



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

Exemplar for Internal Achievement Standard Geography Level 1

This exemplar supports assessment against:

Achievement Standard 91932

**Demonstrate understanding of the spatial distribution of a phenomenon
and its impacts on place**

An annotated exemplar is a sample of student evidence, with a commentary, to explain key aspects of the standard. It assists teachers to make assessment judgements at the grade.

New Zealand Qualifications Authority

To support internal assessment

Grade: Achieved

For Achieved, the student needs to demonstrate understanding of the spatial distribution of a phenomenon and its impacts on place.

This involves describing the spatial distribution of a phenomenon and the factors or processes that contribute to it. Then the impacts of the phenomenon on place are to be described using relevant evidence and geographic terminology.

This student has described the spatial distribution of the phenomenon of New Zealand population, using geographic terminology. For example, the population is clustered and nucleated, and many people are concentrated.

Factors contributing to the spatial distribution have been described. For example, the concentration of people on the East Coast is linked to the drier weather and it being easier to live there. The concentration is also linked to access to food from fishing.

The impacts of New Zealand's population on place have been described. Where people live impacts on the environment by causing deforestation and the use of fertilisers causes poisoning of rivers.

Relevant evidence and geographic terminology has been included in the description. At 920 words, this student response is within the suggested range.

For Merit, the standard requires an explanation of processes contributing to the spatial distribution and the impacts. Greater clarity and specificity of the comments is required. Evidence and geographic terminology should also be used to support the explanations.

Achieved
 NZQA Intended for teacher use only

The figures show the spatial distribution of New Zealand’s population (Figures 1 & 4). In the figure, black represents where people live, and white represents where people don’t live. New Zealand has a population of 5.1 million across the country. The population is not evenly distributed. People tend to live near the necessary resources to live, such as food, water, and medicine. Therefore, the population density in cities is much higher in urban areas than in rural ones. There is high population density along the coastline, where many of the cities and towns are found. For example, about 30% of the New Zealand population lives in Auckland. Auckland is a coastal city and is much more populated than Wellington, another coastal city. These two bay cities are major cities in New Zealand. The population is clustered and nucleated along the east of both islands, with a few large towns on the west coast. Most of the New Zealand population live near the main centres on the Northeast side of the North Island and the South Island's east coast (see Figures 2 and 5). Secondly in the North Island, 54% of the population currently live in the top four locations, Northland, Auckland, Waikato and Bay of Plenty. 77% of the population live in the North Island. Most of the population live in low elevation like in coastal towns/cities (Figures 3 & 6). The maps show us where people live but don’t tell us why they live there. Many people are concentrated in and around the coastal towns and cities.



Figure 1: The spatial map of population distribution, North Island of New Zealand.

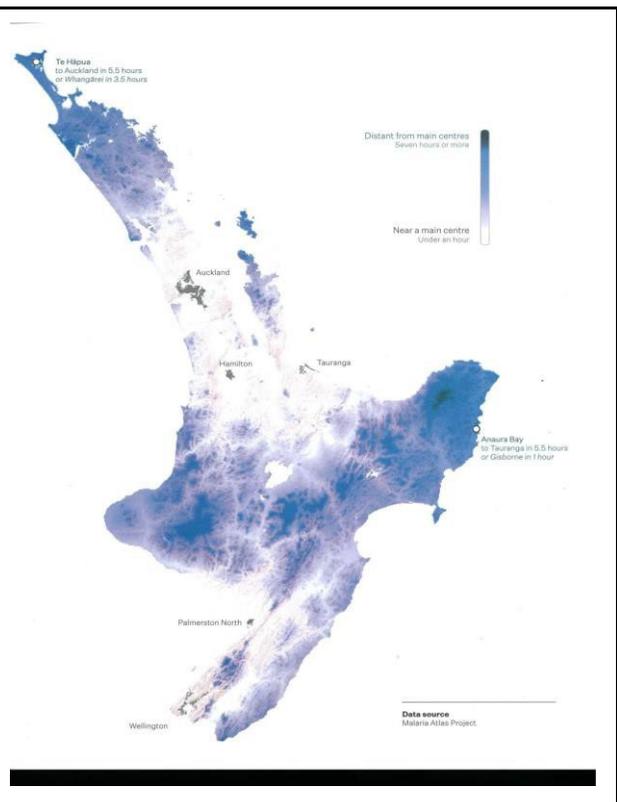


Figure 2: The spatial map of the North Island for how long it takes to reach a main centre.

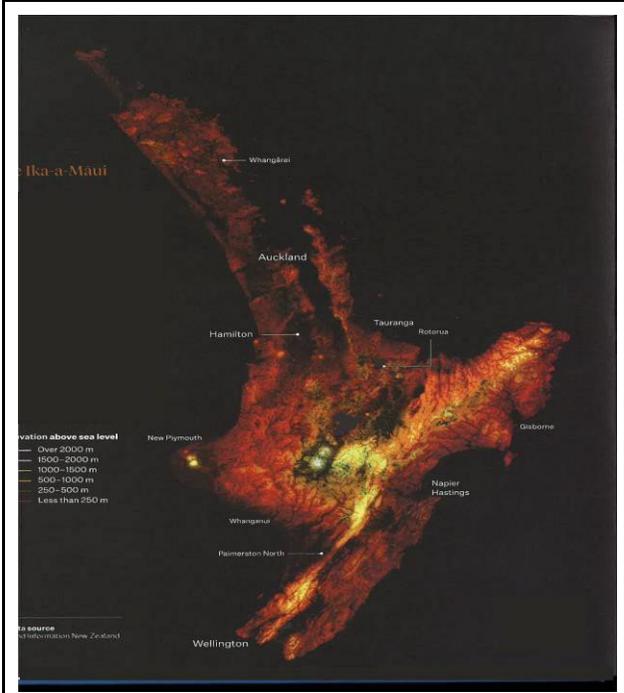


Figure 3: The spatial map of the altitude above sea level of the North Island.

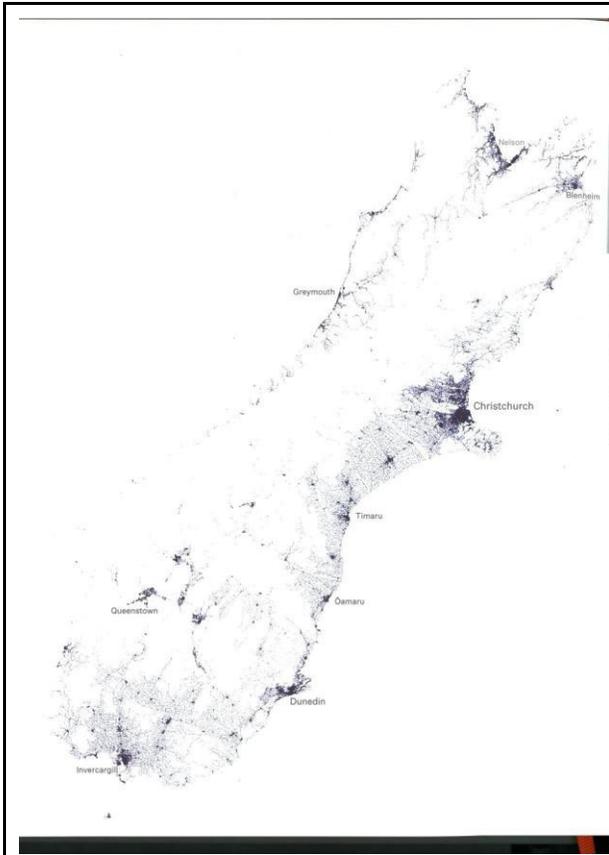


Figure 4: The spatial map of the population of the South Island of New Zealand.

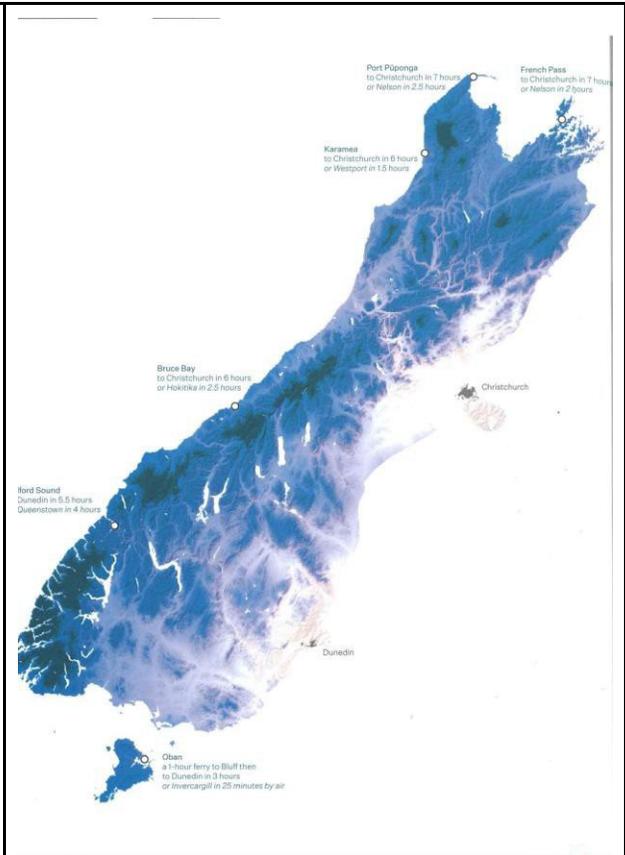


Figure 5: The spatial map of the South Island for how long it takes to reach a main centre.



Figure 6: The spatial map of the altitude above sea level of the North Island.

People are attracted/repelled by specific characteristics of the environment. The two most important environmental characteristics to people are landforms and climate (Figures 7 & 8). The Southern Alps, a large mountain range, creates a barrier causing orographic precipitation. This process shapes the rain fall on the South Island, leading to a wetter West Coast and a drier East Coast. People are concentrated more on the East Coast because it is drier and easier to live there. The concentration of people on the East Coast offers access to food from fishing and transport from the calmer water and so more people live there. They offer several favourable environmental conditions such as less rain and more favourable weather conditions. The North Island has a less linear pattern than the South Island but is a similar characteristic. The orographic precipitation is different because the terrain is different. For example, Mount Ruapehu and Tāupo are some of the highest places on the North Island but are not linear. The map of the North Island shows that the vast majority of the population is concentrated in dry regions around the northeast of the North Island. People are repelled from living in high-altitude regions because the higher you go, the younger the soil gets, and it has less agricultural worth so it's harder to grow food. The weather tends to get colder and is less favourable for crops/animals.

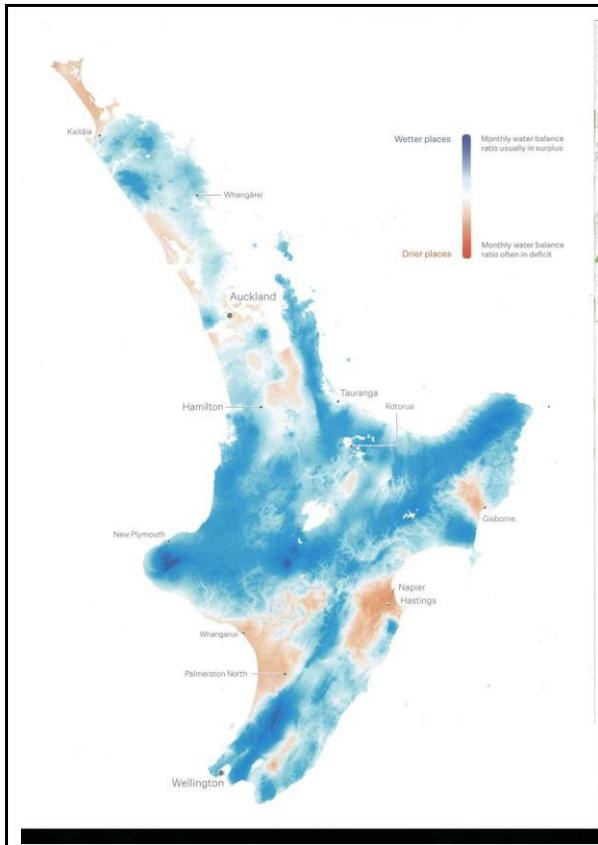


Figure 7: The spatial map wetness of the North Island.

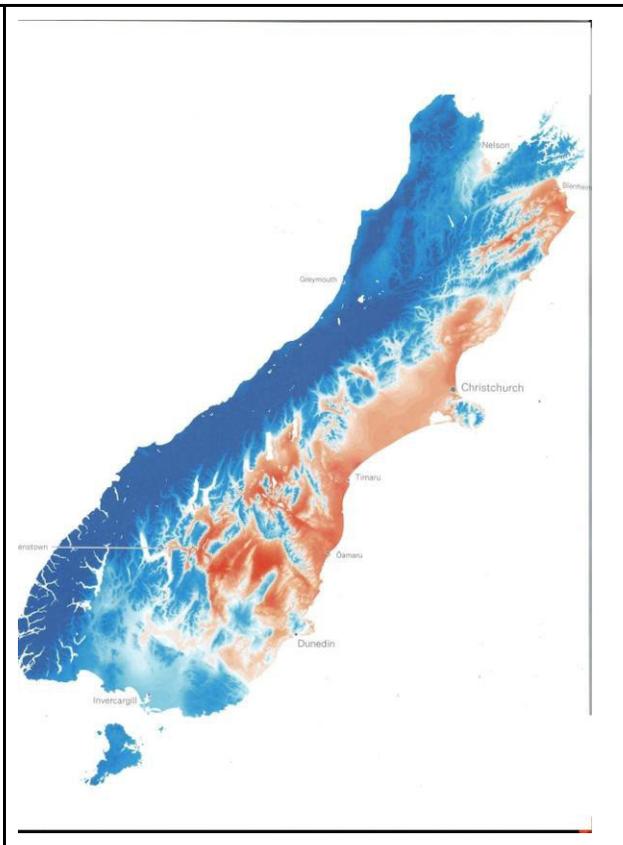


Figure 8: The spatial map wetness of the South Island.

Figure 9 shows that the North Island is mostly forest without human activity. Yet, Figure 10 shows us that where people live resulted in the deforestation of most of the North Island for agricultural use, resulting in significant changes to the environment. The very northern part of the North Island is a great example of this, as there are now orchards and vineyards which are not native bush. Where people live also caused agriculture to use nitrogen fertilizers that leech into the rivers and streams, poisoning them. The life stock also causes phosphate pollution and increases soil erosion. Figure 11 shows the South Island without human activity still looks reasonably the same as it is now (Figure 12), with most of the native bush standing. The few towns that are there are coastal and don't retreat inland. Again, agricultural use of the land increases where humans are. The native vegetation of New Zealand has been altered significantly by people to make way for agriculture and exotic vegetation. The very south of the South Island has been repurposed into resources; most of the forests there now are mixed exotic shrubland and exotic forests. There are about 100km² of mines and dumps and about another 100km² of harbours, train stations and roadways leading to an increase in pollution. There are also about 400km² of urban parks in the city reducing the natural forest. Without the forests,

the air quality drops and ways to slow environmental change are also damaged. Humans in New Zealand are clustered into high density regions causing a significant environmental impact.



Figure 9: Map of vegetation of the North Island without humans.



Figure 10: Map of the vegetation and land use of North Island with humans.

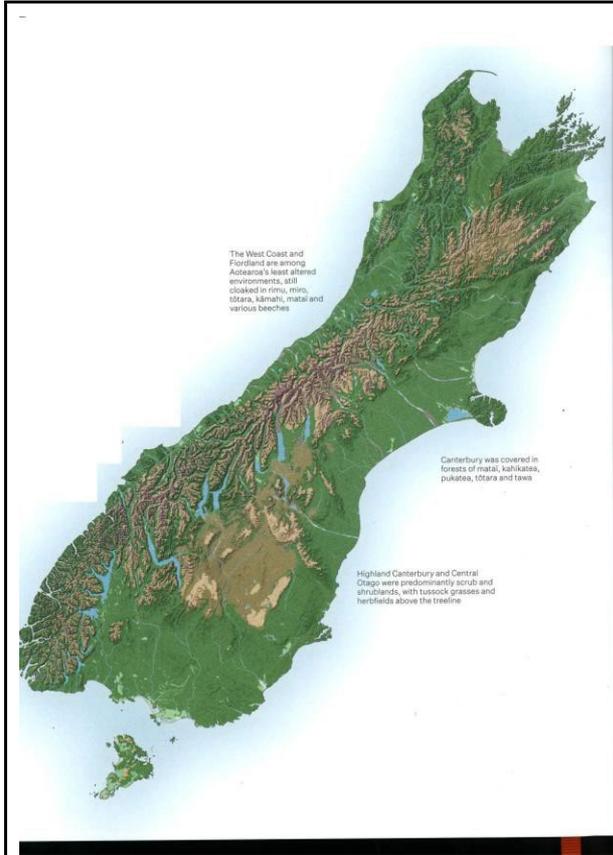


Figure 11: Map of vegetation of the South Island without humans.

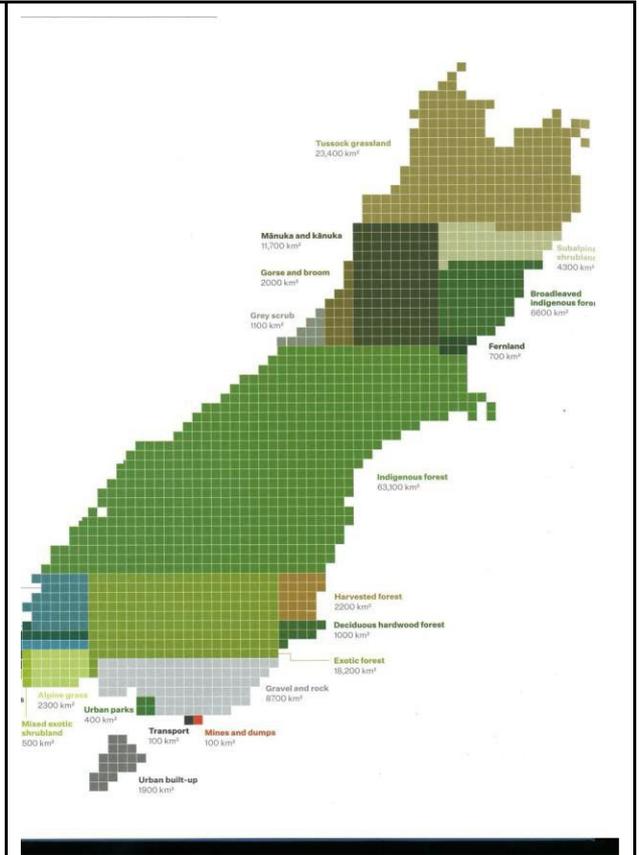


Figure 12: Map of the vegetation and land use of South Island with humans.

Grade: Merit

For Merit, the student needs to explain the spatial distribution of a phenomenon and its impacts on place.

This involves describing the spatial distribution of a phenomenon and then explaining the factors or processes contributing to it. Next, the impacts of the phenomenon on place must be explained, with evidence and geographic terminology included to support the explanation.

The spatial distribution of New Zealand mountains has been described as a linear pattern in a North-East and South-West line, supported by a map.

The tectonic process of uplift explains the distribution in a line of the North Island mountain ranges. The explanations are supported by annotated diagrams.

The impacts of the New Zealand mountains ranges are explained. For example, the impact on accessibility preventing transport and affecting settlement.

Evidence and geographic terminology have been included to support the explanation. At 709 words, this student response is within the suggested range.

For Excellence, factors or processes contributing to the spatial distribution of New Zealand mountains must be examined. Judgements should be made about the significance of the impacts, with supporting evidence and specific geographic terminology to develop the explanation included.

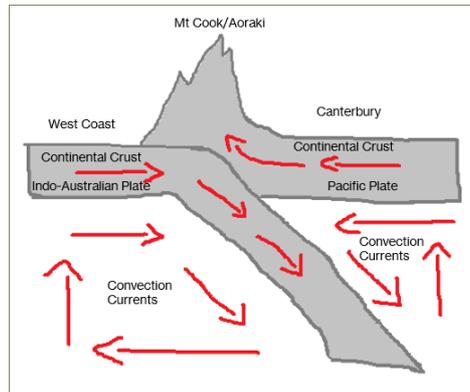
Spatial Distribution

The spatial distribution of the mountain ranges in Aotearoa are described as having a linear pattern in a Northeast and Southwest line because of the fault lines that runs through it, being the boundary between the Indo-Australian plate and the Pacific plate. This is seen in the map. The Southern Alps sit on top of the Alpine fault, lining the western side of the South Island starting from Nelson and running down to Milford Sound. In the North Island, the Raukūmara, Kaimanawa and Taranua Ranges sit on top of the North Island fault, which runs from the Bay of Plenty down to the Wellington coast.



Formation of the Mountain Backbone

The linear pattern of the Southern Alps were created and formed because of a process called "tectonic uplift", involving the Indo-Australian plate and the Pacific plate. Through convection currents in the earth's mantle, these tectonic plates move and friction between them causes a subduction fault to form. This is when two tectonic plates meet and one of the plates subduct under the other, causing tectonic uplift of the other plate. In this case, the Indo-Australian plate has subducted under the Pacific plate as a result of the Pacific plate having weaker crust. The subduction of the Indo-Australian plate causes the Pacific plate to rise above and create the Southern Alps.



Formation of the Mountain Backbone Pt. 2

The distribution of mountain ranges along the North Island fault system in a line were also created as a result of tectonic uplift but were as a result of the Pacific plate subducting under the Indo-Australian plate instead. With the same geographic process of tectonic uplift as the Southern Alps, the Indo-Australian plate rose above the Pacific plate along the subduction boundary, forming the North Island mountain ranges.



Impact of the Mountain Ranges- Accessibility

The Southern Alps impact the geography of the South Island quite significantly in different aspects such as the 'accessibility', 'climate' and 'pounamu'.

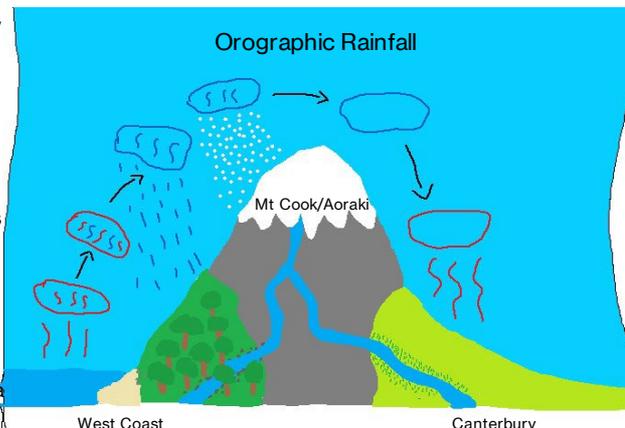
The **accessibility** of the South Island is heavily impacted by the Southern Alps because of its rugged and difficult terrain that acts as a natural barrier preventing most ways of transport between the West Coast and the rest of the land. The only way around this problem is through 3 main passes that cut through the Southern Alps, being Lewis Pass, Arthur's Pass and Haast Pass. The Southern Alps also impact and make a difference as to where people settle. People want to settle in more accessible places and are more likely to do so on the east side compared to the closed off West Coast. Nature is also affected with animals prevented from migrating to either side.



Impact of the Mountain Ranges- Climate

The **climate** of the South Island is also impacted by the Southern Alps through processes like 'orographic rainfall'. This influences different temperature and weather patterns in each region in the South Island.

With different climates and conditions in each region, people and the industries in the land are impacted differently by the geographic possibilities and opportunities that are available. Different industries are affected, and some are more successful and capitalizable as a result of natural climate and conditions that allow for them to flourish. With this, settlement on the east side is more desirable compared to the west because of a more favourable land geography. Flora and fauna also thrive on different sides, with different natural conditions that impact them.



Impact of the Mountain Ranges Pt. 3

Pounamu is another significant impact of the Southern Alps, both naturally and culturally. Pounamu/greenstone is formed when two contrasting rock types fuse under high heat and pressure. Through processes like tectonic uplift, pounamu created deep underground is lifted up and eventually erodes from host rocks where they end up in gravel deposits and rivers. Because of this, in more accessible areas, exposed pounamu was collected.



Judgement: Which impact is the most significant?

In my opinion I think that accessibility is the most significant impact. It impacts both the natural and the cultural environment, negatively limiting the physical capabilities and accessibility of transport between the east and west of the South Island because of the natural barrier it creates. It impacts where people settle and industries that are able to be capitalized and used. Without the Southern Alps, in the aspect of accessibility, travel all around the South Island would be significantly easier, without the natural barrier it creates. Although, the Southern Alps in other aspects positively impact the country with things like tourism, agriculture and other things that boost the economy, while also being a natural beauty of the country.

Grade: Excellence

For Excellence, the student needs to analyse the spatial distribution of a phenomenon and its impacts on place.

This involves describing the spatial distribution of a phenomenon and then examining the factors or processes contributing to it. The impacts of the phenomenon on place must be explained and judgements made about the significance of the impacts. Evidence and geographic terminology must be included to develop the explanation.

The spatial distribution of New Zealand earthquakes is described (for example as a linear pattern), however the addition of a supporting map of earthquakes would have strengthened the response.

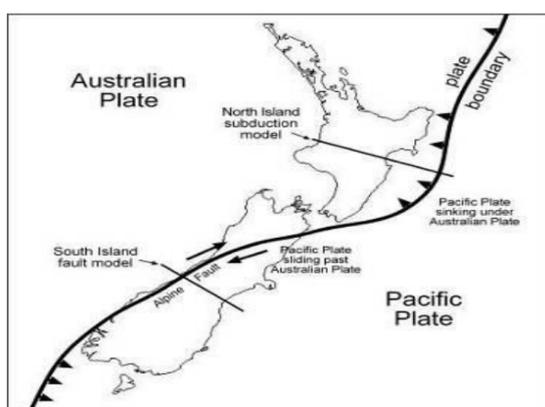
Tectonic processes which contribute to the spatial distribution of earthquakes have been examined in detail. Evidence and geographic terminology are used to develop the explanation.

The impacts of New Zealand earthquakes have been explained, and judgements made about the significance of the impacts.

At a word count of 1005, this exemplar is at the upper end of expected response length.

The spatial pattern that the earthquakes in New Zealand follow is a linear pattern it follows the Australian and Pacific plate boundaries. There is a transform boundary at the top of the South Island Wellington/Marlborough regions with the two plates sliding past each other. A convergent boundary at the east of the north island by the Hawkes Bay/Gisborne region with the Pacific plate sinks under the Australian plate. West of the bottom of the South Island is another subduction zone where the Australian plate sinks under the Pacific plate. The plates' sub-pattern varies depending on the plate tectonics

Other examples of spatial distribution in New Zealand would be clustered and dispersed. An example of clustered earthquakes would be when there are harder earthquakes and they are clustered around the top of the South Island/bottom of the north island, in the Marlborough/ Wellington area. An example of dispersed earthquakes in New Zealand would be on the East Coast of the South Island and the west coast of the north island because there frequently aren't earthquakes in those parts of New Zealand there are earthquakes dispersed all over New Zealand.



In this picture, it shows what the plate boundary is and where it is. In this picture, it shows that the plate boundary on the east coast of the north island is a subduction zone. In the South Island, it shows that the plate boundary is to the west of the alpine fault. The tectonic plates are sliding past each other making it a transform boundary. On the east of the North Island, the Pacific plate is sinking under the Australian plate making it a subduction boundary. The factors contributing to the spatial distribution of earthquakes in New Zealand would be the fault lines running through New Zealand and where the tectonic plates meet and which boundary they have. These plates pushing on each other creates friction which builds up pressure when the plates slip it releases the built-up energy shaking the crust. An example of this would be in the subduction zone with the plate sinking under the Australian plate building up pressure and creating more earthquakes, this is the same with transform boundaries with the plates rubbing past each other also building up pressure also building up pressure. Because there is pressure being built up in these areas more earthquakes would create more patterns. A linear pattern of earthquakes follows the plate boundary where the Australian and Pacific plate meet.

Continental drift also affects the distribution of earthquakes, Continental drift is the concept that the world's continents were once connected. This affects the earthquakes because the continents originally moved because of plate tectonics, and the movement of the plate tectonics cause earthquakes. The tectonic plates are part of the earth's crust, and under the

earth's crust, there is the asthenosphere, which is partially melted. Next are the mantle, outer core, and inner core.

For this section of the assessment, I will make judgements and examine the significance of the 2016 Kaikōura earthquake and the 2011 Christchurch earthquake on a national scale. Earthquakes can greatly affect the environment. They can affect the environment by creating landslides, tsunamis, eruptions and other natural disasters they can also cause liquefaction in the ground, damage buildings and damage more cultural features.

The most significant economic impact of the 2016 Kaikōura Earthquake was the increased transportation costs, In the earthquake around about 38,000 houses and businesses. This meant there were insurance claims were well over \$900 million. This impacted the national GDP of \$450-\$500 million. The estimated reduction for Canterbury was \$110-\$130 million (25% of the total cost) and the estimated reduction for the rest of New Zealand was \$ 340-\$370 million (75% of the total cost).

The most significant environmental impact of the 2016 Kaikōura earthquake would have been that it created landslides and tsunamis. This meant many birdnesting and colony areas were covered and ruined many pāua habitats. A consequence of this would have been that bird numbers decreased and many pāua died.

The environmental impact of the 2011 Christchurch earthquake would have been the liquefaction that occurred damaging sewer systems which meant made the area inhabitable. Because most of the town had been previously built on a former wetland swamp, in the earthquake caused silt and sand to seep through the cracks. many houses had to be demolished. This is the most significant because most of east Christchurch will never be able to be habited again.

The most significant social impact of the 2011 Christchurch would have been that it killed 185 people. 70,000 people left the city because their homes became inhabitable. many sewer systems took years to restore. Many towns around Christchurch's population grew and the school numbers increased. The social impact of the Christchurch 2011 earthquake was that it damaged many houses and killed 185 people. Because many houses were damaged it caused many people to move to towns outside of Christchurch. The significance of this for people could have been that many died; it could have caused depression and anxiety throughout the community. In the Christchurch earthquake, many schools got destroyed. This meant some of the schools had to merge. In the Christchurch 2011 earthquake, many buildings collapsed, and thousands of people were injured and crushed in the rubble 185 people died. This is because this earthquake was at 12.57 pm so many people were at work or on lunch breaks and Christchurch is New Zealand's second most populated city. This was significant because so many people died, and many people remember it. Compared to the Kaikōura 2016 earthquake only 2 people died, this is because the earthquake occurred at 11.58 pm and because Kaikōura isn't as populated as Christchurch.

The most significant economic impact of the Christchurch 2011 earthquake was that it caused over \$77 billion dollars in damage. This led to many people claiming insurance, so they could rebuild which took 6 years to rebuild. For people, this is significant because it caused anxiety, loss of money, and many people had to relocate.