**NZQA**

**Approved**

Achievement standard: 91084 Version 3

Standard title: Demonstrate understanding of basic concepts used in preservation and packaging techniques for product storage

Level: 1

Credits: 4

Resource title: Safe breakfast cereal

Resource reference: Processing Technologies VP-1.62 v2

Vocational pathway: Manufacturing and Technology

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| Quality assurance status | These materials have been quality assured by NZQA. NZQA Approved number A-A-02-2015-91084-02-7384 |
| Authenticity of evidence | Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material.Using this assessment resource without modification may mean that learners’ work is not authentic. Assessors/ educators may need to change figures, measurements or data sources or set a different context or topic to be investigated or a different text to read or perform. |

Vocational Pathway Assessment Resource

Achievement standard: 91084

Standard title: Demonstrate understanding of basic concepts used in preservation and packaging techniques for product storage

Level: 1

Credits: 4

Resource title: Safe breakfast cereal

Resource reference: Processing Technologies VP-1.62 v2

Vocational pathway: Manufacturing and Technology

Learner instructions

# Introduction

This assessment activity requires you to demonstrate your understanding of basic concepts used in preservation and packaging techniques for the storage of breakfast cereals in New Zealand.

You are going to be assessed on how comprehensively you demonstrate understanding of basic concepts used in preservation and packaging techniques for product storage of breakfast cereals in New Zealand.

The following instructions provide you with a way to structure your work so you can demonstrate what you have learnt and achieve success in this standard.

Assessor/educator note: It is expected that the assessor/educator will read the learner instructions and modify them if necessary to suit their learners.

# Task

This activity requires you to create a presentation that demonstrates understanding of basic concepts used in preservation and packaging techniques for the storage of breakfast cereals in New Zealand.

Focus on breakfast cereals eaten in New Zealand, and investigate:

* Types of decay that typically occur in these selected cereals, and why we [need](http://technology.tki.org.nz/Glossary#glossary_31803) to preserve certain products to maintain their integrity over time
	+ for example types of decay may include microbial growth, separation, loss of colour, loss or gain of moisture, loss of viability, loss of nutritional content.
* Preservation techniques used to control the decay of these cereals
	+ for example preservation techniques may include chilling, freezing, heating, dehydration, control of humidity, provision of nutrients, use of chemical additives.
* Packaging techniques used to control the decay of cereals and labelling for identification of anti-decay measures
	+ for example packaging techniques may include cellophane and plastic bags, plastic and cardboard boxes, glass and plastic bottles and jars.
* Reasons why these packaging techniques are effective in maintaining product integrity.
* Storage conditions that will limit decay of these breakfast cereals.
* The legal requirements for labelling these breakfast cereals.
* Reasons for New Zealand’s legal requirements regarding labelling.

Include the following in your presentation:

* Identify and [explain](http://technology.tki.org.nz/Glossary#glossary_31835) the links between types of decay and preservation techniques in breakfast cereals in New Zealand.
* Explain why a particular preservation and packaging technique was chosen for at least one of the cereals you have investigated.
* Discuss how to control the storage environment to limit decay in different types of cereals during storage.
* Compare and contrast preservation and packaging techniques for a breakfast cereal.
* Discuss why labelling of breakfast cereals is legally required in New Zealand and what those requirements are.

# Resources

## Useful websites

<http://technology.tki.org.nz/Case-Studies/Technologists-Practice-case-studies-Introduction/Food-and-Biological/A-Bit-on-the-Side>

<http://www.madehow.com/Volume-3/Cereal.html#b>

<http://www.foodquality.com/details/article/1023787/The_Microbiology_of_Cereals_and_Cereal_Products.html?tzcheck=1>

## Useful reading

Murano, P 2002, *Understanding Food Science and Technology,* Brooks Cole, United States.

Hallam, E 2005, *Understanding Industrial Practices*, Nelson Thornes, United Kingdom.

Robinson, J Roberts, H Barnard, E and Shepard, T 2001, *Design and Make It – Food Technology*, Nelson Thornes, United Kingdom.

Vocational Pathway Assessment Resource

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Assessor/Educator guidelines

# Introduction

The following guidelines are supplied to enable assessors/educators to carry out valid and consistent assessment using this internal assessment resource.

As with all assessment resources, education providers will need to follow their own quality control processes. Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material. Using this assessment resource without modification may mean that learners' work is not authentic. The assessor/educator may need to change figures, measurements or data sources or set a different context or topic. Assessors/educators need to consider the local context in which learning is taking place and its relevance for learners.

Assessors/educators need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing learners against it.

# Context/setting

This activity requires learners to demonstrate their comprehensive understanding of basic concepts that relate to techniques used to preserve, package, and store food cereals for use within New Zealand.

# Conditions

The learners could work independently or in groups to develop their understanding, but they need to create their presentation independently, and will be assessed individually.

# Resource requirements

The assessor/educator will provide learners with the opportunity to explore different products requiring diverse preservation and packaging techniques used to address types of decay and legal requirements.

The assessor/educator will assist learners in the refinement of reflective and inquiry questions related to understanding how product integrity can be established and/or maintained through preservation and packaging suitable for storage conditions in local environments.

Learners will require access to the internet for research.

# Additional information

None.

# Assessment schedule: Processing Technologies 91084 – Safe breakfast cereal

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner demonstrates understanding of basic concepts used in preservation and packaging techniques for product storage by:* describing the types of decay and preservation techniques

For example, the learner describes:* + the types of decay, referring to micro-organisms using their category names (e.g. yeast, moulds, bacteria)
	+ the preservation techniques: how grains need to be dried before and during storage as humid conditions will cause decay of grains by micro-organisms (such as insects, fungi and bacteria); how other contaminations may come from air, dust, soil, water, rodents, birds, animals, humans, storage and shipping containers, and handling and processing equipment.
* describing legal requirements for labelling in a local environment

For example:The learner describes how New Zealand’s food safety policies (<http://www.foodsafety.govt.nz>) require packaged breakfast cereals to provide basic information about what is in the food we eat, and how best to handle it.* describing how a specific product in a local environment could effectively be preserved, packaged and stored to maintain product integrity over time

For example, the learner describes:* + how breakfast cereals are made from grains that need to be stored in a cool, dry, clean environment to avoid infestation, and to minimise changes in flavour and texture; in a domestic situation this may be a pantry that needs to be kept clean and dry, with all packaging well sealed
	+ breakfast cereals found in New Zealand which are both vacuum packed into bags, then boxed and stored in an ambient environment to decrease the risk of decay.

*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates in-depth understanding of basic concepts used in preservation and packaging techniques for product storage by:* explaining the links between types of decay and preservation techniques

For example, the learner explains:* + the identification of a range of different types of decay (e.g. moulds, going stale and softening, loss of nutritional value, and enzymatic degradation), and explains how these are prevented or slowed by particular preservation techniques
	+ how drying is a good way to prevent fungal growth (mould) on grains, processed breakfast cereals have grains milled at high temperature, and are packaged in vacuum packed sealed bags then boxes to further reduce the risk of contamination
	+ drying and storing breakfast cereals in ambient temperatures decreases the chances of fungal growth, and lessens the potential for production of mycotoxins in the grain
	+ how the sealing enhances the preservation of the breakfast cereal as it stabilises the ambient temperature, decreasing humidity, which also slows the growth of moulds, andprolongs the life expectancy of the grain so it doesn’t get soft and stale.
* explaining why a particular preservation and packaging technique was chosen for a specific product to be stored in a local environment

For example:The learner explains the process involved with a whole grain breakfast cereal, rolled oats. These are dried, processed and packaged in sealed vacuum packed bags. This processing allows the whole oat to remain dry thus preventing moulds decaying the grain before being flattened and/or steamed to create rolled oats. As the final product has minimal processing and still contains all of the bran, germ, and endosperm of the grain, contamination from other micro-organisms is reduced. An automated machine packages the cereal into a box, which is assembled from a flat sheet of cardboard. The bag is formed from moisture-proof plastic, and inserted into the box. The cereal fills the bag, and the bag is tightly sealed by heat. Health and safety standards within the workplace ensure the packaging is clean (e.g. no dirty fingerprints) and free of contaminants, such as insects or rodent droppings. * describing legal requirements for labelling in a local environment

For example:The learner describes how New Zealand’s food safety policies (<http://www.foodsafety.govt.nz>) require packaged breakfast cereals to provide basic information about what is in the food we eat, and how best to handle it.*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates comprehensive understanding of basic concepts used in preservation and packaging techniques for product storage by:* discussing how to control the storage environment to limit decay of different types of products during storage

For example:The learner’s discussion describes the conditions that moulds, bacteria and mycotoxins grow in, and explains how they cause undesirable colour changes, and/or loss of nutritional value and possible toxins. It explains how the storage environment can address these issues, for example grains need to be thoroughly dried before storage, and kept at ambient temperatures to inhibit the growth of moulds. The sources of microbial contamination of cereals are many, but all are traceable to the environment in which grains are grown, handled, and processed. When grains are dried, it inhibits the production of fungi, which invade when grain is high in moisture. Musty odours may become apparent before mould growth becomes visible, and is an early warning of mould activity, as is the heating of the grain. Mycotoxins (funguspoisoning) cause further deterioration of the grain, and can occur throughout the processing of breakfast cereals. Most cereals must be packaged in airtight, waterproof plastic bags within cardboard boxes to protect them from [spoiling](http://www.madehow.com/knowledge/Decomposition.html). The discussion goes on to include the type of plastic that is used to prevent odours or moisture or contaminants getting into the cereal, and the cardboard used which must be sturdy enough to protect the cereal during transport and display.* describing legal requirements for labelling in a local environment and discussing why it is required

For example:The learner discusses how New Zealand’s food safety policies (<http://www.foodsafety.govt.nz>) require packaged breakfast cereals to provide basic information about what is in the food we eat, and how best to handle it; and how printing on the cereal boxes (or bags), is carried out with food-appropriate inks so there is no odour contamination of the cereal, which also ensures branding requirements of each company is met.* comparing and contrasting preservation and packaging techniques for a product to be stored in a local environment

For example:The learner compares and contrasts the preservation and packaging techniques for breakfast cereals, identifying the advantages and disadvantages for different purposes and consumers, of different techniques, and different storage conditions. The discussion makes links between the nutritional value of the product, the length of time it can be stored for, and its intended purpose.*The above expected learner responses are indicative only and relate to just part of what is required.* |

Final grades will be decided using professional judgement based on an examination of the evidence provided against the criteria in the Achievement Standard. Judgements should be holistic, rather than based on a checklist approach.