**NZQA**

**Approved**

Achievement standard: 91366 Version 3

Standard title: Undertake development and implementation of an effective manufacturing process

Level: 2

Credits: 6

Resource title: Heaps of herb gardens

Resource reference: Generic Technology VP-2.13 v2

Vocational pathway: Primary Industries

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| Quality assurance status | These materials have been quality assured by NZQA.  NZQA Approved number A-A-02-2015-91366-02-8268 |
| 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

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Learner instructions

# Introduction

This assessment activity requires you to undertake development and implementation of an effective manufacturing process to produce a predetermined number of mini herb gardens.

You are going to be assessed on how comprehensively you develop and implement an effective manufacturing process to produce a predetermined number of mini herb gardens.

The following instructions provide you with a way to structure your work to demonstrate what you have learnt to allow you to 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

Mini herb gardens have become popular with apartment dwellers (they can be placed on their balconies). The gardens are often created for a particular purpose, for example Mediterranean cooking or first aid.

## Part 1: Prepare for the task

You will submit a report or presentation that documents the planning, development and implementation of your manufacturing process and confirms that the majority of your mini herb gardens meet established specifications.

Confirm, with your assessor/educator, the format for your report or presentation. You could submit a portfolio, a slide presentation, an audio-visual presentation or a written report, for example.

Record the decisions that you make and include evidence of what you do and how you do it.

Your assessor/educator will advise you on what evidence you might gather. This might include flow diagrams, annotated photographs, results of quality control checks, and details of modifications made.

## Part 2: Undertake development

Choose an existing mini herb garden, such as one you have made in another project, and determine its suitability for manufacturing.

Establish specifications for your garden, including the accepted tolerances.

Decide, with your assessor/educator, the number of gardens you will produce.

Make any design changes as necessary to allow you to manufacture this number of gardens in your learning environment to meet your specifications while still maintaining the quality and unique characteristics of your original garden. For example, you might need to change the mix of ingredients in the potting mix or the compost; change the shape or size of the plant container (for example a wooden crate); change decorative features (for example it might have a chalk board on one side of the crate); and/or swap one type of herb for another to better suit current growing conditions/consumer requirements.

Select a suitable manufacturing process, such as batch or continuous manufacturing.

Select quality control procedures that allow for ongoing monitoring. These should help you review and refine your manufacturing process to better suit your intended outcome (that is, a predetermined number of mini herb gardens, made to specification) and where you are working.

Confirm the relevant codes of practice and select and organise resources and techniques so that you can follow these relevant codes. You may want to consider:

* what equipment, facilities and materials you require and how these will be organised
* how your materials will be safely stored
* whether you need other people to help you manufacture the herb gardens (although you must develop the manufacturing process independently)
* when the facilities and staff will be available.

Create a detailed manufacturing plan that enables you to produce the required number of herb gardens to meet the established specifications and tolerances.

## Part 3: Implement and refine your process

Following your manufacturing plan, manufacture a predetermined number of mini herb gardens. Work independently and accurately, in keeping with relevant codes of practice. Use feedback to ensure the majority of the gardens meet your specifications and tolerances.

As you develop your plan and manufacture your gardens, collect evidence to show how you have:

* modified the selected techniques and made decisions about use of resources to better suit your intended outcome (that is, your gardens) and where you are working
* modified the quality control procedures to improve the quality of the feedback and allow you to refine the manufacturing process to better suit your intended outcome and manufacturing location.

When you have produced the required number mini herb gardens, collect evidence to confirm that the majority of these meet your specifications and tolerances.

## Part 4: Produce a report or presentation

Produce a report or presentation that documents how comprehensively you developed and implemented your manufacturing process and confirms that the majority of your gardens meet established specifications.

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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 undertake comprehensive development and implementation of an effective manufacturing process for a specified number of mini herb gardens.

# Conditions

This is an individual assessment activity.

While learners must individually organise the manufacturing process, they could use other people to carry out parts of the actual manufacturing.

# Resource requirements

Learners will need access to:

* an area that is suitable for manufacturing the herb gardens
* all necessary materials (such as potting mix ingredients, compost, timber for crates, chalk board paint, labelling materials), all necessary tools and equipment (such as woodworking tools, buckets for mixing)
* a camera with which to take photographs to use as evidence.

# Additional information

Learners will need to determine (in negotiation with the assessor/educator) how many units they will need to produce. The intention of the standard is for learners to develop and implement a manufacturing process that goes beyond one unit to a larger run that ensures consistency of the product. In this case, for example, the learner may want to show that if they made ten herb gardens using the specified process, all of these would be uniform enough to meet the specifications.

In some instances it will be possible to make a smaller number of units to test the specified manufacturing process and then modify as necessary. For example, a system could be set up to produce five gardens and this could provide sufficient information to refine the manufacturing process to ensure future consistency in the product.

# Assessment schedule: Generic Technology 91366 – Heaps of herb gardens

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner undertakes development and implementation of an effective manufacturing process by:   * analysing a technological outcome to determine suitability for manufacture and making design changes as required   For example:  The learner changes the shape and depth of the crate so that the outcome remains successful but is cheaper to produce.   * establishing specifications, including tolerances, required of the outcome that is to be manufactured   For example:  The learner conducts research to determine the ideal number of herbs to place in each garden and their specified height and width tolerances. They determine the acceptable tolerances for the weight of the different ingredients within the potting mix and for the size and colour of each crate. They also determine labelling requirements.   * selecting a manufacturing process and quality control procedures that enable units to meet the established specifications and tolerances   For example:  The learner considers their outcome and the available resources and chooses batch processing as a suitable manufacturing process. They develop a flow diagram of processes that includes when particular quality control procedures, such as checking quality and weight tolerances of potting mix/compost ingredients, needs to be carried out.   * organising and using selected resources and carrying out techniques independently and accurately in keeping with relevant codes of practice   For example:  The learner selects and organises equipment, facilities, staff and materials, including safe storage of these materials. They follow their manufacturing plan and adhere to relevant codes of practice.   * implementing the manufacturing process using feedback from quality control to ensure the majority of the units meet the established specifications and tolerances   For example:  Quality control checks show that the timber used in some crates is not finished as well as others. This stage of the process is adjusted to ensure consistency in the end result.  The learner produces the predetermined number of mini herb gardens and the majority of these are within the accepted tolerances.  *The above expected learner responses are indicative only and relate to just part of what is required.* | The learner undertakes in-depth development and implementation of an effective manufacturing process by:   * analysing a technological outcome to determine suitability for manufacture and making design changes as required   For example:  The learner changes the shape and depth of the crate so that the outcome remains successful but cheaper to produce   * establishing specifications, including tolerances, required of the outcome that is to be manufactured   For example:  The learner conducts research to determine the ideal number of herbs to place in each garden and their specified height and width tolerances. They determine the acceptable tolerances for the weight of the different ingredients within the potting mix and for the size and colour of each crate. They also determine labelling requirements.   * selecting a manufacturing process and quality control procedures that enable units to meet the established specifications and tolerances * organising and using selected resources and carrying out techniques independently and accurately in keeping with relevant codes of practice * modifying the techniques and the use of resources to tailor the manufacturing process to the nature of the outcome and the constraints and/or opportunities of the manufacturing location   For example:  The learner considers their outcome and the available resources and chooses batch processing as a suitable manufacturing process. They develop a flow diagram of processes that include when particular quality control procedures, such as checking quality and weight tolerances of potting mix/compost ingredients, needs to be carried out.  The learner selects and organises equipment, facilities, staff and materials, including safe storage of these materials.  The techniques and use of resources was modified by bringing in learners from another programme as labour to create the potting mix and compost and plant the herbs. They do this in another work space, allowing more room for this as well as the crate manufacture. This enabled lots more materials and components to be laid out at one time, allowing for greater assembling efficiency. The learner replaces the scales with ones that are more accurate. This improves the quality of the feedback for the ratio of ingredients that make for optimal potting mix.  The learner follows their manufacturing plan and adheres to relevant codes of practice.   * implementing the manufacturing process using feedback from quality control to ensure the majority of the units meet the established specifications and tolerances   For example:  Quality control checks show that timber in some crates is not finished as well as others. This stage of the process is adjusted to ensure consistency in the end result. The learner produces the predetermined number of mini herb gardens and the majority of these are within the accepted tolerances.  *The above expected learner responses are indicative only and relate to just part of what is required.* | The learner undertakes comprehensive development and implementation of an effective manufacturing process by:   * analysing a technological outcome to determine suitability for manufacture and making design changes as required   For example:  The learner changes the shape and depth of the crate so that the outcome remains successful but cheaper to produce.   * establishing specifications, including tolerances, required of the outcome that is to be manufactured   For example:  The learner conducts research to determine the ideal number of herbs to place in each garden and their specified height and colour tolerances. They determine the acceptable tolerances for the weight of the different ingredients within the potting mix and for the size and colour of each crate. They also determine labelling requirements.   * selecting a manufacturing process and quality control procedures that enable units to meet the established specifications and tolerances * organising and using selected resources and carrying out techniques independently and accurately in keeping with relevant codes of practice * modifying the techniques and the use of resources to tailor the manufacturing process to the nature of the outcome and the constraints and/or opportunities of the manufacturing location * establishing quality control procedures that allow for ongoing monitoring to enhance the review and refinement of the manufacturing process to better suit the nature of the outcome and the constraints and/or opportunities of the manufacturing location   For example:  The learner considers their outcome and the available resources and chooses batch processing as a suitable manufacturing process. They developed a flow diagram of processes that includes when particular quality control procedures, such as checking quality and weight tolerances of potting mix/compost ingredients, needs to be carried out.  The learner selects and organises equipment, facilities, staff and materials, including safe storage of these materials.  The techniques and use of resources was modified by bringing in learners from another programme as labour to create the potting mix and compost and plant the herbs. They do this in another work space, allowing more room for this as well as the crate making. This enables lots more materials and components to be laid out at one time, allowing for greater assembling efficiency. Rather than a number of workers weighing ingredients that went into the potting mix, one person is given that responsibility. The scales are replaced with ones that are more accurate. This improves the quality of the feedback for the optimal ratio of ingredients for potting mix. The learner follows their manufacturing plan and adheres to relevant codes of practice.   * implementing the manufacturing process using feedback from quality control to ensure the majority of the units meet the established specifications and tolerances   For example:  Quality control checks show that the timber used in some crates is not finished as well as others. This stage of the process is adjusted to ensure consistency in the end result.  The learner produces the predetermined number of mini herb gardens and the majority of these are within the accepted tolerances.  *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.