**NZQA**

**Approved**

Achievement standard: 91055 Version 3

Standard title: Demonstrate understanding of basic concepts used in manufacturing

Level: 1

Credits: 4

Resource title: Manufacturing bagged mixed vegetables

Resource reference: Generic Technology VP-1.12 v2

Vocational pathway: Primary Industries

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| Date version published | February 2015 Version 2  To support internal assessment from 2015 |
| Quality assurance status | These materials have been quality assured by NZQA.  NZQA Approved number A-A-02-2015-91055-02-7371 |
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Vocational Pathway Assessment Resource

Achievement standard: 91055

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Learner instructions

# Introduction

This assessment activity requires you to demonstrate your understanding of basic concepts used in the manufacture of bagged mixed vegetable products.

You are going to be assessed on how comprehensive your understanding is of basic concepts used in the manufacture of bagged mixed vegetable products.

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

Compare the manufacturing processes for two different bagged mixed vegetable products and the manufacturing techniques for two categories of bagged mixed vegetable products used in New Zealand, and explain why these different techniques are used.

## Investigate

The following investigation is to ensure that you present relevant information.

Find out about how two or more different types of bagged mixed vegetable products are manufactured through different manufacturing systems and techniques (see Resource A). This could involve investigating a small company manufacturing organically grown mixed vegetables as opposed to a manufacturer supplying supermarkets and producing large quantities of mixed vegetables using additives and chemicals in the growth and washing processes.

Gather information about the techniques used for inspection, transport, storage, and operation in at least two different bagged mixed vegetable manufacturing processes (see Resource B).

In particular, find out about:

* the operations used in the manufacturing processes of a range of bagged mixed vegetable products and the resources required for these operations
* the order in which the operations are carried out in different processes, and the reasons for this order (you could use flow diagrams to record this information)
* the quality control that is applied during the processing, when it is applied, and how it informs the processing (for example, by providing information to help with the next step or providing guidance on changes that need to be made, to ensure that the end product has the required qualities)
* the safety procedures that should be followed during production
* the legal requirements for manufacturing bagged mixed vegetable products for sale (for example relevant labour laws, safety regulations and environmental laws)
* yield prediction, and how the manufacturer determines the yield prediction for the manufacture of a specific type of bagged mixed vegetable
* how yield prediction and quality control have been affected by social change (for example, the impacts that people’s changing expectations about price, quality and dietary requirements have had on yield predictions and quality control mechanisms)
* how yield prediction and quality control have been affected by environmental change (for example, how the legislation intended to protect people and the environment has impacted on the usage and disposal of resources used in bagged mixed vegetable production and how this has affected yield prediction and quality control)
* how yield prediction and quality control have been affected by computerisation (for example Computer Numerical Controlled machinery - CNC, or CAD/CAM).

## Present your findings

Your assessor/educator will provide you with the format for your presentation.

Present your final findings, which should include the following information:

* Identify and describe at least two different types of bagged mixed vegetable manufacturing systems, and explain why at least two types of manufacturing systems are used in making different types of bagged mixed vegetables.
* Describe at least two of the categories of manufacturing techniques used in making bagged mixed vegetables, and explain why the key manufacturing techniques are used in this manufacturing process.
* Discuss why two or more specific manufacturing techniques are used in making different types of bagged mixed vegetables, giving details of why different techniques are used.
* Create a flow diagram that shows a bagged mixed vegetable manufacturing process. Show how the various stages are linked using different symbols for the different technique categories.
* Describe the yield of a manufacturing process. Explain how the yield is determined within bagged mixed vegetable manufacturing, and discuss how yield prediction and its determination may be affected by social and environmental change.
* Explain the role of quality control in bagged mixed vegetable manufacturing. Identify possible defects in bagged mixed vegetables and describe systems for identifying and responding to these quality issues.
* Discuss how quality control mechanisms may be affected by social and environmental change.

# Resource A

## Useful information

Types of manufacturing systems include but are not limited to:

* one-off custom manufacturing of a unique single product
* batch, intermittent, or short-run manufacturing – multiple copies of the same product or a single batch of a processed product
* continuous (often called ‘assembly line’) manufacture
* flexible manufacture and customisation.

The categories of manufacturing techniques may include but are not limited to inspection, transport, storage and operation.

Thenature of manufacturing may include but is not limited to consideration of product need; resource availability; political, social, and physical environments; and advances in manufacturing systems and techniques.

# Resource B

## Definitions relating specifically to the manufacture of bagged mixed vegetables

Techniques used in bagged mixed vegetable manufacture:

* Quality control inspections are used to detect failures (such as human and non-human factors) that cause defects and subsequently worsen product quality.
* Transport can include the transport of vegetables to another operator or the transport of vegetables from storage area to manufacturing/production to warehouse/distribution.
* Storage includes storage of packaging materials, plants, and waste.
* Operations can include growing the vegetables, picking the vegetables, weighing, quality control, packing and distribution.

Yield prediction means determining the number of bagged mixed vegetables items that is possible from the resources available, taking into account the expected wastage resulting from defects, faulty workmanship, and inefficiency.

Resources used in the manufacture of bagged mixed vegetablesmay include plant nutrients, machinery, floor space, storage, staffing and their skill levels.

Competitive manufacturing is a modern version of Japanese Kaizen ‘lean manufacturing’ that includes JIT (just in time) materials or parts coming from the suppliers for production.

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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 investigate basic concepts used in manufacturing bagged mixed vegetables, and create a presentation that demonstrates their comprehensive understanding.

# Conditions

The learners could gather and analyse their evidence independently or in groups, but they need to create their presentation independently, and will be assessed individually.

Decide on the format of the final presentation. You may wish to take learner preferences into account in deciding on the format.

# Resource requirements

Ensure that learners:

* know how to use a flow diagram to depict a process
* have access to information on:
  + bagged mixed vegetable manufacturing processes
  + quality control in bagged mixed vegetable manufacture
  + yield prediction in bagged mixed vegetable manufacture
  + social and environmental change that have impacted on yield prediction and quality control in bagged mixed vegetable manufacturing in New Zealand.

Learners will require access to the internet for research.

# Additional information

Visiting a small or large scale vegetable manufacturer may be helpful.

# Assessment schedule: Generic Technology 91055 – Manufacturing bagged mixed vegetables

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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 manufacturing bagged mixed vegetables by:   * describing different types of bagged mixed vegetable manufacturing systems   For example:  The learner describes two manufacturing processes: batch or short-run manufacture for a catering company wanting an order for a large event on a specific day, continuous or ‘assembly line’ manufacture where consistent supplies of the same bagged mixed vegetable are required such as a supermarket supply.   * describing categories of manufacturing techniques used in a bagged mixed vegetable manufacturing process   For example:  The learner describes at least two of the following categories:   * + inspection of the mixed vegetables from picking through to packaging (including quality control and quality assurance systems)   + transport of bagged mixed vegetables within the process including stacking, temperature and humidity control   + storage: vegetable plants, picked vegetables, bagged mixed vegetables, packaging materials, chemicals   + operation: the picking process, washing of vegetables, selection of vegetables, packaging. * developing a process flow diagram to communicate a manufacturing process   For example:  The learner creates a flow diagram of a bagged mixed vegetable manufacturing process (using symbols to represent categories of techniques, such as storage and inspection), which illustrates the different stages of manufacture and indicates how they are linked.   * describing the yield of a bagged mixed vegetable manufacturing process and the role of quality control   For example, the learner describes how manufacturers predict the yield of bagged mixed vegetable manufacturing, taking into account:   * + vegetables that do not meet the quality specifications   + how quality control is used to meet manufacturing and hygiene standards   + possible defects related to consistency   + the quality control systems used to check vegetable quality through to the final bagged product   + systems for responding to fault analysis.   *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 manufacturing bagged mixed vegetables by:   * explaining why particular types of bagged mixed vegetable manufacturing systems are used in specific contexts   For example:  The learner explains the manufacturing processes for at least two systems and the reasons for their use in particular situations.  *Batch production is used when the manufacturer is required to produce an order for a specific type of vegetable such as organically grown or a short-run of bagged mixed vegetables is required to meet the needs of a client such as a restaurant.*  *Continuous manufacture is used for mass production of the same product.*   * explaining key manufacturing techniques used in a bagged mixed vegetable manufacturing process   For example:  The learner explains the techniques of at least two of the following categories: inspection (including key quality control and quality assurance systems), transport (including techniques for transporting raw materials within the manufacturing process), storage (including the key items and the types of storage required for these in the manufacturing process), operation (including how the key resources are linked together to produce the bagged mixed vegetables).  *Continuous production would require larger storage areas for vegetables as there are more bagged mixed vegetables being produced, and so greater quantities of mixed vegetables may need to be held for a time in a storage area, until washing and packaging begins. Some vegetables may need to be kept in particular environments like constant or certain temperatures to ensure they do not deteriorate before processing. Once the vegetables are picked, time constraints are needed for a consistently produced product.*   * explaining how yield is determined and how quality control is managed within a bagged mixed vegetable manufacturing process   For example, the learner explains:   * + how yield may be calculated. *At XYZ Vegetable Suppliers(refer to my field trip notes) they calculate their yield in their computer system that shows ...*   + that quality control may be managed as the responsibility of each employee or production line worker*. There are incentives within teams and the goal is minimum defects and waste. There is a check before the final packaging and any defects and waste can be tracked down to the materials or worker responsible. The worker or suppliers are notified and extra training is offered if required, and suppliers are monitored more closely …*   *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 manufacturing bagged mixed vegetables by:   * discussing why particular manufacturing techniques are used in bagged mixed vegetable manufacturing   For example*:*  The learner discusses the reasons for choosing particular manufacturing techniques in the context of specific processes for at least two systems.  The learner compares and contrasts a bagged mixed vegetable manufacturer that produces small batches of organically grown vegetables as opposed to a manufacturer producing much larger quantities using chemical additives in the growing and washing of mixed vegetables.   * discussing how yield prediction and its determination, and quality control mechanisms, may be affected by social and environmental change   For example, the learner discusses:   * + ways in which yield predictions can be determined by using inputs, processes, and outputs   + the role of computer systems, and how these have improved the efficiency of bagged mixed vegetable production   + the efforts that certain bagged mixed vegetable manufacturers are making to reduce their environmental impact by using recycling, using less energy, disposing of fewer chemicals as well as the success (or not) of their strategies   + the impact of customers wanting organically grown produce   + the impact of the non-durability of bagged mixed vegetables and how this has impacted on yield determination and quality control mechanisms   + legislative requirements for social conditions, such as labour laws (e.g. in terms of hours of work, rates of pay, safety considerations) and how these impact on yield prediction and quality control (e.g. cost of bagged mixed vegetable manufacture)   + legislative requirements that relate to environmental issues and how these impact on yield prediction and quality control (e.g. the impact of the Resource Management Act on waste management and disposal requirements).   *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.