> <p>The prototype trialled, and used selected techniques and processes that were suitable for the chosen materials, the garment and the identified environment (3).</p> <p>Ongoing stakeholder feedback is used, showing how their opinions were used in the development of the garment, such as the shoulder feature and the fullness of the skirt (4).</p> <p>At the fashion show the garments had stage impact. The prototype was judged fit for purpose as the garment fit complimented the student's height, draped well from the bodice and allowed movement (5).</p> <p>For a more secure Achieved, the student could provide further information as to the materials and components that were evaluated.</p>

**Please note:** The evidence presented in this exemplar provides snapshots of student evidence. The commentary aims to link excerpts of the student evidence from the student portfolio.

**Context:** "Raising your profile"

Each year the school holds a fashion show profiling local businesses and showcasing our work.

You will need to evaluate and select suitable materials, components, techniques and processes for use in making a prototype. You will also need to provide evidence of how you have used the evidence from ongoing testing and stakeholder feedback to inform the making and trialling of your prototype in the intended social and physical environment and its ability to address your brief. Justify any decisions to accept or modify the prototype.

(As some students were not confident enough to submit their garments for modelling in the fashion show the 'other significant occasion' was built into the context to allow the students a less public forum for 'raising their profile'.)

The starting point for this student was her accepted conceptual design all stakeholders had given feedback and it was seen as a garment that had the potential to address the student brief but there were some key areas, for example, the straps and the bodice embroidery that required further development. (please see next page)

## Final Brief

To design, develop and create a one-off dress my key stakeholder [redacted] - myself - to wear at a family Christmas dinner on December 25<sup>th</sup> 2010, in Burlington, Ontario, Canada. This dress also needs to be able to enter the [redacted] School fundraiser Alice and Wonderland Fashion Show, to be held on 2<sup>nd</sup> September 2010 at the [redacted] Opera House. This dress will be inspired by the works of Alexander McQueen. The dress will have to be made to fit myself around the size of a 10 and will also have to be a formal garment. When designing the dress I will have to be aware of the different functions of the fabrics, the different functions range from straight seams, to gathers, to embroidery techniques.

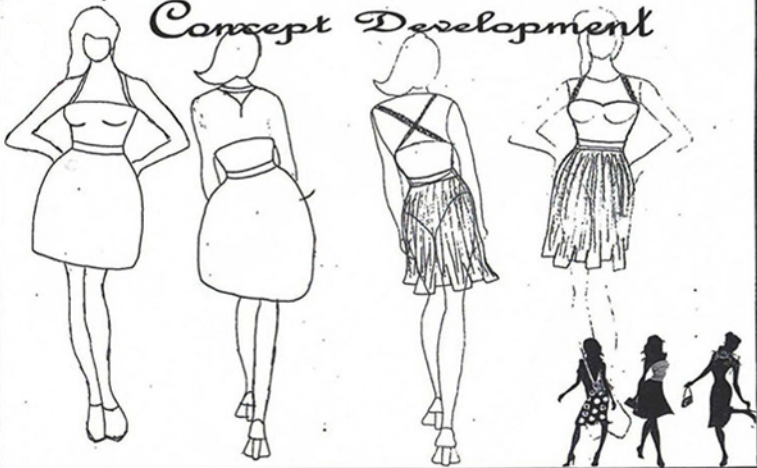


## Specifications

- The dress needs to be in the budget range of under \$100
- This dress will need to be of a very high quality, this will be tested through the snag test, the crease test and the stain test
- It needs to fit perfectly to myself / size 10
- It will be shown on September 2<sup>nd</sup> in the Alice and Wonderland Fashion Show at the [redacted] Opera House
- The dress will be inspired by the late Alexander McQueen
- It needs to be suitable for a family occasion
- It will need to respect the key stakeholders ethics and values
- It will need to be black and silver
- It will need to have some embroidery detail on the bodice with a Maori influence
- It will need to be formal



## Concept Development



The student selected polyester satin for the bodice and polyester organza for the skirt. She discussed possible purchases with her stakeholders. She conducted some tests for snagging, creasing and staining as the performance property chart did not give her enough information. Polyester is elastic so it will resist creasing, and it is fine but strong so resisted snagging in the test. However, it retained greasy stains but stains such as fruit juice washed out easily.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<b>man-made fibres</b>																				
Polyester	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Nylon	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Acrylic	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Acetate	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
<b>natural fibres</b>																				
Cotton	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Linen	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Wool	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Silk	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Abasion resistance																				
Absorbency																				
Elasticity																				
Flame resistance																				
Insulation																				
Mouldproof																				
Mildew resistance																				
Resistance to acids																				
Resistance to alkalis																				
Resistance to damage by bleach																				
Resistance to damage by sunlight																				
Static electricity																				
Tensile strength																				
Thermal conductivity																				
Thermoplasticity																				

1

Ref: Textile Technology by MacArthur, Etchells & Shepherd

## Fabric Testing

After holding the fabric samples in a fist for 5mins. The Dance Time Satin had quite a few creases that lasted for a while after the test was completed, and the crystal organza had a few creases after the test but soon disappeared after the fabric sample was left.

## 2 Development

This technique of embroidery is called straight stitching. When this technique is used it is important to ensure that each stitch is the same size and length.

This embroidery technique is called threaded running stitch. This stitch is good for a design pattern with a lot of curves and fine detail. The combination of mixing two different colours allows a different look for the design.

## 4 Development

These 3 photos are of my finished mock up and how it fits to the key stakeholder. From my mock up, I know that the placement of the straps have to be great and how much fabric is needed to get the desired look and effect.

Back view      Side view      Front view

This is a photograph showing the gathered fabric used for the skirt part of the dress. When I make the gathers out of the actual skirt fabric, I will have to make sure they are attached before removing the gather threads.

3

## Manufacture



This is a photo of the embroidery pattern, which has been locked into place, so I know which guidelines to follow, when the actual thread is embroidered.



In this photo, there is the first step of the embroidery. There was a problem because it didn't have the right line and look.

This is the finished embroidery detail. I had to add in another row of stitching to achieve the right look.



## Manufacture



This is the finished embroidered bodice. It shows what the embroidery detail looks like and it shows the pattern.

This is a photo of the finished dress. As you can see in the photo, there are the plaited straps and the embroidered bodice as well as the gathered skirt.



This photo shows what the finished gathers look like when they are done with the chosen fabrics.



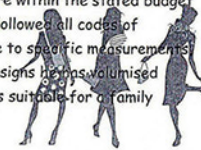
These two pages are just examples of the work the student did during manufacture. Seams and Hems were also tested including decisions such as needle size.



## Evaluation

After having completed my one-off garment for the Alice and Wonderland Fashion Show that was held on the 3<sup>rd</sup> of September at the ~~Victoria~~ Opera House and also having done the technology process alongside the garment, I can say that although my garment was finished to the highest of my personal standards, the technology process was not done to the best of my ability. My garment met my brief because it suited my key stakeholder and fitted really well as well as looking good on the runway at the Alice and Wonderland Fashion Show. My garment was formal and was inspired by the works of Alexander McQueen when it came to my other occasion of Christmas in Canada, I was not able to test my garments fit for purpose because the location and time was in Burlington, Ontario, Canada and on Christmas Day. However I believe that my garment would have fitted in with the intended environment.

My garment met all my specifications because all my materials were within the stated budget of under \$100, my garment was made to a high quality because I followed all codes of practice. My dress fitted my key stakeholder because it was made to specific measurements. My garment was inspired by Alexander McQueen because in his designs he has utilised skirts and also has detail throughout his collections. My garment is suitable for a family



occasion because it is not too short of revealing in any way, being the key stakeholder was able to follow all my ethics and values. My garment was in the colours of black and silver as they were stated in the specifications, the bodice embroidery had a Maori influence with the Koru patterns. The garment was formal because it was to a high standard and would be socially acceptable.

I agree with my wider stakeholders - Emily, Jessica and Donna - when they say that I could improve on my time management skills because I left things unfinished throughout the technology process. I also agree when they say that it suits the wearer and that the bodice embroidery turned out really well.

Overall I think this unit was successful in the meeting all aims and specifications as well as meeting my brief and stakeholder needs.



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	Grade Boundary: High Not Achieved
6.	<p>For Achieved, the student needs undertake effective development to make and trial a prototype.</p> <p>This involves:</p> <ul style="list-style-type: none"> <li>• evaluating materials and/or components to determine their suitability for use in a prototype</li> <li>• trialling practical techniques and processes to determine their suitability for use in making a prototype</li> <li>• selecting appropriate materials and/or components, tools and equipment; and applying practical techniques and processes to make the prototype</li> <li>• using results from testing and stakeholder feedback to inform the making and trialling of the prototype</li> <li>• undertaking prototyping to gain specific evidence of the outcome's fitness for purpose in its intended physical and social environment</li> <li>• explaining any decisions to accept and/or modify the prototype.</li> </ul> <p>This student has made a prototype for a stirling engine.</p> <p>This student has selected appropriate materials, tools and equipment, and applied practical techniques and processes to make a prototype (1). The prototype is mainly for the flywheel component (2).</p> <p>To reach Achieved, the student could show more evidence of using results from testing and stakeholder feedback to inform the making and trialling of the prototype.</p> <p>The engine would also need to be trialled to gain evidence for the evaluation of the prototype's fitness for purpose in its intended social and physical environment. Any decisions to accept and/or modify the prototype would need to be explained.</p> <p>This work would have been enhanced if the student had undertaken practice to develop a prototype to address a brief that clearly described the desired outcome that would meet a need or realise an opportunity.</p>

## Brief

My dad and I would like to develop a stirling engine to work as an alternative power source. It must

- spin reasonably fast
- be well made
- run off both cold and hot temperatures
- must be able to have an attachment like a propeller
- must be able to generate power

1

## Evaluating materials for suitability and selecting them

Part	Material	Reason for Suitability
Piston	Steel	From the materials we had available in the workshop, I researched what kind of material had the least resistance and that was steel. Smooth on the outside so will reduce resistance between the piston and piston cylinder. Easy to machine and machining comes out really smooth and it looks quite good.
Cylinder for Work Piston	Brass	I chose brass because it really looks good with the decorative golden colour on the outside. It is a really easy material to machine. The outcome comes out smooth with a clean cut.
crankshaft	Brass and steel rod	As above for brass For the stirling engine to turn and do work successfully it must have a crankshaft which is strong and able to withstand a high revolution rate, and will not effect the entire engine as a whole.
Displacer cap	Aluminium	The material of choice because it is cheap and easy to manipulate unlike say brass which is very expensive and hard to get in a very large size. However if I was to met down brass I could have used it but brass melts at a high temperature and the forge at school is unable to do so. Aluminium is easy to source and can also transfer heat reasonably well but nowhere as good as a metal like copper. But copper has the same flaws as brass.
Displacer Cylinder	PVC	Can source scrap (eg from pipe gutterings) Can get it in a big enough size unlike petri dishes which are transparent but far too small.
Flywheel	Aluminium	Pretty much same reasons as for displacer cap ie size, cost, ease of working

## Final Brief

The model stirling engine must drive a flywheel by using a source of either hot or cold temperatures

### Specifications

- Height 165mm
- Base 110mm
- Flywheel 100mm
- Displacer 94mm with a 9mm centre
- Upper displacer flange 35mm with a 4mm centre
- Lower displacer flange 35mm 8mm M4x 0.7 depth = 3.5
- Connecting rod clevice 10

## Trialling for suitability, selecting and applying practical techniques and processes

### Selecting appropriate tools and equipment

### Using results from testing to inform the making and trialling of the prototype

While machining the piston, I had to make sure that the tool bit was sharp, so I got a clean and smooth cut.

### Casting process:

When making a prototype out of wood for the flywheel, I had to allow for any machining tolerance and a way of holding the finished cast in the lathe. I cut out spokes but when casting it with aluminium, it didn't work. So I decided I would machine it in the mill drill.

I had to test the moisture content in the green sand to make sure it was as perfect as possible. If it was too great the aluminium would explode and ruin the mould. If it was too dry the mould would just collapse and...

I had to melt the aluminium at the correct temperature. If it is too hot it will form bubbles.

I found that open casting was more time efficient than closed top casting where I may not have been able to finish on time. But it may have left more 'rubbish' in the material. For what I was doing, this was fine but not ideal.

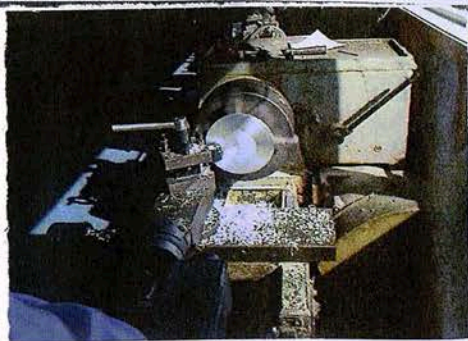
### Milling process:

I faced all sides of the piece smooth then cut a groove into the flywheel with a tip tool. Then I drilled straight through the middle with a 3mm drill bit. This took about 2hours – I had to be exact to every millimetre.

When making the displacer cap, to mark out the holes I used the vernier height guage I did so using the ability to turn the work on its side and using 90degree angle to maximise accuracy

## Using results from stakeholder feedback to inform the making and trialling of the prototype

I did not choose to put the gaps in the material to make the flywheel appear to have spokes because of time constraints.

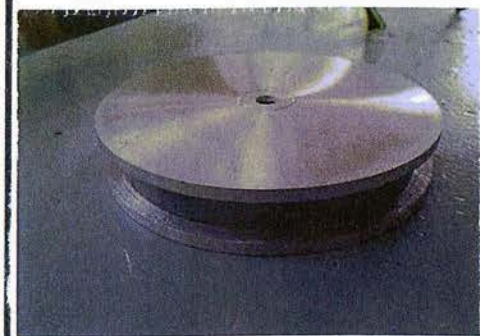


This picture is showing the machining done on the displacer.

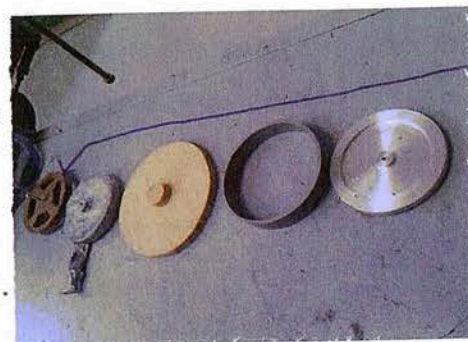


This damage was caused, because we only had like 5mm to grip onto the chuck.

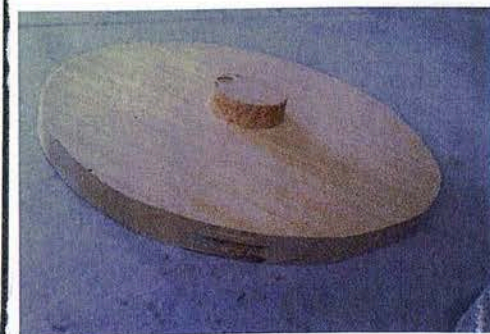
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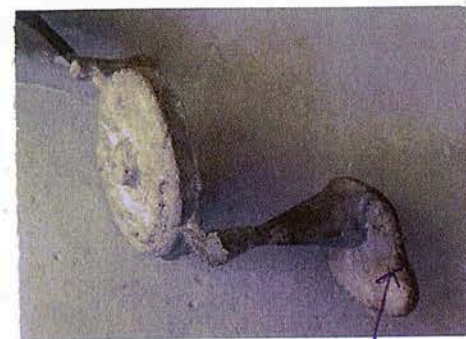
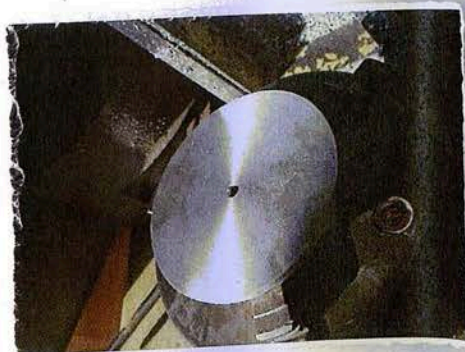
Open cast flywheel  
All the impurities are on the top layer of the cast, which you have to machine off.



This is the mold for the flywheel made out of real hard wood.



This is a casting mold for the displacers which is made out of hard wood.



Closed cast flywheel  
Using closed cast gives a good and clean cast which you don't have to machine a lot. &

This is all the rubbish that has come up.