**NZQA**

**Approved**

Achievement standard: 91357 Version 3

Standard title: Undertake effective development to make and trial a prototype

Level: 2

Credits: 6

Resource title: Be a tidy Kiwi

Resource reference: Generic Technology VP-2.4 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-02-2015-91357-02-8255 |
| 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 effective development to make and trial a prototype for a storage system for tools and equipment used in farm sheds.

You are going to be assessed on how you undertake effective development to make and trial a prototype and justify your decision making.

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

The brief, which must include a conceptual statement and specifications, needs to be provided, or you could develop these and confirm them with your assessor/educator.

Familiarise yourself with the brief agreed on with your assessor/educator, which may include a working drawing, showing what is required in the development of a storage system for tools and equipment used on a farm.

The tools and equipment must be kept safe, secure, and yet easy to access. The materials used in the storage system must be stable, durable and rustproof.

## Materials and/or components

Research and evaluate materials and/or components that could be suitable to use in making your storage system. For example, consider the physical and functional properties of the materials in relation to the unit, where it will be located, and the specifications (which might include a working drawing) of the brief.

## Practical techniques and processes

Trial techniques and processes that you could apply to your selected materials to determine their suitability for use in making the storage system.

Using stakeholder feedback, evaluate and determine the most appropriate techniques and processes to use with the selected materials and/or components, tools and equipment for the storage system in its intended location.

## Making and trialling the prototype

* Using the materials and/or components, tools and equipment you have selected, apply the selected practical techniques and processes to the making of the prototype.
* Combine the evidence gathered from ongoing testing and stakeholder feedback and draw conclusions to make informed decisions (i.e. synthesise) in making and trialling the storage system.
* Trial the storage system (prototype) in its intended social and physical environment to establish whether it addresses the brief (i.e. its fitness for purpose).
* Justify why the storage system is suitable (or needs modification) to be used to store tools and equipment on the farm. Your justification should reflect the feedback gained from the farmer and farm workers (stakeholders).

Note: The *social environment* refers to those who will interact with the final outcome. The *physical environment* refers to the place where the final outcome will be situated.

## Evidence

Submit to your assessor/educator:

* the brief that you used
* evidence of the completed storage system
* evidence of all trials, tests, evaluations and decisions
* justification that the prototype is fit for purpose or that it should be modified.

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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 effective development to make and trial a justified prototype that addresses an assessor/educator-approved brief.

The prototype is for a storage system for tools and equipment used in farm sheds.

# Conditions

This activity is an individual assessment.

The brief, which must include a conceptual statement and specifications and may include working drawings, needs to be provided, or could be developed by the learner and confirmed by the assessor/educator.

# Resource requirements

Assessors/educators must provide a brief and specifications, which may include working drawings, that is a suitable starting point, or develop them with learners.

Learners require:

* equipment and materials/ components for developing and testing prototypes
* internet and library access
* access to suppliers, experts and stakeholders.

# Additional information

None.

# Assessment schedule: Generic Technology 91357 – Be a tidy Kiwi

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner undertakes effective development to make and trial a prototype by:* evaluating materials and/or components to determine their suitability for use in a storage system for tools and equipment
* trialling practical techniques and processes to determine their suitability for use in making a storage system for tools and equipment
* selecting appropriate materials and/or components, tools and equipment; and applying practical techniques and processes to make the storage system for tools and equipment

For example:The learner used their portfolio notes, drawings and research of existing solutions to evaluate possible materials and components for their storage system; selected a range of materials for constructing the racks, and talked to their stakeholder/s about which style they preferred; chose a range of different-shaped stands and presented these to the stakeholder/s, who preferred the look and feel of wall-mounted brackets attached to the existing walls; tested different sized metal bars to see which was the strongest and most suitable to support a range of tools; tried different drills, drill bits and fasteners with a sample of the framework metal to work out which would be most suitable for fixing the components to the wall in a way that was stable, safe for the workers to use and tidy to look at; trialled different methods of welding the frame for the development of the storage system, photographed the results and showed to stakeholder/s – they decided that MIG welding would give the best results.* using results from testing and stakeholder feedback to inform the making and trialling of the storage system for tools and equipment

For example:The learner found that the size of the tools to be stored varies and the pipe they had selected was too small to hold some of the tools – they discussed other possibilities with their stakeholder/s.* undertaking prototyping to gain specific evidence of the storage system for tools and equipment’s fitness for purpose in its intended physical and social environment

For example:The learner and stakeholder/s tested the tool racks once they had been secured to the wall and found that all the intended tools fit the racks and were held securely and safely. They were readily accessed by the farm workers yet unobtrusive from the front of the shed.* explaining any decisions to accept and/or modify the storage system for tools and equipment

For example:*After installing it at the farm we found that the storage system was successful in holding the tools and equipment in a way that they would not be damaged and that they were secure. The rack was stable when the tools were stored and the tools and equipment were easily accessed. I had to custom make some racks for some specialised tools as they did not fit. I also had to provide a locking mechanism for a few tools to improve the safety of their storage.**The above expected learner responses are indicative only and relate to just part of what is required.* | The learner undertakes effective development to make and trial a refined prototype by:* evaluating materials and/or components to determine their suitability for use in a storage system for tools and equipment
* evaluating practical techniques and processes to determine their suitability for use in making a storage system for tools and equipment
* selecting appropriate materials and/or components, tools and equipment; and applying practical techniques and processes to make the storage system for tools and equipment

For example:The learner used their portfolio notes, drawings and research of existing solutions to evaluate possible materials and components for their prototype; selected a range of materials for constructing the racks, and talked to their stakeholder/s about which style they preferred; chose a range of different-shaped stands and presented these to the stakeholder/s, who preferred the look and feel of wall-mounted brackets attached to the existing walls; tested different sized metal bars to see which was the strongest and most suitable to support a range of tools; tried different drills, drill bits and fasteners with a sample of the framework metal to work out which would be most suitable for fixing the components to the wall in a way that was stable, safe for the workers to use and tidy to look at; and researched possibilities for welding the frame of the tool racks. Photographs and annotations showed results from trialling MIG and TIG welding. Discussions with the assessor/educator and an engineer confirmed that MIG welding would enable the quality of outcome needed and would be within their ability.* using evidence from ongoing testing and stakeholder feedback to inform the making and trialling of the storage system for tools and equipment

For example:The learner explained how the first frame materials chosen were not suitable, and how they returned to their stakeholder/s to discuss other possibilities, selecting several other options that were looked at in the original trialling. The learner costed these and went back to the stakeholder/s and assessor/educator with the results. The learner explained how, between the three of them, they agreed on one to use in the prototype.* undertaking prototyping to gain specific evidence of the storage system for tools and equipment’s fitness for purpose in its intended physical and social environment

For example:The learner and stakeholder/s tested the tool racks once they had been secured to the wall and found that all the intended tools fit the racks and were held securely and safely. They were readily accessed by the farm workers yet unobtrusive from the front of the shed.* explaining any decisions to accept and/or modify the storage system for tools and equipment

For example:*After installing it at the farm we found that the storage system was successful in holding the tools and equipment in a way that they would not be damaged and that they were secure. The rack was stable when the tools were stored and the tools and equipment were easily accessed. I had to custom make some racks for some specialised tools as they did not fit. I also had to provide a locking mechanism for a few tools to improve the safety of their storage.**The above expected learner responses are indicative only and relate to just part of what is required.* | The learner undertakes effective development to make and trial a justified prototype by:* evaluating materials and/or components to determine their suitability for use in a storage system for tools and equipment
* evaluating practical techniques and processes to determine their suitability for use in making a storage system for tools and equipment
* selecting appropriate materials and/or components, tools and equipment and applying practical techniques and processes to make the storage system for tools and equipment

For example:The learner used their portfolio notes, drawings and research of existing solutions to evaluate possible materials and components for their prototype; selected a range of materials for constructing the racks, and talked to their stakeholder/s about which style they preferred; chose a range of different-shaped stands and presented these to the stakeholder/s, who preferred the look and feel of wall-mounted brackets attached to the existing walls; tested different sized metal bars to see which was the strongest and most suitable to support a range of tools; tried different drills, drill bits and fasteners with a sample of the framework metal to work out which would be most suitable for fixing the components to the wall in a way that was stable, safe for the workers to use and tidy to look at; and researched possibilities for welding the frame of the tool racks. Photographs and annotations showed results from trialling MIG and TIG welding. Discussions with the assessor/educator and an engineer confirmed that MIG welding would enable the quality of outcome needed and would be within their ability.* synthesising evidence from ongoing testing and stakeholder feedback to inform the making and trialling of the storage system for tools and equipment

For example:*The first frame materials we chose were not suitable so I returned to my stakeholder to discuss other possibilities. We selected several other options that we had looked at in my original trialling. I costed these and went back to the stakeholder and my assessor/educator with the results. Between the three of us, we agreed on one to use in the prototype. I intended to have the frame galvanised but the cost was too great, so I have decided in consultation with the stakeholder to use a paint-on cold galvanised paint then finish with an “anti-rust” paint as a top coat. This will mean more maintenance over time but has a good cost benefit.** undertaking prototyping to gain specific evidence of the storage system for tools and equipment’s fitness for purpose in its intended physical and social environment

For example:The learner and stakeholder/s tested the tool racks once they had been secured to the wall and found that all the intended tools fit the racks and were held securely and safely. They were readily accessed by the farm workers yet unobtrusive from the front of the shed.* justifying any decisions to accept and/or modify the storage system for tools and equipment

For example:*I installed the racks on a wall outside the shed. On testing with a range of tools, I found that I had to make a custom rack for a few specialised tools and provide a locking mechanism to improve the safety of storage for some others.**In the end I was able to store all of the tools securely and safely as the rack was stable and easily accessed by the workers. Because I had thoroughly researched and trialled the materials, techniques and processes and could justify my decisions the farmer was happy with the outcome.**Throughout the making, I tested for quality workmanship and used the results to modify techniques and processes as required. A locked area was also provided for some expensive tools that are not used very often.**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.