



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

Exemplar for Internal Achievement Standard Technology Level 1

This exemplar supports assessment against:

Achievement Standard AS92013

**Experiment with different materials to develop a Materials and
Processing Technology outcome**

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

New Zealand Qualifications Authority

To support internal assessment

Grade: Achieved

For Achieved, the standard requires the student to experiment with different materials to develop a Materials and Processing Technology outcome. This involves exploring the properties of different materials through experimentation, and then creating a purposeful outcome informed by this exploration.

These examples are partial extracts taken from two student folios. The students have developed and created purposeful Materials and Processing Technology outcomes. A purposeful outcome must meet an identified and described need or opportunity for a person, whānau, or community. This is demonstrated in both samples through manufacture photographs, final reflections, and photographs. Both students have identified and described a need, one for a garment and the other for a snack.

The first extract shows the student's experimentation with methods for manipulating the PVC and fleece materials, using different stitch patterns. These techniques explore the material properties of flexibility and rigidity. Ultimately, the student has created a purposeful weatherproof jacket for a cat.

The second extract shows that the student has chosen to develop a chocolate brownie to reduce waste. They have experimented with transforming and combining ingredients to confirm the properties of texture and taste. Ultimately, the student has created a chocolate and banana brownie for teenaged school students.

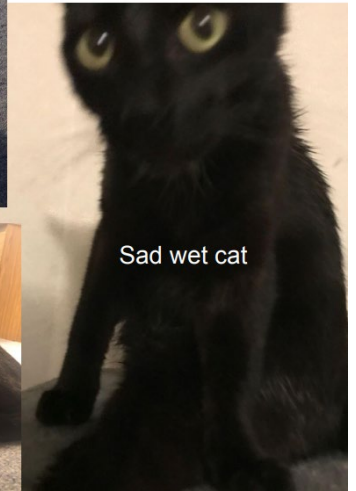
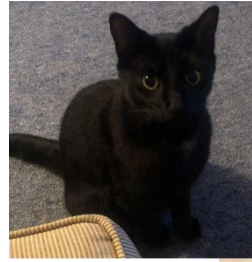
The evidence reveals that both students have sufficiently explored the properties of their chosen materials, through experimentation, to achieve the standard. They have developed, and ultimately created, purposeful outcomes using technological practices.

To attain Merit, the standard requires students to undertake ongoing investigation of the properties of different materials. In both examples, further examination of the material properties to refine the outcome is needed. For example, additional exploration guided by their own curiosity, and stakeholder feedback, is needed to inform the refinement of the developing outcome.

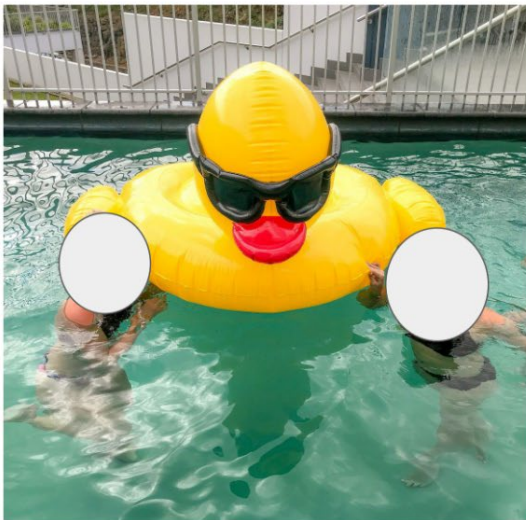
In both examples, further experimentation should also clearly incorporate feedback from more than one person or group, at more than one stage of development. While feedback is evident in both examples, it must be incorporated or used to guide the ongoing investigation of the chosen materials needed to create the purposeful outcome.

Brief

To design a coat suitable for a cat to wear in the rain. After owning a cat for most of my life I have discovered that they don't like getting wet in the rain but they love being outside, for this project I will make a raincoat for my cat made out of his favourite materials to ensure that it would be comfortable and suitable for him. This coat will have to keep him safe from cars outside with its bright colour, and keep him dry with water proof fabric and a hood as well as being comfortable.



Main material i have chosen to explore and experiment with for this project:



What Are Inflatable Pools Made Of? Floats, Toys, And Pools

Before getting an inflatable pool, you might want to consider what it's made out of before you pick one. We have some allergies in our family to latex, and were worried about harmful chemicals in the plastic affecting our youngest. After hours of research, I have an answer.


Inflatable pools and floats are typically made of polyvinyl chloride, a widely produced synthetic plastic polymer that has been made softer with the addition of plasticizers like phthalates. This form of polyvinyl chloride is commonly referred to as PVC or vinyl by inflatable pool manufacturers.


There are other materials being used, though they aren't very common. The added chemicals to make the PVC more flexible could be dangerous or cause allergies to some people. It's important to know what chemicals your inflatable pool are made out of before purchasing or using it.




This PVC pool toy had reached the end of its life as an inflatable duck after many years of fun and use. I deconstructed the duck, keeping all of the parts so they could be reused again. I plan to experiment with the yellow pieces for this project as the PVC is waterproof and will provide the right properties and attributes for this project.

Initial Experimentation

MATERIALS	EXPERIMENTATION	OUTCOME	DISCOVERY
Waterproof PVC Fleece thread	I combined these materials by stitching them together using parallel straight lines like you would on a quilt but straight across instead of diagonally.		I discovered that this was very difficult and it didnt go to plan. The sewing machine foot couldnt slide on top of the yellow PVC because i needed to use a teflon or walking foot which we didnt have. The finished outcome became warped and bunched up which wouldnt be suitable for my design. I think i needed to sew the lines starting from the same end each time and maybe try it with the PVC underneath so the foot could slide on the fleece more easily. I'm also not happy that the colour of the dark fleece comes through the yellow PVC making it not so bright and vibrant anymore.

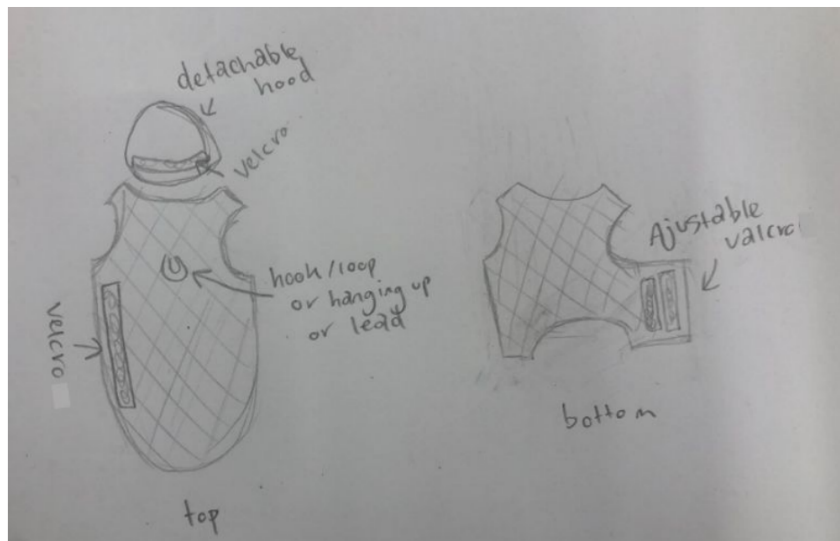
Further Experimentation			
MATERIALS	EXPERIMENTATION	OUTCOME	DISCOVERY
Waterproof fabric Fleece Thread	Sewing them together with a cross quilt like pattern to combine the materials and make a combined strong fabric that is warm and suitable for the purpose of a cat raincoat.		I discovered that this made the finished product a combined material that is very suitable for a rain coat, if you take away the aesthetics part of it in terms of the dull colour. The outcome is a waterproof exterior with a soft and warm fleece interior. Changing the stitching pattern and sewing the layers upside down gave a much better finish that is flat and well held together. This would be suitable for the design but im still not happy about the dull colour.

Final Experimentation			
MATERIALS	EXPERIMENTATION	OUTCOME	DISCOVERY
Waterproof fabric Fleece fabric Stabilizer Thread	Sewing them together to create a quilt like material using a cross method, with the stabilizer in the middle of the water proof fabric and the fleece fabric to make the yellow of the water proof material more vibrant.		I discovered that using a white stabilizer in the middle of the two fabrics separated the dark blue from the opaque yellow and made the yellow colour look so much more vibrant. I did still need to sew it upside down with the yellow PVC layer on the bottom but that didn't seem to affect the properties at all. The thickness of the layered fabrics provides a nice rigid but still flexible material to work with for the design. I happies with this outcome and don't feel any further experiments are required.

Improvements that I made as a result of feedback and experimentation:

I agreed with the feedback i received there were some good ideas i hadn't considered so I have improved the design based on the feedback i received by changing the shape of the underbody piece to have a curve so it won't cut into the cats stomach. I have added a hook/loop to the centre back so a lead can be attached but it can also be used to hang up the coat when it's not being used. To make the coat fit a variety of cat sizes i included more velcro strips on the size so the fit can be adjusted. I also decided to make the hood detachable that way if a certain cat doesn't like their ears covered there is an option to remove it.

Feed back: "I can see in this design that my feedback has been taken onboard, I like the velcro use and how it makes the coat adjustable and i love the idea of a removable/detachable hood. I also really like the loop on the coat that will be used to hang the coat up on a hood and to attach a lead."



Making the pattern and mock-up of raincoat to check sizing

Feedback from end user: "I really like how the coat sits on the cat and covers majority of their body without look uncomfortable. The hood also looks very nice. I also like how the raincoat can fit on different types of cats"



Attributes and how i achieved them...

Brightly coloured	I achieved this by using white stabilizer in the middle of the two fabrics to create a more vibrant yellow colour.
Not to bulky	By drafting a custom pattern i was able to create the perfect jacket suitable for any cat also including the adjustable velcro means it can be fitted to all cats.
Covers cats full body/back	Since i created my own pattern i was able to customize it directly to the length of my cats average size.
Keeps cat dry	Because the material is PVC and used to be a pool floatie it was made for water, so i was sure that it would be a great material for a raincoat.
Is easy to take on and off with velcro fastenings	The velcro on the sides means it is quick and easy to take on and off without having to put the cats legs through the holes..
Does Not irritate cats fur	I chose the fleece fabric as the lining that will sit against the cats fur because it is warm and soft.
Has a velcro detachable hood	The hood can be taken on and off, it is attached with velcro because some cats don't like things over their ears.
Has a small loop on back for leash.	I included a small loop to the back for a leash attachment or to hang it up.
Is the correct size	Because I made the raincoat adjustable it will easily fit many different types of cats. I made the coat adjustable so as your cat grows it will still fit, aswells as fitting different types of cats.
Use waterproof fabric	I used PVC for the outer layer which i know is waterproof after doing research.
3 layers of fabric quilted together (PVC, stabiliser and fleece)	After experimenting with my fabrics and found this was the best method of combining materials to achieve the attributes i needed for this project.



Needs and/or Opportunities Following my research about our school hub and the wasted food available from our local supermarket along with my consultation with stakeholders I have identified the following needs and/or opportunities:

Need:

- use food waste provided by the supermarket
- produce a snack or dessert that is enjoyed by the students at the hub
- a baked product
- extra flavour because some people like spicy things and others don't

Additional attributes I have learned from my research and stakeholders are:

- soft and chewy texture
- made with healthy ingredients
- use some form of fruit or vegetables
- sweet flavour
- single serving (cut into squares/easy to share)
- must be successfully stored to maintain quality
- easy for Mum's to prepare

What was the result of my first trial:

The picture in the next slide is from my first trial which I did.

I made the chocolate and banana brownies to use banana waste and to make a quick dessert for the hub and so any Mum can just pop the brownie in the oven to quickly heat it up.

Within the hour I was able to easily make everything (the brownie and icing).

The recipe ended up using 2 big bananas.

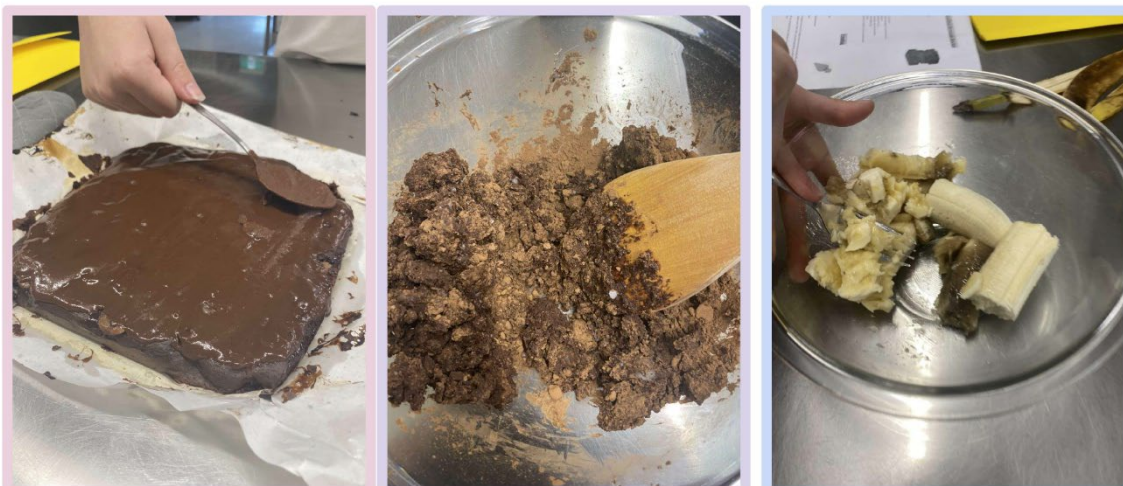
I mashed up the Bananas to manipulate them first then added all the other ingredients to combine them. After awhile the brownie was in the oven where it was transformed from a raw batter to a cooked brownie, I made the icing.

The recipe which I had wrote I followed accurately on this day however I don't think it was very successful.

The banana in the brownie was very clumpy and made the texture not very nice to eat.

I learned that with the icing I need to melt the coconut oil first and with the base (the actual brownie) that banana squashed with a fork may not be the best option to use.

Next I will freeze the brownie to see what happens



What I did next:

For trial 1 I figured out that the base recipe works. For trial 2 I decided to use a blender to mash/manipulate the texture of my bananas so there aren't big clumps in the brownie. I also decided to melt the coconut oil with the icing so it combines more easily and is smoother. I will also may be add a flour (coconut?) to hold the brownie together better and to give it more Pacifica flavour.



Evidence showing I am mashing (manipulating) the bananas




Ingredients I used being accurately measured



Banana peel being composted to reduce waste



I used applesauce in the icing because it is healthier and sweet and could use more waste.

<p>Material I am Testing: Bananas (in a brownie)</p> <p>Attribute to be Met: Must be successfully stored to maintain quality (banana in the brownie does not affect the quality)</p> <p>How will I test Attribute? By storing my brownie in the freezer and taking it out a few days later to test if the texture and flavour are still the same as when fresh and if the quality of the brownie has stayed the same (if freezing has affected the banana in the brownie).</p> <p>What I learned from test: I learned that when I put my brownie in the freezer and take it out to eat it stays mostly the same (freezing does not change the texture of brownie and the banana flavour stayed the same). Also because I am freezing and stopping the bacteria particles from growing (mould is not growing and banana is not getting old and brown).</p> <p>The brownies were frozen when I wanted them to be eaten and took a while to defrost. There was also still the clumps of banana in the brownie that were frozen inside that made the brownie not as appealing to eat as they were mushy and slimy.</p> <p>My next trial</p> <p>I decided because of what I found out in trial 1 I will now combine my materials by mixing my banana that is blended in a machine and other ingredients in a bowl with a spatula. The materials will be shaped and cut into squares that are single serve. They will be transformed by baking them in the oven to change the consistency and change its texture.</p>	<div style="border: 1px solid black; padding: 5px; text-align: center;">  </div> <p>What my stakeholder said:</p> <p>That they like the idea and the kids in the hub would like it if the banana inside is more hidden and there aren't any banana clumps. The banana clumps were left in the brownie which made it unappealing and the brownie wasn't very soft + chewy</p> <p>They also said that they actually liked it a little frozen.</p>
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What was the result of my second trial:

For the icing I melted the coconut oil first and with the base (the actual brownie) I blended the banana to make the texture smoother and reduce clumps. Within the hour I was able to easily make everything (the brownie and icing) and it turned out very well.

The recipe ended up using 2 big bananas.

I blended up the bananas first then added all the other ingredients after and while the brownie was in the oven I made the icing. This time I made the icing very well and melted the coconut butter first which reduced the clumps in the icing.

Stakeholder Feedback:

Feedback My stakeholder liked how there were no longer clumps in my brownie which made it a lot better. She also mentioned that she liked how rich and flavourful my brownie is. She said that the kids in the hub prefer brownies that are sweeter, chewy and that they like their foods more bland so I should maybe lighten how rich the cocoa in the icing is as it cancels out some of the flavour in the base of the brownie.

Why?
6 responses

- The icing tasted too strongly of apple, and the apple taste clashed with the chocolate flavour. The icing was also still clod
- I think it tastes better because the subtle apple flavor in the icing goes well with the brownie
- It tasted less rich and the icing made it very strong which made me like the brownie without icing more
- ick I never tried it
- The Brownie should be the star - it's more healthy without the icing. It also wasn't very appealing to look at.
- Brownie is already quite rich and chocolaty so I don't think it needs icing as well. Also if goal is healthy brownie then removing the icing is an easy way to cut back the kilojoules.

How much do you like the OVERALL product?
6 responses

How much do you like the FLAVOUR of the product?
6 responses

Did you prefer the brownie with icing or the brownie without icing?
6 responses

What do you think about the APPEARANCE of the product?
6 responses

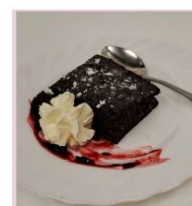
How much do you like the TEXTURE of the product?
6 responses

ATTRIBUTES TO SPECIFICATIONS

Through my development and refinement I have turned these attributes into specifications. These are the properties and characteristics that I need the final outcome to meet. Specifications are measurable and will be used to prove the feasibility of my design.

ATTRIBUTE	SPECIFICATION
Appealing colour	Uses cocoa to give it a nice brown colour
Flavour	Uses cocoa to give it chocolaty flavour
Good texture	Uses banana and cocoa to give it nice texture
Soft and chewy	Cooked for not too long so it is soft and chewy (not too cooked)
Long storage life	Can be stored for many days without affecting its texture and flavour
Uses banana waste	Uses 2 large bananas to reduce waste
Easy to prepare	Only needs to be reheat (easy for mothers to prepare)

From my previous trial and the results from people I decided to make the brownie without icing and sprinkle on some icing sugar. During our final meetup my stakeholder tried my food one last time to give me her final thoughts she said that it was good and that I had improved a lot. She said it was like a real brownie and that the texture was good. She said it was sweet and that she liked the flavour although the banana flavour did come through a little bit. She said that if I took it to the hub it would definitely go and that the kids would like it. In the end she liked the overall taste and product and my outcome was a success. She said that she looks forward to having it at the hub one day and that the kids would love it.



Grade: Merit

For Merit, the standard requires the student to examine different materials to develop a Materials and Processing Technology outcome. This involves investigating the properties of different materials through ongoing experimentation. This experimentation will incorporate feedback, and guide refinement of the selection and use of materials in creating a purposeful outcome.

The student has created a jewellery item for a family member within a multi-materials technology context, by combining different materials.

The evidence reveals the student's experimentation with, and examination of, a range of materials to ascertain their suitability for the outcome. The initial experiments using paper mâché, clay, wood, and acrylic have explored how to form shapes to ensure sturdiness and durability.

Ongoing investigation into how to combine resin with wood, acrylic, gold flakes, and paint chips has guided refinement. Further investigation of properties such as transparency, weight, and aesthetics, resulting in a selection of resin, silver flakes, and acrylic has allowed for the creation of the purposeful outcome.

Stakeholder feedback has been incorporated during the outcome's development and documented at several stages. A key stakeholder has been consulted, and feedback has been used to inform the investigation of the properties of the different materials. To secure the Merit grade, additional explanation of how the ongoing experimentation has refined the use of materials is required.

For Excellence, analysis of the material properties is needed. This would likely show or prove that the resin, silver flakes, and acrylic materials used were fully explored before being determined as reasonable, and therefore a justifiable choice for the creation of the purposeful outcome.

At 14 pages of student evidence, this folio was within the suggested range.

My stakeholder is my Mum. She has expressed interest in cats, flowers, and she also enjoys reading. Her favourite colour is green. She has some jewellery, and enjoys wearing it, and has mentioned that she would appreciate some form of pendant. This is an opportunity for me to create something that involves the attributes she has talked about. Based on these attributes, I have decided to make a necklace pendant that features a cat in some way. If possible, I will also try to incorporate the colour green.

Material 1: Paper mâché

- Paper mâché can be used in many different ways to form shapes.
- Potential ways to explore include using a mould, using a wire frame, and turning into a paper clay to shape.

Material 2: Timber

- Timber is very versatile and will be sturdy even in a small form like a pendant for a necklace. It is durable if treated right.
- Potential ways to explore include etched and cut using the laser cutter, carved with chisels, and covered using resin.

Material 3: Resin

- Because it starts as a liquid, it can be shaped very easily. While in liquid form, things can be placed in it that will be displayed once set
- Potential ways to explore include using a mould to pour into shapes, using a laser cutter on set resin, covering other materials with resin

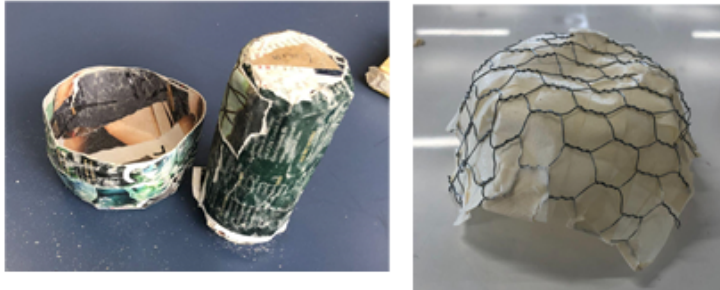
The three main concept designs were just different positions the pendant could have. Here is the feedback for each design:

1. She liked the emotional connection that came with having the cat's actual paw print. She also liked that it was personalised, and it would be a lasting memento after our cat passes away. However, she felt that because it would be realistic it would look messy and unrefined (a true cat paw isn't tidy) and was concerned about the logistics and ethics of how I would be able to get the print in the first place.
2. This design has the potential to get large and chunky due to the size. My mum does not like that type of jewellery and would prefer something more refined. However, she did like the concept of the idea (cat in a heart shape). She also liked the position of the cat itself. Not her overall preferred design.
3. The design of this pendant is reminiscent of a necklace she has had previously, so there is a nostalgic element for her. She also likes how it is just a silhouette and simple compared to the other designs. However, she also said that the tail has the potential to get caught on things because it sticks out so much. This can be easily changed. She also mentioned how it doesn't have a face, which is neither positive nor negative but could get included in future versions.

Material 1: Paper mâché

Process 1: using a mould. I used a jar as a base, covered it with cling wrap and then wrapped pieces of paper dipped in glue around it.

Process 2: Using wire. I combined the paper mâché with wire to mould it into a bowl shape.



Pros: After the materials set, the paper mâché was quite solid and didn't feel like it would rip. It has a unique look due to the paper and can be easily personalised by using different magazines and pieces of paper.

Cons: Considering my outcome is a necklace pendant, I would have to create something quite small. Paper mâché doesn't seem like the best medium for this. If I want to use this material (paper and glue) I will probably have to get a more liquid state and then pour it into a small mould. I need to be able to create something precise, so while this material has some good qualities, it isn't a good match and other explorations are required.

Material 1 comments: My key stakeholder believes that the paper mâché looks flimsy and that it would be difficult to get a nice finish on it. However, she did admit that it would be cost effective and that it would make use of old paper and materials.

Material 2: Clay

Process 1: I shaped the clay in a different form.

Process 2: I combined the clay with chicken wire to give it more structure.



Pros: There weren't many pros for this material in relation to what I want to make.

Cons: To properly utilise clay you need to have the skills to make it look good. Clay is also extremely bulky, especially considering I'm trying to make something small. It could potentially be made into a small pendant if I had the skills to, but I don't, so this material won't work for me. Clay can also break fairly easily once it's dry, which isn't good for my pendant as it needs to be something that can be worn all day without issue.

Material 2 comments: My key stakeholder said that the clay looked too bulky to make a small and refined pendant like the type she wants. I agree with this.

Material 3: Wood

Process 1: Laser cutting. I created a file online and then exported it to the laser cutter.

Process 2: I used the laser to etch a pattern onto the cut out shape.



Pros: Once I figured out how to use the computer and program, it was very easy to get carved. It is also very easy to etch patterns onto the product once the files have been converted.

Cons: You have to be careful that the edges don't burn. The burnt edges meant that the legs and tail of the cat turned completely dark, which just made the entire thing look burnt. If the outcome is going to be small, I need to be careful that the tail and legs aren't too thin otherwise they will snap off. The wood is also a lot more fragile than other materials I have tried and likely won't be as durable. If I want to use this material, I need to find a way to solve the issue of its fragility.

Material 3 comments: My key stakeholder said that this material would be easy to wear because it's nice and light. However, she did say that it needs a varnish or lacquer finish because it looks a bit plain by itself. She liked the etching and the design.

Material 4: Acrylic

I did the same processes I did with the wood to the acrylic.



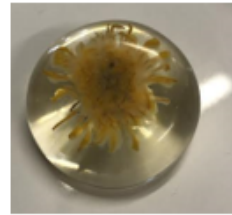
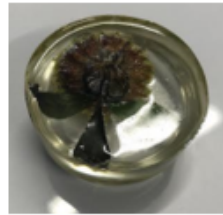
Pros: Very solid and durable. The thinner parts of the design aren't likely to break off. This makes it good for a piece of jewellery, which would be worn for a long period of time. I will likely use either this or wood for my final material.

Cons: The etching is barely noticeable on this colour of acrylic. If I wanted to incorporate that method into the final design, I would have to experiment with making it deeper or adding something on top to make it more prominent. Ideally, if I were to use this material and wanted to have the pattern as well, I would have to make sure the pattern is visible enough on the colour of acrylic my stakeholder decides on. Because my stakeholder said that she liked the pattern design, it is necessary that I use a colour of acrylic that makes it visible for my final outcome.

Material 4 comments: My key stakeholder liked this material because of the finish on the product. She also mentioned that it would be light as well and not annoying to wear. However, she did say that she would like to see the etching on it made more prominent and to look into the possibility of combining colours.

Material 5: Resin

Process 1: I combined a two part resin with flowers in a mould.



Pros: The resin set extremely solid. It is very sturdy and durable and did not shatter or scratch when I dropped it on the ground. It also dried extremely clear. The properties of this material make it perfect for what I am creating. This exploration was extremely beneficial towards the creation of my final pendant, and I definitely plan to use it. Using resin has also opened up the possibility of adding more to my pendant such as glitter or backgrounds. This can be done by placing it in the resin while it's still wet.

Cons: Care needs to be taken to ensure that the resin does not become cloudy. I also had difficulty stopping the flowers from floating to the surface. I also had to make sure that the mould was completely clean before I poured the resin, otherwise pieces of dust and other things could get trapped and ruin the final result.

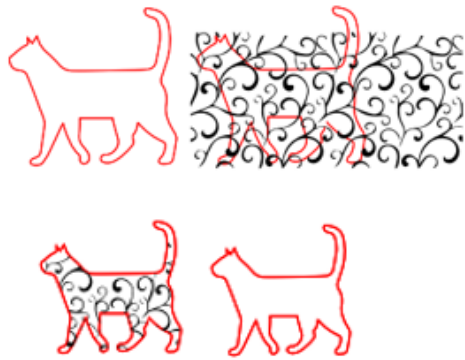
Material 3 comments: My key stakeholder saw the things I created for exploration and said that she quite liked it. She asked if one of the acrylic cats I laser cut into a small disk of resin because it is transparent and strong and then use that as my pendant. This is a great idea, and I will try to combine materials.

Refinement

To create my pendant, I have decided to combine the explorations I did for acrylic and resin. I can create a cat out of acrylic in a colour chosen by my stakeholder which can then be set in a disk of resin to create a pendant. One of the main pieces of feedback I got on the wood and acrylic explorations was that she didn't really like the finish on the wood and acrylic, so by combining it with resin I can change what it looks like. Resin is also extremely solid, which solved the concerns both me and my stakeholder had regarding the fragility of the cat.

Wider stakeholder feedback: My wider stakeholder feedback (teacher) agreed that I should do different combination with resin such as wood. This is easily doable and would also be a good exploration. As I learnt from laser cutting wood, the pattern shows up a lot more than acrylic, so the design would look clearer. One of the issues with wood was that the tail was very flimsy, so setting it in resin would solve that issue. I have explored this process in the production of my outcome.

More investigations. I started by creating my file for the laser cutter. I edited this file multiple times. The result of my first file was too small, which meant I had to go back and increase the size while keeping the pattern the same. Then I struggled to get the pattern matching the outline of the cat to avoid wasting any material but managed to get it sorted. I then cut out of different materials. When I went to the laser cutter, I only planned to use green acrylic, as that was one of the colour options my stakeholder had chosen. However, I got feedback from my wider stakeholder (teacher) that I should try using wood and clear acrylic. They thought the clear acrylic would make interesting dimensions when set in resin, and the wood would be an interesting exploration.



I then cut some cats using the laser cut. When I was setting them in resin, I saw other materials I could involve such as the gold flakes and paint chips. These materials added more depth to the resin and made the cat stand out more. The clear cats couldn't really be seen unless you were looking really closely, even with the gold flakes behind it, so it wasn't something I used again. I showed these to my key stakeholder, who said that she liked the green cat with the paint chips, but though it looked a little busy. She suggested I try the green with other backgrounds. She also said that she really liked the gold flakes but would prefer it with a different colour cat.

Using the things I learnt from the previous exploration and trial, I then made another six cats. I did green again, as this is what my stakeholder suggested, however I used a different shade of green acrylic that's slightly more transparent. I made this change because I thought that this shade of green was slightly transparent and added more dimension without making it see-through. I also chose to try black acrylic, as well as wood again. When I explored wood earlier, I got feedback from my key stakeholder saying that she didn't like the finish on it. By combining it with resin, I am changing the finish on it while making the original cat sturdier. I trialed adding the pattern to all of the cats because my stakeholder liked it and I think it adds character.



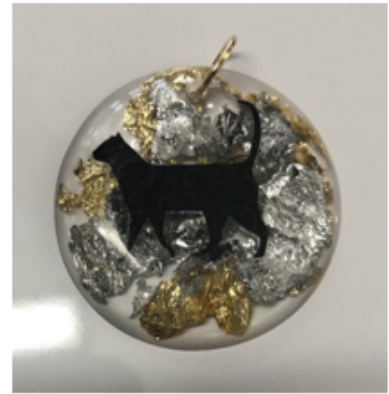
Then my focus was on trying the different types of things I could add to the background. I did gold flakes again, because my stakeholder responded positively to it, as well as silver flakes and paint chips using different colours of cat.



My key stakeholder said that the paint chips looked too busy last time, I feel like one of the problems was that the green clashed with the colour of the paint chips.

Final outcomes

After the resin set, I took them out of the moulds and drilled a hole through them. I then added a ring through the hole so that a chain could be tied. I chose the top three and showed them to my stakeholder. She chose her favourite and that then became my final taonga.



Final Evaluation

My stakeholder identified that she like both cats and jewellery, which gave me an opportunity to create a piece of jewellery. My final outcome incorporates both of these elements effectively, as the pendant has a green cat as the focus (although it might not look fully green due to the lighting of the photo).

The silver flakes in the background were not part of the original specifications, however my stakeholder liked them and appreciates the addition of it.

A way for this outcome to be improved would be to use a different circle mould for the resin. The one used was the only one available and it has a somewhat steep curve on the edges. This isn't necessarily a bad thing; however it was something I had to be cautious of when making the pendant and meant it was more 3-dimensional than originally intended.



Grade: Excellence

For Excellence, the standard requires the student to evaluate different materials to develop a Materials and Processing Technology outcome. This involves analysing the properties of different materials, and justifying the use of those materials for the creation of a purposeful outcome.

The student has created an innovative textiles outcome to be used during a State of Emergency.

The evidence reveals the student's initial exploration and experimentation of the properties of different, often unfamiliar materials. They have then examined and selected a refined range of materials, and further investigated the properties of these materials by trialling a variety of transformation, manipulation, forming, and combining techniques.

The student's investigations have clearly informed the development and refinement of two conceptual designs for a purposeful outcome.

Feedback has been gathered at several stages throughout the investigations, and has been incorporated into the outcome's development. The feedback has clearly guided further investigation and confirmed the ultimate selection of materials.

Analysis of the properties of the different materials is evident throughout the testing and trialling process, revealing that the combination of vinyl and velvet textiles were a reasonable and justifiable choice for the creation of the purposeful outcome. To secure the grade, feedback from a wider stakeholder on the finished bag's purposefulness, in relation to the properties of materials used, would show further justification of the decisions made.

The final brief, conceptual design, and specifications also justify the use of the chosen materials.




At 20 pages of student evidence overall, this folio was within the suggested range.

Needs & Opportunities





Needs and Opportunities Justified: I have the opportunity to possibly save people's lives in the case of State of Emergency.
There is a need for me to design and create an innovative outcome for my family because we would be unprepared if we had to be evacuated from our home.

Needs	Opportunities
Need to create an emergency product for people to use in the state of an emergency.	Opportunity to gain new skills.
Work within an authentic context.	To work with new materials.
Need to use the donated materials.	To create an innovative outcome.
Need to research new skills, materials, and resources.	To save people's lives during a state of emergency.
	To challenge myself.

FABRIC COMPOSITION, STRUCTURE, CHARACTERISTICS, PERFORMANCE PROPERTIES



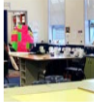

Fabric Composition	Material Structure	Characteristics	Performance properties	Natural or synthetic
-Plastic, foil, and paper that has been laminated together (Aluminium, Propylene) 	Laminated layers of materials.	Shiny, crispy, crinkly, smooth, reflective, thin, opaque, light	Warmth property, waterproof	Synthetic
Double-sided -Stretch spandex -Polyester -Polyurethane 	Woven	Smooth, light, opaque	Waterproof, stretchy	Synthetic
Bark of a Cork Tree 	Bonded+pressed pieces of cork pressed onto a thin material	Smooth, rubbery	Warmth (heat insulation)	Natural

FABRIC COMPOSITION, STRUCTURE, CHARACTERISTICS, PERFORMANCE PROPERTIES




100% cotton 	Woven (weft and warp)	Light, smooth, flexible	Breathable	Natural
Polythene 	Chemicals/oils because it is plastic	Translucent	Waterproof	Synthetic
Layers of paper 	Laminated (pressed down)	Smooth, stiff, light, opaque	Stability, thickness, durability	Natural
Polyamides, made from chemicals found in coal and petroleum 	Woven	Waxy layer	Waterproof	Synthetic

This table gave me a better understanding of the different compositions, structure, characteristics, and performance properties of different fabrics that make them more or less feasible for use in my outcome. After testing and trialling a range of different materials (vinyl, velvet, nylon, etc.), I concluded that vinyl and velvet had characteristics and performance properties that best met the attributes I needed.

IMPACT OF TESTING - RESULTS SUMMARY

ATTRIBUTE TO MEET	MATERIAL SELECTED	TECHNIQUE TRIALLED	TEST CARRIED OUT	TEST RESULT - DETAILED	PHOTO EVIDENCE
<p><u>Visible</u> so you can be located by emergency services.</p>	<p>Vinyl (fluro pink and green)</p> 	<p>Tested that the vinyl heat presses securely onto the non-nap side of the colourful velvet that I would be putting it on for my final outcome.</p> 	<p>I made my friend stand at other end of the room and take a photo of my outcome to prove that it was easily visible.</p>	<p>Because I tested the visibility from across the room, it was proven that my fluro pink and green was easily seen. But this outcome was not tested in a dark, outside environment where my outcome could possibly be used in a real life situation so I went into a dark cupboard that imitates the environment and could still see my outcome's bright colours.</p>	 
<p>Stakeholder -</p> <p>My stakeholder was my friend that I asked to take a photo of my outcome from across the room. We had a conversation after this and she gave me feedback that it my outcome was indeed visible from across the room, meaning I successfully met the attribute.</p> <p>My response: Thank you. I will use vinyl material for the final outcome - it is visible and can be heat pressed.</p>					

IMPACT OF TESTING - RESULTS SUMMARY

ATTRIBUTE TO MEET	MATERIAL SELECTED	TECHNIQUE TRIALLED	TEST CARRIED OUT	TEST RESULT - DETAILED	PHOTO EVIDENCE
<p><u>Waterproof</u> Keeps items inside the bag dry and protected from water</p>	<p>Vinyl (and velvet)</p> 	<p>Tested both nylon and vinyls supposed waterproofing properties to see which one would be more feasible for my final outcome. I decided that vinyl would better meet the attribute of being waterproof.</p>	<p>I splashed my final outcome (with vinyl on it) with water to imitate the rain that would be in my physical environment of a cyclone.</p>	<p>Because I poured some water on the vinyl protectant on my outcome and because the water ran right off and didn't get into the bag, it was proven that the materials I selected did meet the attribute. But there is a chance that water could get into the bag through the open top so I also tested that the velvet was drop resistant and could reduce the impact of water on my outcome.</p>	 
<p>Stakeholder</p> <p>I conversed with my end users (my mother) about her opinion of the waterproof attribute. She said it is a great idea for my creation because it would keep everything inside dry. I showed her how the water runs off and she was amazed and thought the vinyl did a great job of keeping water out of my bag</p> <p>My response: Yes the vinyl does work very well which is why I will use it to meet the waterproof attribute.</p>					

TESTING & TRAILING TECHNIQUES

CLOSURE TECHNIQUES:

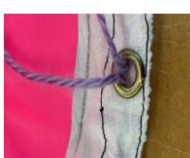
Open ends



Button hole



Grommet



The most **feasible** technique for my outcome is the gold metal grommet **because** it is more aesthetically pleasing than the button hole or leaving the ends unfinished and open. **But**, I may need to consider how durable the grommet is when combined with the fabric **so** when the cord is pulled through quickly in an emergency it doesn't fall apart.

Stakeholder feedback: *Test and trial a grommet with iron on interfacing to see if that makes the grommet more durable and stronger when the cord is pulled through the casing quickly. (Teacher)*

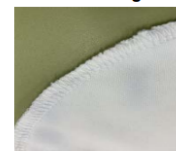
Response: *I have tested the suggested technique from the teacher and will use iron on interfacing to make the material thicker and more durable, therefore it won't fall apart if its used roughly/quickly in a state of panic.*

SEAM TECHNIQUES:

Seam Sealant



Overlocking



Because the casing technique I have chosen won't leave exposed edges, it will be bagged out, seam techniques might not be very important aesthetically **But** I do need to consider durability the edges will have the cord rubbing against them quite quickly **so** they would fray easily **so**, the most **feasible** technique for my outcome is overlocking the fabric edge.

Stakeholder feedback: *Great to see you've investigated different ways to sew your seams and considered functionality. What will you use to thread through the casing? You might need to test what's the most durable option and what material can handle being pulled quickly in the act of an emergency.*

Response: *In my prototypes, I have used yarn and string, and I have also tried one a black cord which is the most durable option.*

TESTING & TRAILING TECHNIQUES

FINISHING TECHNIQUES:

Edge stitching



Bagging out



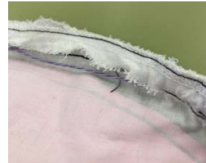
The most **feasible** technique for my outcome is bagging out **because** it creates a better looking finish and looks more aesthetically pleasing and will be more durable than the edge stitching as it does not fray. **But** this technique is a little complicated and I don't have the knowledge of skills to recreate it right now **so** I will ask my teacher for help about how to do this finishing technique.

Stakeholder feedback: Today we went through the "bagging out" technique and how to construct it by using an edge foot on the sewing machine

Response: Now I have learned how to bag out a circle and I believe I can recreate this on a larger scale for my final outcome. It looks more aesthetically pleasing and will be more durable

CASING TECHNIQUES:

Fabric donut



Bias tape



The most **feasible** technique for my outcome is the bias tape **because** it looks much more aesthetically pleasing and will not fall apart and break like the other option. **But** the bias tape is quite thin and might not fit the safety pin and/or cord that I want to use through the casing **so** I will test out whether it fits and then decide if it is a feasible casing technique.

Stakeholder feedback: The bias binding technique does give a good finish, but yes I do agree that it will be difficult to get a safety pin through the casing. The casing is very small. What would be a better option?

Response: A better option would be to use the bagging out as a casing technique by sewing another line of stitching because I can choose how wide the casing would be while still getting a nice looking finish.

TESTING & TRAILING TECHNIQUES

Drawstring material

Black cord



Yarn



Twine



The most **feasible** material to use for my outcome is the black cord **because** it is much more durable than the other options and is strong enough to pull my bag closed roughly/quickly in a state of panic. **But** I would need to test out that this cord pulls through the velvet fabric quickly and smoothly **so** that I know this material will be functional in my final outcome.

Stakeholder feedback: What did you find out after testing the velvet material was there any differences?

My response: I did a test to see if the black cord pulled through the velvet using a prototype that I had made and it worked, so I will use it for my outcome. It was strong and easy to use.



Waterproofing/resisting

Vinyl



Nylon



Using the vinyl to make my outcome waterproof/resistant is the most **feasible** technique to use **because** I would be able to easily apply it to my velvet fabric once I've bagged it out. **But**, I haven't tried heat pressing the vinyl onto the velvet yet so I need to test that out **so** that I can be sure that this technique works.

Stakeholder feedback: What did you find out when you heat pressed the velvet and vinyl. Will it stay set together?

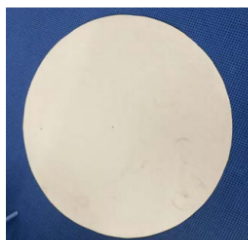
My response: I heat pressed the vinyl onto wrong side because in my outcome I will have the vinyl on the outside and the water-resistant side of the velvet on the inside. It worked well and was really secure.



TESTING & TRAILING TECHNIQUES

CUTTING & SEWING THE FABRIC CIRCLE

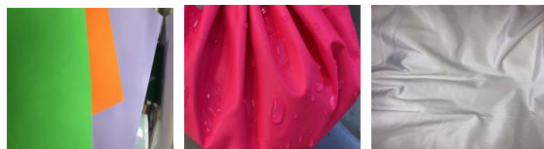
1. Fold (to create casing)
2. Cut (circular shape)
3. Joined materials



I manipulated my material by cutting a circular shape cut from a template. I joined the two materials for the outside and inside by forming a casing and sewing two different materials on top of each other.

COMBINING THE TWO MATERIALS

1. Vinyl (used the left overs from the bin)
2. Velvet curtain (used the donated materials to upcycle)



The most **feasible combination** of materials is the velvet curtain **because** it is shower resistant, meaning it could keep out small amounts of rainwater. **But** my design would need to be more water resistant **so** I am heat pressing an outside layer of vinyl onto the curtain to achieve a waterproof material.

Stakeholder feedback: What a great way to combine two different materials to ensure it is a more water resistant material.

Response: Combining these materials means my outcome will meet the requirement of combining materials and being waterproof/water resistant.

Concept Development

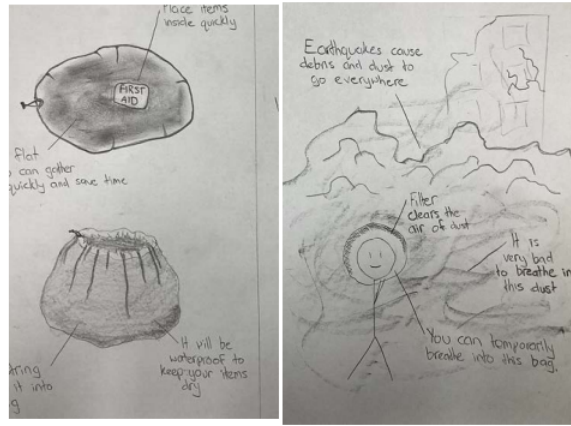
Stakeholder Feedback: "I would potentially have it made out of a reflective material so you could use it for other things like be easily found if you were lost or some sort of bright colour so you could lay it out if there was a helicopter looking for you."

"One of the problems is how much can I carry in it. If it's a first aid type emergency exit then it probably would want to be in as much as I can so it'd need to be pretty big but then you gotta be able to carry a lot so you'd want a way to carry it. Preferably hand-free."

"Materials is dry bag material cause it's quite light and really tough. Not the super thin nylon stuff the sort of rubberised canvas stuff."

"If it was waterproof on one side a fluffy lined on the other side that would be a really good blanket."

My Response: Okay I will definitely implement the bright colours into my final design. I think backpack straps are a good way to carry it while being hands-free so I will add that to my design. I will think about what you said about the material and I think using vinyl is a great material because it is waterproof AND can be visible. The multifunction that I believe is a great idea. I'll have to consider what materials to use.



Stakeholder Feedback: "Could covering your mouth and nose only be sufficient that way it can be a smaller thing?"
 "It would be impossible to make though with the materials that you have available."

My response: I agree that the constraint of only being able to use the donated materials means that I will not be able to create this product so I will not develop it further.

Concept Development



Stakeholder Feedback: "You'd want waterproof (materials), probably something plastic and non-ripping. Probably pretty thin if you're only putting documents in there—thin but solid enough that it doesn't rip easily. I think this is a good design and would work pretty well."

My Response: Yes the attributes of the materials would need to be similar to those and I believe there are materials in the pile of donated goods that could be used to meet those attributes.

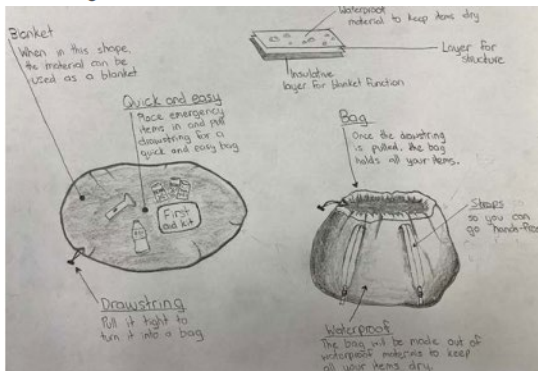


Stakeholder Feedback: "My change to the concept would be one sleeping bag each because I don't know if everybody would want to be in one big sleeping bag. I would have individual sleeping bags that you can zip together so instead of one big one you can make it little normal sized ones or one big one depending on what you want."

"The best stuff I'd make it out of would be rip-stop nylon with goose feather."

"Depending on the situation you'd want it reasonably bright coloured. If it's just a waterproof bag that would be more important."

My Response: My time restraint makes it unreasonable to try to create 5 different sleeping bags for my 5 end users and it would also use an unnecessary amount of materials. Goose feather is definitely not available for me as I can only use the donated materials. Both these restraints make this concept a bad choice so I will not develop this idea.



OVERALL DECISION

After investigating materials and techniques I have refined my idea and decided the most feasible design idea is Concept 1 because it solves the issue of my end users. I have a family of 5 and with concept 1 it is more fit for purpose because it can hold larger and more items for everyone to keep safe in comparison to concept 2 which is much small and fiddly to use. I used my investigations and feedback to decide that I will combine off cuts of vinyl and scrap velvet material from the donated goods pile to ensure I am being sustainable in class.

I will manipulate my materials by cutting, joining and shaping two materials by bagging out or creating a casing.

The performance properties of the chosen materials are water resistant (vinyl) and insulating (velvet). The composition of my material is made up of a combination of brightly coloured vinyl and velvet which is heat set together and to change the structure making it thicker and durable. The outcome will be suitable for the physical environment because it will be easy to access for all members of my family hanging by the drawstring by the door.

The characteristics of concept 1 is more visible because of the bright pink and green colours which could be identified easier by a rescue team.

Stakeholder feedback | Whānau

"Looks like it would hold a lot of stuff and does that in a smart way. Easy to carry -hands free which is good if there are children that need to be held, phones for navigation, etc. Vinyl is a good choice for waterproofing were we to be stuck outside in the rain."

PROPERTIES	CHARACTERISTICS
Insulative	Bright
Waterproof	Round
Multi Purpose	Large
Durable	



Outcome justification

Specification	Met Y/N	Explanation/Justification
Round (<i>A circular shape is the most feasible shape to pull a drawstring</i>)	Yes	My outcome is as circular as possible (1 metre diameter all the way round)
Bright / Visible (<i>so you can be located by emergency services</i>)	Yes	Fluro pink and green pieces of vinyl heat pressed in a patchwork on the outside of my bag
Waterproof (<i>Keeps items inside the bag dry and protected from water</i>)	Yes	I combined the materials of velvet and vinyl to make my outcome drop resistant on the inside (velvet nap) and waterproof on the outside (vinyl)
Size (<i>Must be large enough to hold all the emergency items for a family of 5 and to be functional as a blanket</i>)	Yes	1 metre in diameter. 0.8 m ² area of blanket. Will be large enough to fit emergency items (tested for proof). Circumference= 3.14m
Recycled materials (<i>To reduce waste of materials in the hope to show kaitiakitanga and preserve the environment for future generations</i>)	Yes	All materials used to create my outcome were recycled/donated materials by teachers at Otumoetai College, for example an old velvet curtain. Also used vinyl from the scrap bin that would have been thrown out otherwise.
CPR instructions (<i>to inform people in case they need that knowledge in an emergency situation</i>)	Yes	Vinyl pressed CPR instructions for adults, children, and infants on the white vinyl on the inside of my bag so it can be read.

Outcome justification Continued

Casing (<i>must be wide enough for my cord to pull through+must be functional in the environment</i>)	Yes	My casing is 1.5cm wide and I have tested to prove that it is functional.
Grommets (<i>must be functional to allow the cord to pull through+be durable</i>)	Yes	2 gold grommets with a hole that is 0.8cm wide. Tested to ensure that the cord pulls through quickly and easily.
Cord (<i>must be long enough to be feasible in my outcome</i>)	Yes	Round black cord 5mm wide + 4.43 metres of cord total.
Must be fit for purpose (<i>must be durable+large enough and fit the required attributes that would make it suitable</i>)	Yes	Cannot test it in the physical environment of a cyclone but have tried splashing water on it to ensure it is suitable enough. See above for other attributes that would make it suitable.
Finished in allocated time (<i>done by the due date</i>)	Yes	1 term allocated to finish outcome and I finished in 8 weeks.
Completed to the best of my abilities (<i>ensures the outcome is finished as well as I can make it</i>)	Yes	Unpicked a stitch when I wasn't satisfied with it. Used a walking foot to stop fabric bunching.
Suitable for end users (<i>users can use my outcome</i>)	Yes	Let my end users (immediate family) try out my outcome and they can use it well.
Must combine materials (<i>brings two or more materials together to form a new material</i>)	Yes	I combined the materials velvet and vinyl using a heat press. The new materials has a different composition and structure.

Final Brief

I had the opportunity to design and create an emergency drawstring bag that will allow them to quickly and easily gather important items if we were to go into a state of emergency during a natural disaster. The bag is circular 1 metre in diameter. It is covered in fluro pink and green vinyl to make it visible and waterproof at the same time. I designed it to combine the vinyl with a velvet lining so my outcome has a multifunction to be used as a blanket for my immediate family (Mum, Dad, Sister, Brother).

My emergency drawstring bag will be stored in an easily accessible location in my house so my family members could grab the bag and fill it quickly. It could be used during multiple natural disasters but specifically a cyclone would be the most likely for where I live.

An emergency bag would be useful because you could quickly gather your necessary survival items and get to a safe place.