**NZQA**

**Approved**

Achievement standard: 90952 Version 3

Standard title: Demonstrate understanding of the formation of surface features in New Zealand

Level: 1

Credits: 4

Resource title: Local features

Resource reference: Science VP-1.13 v2

Vocational pathway: Services Industries

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| Quality assurance status | These materials have been quality assured by NZQA.  NZQA Approved number A-A-02-2015-90952-02-7303 |
| 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: 90952

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Resource reference: Science VP-1.13 v2

Vocational pathway: Services Industries

Learner instructions

# Introduction

This assessment activity requires you to demonstrate understanding of the formation of surface features in the Canterbury area.

You are going to be assessed on how comprehensively you demonstrate understanding of the formation of surface features in the Cass Basin area. You need to show that you can collect and process information by producing a display that explains thoroughly how the internal and/or external processes have affected how the landscape looks today.

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 Cass Basin area is a geological area in New Zealand of world significance.

In your work as a trainee outdoor recreation guide, people you meet often ask you about the geology of the Cass Basin area. You have decided to build a display at guide headquarters to highlight the local surface features of the Cass Basin area.

## Research

Surface features are the features of the landscape that can be seen in the Cass Basin area. These include limestone formations, caves, landslides, glacial features, mountain ranges, and fault lines.

Internal and/or external processes that have formed the surface features may include:

* Internal geological processes, such as:
  + the formation of volcanoes or mountains due to collisions between the Pacific Plate and the Australian Plate
  + lateral movement along tectonic plate boundaries
  + the formation of volcanoes by hot spots
  + movement along fault lines, such as folding, faulting, and uplift
  + land movement due to earthquakes.
* External processes that occur on the surface of the Earth, such as erosion and weathering caused by wind, ice, water, animal and plant action, human action, and changes in sea levels.

Collect information that explains how the internal and/or external processes have formed the features of the Cass Basin area.

You could undertake a field trip to collect and record data by:

* examining the surface features of the area
* recording what you observe; sketches, maps, and photographs are good ways of recording observations.

Research the internal and/or external processes involved in the formation of surface features in the Cass Basin area using secondary sources as well, such as the internet, geological and nuclear sciences publications, textbooks, and geology books.

You could also interview local people who have experienced changing surface features as a result of these processes, and/or contact your local rock and mineral club to access local experts for this area’s geology.

## Build a display for your guide headquarters

Using the information you have gathered, build a display that shows your comprehensive understanding of the formation of surface features in the Cass Basin area by:

* identifying and describing the surface features
* explaining detailed links between the surface features, and the internal and/or external processes that led to the formation of these surface features.

Include in your display:

* evidence from your research and field trip notes
* visual representations such as models, photos or diagrams to support your explanation.

# Resources

Useful websites include:

Geological Society of New Zealand: <http://www.gsnz.org.nz/>

University of Otago Geology Department: <http://www.otago.ac.nz/geology/>

University of Canterbury Geology Department: <http://www.geol.canterbury.ac.nz/>

Victoria University Geology Department: <http://www.victoria.ac.nz/geo/geology/index.html>

Waikato University, Earth Science: <http://earth.waikato.ac.nz/>

Useful rock and mineral clubs’ websites include:

Canterbury Mineral and Lapidary Club: <http://www.cmlclub.org.nz/>

Otago Rock and Mineral Club: <http://sites.google.com/site/theotagorockandmineralclub/>

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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 task requires learners, who are outdoor recreation guides, to demonstrate comprehensive understanding of the key features of the Cass Basin area. They will set up a display in their local tour guide headquarters that incorporates their field trip notes and research, and demonstrates their comprehensive understanding of the formation of surface features in the Cass Basin area.

# Conditions

Learners will produce their display independently, and will be individually assessed.

Decide on the format of the display; it could include written explanations, a PowerPoint presentation, a video and/or a model. You may wish to take learners’ preferences into account in deciding on the format.

# Resource requirements

Internet, geological and nuclear sciences publications, textbooks, and geology books.

# Additional information

The assessor/educator should choose a site that is relevant to learners, and where they could easily go on a field trip, for example learners in Auckland could study volcanoes, learners in Dunedin could observe the Dunedin volcano on the Otago Peninsula etc.

Assessors/educators could lead the field trip if it is their area of expertise, or ask a local expert to guide it.

Assessors/educators may wish to develop a field trip log that learners could complete during the field trip. Headings could include location, description of surface features, and internal and/or external processes (that formed the surface feature).

# Assessment schedule: Science 90952 – Local features

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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 the formation of surface features of the Cass Basin area by:   * describing how at least two surface features of the Cass Basin area were formed * describing a geological process for each surface feature   Understanding is supported by visual representations and relevant data  For example:  The learner describes the internal processes for the formation of landscape features in the Cass Basin - Mountain Formation: *The interaction of the Alpine Fault between the Pacific and Australian Plates has produced the Southern Alps which surround the Cass Basin*.  The learner describes the external processes for the formation of landscape features in the Cass Basin - Glacial erosion: *Moraines of old glacial advances are found in the Cass Basin and were the result of an ice age in the geological past.*  *The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates in-depth understanding of the formation of surface features of the Cass Basin area by:   * explaining in-depth how at least two surface features of the Cass Basin area were formed * explaining geological processes for each surface feature by linking the processes to the final surface feature   Understanding is supported by visual representations and relevant data  For example:  The learner explains the internal process for the formation of landscape features in the Cass Basin - Mountain Formation: *The interaction of the Alpine Fault between the Pacific and Australian Plates has produced the Southern Alps which surround the Cass Basin. The basin is a down faulted block which links to the Arthurs Pass off shoot fault system to the Alpine Fault.*  The learner explains the external process for the formation of landscape features in the Cass Basin - Glacial erosion: *Moraines of old glacial advances are found in the Cass Basin. They show evidence of 3 cold temperature times in the last 100 000 years. Erosion on the mountains is caused by freeze thaw processes and the basin is drained by the Waimakariri River.*  *The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates comprehensive understanding of the formation of surface features of the Cass Basin area by:   * explaining in-depth how at least two surface features of the Cass Basin area were formed * explaining thoroughly the geological processes for each surface feature by the use of reasoned explanations, and thorough linking of the processes to the final surface feature observed today   Understanding is supported by visual representations and relevant data  For example:  The learner explains thoroughly the internal process for the formation of landscape features in the Cass Basin - Mountain Formation: *The interaction of the Alpine Fault between the Pacific and Australian Plates has produced the Southern Alps which surround the Cass Basin. The Pacific Plate is being thrust over the Australian Plate and the Cass area is being uplifted. The basin is a down faulted block which links to the Arthurs Pass off shoot fault system to the Alpine Fault. This Arthurs Pass Fault has caused many major earthquakes and in 1929 a M7.1 event caused major landslides in the area with the largest being in the Otahake Valley, where 900M of rock fell off one of the mountains, just north of Arthurs Pass.*  The learner explains thoroughly the external process for the formation of landscape features in the Cass Basin - Glacial erosion: *Moraines of old glacial advances are found in the Cass Basin. They show evidence of 3 cold temperature times in the last 100 000 years. The youngest at 12-16 000 years ago dammed a lake which can be seen on the Northern side of the Waimakariri River. There is evidence of a catastrophic draining of this lake when the river cut into it. Erosion on the mountains is caused by freeze thaw processes and the basin is drained by the Waimakariri River. This erosion is wearing the land down at an average of 2mm per year but uplift is greater than this so the mountains are gaining in height over geological time. One key erosional factor here is major earthquakes with the Cass Basin being very close to the Alpine Fault. This accounts for the large number of landslides mapped in this area.*  *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.