**Marketing a reusable product: potato plates – unit plan**

**Overview**

Students develop their understanding of material sustainability and explore the benefits and uses of new products made from potato starch.

**Purpose**

To understand why increasing use of non-degradable materials is not sustainable and how this is influencing the development of new materials.

To develop understanding of product life cycles as a way of measuring the environmental impact of a product.

To understand the benefits of potato plates and investigate and promote new opportunities for using them in place of plastic and polystyrene alternatives.

## Background

### Suggestions for a scenario

Disposable products made from plastic take a long time to break down in landfills and are made from depleting petroleum resources. A New Zealand company is making alternative products that are 100% biodegradable and made from renewable and recycled ingredients. Increasing their use will have a beneficial impact on the environment, and promoting their benefits will help inform and encourage consumers to use them.

### Where's the Biotechnology?

Biotechnology research is looking at using material from plants, like cereals and tubers, to make materials that will biodegrade and use renewable resources. They have to formulate the material to have properties that will endure the end use and will not have harmful effects on people or the environment when used and disposed of.

## Curriculum focus

### Technology

***Technological knowledge:*** Students will develop their understanding of product life cycles and how materials impact on this by comparing the disposal rates of potato plates with traditional materials. They will develop knowledge of how the potato starch material is made and how the ingredients and manufacturing process affect the properties of the material. Students will develop an understanding of why new materials are developed and appreciate the possibilities for further development in the future.

***Nature of technology:*** Students will develop their understanding of the characteristics of technology by appreciating that technological products impact on the world. By comparing the materials and product life cycles, they will appreciate how different materials impact differently and how people develop knowledge and motivation to transform materials and develop new products. Students will develop understanding of how the development of technological outcomes reflects the historical, social and cultural environment at the time.

### Focus of skill & strategy

Students will learn about product life cycles and how materials can impact on them. They will learn how disposal rates differ for different materials and in different conditions and how this impacts on people and the environment. Students will learn that new materials are possible and are developed to meet needs and improve our lives.

Students will learn about the development and benefits of potato plates and that informing and promoting to consumers helps to widen the use of new products.

Students will explore further opportunities in their community for using the new products and target these with a promotional letter explaining the nature and benefits of the potato plates and containers over traditional ones.

### Health and Safety

Health and safety needs to be considered when doing the experiment with disposal methods. Burying and digging up the plates may require gloves or careful hand washing, as well as care with choice and use of tools for digging.

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| **UNIT PLAN: Marketing a reusable product: potato plates** |
| **Suggested learning intentions** | Suggested learning experiences | Possible teaching/assessment activities |
| * Understand how new product development impacts on people and the environment and how people influence new product development.
* Understand how potato plates are made and why potato starch is used.
* Develop an understanding of how different materials have different properties that can affect how they are used and how they impact on society.
 | **Introduce the scenario*** Look at a range of disposable plates including plastic, polystyrene and potato plates. Discuss why we use them and what people would have used before these products were invented.
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| * What are the plates made from? Discuss the differences. Discuss how you would make a plate out of potatoes and why potato starch has been used.
 | * Get video: [What are potato plates?](http://www.biotechlearn.org.nz/focus_stories/potato_plates/video_clips/what_are_potato_plates_v0365)
* Get video: [How are potato plates made?](http://www.biotechlearn.org.nz/focus_stories/potato_plates/video_clips/how_are_potato_plates_made_v0367)
* Get interactive: [Potatopak manufacturing process](http://www.biotechlearn.org.nz/focus_stories/potato_plates/potato_plate_manufacturing_process)
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| * What happens to the plates after we have used them? Discuss the problems associated with rubbish disposal in landfills. What are the alternatives?
 | * Get activity: [Testing the degradability of potato plates](http://www.biotechlearn.org.nz/focus_stories/potato_plates/experiment_testing_the_degradability_of_potato_plates)
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| * Carry out an experiment with the different plates and different methods of disposal and discuss the reasons for the different results.
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| * Understand product life cycle and how the life cycle of a potato plate compares with plastic.
 | **Developing expertise*** Discuss product life cycles as a way of understanding the environmental impact of a product.
* Find out more about the benefits of potato plates. Assign groups different questions to investigate using the information sheets and videos.
* Groups report back their findings and compile a class list of benefits of potato plates.
 | * Get article: [Environmental benefits of potato plates](http://www.biotechlearn.org.nz/focus_stories/potato_plates/environmental_benefits_of_potato_plates)
* Get video: [Why import starch?](http://www.biotechlearn.org.nz/focus_stories/potato_plates/video_clips/why_import_potato_starch_v0369)
* Get video: [Recycling the potato plate waste](http://www.biotechlearn.org.nz/focus_stories/potato_plates/video_clips/recycling_potato_plate_waste_v0368)
* Refer to the helix of sustainability at: [www.potatoplates.com](http://www.potatoplates.com)
* For more information view the resources on the Science Learning Hub about [biodegradability](http://www.sciencelearn.org.nz/contexts/enviro_imprints/science_ideas_and_concepts/biodegradability) and [measuring biodegradability](http://www.sciencelearn.org.nz/contexts/enviro_imprints/looking_closer/measuring_biodegradability).
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| * Describe the properties and possible uses of potato plates and the benefits of using these over plastic disposable products.
 | **Taking action*** Use the information gained to help write a letter explaining the benefits of potato plates and why they should consider using them over other disposable plates. Include photographs and evidence from the experiment above.
* **Primary** **students** could write a letter home.
* **Secondary** **students** could write a letter to a business, for example, a café, canteen or supermarket where they see an opportunity for potato plates to be used in place of existing plastic or polystyrene containers.
 | * Assess students’ understanding of the properties and life cycle of potato plates and their potential impact on the environment.
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