**NZQA**

**Approved**

Achievement standard: 91051 Version 3

Standard title: Demonstrate understanding of how different disciplines influence a technological development

Level: 1

Credits: 4

Resource title: A meeting of minds

Resource reference: Generic Technology VP-1.8 v2

Vocational pathway: Construction and Infrastructure

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| Quality assurance status | These materials have been quality assured by NZQA. NZQA Approved number A-A-02-2015-91051-02-7363 |
| 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: 91051

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Vocational pathway: Construction and Infrastructure

Learner instructions

# Introduction

This assessment activity requires you to demonstrate your understanding of how different disciplines influence an on-site wastewater treatment system.

You are going to be assessed on how comprehensively you demonstrate understanding of how knowledge, practices and collaborations from a range of disciplines (i.e. mechanical, engineering, structural design, physics) influence the development of an on-site wastewater treatment system.

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

You have been asked to report about the development of an on-site wastewater treatment system near an environmentally sensitive area (e.g. near a lakefront or coastal reef), and how the collaboration between experts contributed towards this.

You will be expected to discuss how different disciplines have impacted on the quality of the design and functionality of an on-site wastewater treatment system development.

Begin by looking at a specific on-site wastewater treatment system and identify:

* The knowledge and practices drawn from disciplines that have influenced the development. This could include:
	+ chemistry (e.g. chemicals which assist the breakdown)
	+ engineering (e.g. hydraulics – water in motion)
	+ biology (e.g. anaerobic and aerobic bacteria)
	+ physics (e.g. cascade macerating pump)
	+ mathematics (e.g. sizing relative to household size)
	+ botany (e.g. evapotranspiration rates of different systems)
	+ geology (e.g. soil science).
* How individuals from these disciplines collaborated during the development, for example biologists who were looking at anaerobic and aerobic bacteria collaborated with chemists, whose knowledge of chemicals, helped foster an understanding of reactions involved in processing waste.

## Report

Complete your report. This could be written or presented in the first person as a consultant or as an account in the third person.

Your report needs to:

* identify the knowledge and practices drawn from two or more disciplines that influenced the development of the on-site wastewater treatment system
* consider the role of the individuals associated with these different disciplines
* identify how the collaboration of these people interact during the development of the on-site wastewater treatment system, for example how these people bring together different knowledge bases and practices
* discuss the impact this knowledge, practices and collaboration has on the development of an on-site wastewater treatment system.

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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 present a report that demonstrates comprehensive understanding of how different disciplines influence the development of an on-site wastewater treatment systems development.

# Conditions

Learners could work individually or in groups to gather and analyse their evidence. The final work will be individually assessed. Decide on the format of the final presentation, for example a written report, computer slide show, brochure or video. You may wish to take learner preferences into account in deciding on the format.

# Resource requirements

Learners require access to the internet for research.

# Additional information

Environment Bay of Plenty – Dealing with your wastewater (pp. 11–13, 25–36): <http://www.boprc.govt.nz/media/30917/Plan-2006-OSETPlanGuide2006.pdf>

Wanganui City Council sewerage issues: <http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10859933>

Wastewater treatment systems – Engineering and design:

<http://www.build-on-prince.com/waste-water-treatment-systems.html>

<http://www.build-on-prince.com/#sthash.xdoKaMqP.dpbs>

<http://www.mwhglobal.com/services/engineering-and-design/wastewater-treatment/>

Presenting the report as a Prezi presentation: [http//prezi.com](http://www.prezi.com)

A Technology Online report may be helpful:
<http://technology.tki.org.nz/>

## <http://technology.tki.org.nz/Case-Studies/Technologists-Practice-case-studies-Introduction/Hard-Materials/A-new-Carter>

## Other possible contexts for this vocational pathway

* solar water heating
* roof gardens (e.g. vegetated roofing solutions)
* roofing material, pre-painted roofing incorporated with photovoltaic cells.

# Assessment schedule: Generic Technology 91051 – A meeting of minds

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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 how different disciplines influence the development of an on-site wastewater treatment system by:* identifying the knowledge and practices drawn from the disciplines

For example:The learner identifies chemist knowledge assisting with the breakdown of waste, and biologist practices to show the behaviour of anaerobic and aerobic bacteria. * identifying how individuals from the disciplines collaborated during the development of an on-site wastewater treatment system

For example:The learner identifies chemists and biologists as key people who worked together during the development of an on-site wastewater treatment system.* describing the impact of knowledge, practices and collaboration on the on-site wastewater treatment system

For example:The learner describes how all the people involved in the development of the wastewater treatment system had different expertise or knowledge bases. *The biologists knew how the anaerobic and aerobic bacteria behaved to process waste and how they might react to each other. The chemists added knowledge of chemicals used in the wastewater treatment process.**The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates in-depth understanding of how different disciplines influence the development of an on-site wastewater treatment system by:* identifying the knowledge and practices drawn from the disciplines

For example:The learner identifies chemist knowledge assisting with the breakdown of waste, and biologist practices to show the behaviour of anaerobic and aerobic bacteria. * identifying how individuals from the disciplines collaborated during the development of an on-site wastewater treatment system

For example:The learner identifies chemists and biologists as key people who worked together during the development of an on-site wastewater treatment system.* explaining how knowledge, practices and collaboration impacted the development of an on-site wastewater treatment system

For example:The learner explains how all the people involved in the development of the wastewater treatment system had different expertise or knowledge bases. The learner explains in-depth how biologists knew how the anaerobic and aerobic bacteria behaved to process waste and how they might react to each other, and the chemists added their knowledge of chemicals used in the wastewater treatment process.*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates comprehensive understanding of how different disciplines influence the development of an on-site wastewater treatment system by:* identifying the knowledge and practices drawn from the disciplines

For example:The learner identifies chemist knowledge assisting with the breakdown of waste, and biologist practices to show the behaviour of anaerobic and aerobic bacteria. * identifying how individuals from the disciplines collaborated during the development of an on-site wastewater treatment system

For example:The learner identifies chemists and biologists as key people who worked together during the development of an on-site wastewater treatment system.* discussing how knowledge, practices and collaboration interacted to impact on the development of an on-site wastewater treatment system

For example:The learner discusses all the people involved in the development of a wastewater treatment system and how their different expertise or knowledge bases interacted: *Although biologists knew how the behaviour of anaerobic and aerobic bacteria might react to each other, they needed a chemist’s knowledge of what chemicals may be used in the wastewater treatment process to fully understand the impact these bacteria could have on the waste process. This was added to an engineer’s knowledge of the physics involved within a cascade-macerating pump, involving hydraulics and water in motion, to develop the most efficient wastewater treatment system for the site.*The learner discusses how close collaboration between different disciplines also allowed scientists and mathematicians, who were looking at evapotranspiration rates of different wastewater systems,to solve problems arising within sizing relative to the site’s size, quickly.*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.