

Achievement Standard

Subject Reference		Geography 1.8			
Title		Apply spatial analysis, with direction, to solve a geographic problem			
Level	1	Credits	3	Assessment	Internal
Subfield	Social Science Studies				
Domain	Geography				
Status		Registered		Status date	30 November 2010
Planned review date		31 December 2018		Date version published	20 November 2014

This achievement standard involves applying spatial analysis, with direction, to solve a geographic problem.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Apply spatial analysis, with direction, to solve a geographic problem.	Effectively apply spatial analysis, with direction, to solve a geographic problem.	Comprehensively apply spatial analysis, with direction, to solve a geographic problem.

Explanatory Notes

This achievement standard is derived from the second Level 6 Geography achievement objective, of *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, and is related to material in the *Teaching and Learning Guide for Geography*, Ministry of Education, 2010 at <http://seniorsecondary.tki.org.nz/index.php/Social-sciences/Geography>

Apply spatial analysis typically involves:

- collecting spatial data relevant to the geographic question or problem
- completing simple manipulations of the spatial data to produce a layout related to the question or problem
- describing a valid answer or solution based on the manipulations

Effectively apply spatial analysis typically involves:

- collecting sufficient spatial data to address the geographic question or problem
- completing simple manipulations of the spatial data to produce an accurate layout related to the question or problem
- explaining a valid answer or solution, based on the manipulations, that is supported by evidence

Comprehensively apply spatial analysis typically involves:

- fully explaining a valid answer or solution, based on the manipulations, that is supported by detailed evidence

Spatial analysis involves collecting, manipulating and presenting spatial data for which direction will be given.

With direction refers to being given direction about spatial analysis including the collection, manipulation and presentation of spatial data.

Geographic problem refers to a question or problem (real or simulated) relating to aspects of the natural and/or cultural environment(s), and which includes a spatial dimension.

Collecting spatial data refers to either collecting data with a spatial component in the field or accessing spatial data from other sources.

Layout refers to some kind of map but may also include other visuals such as tables, graphs and images.

Simple manipulations refer to data transformations such as:

- measuring
- layering
- changing the symbols used
- sorting and editing a table
- querying the map
- using coordinate systems
- displaying a graph based on the map

Geospatial techniques and/or technology should be used to manipulate and present the spatial data in ways that support problem solving.

Conditions of Assessment related to this achievement standard can be found at <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>

Quality Assurance

Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.

Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference	0233
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When the ground shook: The Canterbury Earthquakes

Achievement Standard Geography 91014: Apply spatial analysis, with direction, to solve a geographic problem

Resource reference: Geography 1.8

Credits: 3

Teacher guidelines

The following guidelines are designed to ensure that teachers can 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 Geography 91014. The achievement criteria and the explanatory notes 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 comprehensively apply spatial analysis, with direction, to solve a geographic problem. Students will create spatial data about the 2010 – 2012 Canterbury earthquakes. Manipulation of the data will enable a WebMap to be created and shared for this lesson. Students are also to write a detailed report for the Regenerate Christchurch on the effects of the Canterbury Earthquake.

The questions in this assessment activity are intended to guide students through the material needed for their final report.

This activity is based on information collected 2010 and 2011 in Canterbury during and after the devastating Canterbury Earthquakes.

You can adapt this assessment activity to use with other Civil Defence scenarios or extreme natural hazards. If you choose to modify the activity, ensure that you modify the student instructions and assessment schedule accordingly.

Conditions

This assessment activity will take place over two weeks of class time.

Students will work individually to create spatial data during class time. Students will also work individually on their WebMap, Layout and written analysis, and will be assessed individually on these.

Resource requirements

For spatial data collection/creation, and analysis, students will require the information provided in this assessment resource. Students can use this to create place marks and polygons, and add layers to the view.

- Students will require access to a computer with internet access, a Web browser (e.g. Internet Explorer, Mozilla Firefox, Google Chrome)** and an Esri ArcGIS Online school subscription account user.

**Please ensure that pop ups are not blocked for the arcgis.com site.

If students' work is to be printed, a colour printer will produce a more effective result than black-and-white printing.

The following websites might be useful sources of information:

- GeoNet earthquake records <https://quakesearch.geonet.org.nz/>
- GeoNet recent earthquakes <http://www.geonet.org.nz/earthquake/>
- Regenerate Christchurch <http://www.regeneratechristchurch.nz/>
- Canterbury Earthquake <https://nzhistory.govt.nz/keyword/canterbury-earthquake>
- EQC Canterbury Earthquake <https://www.eqc.govt.nz/canterbury>

Prior to this activity, provide an explanation of what the Regenerate Christchurch is and what the organisation does. It is also necessary to teach the recognition of land-use patterns from aerial imagery.

This activity would work well as part of a topic examining extreme natural events, focussing on earthquakes. Prior knowledge of these would be beneficial. If this activity is *not* linked to a study of extreme natural events, pre-teaching about the effects of earthquakes is required; in particular the effects of earthquakes on land and people.

Guide students in becoming familiar with ArcGIS Online and understanding how to create and manipulate data.

Students will undertake the following tasks using ArcGIS Online:

- Zooming to places
- Creating place marks using appropriate symbols, colours, and size
- Creating polygons
- Measuring distances
- Creating pop-ups.

Guide students in setting up a folder in their own workspace in which to save the table and report they create. They will also need to know how to save and share a WebMap in ArcGIS Online. Refer to [ArcGIS Online help](#) for assistance.

Requirements:

- Internet access
- Web browser (e.g. Internet Explorer, Mozilla Firefox, Google Chrome)**
- A username and password for your schools ArcGIS Online account

**Please ensure that pop ups are not blocked for the arcgis.com site.

Introduction:

This assessment activity requires you to **comprehensively apply spatial analysis**, with direction, to solve a geographic problem.

Between 2010 and 2012 the Canterbury region experienced a series of earthquakes some producing devastating results. Geologists have recorded these earthquakes.

Regenerate Christchurch is an organisation set up by the New Zealand Government to lead recovery work in the Canterbury Region following the earthquakes of 2010 and 2011. Regenerate Christchurch wants to produce material to inform the wider NZ population of the **effects** and **significance** of the earthquakes. They want this material to be easy to understand and available for organisations such as newspapers, internet writers to use.

Imagine that you have the job of producing a report for Regenerate Christchurch on the effects of the Canterbury Earthquake. Your task is to:

- Work through the exercise using ArcGIS Online
- Write a process summary outlining what spatial analysis tools you have used
- Produce a layout that includes maps/images to show the effects and significance of the earthquakes that occurred in 2010 and 2011 on the Canterbury Region
- Write a report about the effects of the earthquakes on people, and the built environment of the Canterbury Region.

You will work individually to produce several maps/images that will make up a layout on one side of an A4 or A3 piece of paper depending on the page size print out your school printer can produce.

You will be assessed on how well you are able to apply spatial analysis to solve this geographic problem.

You will share your map with your teacher and hand in your layout and your written report.

Your final work is due on:

Instructions

The questions are to help you analyse your maps. For merit and excellence you should consider other questions and gain other information from your spatial analysis. You should also consider other ways of collecting and presenting the information in your WebMap by developing the basic skills included here. You may discuss your ideas with your teacher.

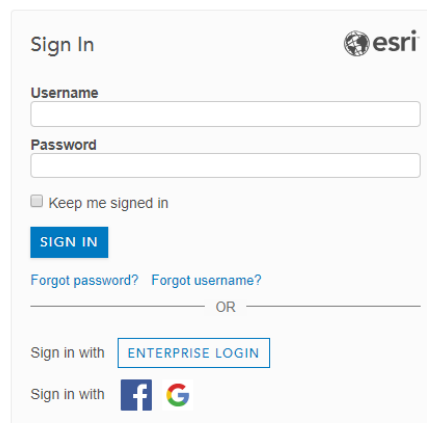
You may also consider other information you could add to your map and other spatial tools you could use to analyse the data in greater depth. For example you could make a comparison with other major earthquakes in NZ.

Remember you are trying to provide an interactive visual solution for Regenerate Christchurch that allows people to interact with your map to understand the effects of the 2010-2011 earthquakes on people and the environment.

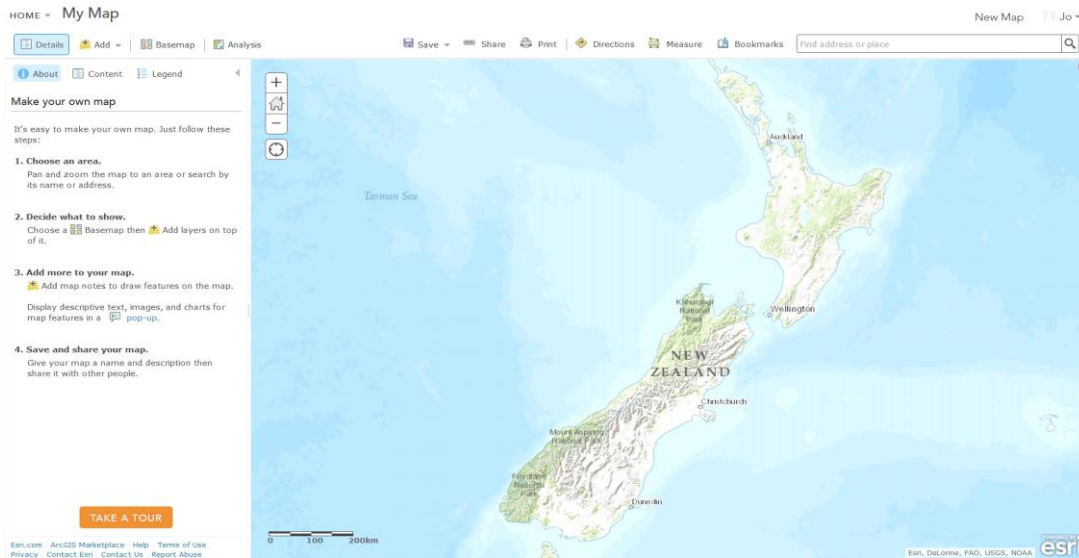
Setup

Task A: Setup ArcGIS Online

- Open ArcGIS Online (<https://www.arcgis.com/home/>).
- Sign In to ArcGIS Online using the account details provided by your teacher.

The image shows the ArcGIS Online 'Sign In' page. At the top right is the Esri logo. Below it, the text 'Sign In' is displayed. There are two input fields: 'Username' and 'Password'. Below the password field is a checkbox labeled 'Keep me signed in'. A blue 'SIGN IN' button is positioned below the checkbox. Underneath the button are two links: 'Forgot password?' and 'Forgot username?'. A horizontal line with the word 'OR' in the center separates these from the 'Sign in with' section. This section includes a button labeled 'ENTERPRISE LOGIN' and two social media icons (Facebook and Google) with the text 'Sign in with' to their left.

- Click on map to open a new map.



- Change the Basemap to *World Imagery*.

Saving your map.

- Click the Save button and then select save from the drop down menu.
- Fill in the Save Map dialog that appears with the appropriate information. You should prefix your title with your name; tags are words that are used to search for your map.

×

Save Map

Title:

Enter a title for the map.

Tags:

Add tag(s)

Summary:

Description of the map.

Save in folder:

joheitger21

▼

SAVE MAP

CANCEL

- Click Save Map.

Tip: Remember to click Save before you sign out of ArcGIS Online or close your browser to save all map updates.

Task B: Create a folder

- In your personal drive, create a folder where you can save your data.

Task C: Prepare a document for your layout

- Create three new word documents and save them to the folder you created in Task B using the names of:
 - a. "yourname_earthquake_process_summary"
 - b. "yourname_earthquake_assessment_report"
 - c. "yourname_earthquake_assessment_layout"
- For the "yourname_earthquake_assessment_layout" document change the orientation of the document to landscape, and the page size if you can print at A3 size. This document will be your LAYOUT.
- Save the document.

Collecting Information

Task D: Download earthquake information from the Geonet Site

- Open the following webpage <http://quakesearch.geonet.org.nz/>
- Download and save a csv file containing the earthquakes centred in Canterbury from the start of 2010 to the end of 2012. Make sure the earthquakes you download have a minimum magnitude of five and a maximum magnitude of ten. You will need to click on *build query*, and then select .csv as output format.

You need to use the query builder on the geonet website to create the csv file.
Students if they have done this query correctly should download 32 earthquakes.

- Save the downloaded file in the folder you created in Task B.

Q1 Why did you only download the earthquakes of magnitude 5 and above?

Thinking further: You could select this data in different ways – i.e. select 2010 and 2011 separately. Why might this be helpful on your Webmap?

Task E: Research on-line the effects the earthquake had on land and buildings in Christchurch. You will need this information later.

Keep a record in a word document of:

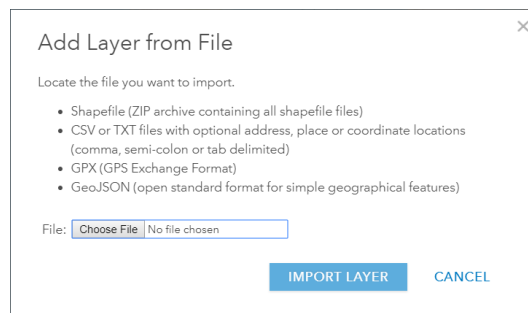
- The location of the effect. Some effects may have been widespread you only need one example though you may refer to the distribution in your description.
- A description and explanation of what happened.
- The URL of a photograph showing the effect.

Manipulating the data

Hint: You should take screen captures to include in your written report as you complete each task

Task F: Create points in your map to represent earthquakes in the Canterbury Region.

- In ArcGIS Online you will add a layer from file to your map, this layer will be the csv file you downloaded in Task D.
 - Click Add
 - Click Add Layer from File from the drop down menu



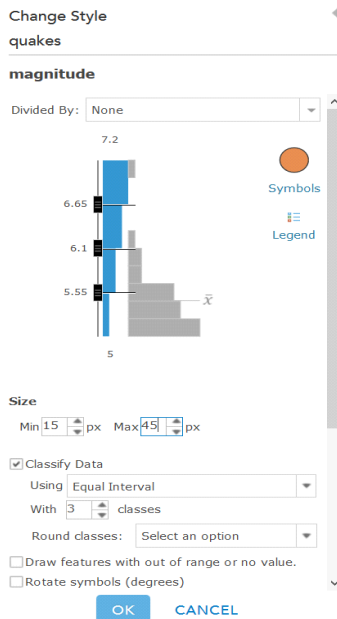
- Browse to your workspace where you saved the file you down loaded from Geonet
- Click Import Layer

If you csv file contains accurate information the location of your map should change to the Canterbury region of New Zealand.

- Change the appearance of the earthquakes so that the smaller magnitude earthquakes are represented by small dots on the map and the larger magnitude earthquakes are represented by larger dots on the map.
 - Click on 'Choose an attribute to show' – change it to *Magnitude*.
 - Click 'Counts and Amounts (Size)' / Options.



- Put a tick in the 'Classify data' check box.
- Change the 'Using' dropdown box to 'Equal Interval'.
- Change the number of classes to 3.
- Set the 'min size' to 15px and the 'max size' to 45px.

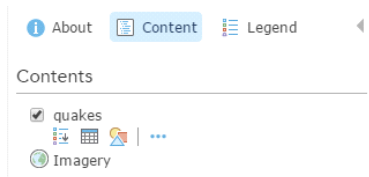


- Click OK and Done.

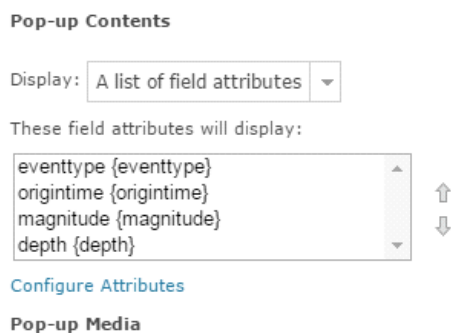
Task G: Create a pop-up for the Canterbury Earthquakes.

A Pop-up is an information box that pops up when you click on a location

- Click on 'Content' on the left-hand side.



- Click on the three dots (...) under the earthquake heading and then click on 'configure pop up'.
- Type Earthquake in the 'Pop-up Title'.
- Click on 'Configure Attributes' and maintain the ticks beside the *eventtype*, *origintime*, *magnitude* and *depth* fields. All other fields should not have a tick beside them.



- Click OK.
- Click the 'Configure attributes' words again.

Configure Attributes

Check the fields you want to display. Select a field to change its alias, order it, and format it.

Display	Field Name	Field Alias
<input checked="" type="checkbox"/>	{eventtype}	eventtype
<input checked="" type="checkbox"/>	{origintime}	origintime
<input type="checkbox"/>	{modificationtime}	modificationtime
<input type="checkbox"/>	{longitude}	longitude
<input type="checkbox"/>	{latitude}	latitude
<input checked="" type="checkbox"/>	{magnitude}	magnitude
<input checked="" type="checkbox"/>	{depth}	depth

Format: 1 decimal place

☐ Use 1000 Separator

OK

CANCEL

- Click on the *Magnitude* field
- Format the *Magnitude* field to have only one decimal place and untick 'Use 1000 Separator'.
- Click OK twice.
- Click any earthquake in the map and have a look at the pop up. If there is more than one earthquake close to the point where you clicked have a look at all the information by using the arrow button(s) at the top of the pop-up

Q2 Can you explain the distribution of earthquakes that you see?

Task H: Create Areas on your map that represent locations of major damage

The location of the original Central City Red Zone / Cordoned Off zone can be found on the Eagle GIS in Schools website below <http://arcg.is/2bomgB2>

- Visit the following web sites familiarise yourself with the areas of Canterbury that sustained major damage (red zoned) in the 2010 – 2012 Canterbury earthquakes.

<http://bit.ly/2zZ6PJc>

<http://bit.ly/2lr3rng>

More detailed maps and information about individual red zones can be found on the following web site.

<http://bit.ly/2zPfixV>

Q3 At <http://bit.ly/2zPfixV> explore the detail of the OTAKARO/AVON RIVER CORRIDOR RESIDENTIAL RED ZONE map. What was a common reason for red zoning these areas of Christchurch?

- In ArcGIS Online, go to Add
- Click on Add Map Notes. Create a layer with a name of Areas of Damage

Add Map Notes

Name:

Template:

Use Map Notes to create basic shapes in a wide variety of applications.

CREATE CANCEL

- Use the Area edit tool create rough polygons around red zoned areas.
- Give each area you create a name and short description.

- Q4** Does the distribution of the earthquakes explain the pattern of damage you have mapped?
- Q5** What other factors could be taken into consideration if you were explaining the major damage that Canterbury sustained?
- Q6** Major damage only occurred as a result of a few of the earthquakes shown in this map. Why was that?
- Q7** What were the earthquakes called that didn't cause major damage?

Task I: Locate Christchurch Cathedral and other significant effects.

- Zoom and pan around the map until you locate the Christchurch Cathedral in the Centre of Christchurch. If you are unfamiliar with Christchurch change the Basemap to Streets and locate Christchurch Cathedral within the city block created by Gloucester, Manchester, Oxford and Hereford Streets.
- Create another layer using *Add Map Notes* with a name of Christchurch Cathedral.
- Place a pushpin at Christchurch Cathedral.
- Give the push pin a title and description considering what the Cathedral meant to Christchurch and the implications of its potential demolition.
- Go to the internet and find a picture of the Christchurch Cathedral before and after the Canterbury earthquakes. If you can't find a shot like this try to locate just an after shot. Save the URL for the image
- Place the URL in the Image URL field. [This URL most finish with a image extension e.g. .jpg, .png, if it is not working the students may need to check for a double http:// at the start of the URL](#)



- Change the symbol colour to something that will show up against a green and grey background.
- Close the 'Edit side window' by clicking 'Edit'.
- Click on 'Content' again to return to the original view.

Q8 Does all the information you added in the above steps appear in your pop-up?

Q9 As you look at the Christchurch Cathedral in the after picture why do you think the decision to demolish the Cathedral was made in 2012?

Q10 Was anyone killed or hurt in the Christchurch Cathedral during the earthquakes that occurred in the Canterbury Region 2010 – 2012?

Q11 Collate eyewitness accounts of the damage sustained to the Christchurch Cathedral and **using your own words** write a paragraph summarising these eyewitness accounts.

Q12 Was anyone killed in other areas of Canterbury during the earthquakes that occurred in the Canterbury Region 2010 – 2012? If so, how many people died and where did they die?

Q13 Find out about the controversy over what should be done with the cathedral

*Using the method above, create pop-ups for other **effects** of the earthquake and annotate these effects.*

Include an image for each effect.

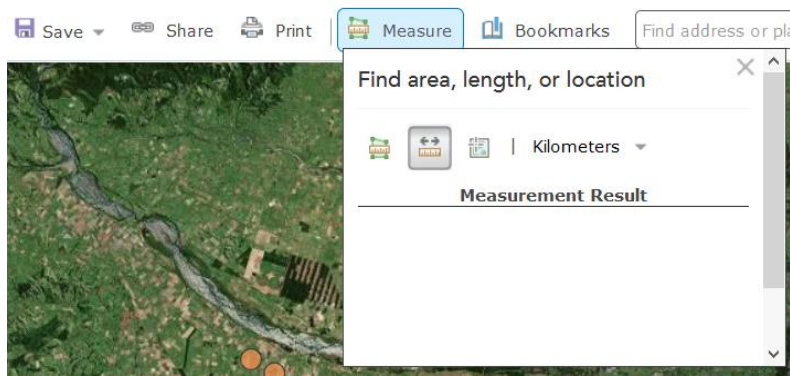
You could use the information you collected in Task E.

You might consider rock falls, liquefaction, and property damage (it might be good to think about the natural environment as well as the cultural/social environment).

Thinking further: you could consider organising the pop-ups so that the pins are different colours as they relate to either 2010 or 2011. You can add other general information even if it has no specific location, you could locate it logically to give more detailed explanations.

Task J: Measure distances between the largest magnitude earthquakes to Christchurch Cathedral.

- Zoom out to an extent that you can see all of the Canterbury earthquakes you added to the map at the beginning on the lesson
- Click Measure close to the top of your screen
- Hover over the icons that appear and choose the one that pops up distance when you hover over it. This is the distance measure tool.



- Change the measure unit to Kilometres
- Click on one of the earthquakes with the biggest circle symbol (earthquake magnitude greater than 6.41) and then use your cursor to double click on your push pin for Christchurch Cathedral. Write down this distance and also the date time and magnitude of the earthquake.
- Repeat this process for the other earthquakes that have the biggest circle symbol.

Q14 Is there any relationship between the distance, date and time of the earthquakes and the damage to the Christchurch Cathedral?

- Close the “Find area, length, or location” menu.

Final Presentation

Task K: Write a process summary

Produce a short document that outlines the spatial analysis tools you have used in this exercise.

This document should be less than a page in length.

Task L: Produce a Layout

Produce one annotated A4 or A3 sized layout that shows your manipulations. Your layout should contain the maps / images that you created throughout this exercise as well as annotations and labels to explain your images briefly.

Your layout should clearly and accurately show (max 4 screenshots):

- The location of Canterbury on a map of New Zealand
- The distribution of earthquakes in the Canterbury region
- A map of significant effects of the 2010-2012 Canterbury earthquakes
- One additional screenshot if you wish

Task M: Write a report

This task requires you to provide a **report** for Regenerate Christchurch showing why a map is a good solution to provide information about the effects of the earthquakes on people. Your report must clearly outline the **effects** of the earthquake on **people**, and the **built environment** of the Canterbury Region.

Ensure that your report is valid, detailed, and based on information that is shown in your layout and the questions you answered throughout this lesson.

Make sure that you:

- refer to your layout specifically (eg. In figure 1, you can see that...)
- include **specific details** in your answer, such as distances, elevations, suburbs, streets, and other relevant statistics.

You may use the internet to gather additional information to include in this report. You should reference this at the end of the report. Try to include some of the Important Geographic Concepts in your answers.

Your report should be typed in Word and be 1 -2 pages in length. **Maximum 1000 words.**

Submit your work by: _____

How will you know the level of your own work in relation to the requirements of the standard?

Achieved

You will *apply spatial analysis* which involves:

- collecting spatial data relevant to the geographic question or problem
 - data from Geonet
 - Red Zone data
 - location of cathedral and distance from the major earthquakes
- completing simple manipulations of the spatial data to produce a layout related to the question or problem
 - adding points
 - drawing polygons – most areas drawn with good accuracy
 - creating a pop-up
- describing a valid answer or solution based on the manipulations.
 - Using both your layout and report you describe effects to locations in Christchurch in relation to location of major earthquakes

Merit

You will *effectively apply spatial analysis* which involves:

- collecting sufficient spatial data to address the geographic question or problem
 - As above
- completing simple manipulations of the spatial data to produce an accurate layout related to the question or problem
 - polygons more accurate and complete
 - create several pop-ups with accurate information showing effects
- explaining a valid answer or solution, based on the manipulations, that is supported by evidence.
- using both your layout and report to explain the effects to location in Christchurch in relation to location of major earthquakes – you use detailed specific evidence gained from analysis of the information in your WebMap and process summary

Excellence

You will *comprehensively apply spatial analysis* which involves:

- fully explaining a valid answer or solution, based on the manipulations, that is supported by detailed evidence.
 - using both your layout and report to fully explain the effects to location in Christchurch in relation to location of major earthquakes – you use detailed specific evidence gained from analysis of the information on your WebMap and process summary

Assessment schedule: Geography 91014 - When the ground shook: The Canterbury Earthquakes

Credits: 3

Name _____ Class _____

Achievement	Achievement with Merit	Achievement with Excellence
Apply spatial analysis, with direction, to solve a geographic problem.	Effectively apply spatial analysis, with direction, to solve a geographic problem.	Comprehensively apply spatial analysis, with direction, to solve a geographic problem.

Overall judgement will be made holistically based on the achievement standard criteria using the following statements as a guide to a valid decision and for student feedback.

Evidence/Judgements for Achievement	Evidence/Judgements for Achievement with Merit	Evidence/Judgements for Achievement with Excellence
<i>Apply spatial analysis, with direction, to solve a geographical problem. The student has:</i>	<i>Effectively apply spatial analysis, with direction, to solve a geographical problem.</i>	<i>Comprehensively apply spatial analysis, with direction, to solve a geographical problem.</i>
<p>Collect spatial data relevant to the geographic question or problem</p> <ul style="list-style-type: none"> • data from Geonet • Red Zone data • location of cathedral and distance from the major earthquakes <p>Completed simple manipulations of the spatial data to produce a layout (Screen capture) related to the question or problem</p> <ul style="list-style-type: none"> • adding points • drawing polygons – most areas drawn with good accuracy • creating a pop-up <p>Described a valid answer or solution based on the manipulations.</p> <ul style="list-style-type: none"> • answer describes effects to locations in Christchurch in relation to location of major earthquakes 	<p>In addition:</p> <p>Has collected sufficient spatial data to address the geographic question or problem completing simple manipulations of the spatial data to produce an accurate layout related to the question or problem</p> <ul style="list-style-type: none"> • polygons more accurate and complete • create several pop-ups with accurate information showing effects <p>Has explained a valid solution, based on the manipulations, that is supported by evidence.</p> <p>Has given an explanation of the effects of the earthquake that has detail</p> <ul style="list-style-type: none"> • discussed effects on people, transport, and the economy. • referred to maps/images. <p>Sample excerpt:</p>	<p>Has in addition:</p> <p>fully explained a valid solution, based on the manipulations, that is supported by detailed evidence. The student has:</p> <p>Given a comprehensive explanation of the effects of the earthquake that includes detailed supporting evidence.</p> <p>Comprehensively discussed effects on people, transport, and the economy</p> <p>Referred in detail to maps/images to provide locational detail</p> <p>Referred to specific place names.</p> <p>Sample excerpt:</p> <p><i>A Webmap provides an interactive solution that links location and patterns and the popups allow extra information to be given solution to show the effects of earthquakes on people. So that people using my Webmap could see the different effects caused by 2010 earthquakes compared with</i></p>



<ul style="list-style-type: none"> referred to maps/images. given comments that are valid but lack detail. <p>Sample excerpt:</p> <p><i>My Layout provides a solution to show the effects of earthquakes on people.</i></p> <p><i>The pattern of earthquakes is seen in Figure 1. Earthquakes affected people, transport and the economy. In the Red Zone a major building affected was the Christchurch cathedral. This can be seen on Figure 2. The whole CBD was cordoned off disrupting transport and business in Christchurch. The final parts of the cordon have only just been removed in 2013.</i></p>	<p><i>A WebMap provides an interactive solution that links location and patterns and the popups allow extra information to be given solution to show the effect so of earthquakes on people.</i></p> <p><i>The pattern of earthquakes is seen in Figure 1. Earthquakes affected people, transport and the economy. In the Red Zone a number of major buildings were affected including the Christchurch cathedral and unfortunately the CTV building where there was a major loss of life. Figure 2 shows a close up of the CTV popup and Figure 3 shows the location of the building pop-ups. The relationship between the location of the major earthquakes in 2010 and 2011 can be seen in Figure 4 which shows the location of the 2011 earthquakes.</i></p>	<p><i>2011 I used different coloured pins for the popups relating to each earthquake. I added a third set of pins for general information which included other graphs and explanations relating to the earthquakes</i></p> <p><i>I also made two selects of the earthquakes so that I could separate 2010 clearly from 2011.</i></p> <p><i>The pattern of earthquakes is seen in Figure 1 with 2010 having green dots and 2011 blue dots. Earthquakes affected people, transport and the economy.</i></p> <p><i>In the Red Zone a number of major building affected were affected including the Christchurch cathedral and unfortunately the CTV building where there was a major loss of life. Figure 2 shows a close up of the CTV popup and Figure 3 shows the location of the building pop-ups. The relationship between the location of the major earthquakes in 2010 and 2011 can be seen in Figure 4 which shows the location of the 2011 earthquakes. I found a graphic that shows the relationship between the earthquakes and the subsidence in the Red Zone – I added this as a general information pin - Figures 4 and 5.</i></p>
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Final grades will be decided using professional judgement based on a holistic examination of the evidence provided in both the Layout and the report against the criteria in the Achievement Standard.



When the ground shook: The Canterbury Earthquakes

Credits: 3

Name _____ Class _____

Task	Evidence/Judgements for Achievement	Evidence/Judgements for Achievement with Merit	Evidence/Judgements for Achievement with Excellence
Setup ArcGIS Online	No Assessment		
Collecting Information			
Task A	The student has: Successfully downloaded some earthquake data from the Geonet website		
Task B	No Assessment		
Manipulating the data			
Task C	The student has: Successfully and accurately symbolised earthquakes		
Task D	The student has: Successfully and accurately symbolised earthquakes and created popup information Added some polygons and created some popups for effects on people and saved these features in the view.	The student has: Successfully and accurately symbolised earthquakes and created popup information Added some polygons and created some popups for effects on people and saved these features in the view	



When the ground shook: The Canterbury Earthquakes

Credits: 3

Name _____ Class _____

Task	Evidence/Judgements for Achievement	Evidence/Judgements for Achievement with Merit	Evidence/Judgements for Achievement with Excellence
Task E, F, G	The student has: Successfully and accurately created some polygons and place marks Added some layers and saved these features in the view.	The student has: Successfully and accurately created, added, and saved most of the polygons, place marks, and layers in the view	
	The student has Completed some of the required maps/images to a good standard to show the information. OR Included all required maps/images but several are missing information.	The student has: Completed all of the required maps/images and shown them on the layout. The maps/images show the information accurately; Used most of the appropriate mapping conventions.	



When the ground shook: The Canterbury Earthquakes

Credits: 3

Name _____ Class _____

Task	Evidence/Judgements for Achievement	Evidence/Judgements for Achievement with Merit	Evidence/Judgements for Achievement with Excellence
Valid answer solution			
Task H	<p>The student has described a valid solution based on the manipulations. The student has:</p> <ul style="list-style-type: none"> given a description of the effects of the earthquakes Referred to maps/images. Given comments that re valid but lack detail. 	<p>The student has explained a valid solution, based on the manipulations, that is supported by evidence. The student has:</p> <ul style="list-style-type: none"> given an explanation of the effects of the earthquakes that has either breadth or depth Discussed effects on people, transport, and the economy. Referred to maps/images. 	<p>The student has fully explained a valid solution, based on the manipulations, that is supported by detailed evidence. The student has:</p> <ul style="list-style-type: none"> Given a detailed explanation of the effects of the earthquakes that has breadth and depth Discussed effects on people, transport, and the economy Referred to maps/images to provide locational detail Referred to specific place names.
Overall achievement			

