



National Certificate of Educational Achievement  
TAUMATA MĀTAURANGA Ā-MOTU KUA TĀEA

## Internal Assessment Resource

### Science Level 1

This resource supports assessment against:

Achievement Standard 90955

Investigate an astronomical or Earth science event

**Resource title: When Christchurch Shook**

4 credits

This resource:

- Clarifies the requirements of the standard
- Supports good assessment practice
- Should be subjected to the school's usual assessment quality assurance process
- Should be modified to make the context relevant to students in their school environment and ensure that submitted evidence is authentic

Date version published by Ministry of Education	November 2012 Version 2 To support internal assessment from 2013
Quality assurance status	These materials have been quality assured by NZQA. NZQA Approved number A-A-11-2012-90955-01-4151
Authenticity of evidence	Teachers must manage authenticity for any assessment from a public source, because students may have access to the assessment schedule or student exemplar material.  Using this assessment resource without modification may mean that students' work is not authentic. The teacher 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.

## Internal Assessment Resource

**Achievement Standard Science 90955:** Investigate an astronomical or Earth science event

**Resource reference:** Science 1.16 B v2

**Resource title:** When Christchurch Shook

**Credits:** 4

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### Teacher guidelines

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The following guidelines are supplied to enable teachers to carry out valid and consistent assessment using this internal assessment resource.

Teachers need to be very familiar with the outcome being assessed by Achievement Standard Science 90955. The achievement criteria, explanatory notes and conditions of assessment contain information, definitions, and requirements that are crucial when interpreting the standard and assessing students against it.

### Context/setting

This assessment activity requires students to communicate key stages of the Christchurch earthquake in September 2010, by thoroughly explaining information and data that they have collected, selected, and processed. The key stages of the earthquake can be a selection from the many stages of the event, depending on the focus that you and/or your students decide.

To guide students' collection of data and information, provide a list of eight to twelve focus questions. These questions may arise from class discussion, or be generated by groups of students. The questions need to be appropriate to Curriculum Level 6, and students need to be able to answer them using readily available information. An example list is provided under additional information below.

Provide students with opportunities to learn about the causes of earthquakes in general and the Christchurch earthquake in particular, before they begin the task. Students will need to know about plate tectonic movement in this area of New Zealand, and what a fault line, an epicentre, and the different types of earthquake waves are.

### Conditions

This assessment task will take place over four to five weeks of in-class and out-of-class time.

Students may work individually or in groups of two or three to collect, select, and process relevant information, but will work individually to present their information.

### Resource requirements

Access to computers is desirable but not essential.

You will need to provide students with some starter websites or printed resources. Students could select from a range of reputable websites or reputable printed resources. Students may also undertake their own research.

A list of reputable websites that may be helpful is provided in Teacher Resource A. A selection of these addresses can be made available to students. Alternatively, if the school does not have ready access to the Internet, photocopies of the printed articles can be given to students.

### **Additional information**

You could require students to:

- present their final processed information in their own words
- hand in all notes, copies of sources of information, rough drafts, and resources used. These may be on paper or recorded electronically.

### ***Focus questions***

Adapt this example list of focus questions to suit your context:

- What happened underground to cause the Christchurch earthquake?
- When did this particular fault last move, and how can scientists decide this?
- How long was the fault?
- How did scientists find this information out?
- How much ground movement has there been?
- What caused the ground to shake so strongly?
- How is shaking recorded?
- Why did people hear a loud rumble before the shaking began?
- What causes aftershocks?
- Roughly, how many aftershocks have there been in Canterbury?
- Why don't the aftershocks occur in the same place?
- What is liquefaction?
- What damage did liquefaction cause?
- Why did liquefaction cause so much damage in some areas?
- Why did so many buildings survive the earthquake?
- Why didn't a tsunami occur?

## Teacher Resource A: Websites

You could provide a selection of these addresses to students. Alternatively, if the school does not have ready access to the Internet, give students photocopies or printouts of the information.

### Links

Highly Allochthonous:

<http://all-geo.org/highlyallochthonous/2010/09/tectonics-of-the-m7-earthquake-near-christchurch-new-zealand/>

Christchurch Quake Map:

<http://www.christchurchquakemap.co.nz/>

GeoNet:

<http://www.geonet.org.nz/earthquake/quakes/3366146g.html>

<http://www.geonet.org.nz/earthquake/quakes/3366146g-maps.html>

<http://www.geonet.org.nz/earthquake/historic-earthquakes/top-nz/quake-13.html>

Stuff:

<http://www.stuff.co.nz/national/4096802/Canterbury-earthquake-really-three-quakes>

<http://www.stuff.co.nz/national/4425463/Major-quake-had-been-expected>

New Zealand Herald:

[http://www.nzherald.co.nz/science/news/article.cfm?c\\_id=82&objectid=10671602](http://www.nzherald.co.nz/science/news/article.cfm?c_id=82&objectid=10671602)

[http://www.nzherald.co.nz/nz/news/article.cfm?c\\_id=1&objectid=10671382](http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10671382)

[http://www.nzherald.co.nz/nz/news/article.cfm?c\\_id=1&objectid=10671192](http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10671192)

[http://www.nzherald.co.nz/science/news/video.cfm?c\\_id=82&gal\\_objectid=10671602&gallery\\_id=113754](http://www.nzherald.co.nz/science/news/video.cfm?c_id=82&gal_objectid=10671602&gallery_id=113754)

[http://www.nzherald.co.nz/science/news/article.cfm?c\\_id=82&objectid=10671607](http://www.nzherald.co.nz/science/news/article.cfm?c_id=82&objectid=10671607)

GNS Science:

<http://www.gns.cri.nz/Home/News-and-Events/Media-Releases/Most-damaging-quake-since-1931/Canterbury-quake/Darfield-Earthquake>

University of Canterbury:

<http://www.geol.canterbury.ac.nz/earthquake/index.shtml>

Earthquake information:

<http://earthquake.urlpetty.com/category/earthquake-video/>

Sciblogs:

<http://sciblogs.co.nz/shaken-not-stirred/tag/liquefaction/>

New Zealand Parliament:

<http://www.parliament.nz/en-NZ/ParlSupport/ResearchPapers/f/a/8/00PLEcoRP10071-Canterbury-earthquake-facts-and-figures.htm>

## Internal Assessment Resource

**Achievement Standard Science 90955:** Investigate an astronomical or Earth science event

**Resource reference:** Science 1.16B v2

**Resource title:** When Christchurch Shook

**Credits:** 4

Achievement	Achievement with Merit	Achievement with Excellence
Investigate an astronomical or Earth science event.	Investigate, in-depth, an astronomical or Earth science event.	Investigate, comprehensively, an astronomical or Earth science event.

### Student instructions

#### Introduction

On Saturday 4 September 2010, at 4.35 am, a magnitude 7.1 earthquake hit Christchurch. The earthquake was caused by movement of the land along a fault line beneath the Canterbury plains. The city was extensively damaged. Luckily, no human lives were lost.

Teacher note: You could adapt this to suit later earthquakes, such as 22 February 2011. Note that lives were lost in that event.

This assessment task requires you to collect, select, and process data and information about key stages of the Christchurch earthquake, and explain the earthquake and its effects.

Teacher note: Give your students specific questions that will focus their investigation appropriately.

You can present your findings in a written report, a poster, a PowerPoint presentation, or an oral presentation.

You may gather, select, and process your data individually or in groups of two or three. You will present your findings individually.

You will have four to five weeks of in-class and out-of-class time to complete this task.

You will be assessed on how well you are able to investigate and explain the earthquake and its effects.

## **Task**

Your teacher will give you focus questions. Use these to guide your work.

### ***Collect, select, and process information***

Collect data and information about key stages of the Christchurch earthquake that will answer the focus questions. Your teacher will provide you with website and/or printed resources.

Select which parts of the data and information you will use to answer each focus question: highlight, annotate, underline, and/or take notes from the material you collect.

Process your selected data and information: bring together the relevant data and information so that you can answer each focus question.

Keep all your rough notes and copies of sources of information. These may be paper copies kept in a folder or electronic files.

Hand these in with your final work.

### ***Present your information***

Decide on the form of your work. It could be a written report, a poster, a PowerPoint presentation, or an oral presentation.

Present your final processed information in your own words.

In your presentation:

- describe key stages of the event
- describe and explain the key stages by linking relevant stages together
- explain thoroughly the links between your selected key stages. For example, explain why one stage followed another. Your explanation may involve elaborating, justifying, relating, evaluating, comparing and contrasting, and analysing.

Record the sources of data, images, diagrams (not drawn by you), and information in a traceable format.

Provide references as:

- a bibliography that provides full web addresses for Internet sources and full referencing of books and journals used

and/or

- footnotes or references within the text for:
  - diagrams, tables of data, or images
  - direct quotes (no more than two sentences in length)
  - ideas that are not your own, even if they are in your own words.

## Assessment schedule: Science 90955 When Christchurch Shook

Evidence/Judgements for Achievement	Evidence/Judgements for Achievement with Merit	Evidence/Judgements for Achievement with Excellence
<p>The student investigates an Earth science event. The student:</p> <ul style="list-style-type: none"> <li>• collects, selects, and processes secondary data and information</li> <li>• provides evidence in the form of rough notes, copies of sources of information (on paper or electronically), and their final report</li> <li>• communicates the processed data and information by describing key stages of the event</li> <li>• records their sources in a traceable format.</li> </ul>	<p>The student investigates, in-depth, an Earth science event. The student:</p> <ul style="list-style-type: none"> <li>• collects, selects, and processes secondary data and information</li> <li>• provides evidence in the form of rough notes, copies of sources of information (on paper or electronically), and their final report</li> <li>• communicates the processed data and information by describing and explaining key stages of the event</li> <li>• records their sources in a traceable format.</li> </ul>	<p>The student investigates, comprehensively, an Earth science event. The student:</p> <ul style="list-style-type: none"> <li>• collects, selects, and processes secondary data and information</li> <li>• provides evidence in the form of rough notes, copies of sources of information (on paper or electronically), and their final report</li> <li>• communicates the processed data and information by describing and explaining key stages of the event, and explaining thoroughly links between key stages of the event. This may involve elaborating, applying, justifying, relating, evaluating, comparing and contrasting, and analysing</li> <li>• records their sources in a traceable format.</li> </ul>

Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria in the Achievement Standard.