**Unit plan: Develop a novel taewa product**

**Overview**

Students investigate opportunities for new products using taewa and develop a prototype taewa product for a specific market.

**Purpose**

To understand the attributes and benefits of taewa and the opportunities they offer for new products. Consider the long-term impacts of developing these new products for different groups of people and understand how new knowledge and creative thinking create new possibilities. Develop a prototype taewa product for a particular person or group.

**Suggestions for a scenario**

Researchers are looking for new ideas for food products using taewa to sell to local and overseas markets. Consider the attributes of taewa and opportunities where these may benefit people, before developing a suitable prototype product.

**Where's the Biotechnology?**

In New Zealand, biotechnology research is investigating the physical and functional characteristics of some early New Zealand vegetables. Their findings show that early potato varieties, grown by Māori since their introduction to New Zealand, have considerable health benefits and unique qualities modern potatoes don’t have. Taewa haven’t been grown in commercial volumes since the late 19th century but now researchers are developing taewa products for their health benefits and other unique characteristics.

Researchers need to understand the properties of foods before they can use them to develop new products. Testing provides knowledge of how these foods can be processed and their nutritional composition.

Researchers also have current knowledge of market trends and nutritional issues. They know the importance of developing food products with particular qualities that will appeal to different groups of consumers.

**Curriculum focus**

**Technological practice:** Students will investigate a need or opportunity for a taewa product and develop a brief. They will plan, develop and evaluate a prototype taewa product to meet their brief.

**Technological knowledge:** Students will develop their understanding of the qualities of taewa and how they can be made into different products that meet specific needs. Students will model their developing ideas to inform their decision-making and justify how their prototype taewa product meets the needs of their particular consumer/s.

**Nature of technology:** Students will develop an appreciation of how social and environmental issues and knowledge have influenced the development of modern potato varieties. They will consider benefits of developing new taewa products and potential long-term impacts on different groups of people.

**Focus of skill & strategy**

This unit provides students with an opportunity to engage with a current technological development in New Zealand. They will appreciate the immediate and longer-term impact of developing taewa products and think creatively about new opportunities and ideas for products with health benefits for specific groups of people.

Students will be able to develop a prototype product that takes into account the characteristics of taewa and the needs of a selected market or consumer.

**Health and Safety**

Food hygiene regulations must be applied to all food preparation and testing. These procedures must be carried out in suitable, designated areas. Resources and supervision should be age-appropriate.

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| **UNIT PLAN: Develop a novel taewa product** | | |
| **Suggested learning intentions** | **Suggested learning experiences** | **Possible teaching/assessment activities** |
| **Introduction**  Students identify the unique characteristics of taewa. | **Introduction**  Display taewa cultivars and/or images. Refer to images in image gallery.  Discuss the unique characteristics of taewa and how these may affect how you use them.  Consider possible advantages of these characteristics in existing potato products. | **Introduction** |
| **Introduce the scenario**  Understand how and why the existing taewa products were developed. | **Introduce the scenario**  **Scenario**: Researchers have found that taewa have a number of benefits over modern potatoes. They are looking for new ideas for taewa food products to sell to local and overseas markets.  View videos:   * [Developing taewa snacks](https://www.sciencelearn.org.nz/videos/393-developing-taewa-snacks) * [Chef-ready taewa products](https://www.sciencelearn.org.nz/videos/394-chef-ready-taewa-for-restaurants)   Use animation:   * [Making taewa snacks by extrusion](https://www.sciencelearn.org.nz/videos/664-making-taewa-snacks-using-extrusion)   Discuss how the idea for these products developed, for example, improved crop production, knowledge of nutritional benefits, food industry demand for unique New Zealand foods.  Discuss the benefits of taewa and brainstorm possible needs/target markets for products made from taewa. | **Introduce the scenario**  For supporting information, refer to the articles:   * [The benefits of taewa](https://www.sciencelearn.org.nz/resources/788-the-benefits-of-taewa) * [Developing novel foods from taewa](https://www.sciencelearn.org.nz/resources/790-developing-novel-foods-from-taewa)   Student record of brainstorm. |
| **Understanding the background**  Students understand the cultural and historical value of taewa and reasons for their decline as a commercial crop.  Consider factors contributing to developments in taewa and the potential opportunities these offer.  Appreciate potential long-term impacts of developing new taewa food products. | **Understanding the background**  Show videos:   * [Introducing taewa to New Zealand](https://www.sciencelearn.org.nz/videos/384-introducing-taewa-to-new-zealand) * [Taewa are taonga to Māori](https://www.sciencelearn.org.nz/videos/385-taewa-are-taonga-to-maori)   Explore and discuss reasons why taewa crops declined in the late 19th century. This could be a homework task.  Discuss why taewa have recently become a focus for research. Use video:   * [The importance of taewa research](https://www.sciencelearn.org.nz/videos/388-the-importance-of-taewa-research)   Discuss what impacts increasing taewa crops and new food products may have for different groups of people. | **Understanding the background**  For supporting information, refer to the articles:   * [Taewa (Māori potatoes)](https://www.sciencelearn.org.nz/resources/781-taewa-maori-potatoes) * [The cultural value of taewa](https://www.sciencelearn.org.nz/resources/783-the-cultural-value-of-taewa-maori-potatoes) * [Growing taewa: research and development](https://www.sciencelearn.org.nz/resources/786-growing-taewa-research-and-development)   Student record of:   * reasons for taewa crops declining * reasons for renewed interest in taewa * possible future impacts. |
| **Developing knowledge and skill**  Understand the key nutrients in taewa and their function.  Understand the physical properties of taewa and how they can be transformed into different products. (TKn-TP) | **Developing knowledge and skill**  *Organise a range of whole-class and/or group activities that will develop knowledge and inform the development of a taewa product. Possible activities are listed below – these can be adapted to suit the level and prior knowledge/skills of the class.*  Jigsaw-type activities could be used whereby expert groups complete specific tasks and report back to their base groups (becoming the expert on that topic for their group).   * **The nutritional benefits of taewa**: Research the key nutrients in taewa and compare with modern potatoes. What is the role of these nutrients in the body and their relative importance to different groups of people? Are there any current nutritional issues that relate to any of the key nutrients? * **The cultural value of taewa**: Interview a Māori vegetable grower – person who grows Māori vegetables - about how they grow and use taewa. What are their perceptions of the benefits or otherwise of using them to develop new products? Discuss possible future impacts of developing taewa products. * **Testing taewa’s functional properties**: Prepare and cook different varieties of taewa and modern potatoes using a range of basic cooking methods. Compare the texture differences after cooking and discuss their suitability for different types of products and processing methods. * **Analyse existing products**: Investigate a range of potato products for information on ingredients, processing methods, packaging and labelling. (This could be done by visiting a supermarket, using images, using recipe books, using the internet or discussing with family, as either a group or homework activity). Record the data in a table. Evaluate the potential for substituting taewa in the products and possible target markets. * **Food safety**: Identify/investigate high-risk ingredients in a range of potato products and safe food-handling standards that apply (use the products from the market survey above). How does this impact on shelf life, packaging and storing? For example, some products will need to be stored in a refrigerator or freezer and/or will need to have a ‘use by’ date. (Identify texts/websites/prior learning for researching this aspect.) * **Target market** **survey:** Design a survey to find out the attitudes of different age groups towards taewa and the types of potato products that appeal to them the most. Students gather responses for homework and combine the results as a class. Discuss ethical guidelines for completing surveys. | **Developing knowledge and skill**  Refer to the articles:   * [The benefits of taewa](https://www.sciencelearn.org.nz/resources/788-the-benefits-of-taewa) * [Growing taewa: research and development](https://www.sciencelearn.org.nz/resources/786-growing-taewa-research-and-development)   Student record of key nutrients, function and benefits.  Student and teacher checklist of safe and hygienic practices.  Student record and analysis of test results.  Student record of data and evaluation of potential for using taewa. |
| **Developing a brief**  Identify and explain a need/opportunity for a taewa product.  Describe the key attributes/specifications the product will need to be fit for purpose. | **Developing a brief**  Identify a potential target market for a taewa product, taking into consideration previous ideas and the unique characteristics of taewa. Who could benefit and why? Think about the importance of being innovative. Use video:   * [Identifying opportunities for taewa](https://www.sciencelearn.org.nz/videos/383-identifying-opportunities-for-taewa)   Draw on research findings in making and explaining decisions.  Identify and interview key stakeholders, representative of the target market, to help define the sort of product that would appeal and meet their needs. (Establish ethical guidelines for designing and carrying out an interview.)  Discuss examples of attributes/specifications that may be required, such as specifying key ingredients, colour, flavour, texture, viscosity, portion size, shelf life, packaging.  The attributes/specifications must take account of the physical and functional requirements of the product and stakeholder needs and preferences. For example, who will the consumer be, where and how will the product be stored and eaten, what size portions will be suitable? | **Developing a brief**  Some examples of target markets could be young children who could be motivated to eat by the interesting colours, tourism operators, restaurants.  **Assessment**: A brief for a taewa product is developed with a conceptual statement describing the nature of the product and who it is for, as well as a list of attributes/specifications the product must have. |
| **Planning for practice**  Students will consider the stages and resources needed to develop their product and make a plan to follow. | **Planning for practice**  Discuss the key stages required to develop the taewa product, including getting constructive feedback. Feedback could be from representatives of the target market or an appropriate expert.  Students plan the resources they will need and allocate time within a given timeframe. | **Planning for practice**  Build on students’ previous experience and planning tools used. |
| **Developing a taewa product prototype**  Use sensory testing protocol and language to record testing results. | **Developing a taewa product prototype**  Develop and refine product ideas through analysis of research and consulting with stakeholders.  Trial (model) developing ideas – carry out sensory testing with stakeholders and evaluate against attributes/specifications. Refine ideas according to results of testing and feedback from stakeholders.  If packaging is part of the brief, this can be developed alongside the product or as an extension task. | **Developing a taewa product prototype**  To help generate ideas students could be encouraged to review their analysis of existing potato products and other research activities and discussion completed earlier. |
| **Presenting the prototype product**  Justify how the prototype fulfils the requirements of the brief. | **Presenting the prototype product**  Students present taewa products to the class, explaining the need or opportunity and how the product meets these requirements. | **Presenting the prototype product**  **Assessment**: A taewa product is developed that is fit for the purpose described in the brief and meets the specifications and needs of the client/target market. |