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Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 1 Materials and Processing Technology RAS 2023

**92015 Demonstrate understanding of materials and
techniques for a feasible Materials and Processing
Technology outcome**

EXEMPLAR

Excellence

TOTAL 08

To be completed by candidate:

NSN

School Code



Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 1 Materials and Processing Technology RAS 2023

92015 Demonstrate understanding of materials and techniques for a feasible Materials and Processing Technology outcome

Credits: Four

PILOT ASSESSMENT

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of materials and techniques selected for a feasible Materials and Processing Technology outcome.	Explain materials and techniques selected for a feasible Materials and Processing Technology outcome.	Evaluate materials and techniques selected for a feasible Materials and Processing Technology outcome.

Enter your 9-digit National Student Number (NSN) and School Code into the space at the top of slide 1. (If your NSN has 10 digits, omit the leading zero.)

Answer ALL parts of the assessment task in this document.

Your answers should be presented in Verdana font within the text boxes. You may include only information you produce during this assessment session. Internet access is not permitted.

Save your finished work using the following naming convention: **SchoolCode-YourNSN-92015.pptx**.
If you submit your report orally, embed the single file into this document.

If you open this document using software other than PowerPoint:

- save your slideshow as a PDF, using **SchoolCode-YourNSN-92015.pdf**
- if submitting oral responses with a PDF report, submit a separate file for the audio, using **SchoolCode-YourNSN-92015.mp3 or wma**

By saving your work at the end of the assessment session, you are declaring that this work is your own. NZQA may sample your work to ensure this is the case.

INSTRUCTIONS

Respond to the following task about how you **selected, tested, and trialled materials and techniques** for the design of a feasible outcome.

You may support your answers with images, which can be inserted into the report where image boxes have been provided.
Do not use video files.

You should aim to write no more than **800 words** in total. Where audio evidence is used, the total duration should not exceed **4 minutes**.

(a) Your design – what it is

(i) Who is your design for (i.e. person, whānau, or community)?

My design is for my sister who needs a cupcake for a family gathering that expresses a celebration in her culture. My end user is Indian Punjabi so therefore my end user would like a cupcake that represents Lohri. To express the festival I will decorate the cupcake with red-orange frosting and chocolate curls to represent a bonfire, a special element of Lohri. Lohri is a celebration that celebrates the end of the winter solstice and beginning of harvest season so throughout the assessment I was mindful of the ingredients I used. By specifically using the bonfire element I want to represent the idea of coming together to celebrate our cultures and having pride in them.

(ii) In what environment is the design intended to be used?

The cupcakes will be presented at an informal social gathering/get together inside the house, there will be family and friends present. Since Lohri is in January it will be summer so it is going to be quite hot but since the event is hosted inside the house it will be well ventilated and cool from air conditioning. Therefore the temperature inside the house should be cooler compared to outside. However I will still take some precaution to avoid the decorations - fondant and frosting from melting. Such as keeping the cupcakes in the fridge to keep them cool.



The picture above is an image of how I want my cupcakes to look like. I have two different designs: one that resembles a bonfire for the younger guests and the other which looks more sophisticated for the more mature guests.

(iii) Describe in detail the physical attributes of your feasible outcome.

I want the cupcake to have a round shape of about 5 cm in diameter and 6 cm in height.

I want the colour of the cupcakes to be dark brown with orange-red for the frosting. To represent the festival Lohri through the special element the bonfire.

I want the cupcakes to be chocolate flavoured. To achieve this I will incorporate cocoa powder into the batter.

I want the cupcakes to be sweet therefore I will add sugar to my batter and powdered sugar in the frosting. This will contribute to making the cupcakes sweet.

I want the texture of the cupcakes to be light and fluffy. To achieve this texture I will focus on not over mixing the batter and adding the correct amount of rising agents to the batter.

(iv) Describe in detail the functional attributes of your feasible outcome.

I want the cupcakes to represent the celebration, Lohri. To achieve this I will need to decorate the cupcakes with frosting that resembles a bonfire.

I want the cupcakes to have a yield of 3 servings so that there is one cupcake for my end user, one for my stakeholder and one for myself.

I want the cupcake to be moist not dry. To achieve this I will want to use the best liquid possible that won't negatively affect any other factor of the cupcake such as the taste. I want it to also contribute to the tenderness of the cupcake. I will find out which liquid to use after my experimenting trials.

I want the cupcake to have good structure. To achieve this I will want to use the best flour possible that is readily available. I will find out which flour to use after my experimenting trials.

I want my cupcakes to be as sustainably as possible. This means I will not waste any ingredients or other resources. This can be done by correctly mise en placing my ingredients with a measuring scale.

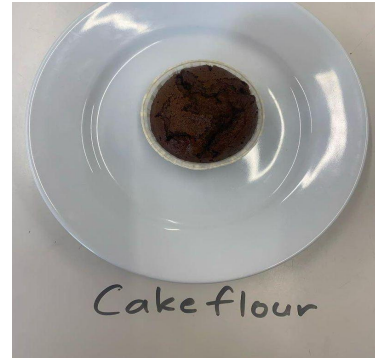
I want my cupcakes to be made with affordable and local ingredients. This means I will use locally sourced ingredients from New Zealand and in season ingredients if any are needed.

Image
1



The image above shows one of my functional specifications which is to be able to represent the celebration through a bonfire. I did this by using orange frosting to resemble a bonfire.

Image
2



The image above shows one of my physical attributes which is that the cupcake should be round in shape and about 5 cm in diameter. The height of the cupcake should be around 6cm. The round shape of the cupcake contributed to the appearance and aesthetic of the cupcake.

Image
3



The image above shows one of the functional specifications which is that I need 3 serving sizes for each individual. This image is from my final trial so I did double the recipe to make 6 cupcakes instead of 3. This is because I was confident in the recipe and knew I wouldn't waste any ingredients.

Image
4

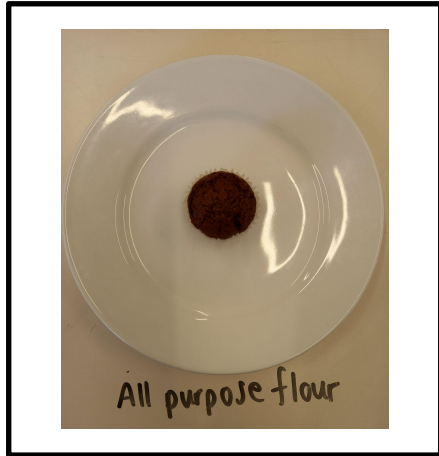


The image shows one of my functional specifications which is to be sustainable by using local and affordable ingredients. While also considering the quantity of ingredients used to avoid any wastages. This image shows a muffin from my experimenting trials where I only made one muffin for each different test to reduce the wastage if the muffin turned out inedible.

- (b) Based on the physical and functional attributes of your feasible outcome, identify **one or more** tests you undertook on **at least one** possible material / component.

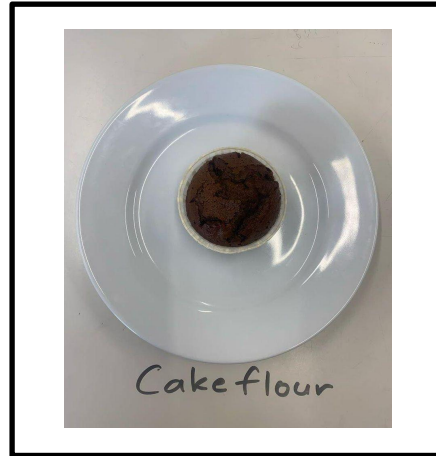
Material / component	Tests
Flour	All purpose flour
Flour	Self-rising flour
Flour	Cake flour
Sugars	White Sugar
Sugars	Caster sugar
Liquids	Buttermilk
Liquids	Milk
Liquids	Water

- (c) Provide evidence of at least one test you carried out on your selected materials / components for use in your feasible outcome.
You may show evidence from up to four tests.



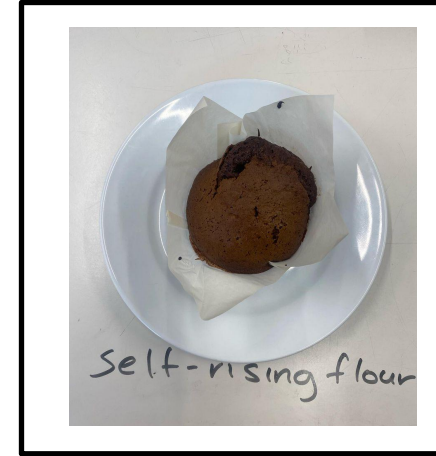
Results

The image above shows muffins with all purpose flour, these were the best ones overall. They were light and fluffy, with a slight crispy exterior. With these muffins the chocolate flavour was the most evident.



Results

The image above shows muffin with cake flour, these were also good. They were super soft and my end user described them as eating cotton candy and it melting in your mouth. However the chocolate flavour was not really there for these muffins.



Results

The image above shows muffins with self-rising flour, these were the worst in appearance, texture, and taste. The appearance was unappealing as the colour was lighter than what I would've expected from a chocolate muffin and it looked the different from the rest as the dome of the muffin was baked unevenly. In terms of texture it was really chewy, tough and doughy. This may have been due to over mixing the batter in order to incorporate all the ingredients and remove any lumps in the batter.



Results

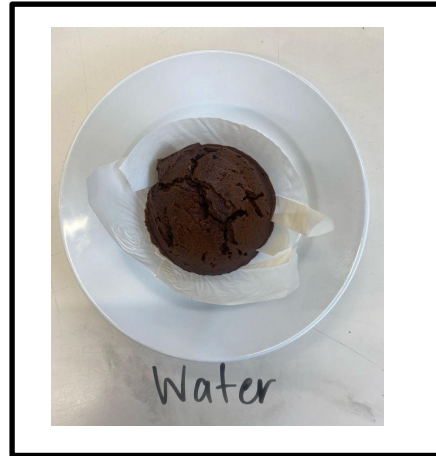
The image above shows the muffins with milk, these were probably also my end users favourite. They have a well balanced appearance - good colour, structure, taste and texture. However they were chewy and also had a crispy exterior like the all purpose flour muffins.

- (c) Provide evidence of at least one test you carried out on your selected materials / components for use in your feasible outcome. You may show evidence from up to four tests.



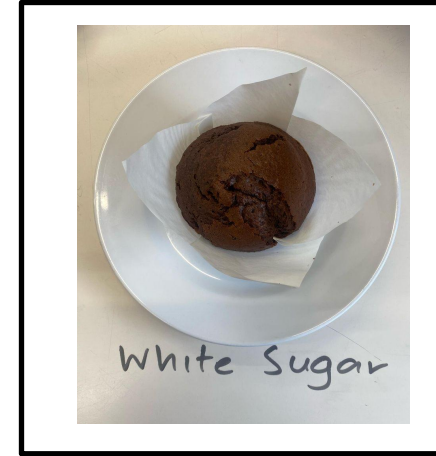
Results

The image above shows the muffins with buttermilk. My expectations for muffins with buttermilk were really high as I had seen multiple chocolate cupcake recipes with buttermilk. However my end user and myself were quite disappointed as they had a sour taste and mushy texture. The appearance was alright though.



Results

The image above shows muffins with water. Upon seeing other recipes where water is used in chocolate cakes I thought I would experiment with adding water in the cupcakes. However I was quite disappointed at the results as the muffin was probably the worst in terms of structure and taste. The chocolate flavour was very bland, close to nothing and it also felt like mush in my mouth.



Results

The image above shows the muffins with white sugar. These muffins were quite chewy and the top of the muffin had some deep cracks. The chewiness of the cupcake could be due to over mixing the batter.



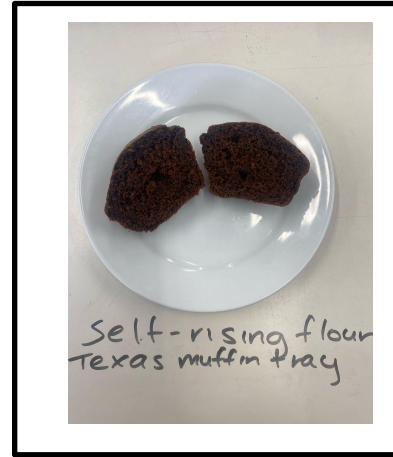
Results

The image above shows muffins with caster sugar these muffins were also chewy and cracked on the top like the white sugar muffins. But were also quite tough. Again I think this was due to over mixing the batter which caused them to turn out tough and chewy.

- (d) Based on the physical and functional attributes of your feasible outcome, identify **one or more** techniques you trialled with **at least one** possible material / component.

Material / component	Techniques
Flour: All Purpose Flour	Muffin Tray Size: Small Muffin Tray
Flour: Cake Flour	Muffin Tray Size: Regular Muffin Tray
Flour: Self-rising flour	Muffin Tray Size: Texas Muffin Tray
Sugar: Caster sugar	Doneness: Touch + Sight
Sugar: white sugar	Doneness: Toothpick

- (e) Provide evidence of at least one test of a technique you carried out to select the most relevant one for your feasible outcome. You may show evidence from up to four tests.



Results

The image above shows the muffins in the small muffin tray. These muffins baked the quickest and were nice and nice. It was slightly crispy on the top but it didn't affect the overall muffin too much. However I don't think these muffins will be a good size to decorate with.

Results

The image above shows the muffins in the regular muffin tray. These muffins would be the perfect size for frosting and decorating them with the other small decorations. This muffin was also light and fluffy due to the tray size which allowed them to bake in even heat distribution and have uniform domes.

Results

The image above shows the muffins in the texas muffin tray. These muffins had cracked tops and uneven muffin domes because of the increased batter in each individual muffin holder. However these muffins were also quite light and fluffy.

Results

The image above shows the muffins that were tested for doneness through sight and touch. This technique gave me muffins that were properly baked, not under baked or over baked.

Results

The image above shows the muffins that were tested for doneness through the toothpick method. Where I inserted a toothpick into the muffin and if it came out clean the muffins were baked. The result of this muffin was that the toothpick method was not as accurate in telling me how much the cupcakes were baked compared to the touch test as they were slightly over baked.

- (i) What influence did your selection and testing of different materials / components and trialling of techniques have on the feasibility of your outcome and its physical and functional attributes? Add images that support your response into the next slide as needed.

Because of the experimenting day I was able to test for different materials to produce a cupcake that met my physical and functional attributes.

The experimenting day allowed me to test different flours like all-purpose flour, cake flour and self-rising flour. As a result of this i was able to select the best flour option that produced a cupcake with good structure which was all purpose flour. Using all purpose flour produced cupcakes that were light and fluffy and it didn't subdue the chocolate flavour of the cupcake. Unlike the cake flour cupcakes where the cupcake itself was super soft but it didn't have much chocolate flavour. Or the self-rising flour cupcakes where none of the aspects of the cupcake were good including appearance, taste or texture. Because I tested for flours and was able to find the best option I knew that the outcome would meet my attribute of having a light and fluffy cupcake.

Another test for materials was testing for different liquids like milk, buttermilk and water. As a result of being able to test for different liquids for my cupcakes I was able to select milk as the best option. As it was the best out of the three in terms of taste, appearance and texture. Using milk didn't alter the taste of the cupcake like the buttermilk cupcakes or dull the taste like with water or produce a cupcake that has a mushy texture. Because I tested for different liquids and was able to find the best option I knew that the outcome would meet my attribute of having a tender and moist cupcake.

I was also able to test for different sugars like white sugar and caster sugar. As a result of this I was able to select white sugar for my final trial recipe because it had a slightly better outcome. Because I tested for the type and amount of sugar to use I knew that the outcome would meet my specification for a sweet cupcake.

Because of the experimenting day I was also able to test different techniques for the making of my cupcakes. It allowed me to experiment with how using different muffin tray sizes would affect the outcome. I was able to test for three different muffin tray size: small muffin tray, regular muffin tray and texas muffin trays. The most suitable muffin tray was the regular muffin tray as it met my attribute of having a round cupcake with a diameter of around 5 cm and because it had just the right amount of space to decorate with. Additionally it gave me cupcakes with smooth dome.

I was also able to test for different ways to test for the doneness of my cupcakes through either touch and sight or the toothpick method. While the touch and sight method gave me cupcakes that were baked just right. However in my trials I will incorporate the toothpick test to be sure the cupcakes are baked correctly. To avoid any unnecessary wastage of ingredients in case the cupcakes don't bake properly.

- (ii) What influence did stakeholder feedback have on your feasible outcome, including the selection of materials / components and techniques?

Add images that support your response into the next slide as needed.

Because my end user required something for her family gathering that celebrated the festival, Lohri. This meant that with her feedback I was to make a sweet treat that showcased the festival. With my end users ideas I was able to make a cupcake that resembled an important element of Lohri which is the bonfire. Using this element I was able to represent the idea of coming together to celebrate special celebrations with friends and family.

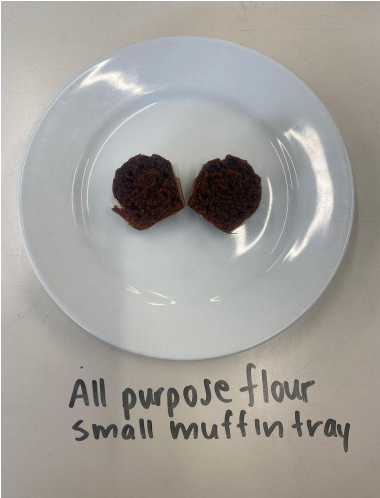
While experimenting for the cupcake I was able to work collaboratively with my end user in knowing what she wanted and what she was looking for in the cupcake. I was able to understand what my end user liked and what she disliked. For example my end user did not like the cupcakes with buttermilk or water. So with her feedback I was able to make the decision to change the original ingredient buttermilk to milk to better suit her needs. Moreover I was also able to get her feedback on what size cupcake she preferred for guest, which was the regular muffin tray size. With her insight I was able to update my recipe to produce a better product that met the needs of my end user.

With the feedback I got from my end user I was able to make a cupcake using the new selected ingredients. From the first trial my end user found that the cupcakes were lacking chocolate flavour so to suit her needs I adjusted the cocoa powder by increasing it. While the development of the ingredients was excellent the actual muffin according to my end user was fluffy yet chewy. Therefore this meant that the muffin was over baked and over mixed. The overmixing was evident from the tunneling in the muffin. So to improve my muffin I changed the method to produce the cupcake to sifting the dry ingredients to prevent over mixing and also added the cocoa powder to hot milk to dissolve it better. This preventing clumps from forming which would lead me to overmix the batter.

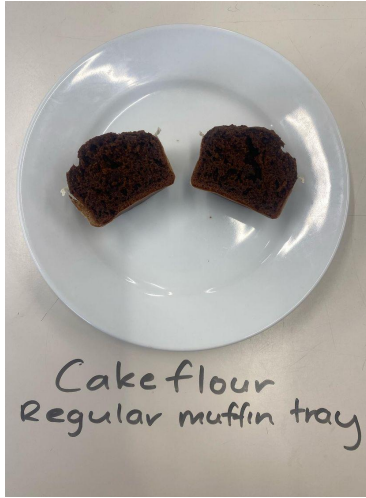
In my final trial with in depth feedback on how to improve the cupcake from my stakeholder and the more direct feedback on the cupcake should be I was able to improve the cupcakes even more. This is proven by feedback I got from the end user and stakeholder who said that the cupcake was moist with good taste and texture. However the buttercream was quite sweet and my end user thought it overpowered the muffin. With the feedback from my stakeholder to improve the cupcake even more next time I would use a less sweet frosting like a cream cheese frosting. Otherwise from this feedback I also got positive feedback such as the cupcake being a great presentation of culture

Overall, both my end users and stakeholders feedback had a positive impact on the outcome. As through their feedback I was able to improve the final product.

You may include clearly labelled images to support your response to part (f).



Selection
of best
flour



Selection
of best
muffin
tray size



Selection
of best
liquid



Selection of sugar to use plus technique



First trial
outcome.
Fondant
topper
saying
"Happy
Lohri" over
orange
frosting and
chocolate to
represent
bonfire.



Final trial
outcome.
With
three
different
designs.

Excellence

Subject: Materials and Processing Technology

Standard: 92015

Total score: 08

Q	Grade score	Marker commentary
(a)–(e)	E8	The candidate clearly describes the end user and the environment. Physical and functional attributes have been detailed. Testing: although the name of the test is incorrect, the information provided clearly relates back to the physical and functional attributes.
(f)(i)		The candidate evaluates information from testing and states the reasons for their selection of materials and techniques.
(f)(ii)		The candidate reflects on and justifies the selection of materials and techniques based on stakeholder feedback. Clear photographic evidence has been supplied in all sections. The candidate provides a very good synthesis of the results achieved from the testing of materials and techniques.