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

Assessment Schedule: AS 91363
Demonstrate understanding of sustainability in design

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

Issues from the Specifications

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

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

Where a candidate has used a small font markers should make a judgement about where to stop marking. This judgement should be made relative to 10 pages of Ariel font

Where work is illegible, it cannot be marked.

Digital submissions that cannot be read cannot be marked.

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of sustainability in design involves	Demonstrate in-depth understanding of sustainability in design involves	Demonstrate comprehensive understanding of sustainability in design involves
explaining how lifecycle considerations determine the focus for design interventions explaining the relationship between lifecycle design, innovation and sustainability.	explaining how lifecycle analysis is undertaken and how this determines the focus for design intervention explaining how issues identified by lifecycle analysis led to design innovation being applied in the development of a sustainable technological outcome.	discussing the competing priorities and compromises made as a result of lifecycle analysis in the development of a sustainable technological outcome.

This submission is seen as clearly meeting the criteria for Excellence. The template assists to some degree, in helping the candidate discuss how innovation impacts on the sustainability of a range of products and discuss the design decisions that underpin sustainable products. The inclusion of sections that highlight compromises and competing priorities enhances the depth of discussion and allows the student to produce evidence that demonstrates comprehensive understanding.

The submission is seen as being Excellence.

Technology Schedule Appendix 1

Markers must exercise professional judgement to decide if a report demonstrates understanding. The following appendix provides guidance for markers making this judgement.

A report must use information to demonstrate understanding.

Reports described wholly or substantially by one or more of the statements in the left column demonstrate understanding.

Reports described wholly, or substantially, by one or more of the statements in the right column do not demonstrate understanding.

Where the report is made up of both used and reproduced information the marker must decide if the report is successful against the standard when the reproduced information is ignored.

Evidence of **use** of information	Evidence of **reproduction** of information
Candidate's report describes and explains the candidate's use, in their practice, of information relating to the standard	Information is presented in isolation from the candidate's Technological experiences. It offers nothing or little to suggest the information is related to a course of instruction at level 7.
Information from the candidate's practice, research, the practice of others, and teaching is related to the candidate's technological experiences. The report describes experiences you would expect to come from a course of instruction derived from The Technology Learning area the NZC. These could include but are not limited to • testing and trialling within a modelling process • developing a conceptual statement • developing a conceptual design • development of a brief • material selection • refinement of a brief • development of a prototype • development of a one off solution • further examples may be added.	
Information from research, the practice of others, or teaching is reported in the candidate's own voice.	Information is not in the candidate's voice. The word choice, sentence structure, sentence length, punctuation and so on are not what a candidate could be expected to produce.
Referenced, complex research information unchanged by paraphrase is related to other information in a manner that unambiguously constructs meaning. (very rare)	**Unreferenced**, complex, research information is presented as though it is the candidate's own work.

Where the marker suspects a report is a deliberate attempt to deceive the report should be referred to the panel leader using the Irregular Booklet process.

AS 91363 Demonstrate Understanding of Sustainability in Design

INTRODUCTION

The people of our earth will not be able to live the way we do now in 2020 because of the extensive use of all the resources that are available to us. Sustainability is becoming more aware to this generation because of the increase in climate change and global warming. Our planet is being ridden of the natural resources that it provides us with and something must be done to stop it.

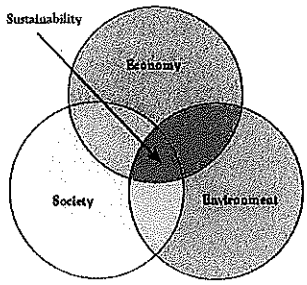
In term three we were given a brief to design a product which is plant based and can be sold from a food truck. A plant-based diet is the diet of an organism that is based off food derived from plants. This 'Food truck project' was to show us how we could create a dish that could be sold off a food truck that would appeal to people that were not so interested in the idea of not eating meat. It was also to give us an idea of what sustainable prototyping is like and how we can create a product while considering the three pillars of sustainability for us to become aware of what is needed for the next generation to have the use of the resources we have today.

DEFINE DESIGN

Dictionary.com defines design as a plan or drawing produced to show the look and function or workings of a product. For this context we created a plan to maximise sustainability within the development of a food truck product. For this report we will look at what design interventions companies and organisations have made to maximise sustainability whether it be in the production of the product, sourcing of materials or their waste management and then translate this into our design process.

DEFINE SUSTAINABILITY

From technology TKI sustainability is defined as the use of resource, the creation of product and/or the provisions of services in such a way as to meet the present needs without compromising the ability of future generations to meet their needs by the same or similar amount. Sustainability is being able to cater for our own needs while also being cautious and able to pursue the needs of the future generation to come.



Pillars of sustainability venn diagram

THE THREE PILLARS OF SUSTAINABILITY

The three pillars of sustainability is the foundation of achieving true sustainability. Each pillar can be separately worked on but when intertwined with each other the end result is more effective. To sustain means that that it remains the same and does not degenerate or degrade further ultimately we need to look at ways to regenerate or improve economically, environmentally and socially.

Economical- economic sustainability refers to maximising financial activities with increased sales and profits.

Environment- Using the resources given to us by the land to fulfil our needs and wants, but being courteous towards the way we use this resources and how we are going to look after the environment in what it has to offer, so that it can be kept available for the next generation.

Social Environment- The awareness of people's health from pollution by the activities of business and organisations, the well-being of others is important in order to keep society around for generations to come.

Social and environmental pillars are linked because if we do not look after the environment then we will not be able to live. People will become sick and starved if we carry on exploiting the resources we

are given on the planet. The well-being of people can also impact the change that occurs towards sustainability, without the people there can be no change in the state of the environment. Economic and social pillars are linked in which the economical state of our government affects the society largely. This can be from housing prices to an increase in tax. Without the stability of the economy people will not be able to live the way they are living now, money will be used scarcely and not on how we can improve sustainability in the world. In order for the environment to become more sustainable the link between economic and environment needs to be large. Increases in laws and regulations towards the environmental practices should be put in place by the government. For example zero waste schools, and a law on carbon emissions from companies.

All three pillars must be covered in order to be sustainable, as shown in the venn diagram; if one pillar is not being achieved then your design will not be sustainable.

The Given BRIEF

Our brief was to develop a plant based menu item suitable for sale in a food truck whilst considering sustainability at every stage of the design and development process. The product should be targeted at people who like eating meat. Our product therefore must mainly consist of fruits, vegetables and legumes. Since we are producing this product out of a food truck we must consider the practicality of cooking our dish inside the food truck with a limited amount of space it gives. For our product to be able to be produced in a food truck elements must not include difficult procedures with complex equipment. As there are paying customers ordering our food, I must make sure my product is delicious and appetizing to the eye. We eat with our eyes, and so having an attractive dish will entice the customers. Even though this is a plant based meal, this does not mean we have to compromise the protein we get from meat products. In order to do this a protein additive will need to be put in place.

Food trucks are becoming a major trend in New Zealand, with different trucks selling a range of cuisines to their customers. It first started in America and has made its way to New Zealand. With more than three million food trucks and five million food carts in the US, it is safe to say that food trucks are becoming on trend. With the easiness of queuing, ordering, paying and receiving food, food trucks are a faster way to get an inexpensive, tasty meal. This is popular within cities like Auckland which are fast paced and forever busy. With this popularity, councils have to place laws around food vending. Food trucks drive to be eco-friendly; this is from the use of sustainable initiatives although the first thought of a food truck is the large amount of fuel required to drive around and therefore the emission of gases causing pollution. This is true, but once a food truck is parked it would only then again move once or twice during the day, therefore not emitting the gas as frequently. The smaller usage of water, electricity and ingredients from across the globe makes food trucks more sustainable than a restaurant. Food vendors are supportive towards locally farmed produce meaning they implement all three pillars of sustainability. The packaging used in food trucks is important. For the reason that a lot of plastic can potentially be used, but with the introduction of compostable packaging this is reduced. Local companies like *Innocent Packaging* provide packaging for many food trucks around New Zealand which will decrease our plastic and waste output.

I am able to consider sustainability in my design process by researching and understanding what makes a product sustainable. I must be able to make sense of what elements must be added or taken out in order to create a product that is sustainable. This will be done by justifying why I have done each step and consider the alternatives that may be used in order to fully meet my brief. Each design process must involve all three of the sustainability pillars to achieve sustainability.

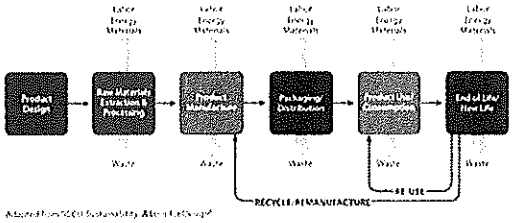
WHAT IS SUSTAINABLE FOOD?

We are taking more out of the environment than we are putting back in and with the increasing population, by 2020 we will need 5 planets to feed our current population. One third of our food produced world-wide is lost or wasted in food production and consumption and 1.4 billion hectares of land is used to produce this waste food. The food industry must put in an intervention to reduce the amount of waste that is produced or put in practices that mean the waste produced is able to be composted and therefore put back in to the earth to be re-used. In order for this to occur a change must start in the design process of a business, designers must take responsibility for how their products may affect people involved in producing, using and disposing the product. If a business has sustainability in their DNA it means their business has been grown around implementing sustainable processes. Businesses that do not have sustainability in their DNA will be faced with challenges to implement these procedures.

The key issues that affect sustainability in the food industry is the emission of greenhouse gases, and water and land usage for the production of the meat industry. Our large consumption of meat means that we are impacting the environment, not because of the death of large amounts of animals, but the pollution and overuse of natural resources. For example, 23% of the global freshwater is used to grow livestock feed. 14.5% of the greenhouses gases in our air is produced by livestock and 45% of the land we have on our earth is occupied by the livestock system. A change in how much meat we consume and use in the food industry will deplete these numbers meaning our future generation will have the privileges we have today.

LIFE CYCLE ANALYSIS

Linear Life cycle analysis



A life cycle analysis is the examination of environmental impacts associated with stages of a product's life. It is how the stages of a product's life affects the environment around in it different ways from the materials it uses to be made, to how it gets decomposed. It enables designers to improve the efficiency and sustainability of their designs. The life cycle of many food related products including packaging is linear. This is because we take out so many resources from the land and use them, but we do not put them back in, therefore it cannot be cyclical. This linear analysis cannot occur in a finite planet because it will not last, if we continue with a linear cycle then there will be no resources left for the future generations, and therefore unsustainable.

LIFE CYCLE ANALYSIS STAGES

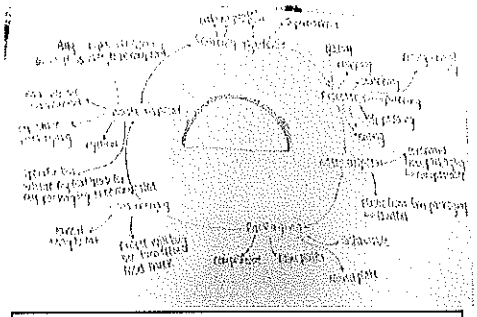
Extraction: The sourcing of ingredients, materials and any products that are used in the making of the end prototype. Each of my ingredients are locally sourced from around New Zealand. Therefore I am able to say that I have met all three pillars of sustainability. Socially, I am supporting a local business and which have practices that eliminate unhealthy working environments and unfair pay. Environmentally, each ingredient comes from the ground and no meat products have been used which is the main contribution to the pollution on our earth. Economically, since these ingredients are sourced in New Zealand I am not spending money on modes of transport importing the ingredients to New Zealand and therefore producing a large amount of carbon.

Processing: The procedures in which each ingredient or material go through that result in to the end product.

I undergo processes such as:

Chopping Boiling Freezing Sautéing Pureeing De- podding
Rolling Measuring Kneading . Unpackaging Zesting Frying

In this processing stage there is waste created. For example the plastic packaging that ingredients come in, the shells of the broad beans and any skins or stalks coming from the vegetables. I am able to dispose of some of this waste through composting (the organic waste and the cardboard cartons the mushrooms came in), but some of the packaging has to be thrown in to landfill as they are unable to naturally decompose because of their nature.



My life cycle analysis

Manufacturing: The products assembly, packaging and transportation to final distribution. I did not need to transport my product away because my physical environment for my prototype was at the school I was preparing it. I packaged my prototype by using a *Palm Leaf Plate,* this is a plate made from fallen palm leaves, and therefore is compostable. If I was to add a napkin for customers to use I would purchase it from *Innocent Packaging,* a New Zealand business that produces compostable packaging to use.

Product Life: the point at which the product made is used for job it has been designed to undergo. My product is being eaten and so the product life is not long because it's only use is to fuel people and be enjoyed.

Disposal: How the product is disposed of after being used, for example landfill and recycling. Each of my elements was sourced from the environment and therefore any waste is able to be put back in to the environment to make this life cycle a cyclical procedure. The plates and napkins used are able to be put in to the environment to be decomposed. In order to make sure all of my elements, including packaging, is going to be composted I will make sure I place a bin outside the food truck for people to place their waste. This means I am able to monitor where the waste goes, and make sure it is being disposed appropriately. This initiative ensures that the waste is going back in to environment, enriching the soil with nutrients needed to grow more resources and crops to then start the process again.

Each stage of the life cycle analysis occurs in the production of my product, I have considered ways to ensure that this life cycle is cyclical rather than linear in order for it to be truly sustainable. A life cycle analysis is an important part of a designer's process, it is vital to think about each stage of the cycle in order for the whole product to be sustainable. This analysis reduces pollution and waste, and maximises recycling and renewable resources. Therefore making it an important part of sustainable design, helps designers recognise the points where they can be more sustainable.

INNOVATION

Innovation is the act of something new or different being introduced, this can be an idea, a product or design. A sustainable innovation would be something that could aid a more sustainable life.

COMPETING PRIORITIES AND COMPROMISES

The TKI glossary explains competing priorities as potentially conflicting outcomes within technological practice that require identification and a judgment on relative value in order to decide on an appropriate course of action. In order to produce a sustainable, yet tasty product compromises must be made. This is the sacrifice of one element in order to meet the needs of

accordingly. The compromise made in order to be ethical is that the products are usually more expensive than non-ethical products.

School Waste: At our school we undertook a rubbish audit to see how much of our rubbish was landfill, organic waste or recycling. We found that the largest type of waste we had was landfill. This was from the plastic that was ridden with food and unable to be recycled. The large amount of waste we found was from our cafeteria.

We produce 2 tonnes of waste every week that gets compacted and sent to landfills in Auckland. Our school does not provide a large amount of recycling bins; in fact there are only 2 recycling bins on the whole campus.

In order to reduce the amount of waste produced we must put in practices that increase recycling, this will firstly be by making recycling bins more accessible and then we can change the packaging that the food from our cafeteria comes in. Another option is by making a compost bin option available; this will enable us to dispose of waste efficiently. There are companies in New Zealand that would be able to provide us with the compostable packaging such as *Innocent Packaging.*

Recycling: The act of converting waste in to a reusable product

For a product to be recycled it must have the chemical compounds in it that enable it to be recycled. These chemical compounds include; polyethylene terephthalate (PET 1) and polyethylene high density (02). These numbers are found on the bottom of plastics and show whether the plastic is recyclable or not.

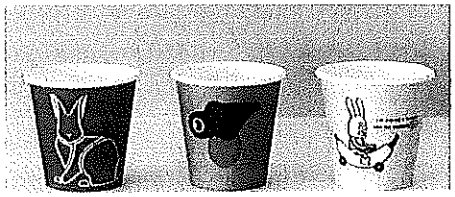
Plastic is unable to be decomposed by the environment and so it is heated and melted to then be moulded in to another product. Plastic packaging is not recycled if there is food waste left in it, this is because extra costs need to be put in to remove the food to then be recycled. If this food does not get removed the plastic will be put in to a landfill.

INNOCENT PACKAGING

Innocent packaging is a New Zealand packaging business that makes compostable and sustainable products. Their vision is for a zero waste New Zealand, they understand that this is a large goal, but are taking vital steps in their production to help New Zealand get closer. Their packaging is compostable rather than recyclable. This means that the cups, bowls, plates, cutlery, and napkins that they produce are able to be composted after use instead of recycled, thus in line with their company belief that sustainable packaging can be compostable. Recycling has been taught to us as environmentally friendly, when in fact it is not. Recycling is less sustainable than composting because it is melted down and greenhouse gases are produced, whereas composting gives back to the environment because it is able to be put back in to the earth and completes a cyclical life cycle analysis.

The packaging is made with PLA which is sustainable because it is made from cornstarch and therefore is compostable. PLA is used in cups, lids, straws and cutlery as well as lining hot paper bowls and cups with this material. The packaging is also made with wheat straw which is used in paper cups, bowls and other products. They found that a large amount of water was being wasted when doing this, so took initiative and built a worm farm next to their factory, and in turn some of the worms are fed to fish.

These practices that *Innocent Packaging* put in to place is in their DNA, meaning that their company and products grew around sustainability, rather than suddenly

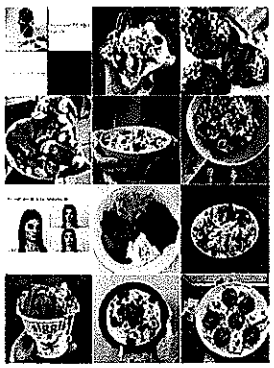


introducing it in to their business. As a result of this large costs are not needed to be added in to making their company sustainable, this is a disadvantage of suddenly introducing sustainability practices.
The one disadvantage of this innovative and sustainable packaging is the cost. As a society we are too cost focused, and the production of these compostable products is 2 or 3 times expensive than the recyclable or non-recyclable materials that are used in cafes, fast food chain and takeaways shops. Ethically the packaging created is great, the clear plastic cups are made in Taiwan, in which the manager of the company goes and visits the factories themselves. *Innocent Packaging* has international certification of ethical working, meaning that the factory in which the workers make the packaging in is safe.

Innocent Packaging is now striving to increase the number of businesses using their products. Cafes such as Kokako Coffee and Shaky Isles already use their packaging. As wholesalers they only sell to direct cafes and food trucks, but they are trying to get in to bulk sellers like Gilmors. One thing that *Innocent Packaging* wants to change is the packaging for sushi. The extra bits of plastic for the soy sauce, the chopsticks, and the plastic container itself could become more sustainable, and *Innocent Packaging* wants to help with this. The Business Development Manager of *Innocent Packaging* came and talked to us, and explained one thing that has stuck with me largely, "Every dollar you spend is the vote on the world". We make decisions on the products we buy, whether the products are good or bad, sustainably or ethically, we must think hard about the money we are spending on the unsustainable products, because that is the money that will lead us to an increase is climate change and an unsustainable world.

DESIGN PROCESS

Empathise- empathising is how you understand the context, in our case it was a plant based dish that could be produced and sold out of a food truck. In order to understand this I researched what a food truck is and the history behind them, in our food technology class we had a food truck owner come and talk about working in a food truck which gave me a good insight to how a food truck works. I also found out the problems in our environment and why changing our diets to become more plant based will be the first step for our earth to become more sustainable, to fully understand plant based, I needed to define what this meant. As a class we did a rubbish audit to completely understand how big the waste problem is in our school.



Screenshot of my Instagram

Define- through defining I learnt what the current food trends are in 2016, I did this by looking at my Instagram and foods occurred most on my newsfeed. From this I found that foods in bowls (smoothies, rice bowls), raw foods (cafes such a little bird Unbakery), and then foods like burgers, tacos and milkshakes have suddenly become a huge hit in restaurants and cafes. This was also backed up through analysing the menus in three restaurants, Meadow, Little Bird Unbakery and Cali eatery. It was found that each of these restaurants had tacos, burgers and dishes in bowls on the menu. From this I could decide on my idea for my prototype by going through these trends and seeing what I could turn in to plant based and fit in the context of a food truck.

Ideate- this is the collecting of ideas for potential solutions. At the start of our project we were given a vegetable, mine was broad beans. The way I ideated was by researching what a broad bean was, how it grew, where it came from, and what dishes they were used in. After this I looked through vegan and vegetarian food blogs and found recipes that I could incorporate my vegetable in, this was by substituting the bean or pea they had in their recipe with broad beans, or adding it as another component. After each recipe I found I evaluated it to find the recipe that would be most suitable for my context. I

another. Competing priorities include: the price, taste, appearance, sustainability or opinions between two stakeholders.

The competing priorities and compromises will affect the designers decisions by making them choose between two options, this could mean sacrificing one idea for another. In our brief we were shown competing priorities with the packaging we decided to use. Our first priority was that it was functional, without the packaging being able to function then it does not fit the job intended. I sacrificed price for compostable packaging. As a designer I chose to do this because of how aware I have become of the environment crisis we are having with the increase in global warming. 2016 has been the hottest year so far and September being the second-warmest September on record. This is due to the increase in greenhouse gas emissions produced by landfills, and the burning of fossil fuels.

My packaging was a *Palm leaf plate,* the packaging is 100% biodegradable, meaning it can be broken down by the environment, as it is made from fallen leaves of the Areca Palm tree. The money made from the sourcing of the palm leaf plates goes back to the families and community of South Asia, therefore making them ethical to purchase and use. The life cycle of these plates include the extraction of the fallen palm leaves, then the transportation of them to a factory in which they are gathered, washed in spring water and then heat pressed in to shape. No glues or chemicals are used making them completely compostable. The plates are then transported to New Zealand to be used and then disposed of through composting and therefore going back in the environment to enrich the soil with nutrients to be able to grow crops and completing a life cycle.

FACTORS IMPACTING THE SUSTAINABILITY OF PRODUCTS

Food Miles: the distance food travels from where it is grown, to where it is ultimately purchased or consumed by the end user. It is a good way to look at the environment impact of foods and ingredients. It includes foods getting to you, but also where the food has to travel to be disposed of. As a designer I considered food miles by ensuring that each of my ingredients came from New Zealand. This way there is a small amount of transportation in order to get my produce and as a result of this, a decrease in the amount of carbon emissions from the burning of fossil fuels. One element of my prototype that would have a large food mile is packaging. This is because the palm leaves are brought from South Asia, there is 12,647km that the packaging travels to New Zealand, and therefore a large carbon emission is produced.

Carbon Emissions: Carbon Dioxide and carbon monoxide in the atmosphere, produced by vehicles and industrial processes.

These carbon emissions are caused by greenhouse gases and transportation of materials to countries. In our brief we were given we had to ensure that our prototypes for the food truck were plant based, this is due to the discovery of the production of meat producing 14.5% of our global greenhouse gas emissions. Therefore I cut out the use of meat in my prototype.

Ethical Considerations: the standards of right and wrong that humans should carry out. Fairly treating animals and human beings with equal standards. In our situation ethical considerations are fair trade, which is appropriate and equal pay among workers in their jobs, and organic practices, which is the act of not using pesticides and chemicals to enhance the growth of produce.

In my practice I have been able to consider ethical decisions, this is by supporting and using local growers that are organic, free range and also the workers are in a safe environment and get paid

considered sustainable options through the ingredients used in each recipe and whether there were any ingredients from overseas that needed to be imported to New Zealand. Therefore producing a large food mile

Test- This is testing aspects and elements of the proposed product. My product was a mushroom taco, with a tomato salsa and broad bean mash. I first trialled the tortilla, for this I trialled two recipes and found one better than the other. I then tested the mushrooms, and found that I needed to adapt the recipe to suit my target market; this was because I used chilli flakes and found they were too spicy for the mushrooms and tortilla. After testing these two elements I realised I needed a fresh element, so adding the tomato was a good way to do this. To add in my vegetable I decided to substitute a typical avocado guacamole, which is usually in a taco, for a broad bean mash. Through this testing I was able to adapt recipes in order to appeal to my target market, this is because of the stakeholder feedback I got after each trial.

Deliver prototype- this is visual display of what is needed in order to create my product. I did the costing of my prototype through menucoster, this also produced the nutritional values for my product which is needed in order to sell food out of a food truck. I also made lists of the equipment needed to make my product, and also a step by step flow chart of what is involved to be done to successfully execute my prototype.

Material/Ingredient	**Justification**
Portobello Mushrooms	I used mushrooms to replicate the umami taste that comes from meat. Mushrooms contain the amino acid glutamate which is the same amino acid that meat contains. Therefore this ingredient is able to substitute meat without taking away popular taste that meat products give. As a result of this fitting in to my sustainability message that I came up with. Also I believe mushrooms have a firm texture that is similar to the texture that meat gives; this also means I am not sacrificing the attributes that meat has in order to make my prototype fit in with the plant based diet brief and specifications. I also found a business from New Zealand called *Meadow Mushrooms* that grow mushrooms sustainably meaning the carbon release from transportation is small, therefore the environment is helped, and I am thinking about the social pillar by supporting a local business.
Sunflower Oil	It is tasteless so it would not affect the flavour of my mushrooms and the rest of my dish. Sunflower oil is the oil extracted from sunflower seeds. Sunflowers are able to survive drought meaning they can stand not having a large amount of water, therefore sunflowers do not need as much water to survive.
Garlic Clove	Garlic cloves are grown locally around New Zealand meaning that my prototype covers the social pillar of sustainability because I am supporting local growers. Garlic also makes everything taste and smell great. This means I am able to disguise the mushroom flavour in my tacos to taste like garlic, in case some people are fussy towards mushrooms. Also it will complement and enhance the broad beans flavour in my broad bean mash making it a better accompaniment for my taco.
Salt	I used salt because it is a vital ingredient with balancing flavours especially beans tomatoes. It also makes bread be less bland. The salt I used was from New Zealand, Marlborough in fact meaning I am supporting a New Zealand salt business, costs were not put towards to large transportation and carbon emissions.
Broad Beans	I used Watties broad beans, which is a New Zealand vegetable company. It is well known around

	New Zealand. Broad beans were the vegetable I was given by my teacher so I had to make sure I incorporated them.
Cricket Flour	I wanted to make sure that while creating a plant based dish I was not sacrificing any of the attributes that meat has. Therefore, by adding the cricket flour I am able to have the protein that meat gives us for our diets. The cricket flour is more sustainable that meat products and as a result of this I wanted to somehow incorporate it in my dish. Cricket flour contains more protein in it that meats do and so it is a perfect additive of protein.

EVALAUTION

For my prototype I created a spiced mushroom taco, with a tomato salsa and broad bean mash. The tortilla had cricket flour incorporated in it, in order to give the dish more protein and therefore not compromising the protein that meat gives us. I used mushrooms because they have the amino acid glutamate which creates the umami flavour that is found in meat. Mushrooms also contain the texture and smell in them which make them the perfect meat substitute.

I learnt that in order for our world to become sustainable, we must change our actions towards involving the foods we eat, the way we packaged products and how we dispose of our waste. With the increase in global warming sea levels are rising 12 inches per year. This is due to the emission of greenhouse gases from the burning of fossil fuels. In order to preserve the resources for future generations we must have a plant based diet, this is because the production of meat is a large part of greenhouses gas emission in the world.

In my own practice I have learnt that by making small changes and compromises in my design I am able to create a product that is able fit a cyclical life cycle analysis. This is through prioritizing what is important to me and the context. This is from design intervention and choosing particular products, packaging and practices in order to make my prototype sustainable.

The food industry needs to be less reliant on meat products and incorporate vegetables and fruits in to their menus and foods, with the additives of proteins sources, like cricket flour. This way we get our dietary requirement of protein without the use of meat products. Compostable packaging and the appropriate waste disposal units must be put in place in order to reduce the burning of fossil fuels for getting rid of our waste.

My product is sustainable and fits the written brief because all the elements of my dish are able to be disposed of sustainably. For the reason that they are all plant based, including the packaging. This means I am able to complete a cyclical life cycle analysis from the efficiency of my design process and taking steps towards producing a sustainable product that can be sold out of a food truck. I have made compromises with price in order to have a completely sustainable product. The elimination of meat products means I am fitting the brief; I have been innovative in coming up with ideas to ensure I did not sacrifice the attributes of meat by adding a cricket protein additive and using mushrooms to add the umami taste which is also found in meat products. Each of my elements is able to be disposed of in to the ground and decomposed naturally to enrich the soil for future growth of crops. I have been innovative in coming up with ideas to ensure that

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