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

Exemplar for Internal Achievement Standard

Geography Level 2

This exemplar supports assessment against:

Achievement Standard 91244

Conduct geographic research with guidance

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

New Zealand Qualifications Authority

To support internal assessment

	Grade Boundary: Low Excellence
1.	For Excellence, the student needs to conduct comprehensive geographic research with guidance. This involves: • effectively presenting a combination of spatial, statistical and visual data • fully explaining findings • fully explaining the strength(s) and weakness(es) of the research process and how they impact on the validity of the findings and/or conclusion • discussing ways the research process could be improved. The student has effectively presented spatial, statistical and visual data. Detailed annotations (1) show relevance to the research aim. The presentation method focuses on the comparison of two locations, which directly supports the aim and shows understanding of the spatial component of the research (2). The findings are fully explained including detailed evidence from the presented data (3). This explanation demonstrates a comprehensive understanding of the natural elements and interactions (4) (5) which form the basis of the research. A range of relevant geographic concepts, such as process, interaction and location, have been incorporated into the explanation of the findings (4) (6). The student has acknowledged and addressed the anomalies in their data, demonstrating understanding that is indicative of comprehensive research (7). For a more secure Excellence, the student could discuss ways of improving the research. The research process is effectively evaluated (9), but the suggested improvements (8) need to be discussed further. For example, the instructions beside each recording box could be more specific, with a statement that includes the formula for calculating tree height or soil descriptors.

Student 1 Page 1: Low Excellence

NZQA Intended for teacher use only

Location Two-Manganui Ski Field

Site One 1245m Altitude, Latitude 39.30 S, Longitude 174.1 E

Site Three 1263m Altitude, Latitude 39.30 S, Longitude 174.08 E

Site Two, 1270 m Altitude, Latitude 39.30 S, Longitude 174.09 E

Location Two- Manganui Ski Field

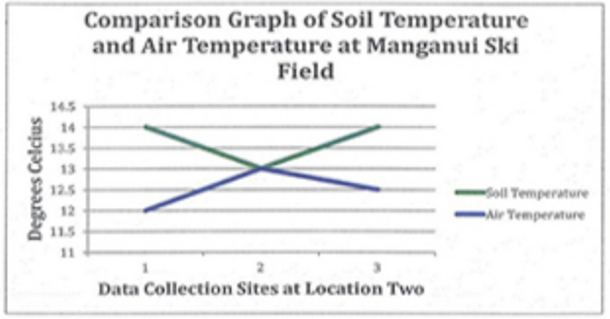
The Manganui ski field is situated on the East side of Mount Egmont and is approximately 1260 metres in altitude. The Manganui ski field consists of low height vegetation including tussocks, leatherwood and hebi. The climate of the Manganui Ski Field is unpredictable and often changes, with it normally being lower in temperature because of its altitude.

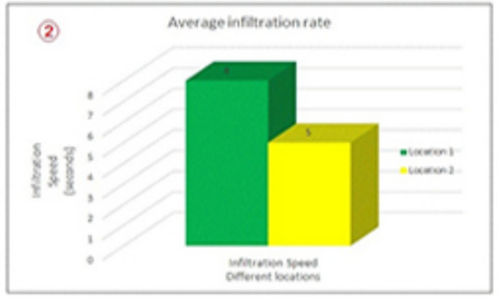
Location One- Potaema Swamp, Pembroke Road

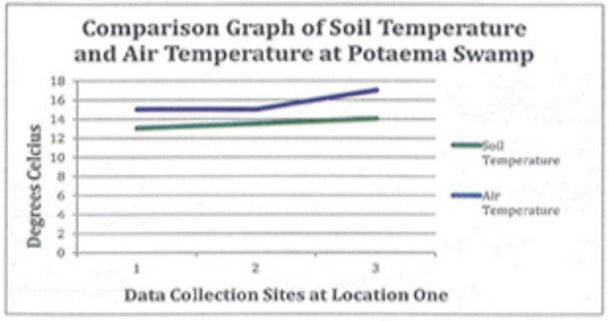
Location One- Potaema Swamp, Pembroke Road

Potaema swamp is located just below the Stratford Mountain House at approximately 640 metres in altitude. It consists of forest vegetation including kamahi, rata, rimu and punga. It is a fairly damp location hence why is it a swamp. The climate is usually about the same as New Plymouth with a slight decrease in temperature. ①

KEY:
- Site One
- Site Two
- Site Three







Student 1_Low Excellence

Research Question: How will an increase in altitude affect the natural elements (climate, veg, soils) and their interaction on the slopes of Mount Taranaki?

Explanation of the research findings

The soil and air temperatures between location 1 and location 2 were not hugely different despite the difference in altitude. At Location 1 the air temperature was averaged 15.5°C and the altitude was 640m above sea level, compared with the air temperature at the location 2 which averaged 12°C with an altitude of approximately 1260m (3). This shows that the higher in altitude the colder the air temperature is, this is because of the process of air pressure (Description of this process with diagram) … this shows the interaction between altitude and air pressure resulting in different air temperature at the two selected locations (4).

Location 1 was expected to be the higher temperature because… and the difference with location 2 was expected to be greater e.g… This anomaly can be explained by the difference in time when the data was collected…The temperatures were taken at 10am at location 1 and 4pm at location 2 consequently warmer than expected temperatures at the higher altitude. Insolation is a significant factor in the process relating to air pressure shown in the above diagram (5).

From both locations the data collected shows that soil and air temperatures are fairly similar, a range of only 3.5°C across all the data. These results show that the interaction between the soil and air temperature is slightly different at higher altitudes (6). At Location 1 the lower altitude location the soil is cooler (13.5°C) than the air temperature (15.5°C) whereas at location 2 the soil temperature is slightly warmer (2°C) than the air temperature. Reasons for the difference could relate to the different soil types and vegetation at each location. The denser soils at Location 1 proved to be cooler than the higher altitude coarser soils. This can be explained by analysing the moisture content of both soils. The soils in the swamp were colder and held more moisture, whereas the higher altitude soils contained less water and more air. With more air they warmed up more quickly than the wetter swampy soils thereby explaining this difference (7). There is still an interaction between air and soil temperatures but other variables must be considered. Such as slope, aspect, vegetation etc.

	Air temp	Soil temp
Location 1 [640m]	15.5°C	13.5°C
Location 2 [1260m]	12°C	14°C

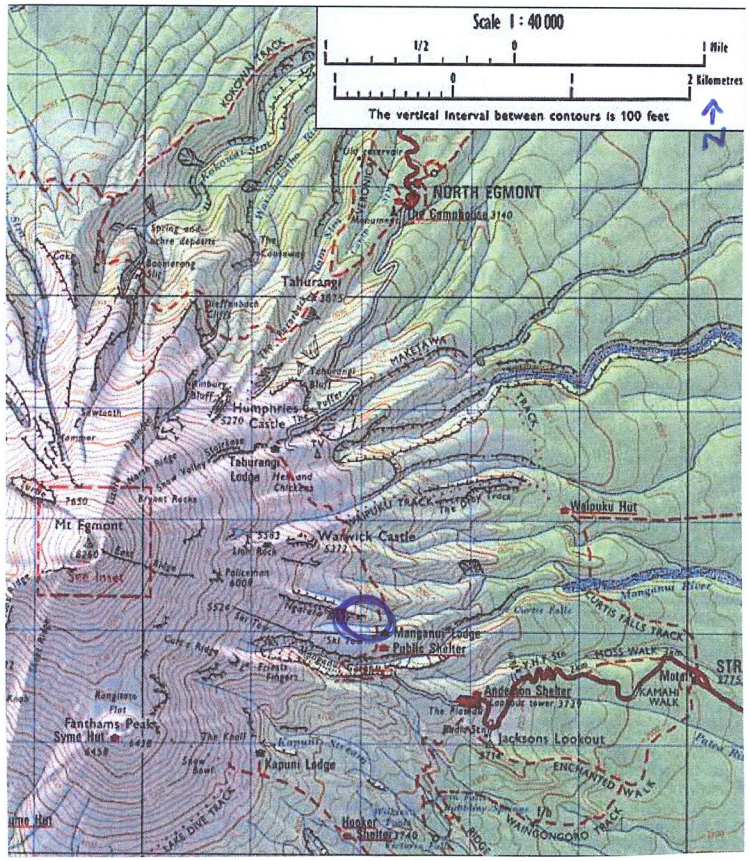
Evaluation of the research process

A strength of the data collection was having tables to record the data. This was especially helpful as we knew what we had tested and what was still to be tested. The recorded data was then easy to process into graphs and charts… This helped ensure the accurate transfer of data which enabled me to make valid conclusions. An improvement I would make would be to have space for comments and instructions beside each data recording box (8).

A weakness of the data collection was the time difference of recording at the different locations. The evidence for the temperature of the air is not completely valid as in location 1 the temperature was taken at 10 am whereas in location 2 the air temperature was taken an 4pm, so the sun would have been out for longer…This affects the validity of some of the data because it was a sunny day and the temperatures at the higher altitude were higher than expected (9). Data needed to be collected at the same time especially for temperature evidence.

	Grade Boundary: High Merit
2.	For Merit, the student needs to conduct in-depth geographic research with guidance. This involves: • accurately presenting a combination of spatial, statistical and visual data • explaining findings in detail • providing a detailed conclusion • explaining, in detail, the strength(s) and weakness(es) of the research process and how they impact on the validity of the findings and/or conclusions. The student has accurately presented data, using a combination of methods and the correct conventions (1). The quadrat annotations use specific details that directly link them to the research focus (2). The findings are explained in detail, with specific evidence from the collected and presented data (3). The explanation also incorporates relevant geographic concepts such as interaction (4) (5), change and process. The student has provided a detailed conclusion demonstrating an ability to extrapolate the key results of the research. The aim is directly addressed (6), and specific evidence is used (8). The student also shows understanding of how the timing of data collection influenced the results and conclusion (7). To reach Excellence, the student could present the data more effectively to enable comparisons to be made between the two sites. This could be achieved by drawing graphs that combine data for both locations, or by presenting this data as a statistical map. More effectively presented data could lead to a full explanation of the findings. An explanation that compares sites would demonstrate more comprehensive understanding of the research aim, interactions, and the spatial context of the research.

Location Two - Manganui Ski field



O sites 1, 2, 3

Quadrant at location 2 (Manganui ski lodge).

Rollian, moss-like covering soil

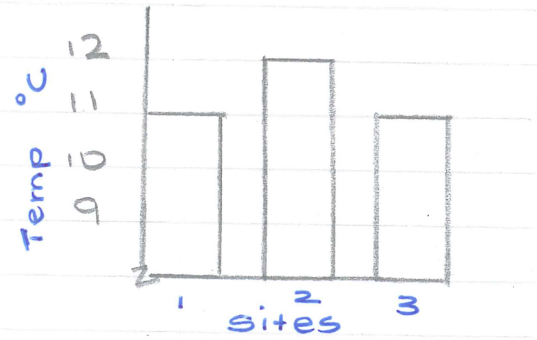
Red tussock 0.5m tall, grass-like and stringy

2

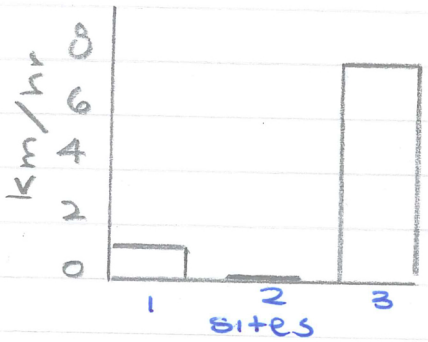
large portion in this quadrat is made up of Hebi adora, it is about 0.5m tall and has small gathered leaves at the ends of the ~~plant~~ branches.

1

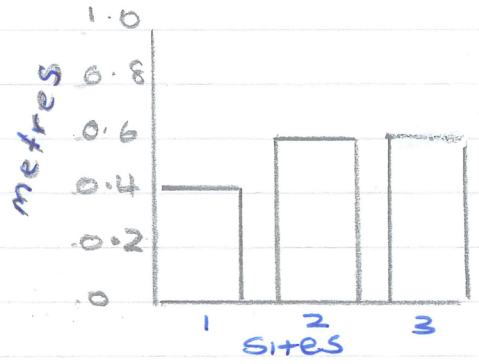
Air temperature



Wind Speed



Plant height (average)



Student 2_High Merit

Research Aim: To compare and explain differences in climate, vegetation and soil between two locations at different altitudes on the slopes of Mount Taranaki.

Findings for location 2:

Vegetation: At location 2 the vegetation content is generally made up of shrubs (Hebe), grasses and mosses. The quadrat shows partly exposed rock with no vegetation cover. The vegetation is all short and has hard leaves, which shows adaptation for the rough weather conditions. The tallest plant was the Astellia (like a flax), was almost 1 metre tall. Most of the Hebes and Red Tussocks were shorter at 0.5m and the mosses just covered the rocks (3). The mosses caused the average height to be smaller than it first looked. A lot of the vegetation is brown or slightly green in colour. The leaves of the plants tend to start right at the roots of the plant and … Interaction between the altitude, climate and soil result in this type of vegetation (4). Due to the altitude the climate is very cold with snow cover for part of the year so plants need to adapt to these winter conditions, consequently the tussock type leaves or the small leathery leaves of the Hebes. Also at these higher altitudes the soil is thin, this is shown in the quadrats and photos where rock is exposed. Due to the thin rocky soils the largest vegetation is only shrubs and grasses. The vegetation at this location protects the soils with their spreading surface roots and way they spread as they grow. The dead leaves of the Astellia and tussocks decay slowly and can form a cover on the soil… This shows a clear two way interaction between vegetation and soils at this location (5)…

Conclusion:

I conclude from my research that there are distinct differences in climate, vegetation and soil at different altitudes on Mount Taranaki and these can be explained through interactions between the main elements (6). An increase in altitude affects the climate which affects the vegetation and soils. Location one was at 640 metres and location two was 620 metres higher at 1260 MASL.

From the results of my research there was clearly an interaction between the altitude and the climate. As the altitude increased the climate got colder and secondary data showed that the weather patterns are more irregular and extreme. My data only showed a 4°C decrease in temperature with the increase in altitude, but as my data collection at location 1 was early morning and collection at location 2 was late in the afternoon the expected and probable difference is not shown (7)…

My results show an interaction between altitude and vegetation. As the altitude increased on Mount Taranaki the vegetation becomes low shrubs compared to dense large forest trees. This is a result of altitudinal zones and the environmental interaction between temperature, soil compositions …My results show there is a change from tall forest trees and ferns e.g. Beech, Kamahi and Ponga, to low tough hardy shrubs all around 0.5-1m in height including Tussocks, Leatherwood, Hebe etc. These results show that the higher the altitude the smaller but hardier the vegetation, which is adapted to the harsh conditions (8). There is also a change in soil and slope which also interact to influence vegetation types and density…

	Grade Boundary: Low Merit
3.	For Merit, the student needs to conduct in-depth geographic research with guidance. This involves: • accurately presenting a combination of spatial, statistical and visual data • explaining findings in detail • providing a detailed conclusion • explaining, in detail, the strength(s) and weakness(es) of the research process and how they impact on the validity of the findings and/or conclusions. This student has presented a combination of data (not exemplified here), explaining the findings in some detail through the use of specific collected and presented evidence (1) (4). The geographic concepts of change and location have been incorporated to support the explanation (2) (3). The student also explains the strengths and weaknesses of the research process (not exemplified here). For a more secure Merit, the student could provide more evidence from the collected and presented data to support the ideas presented in the conclusion (5), for example by including statistical evidence of temperatures at the different altitudes.

Student 3_Low Merit

Research question: How does relief interact with vegetation, climate and soil elements of the ecosystem model at two different locations on Mount Taranaki.

The student recorded data at two different locations at different altitudes. At each of these locations data was gathered from three sites.

The findings from the wind speed data: At location 1 our three recording sites were calm. At location 2 the average wind speed was 3.3 km/hr – at sites 1 and 2 it only ranged between between 0-1km/hr but at site 3 it got quite windy, gusting between 6-8km/hr (1).

The change in several factors impacted on this aspect of climate:

- Change in altitude by about 600m.
- Change in overall weather conditions from the morning data collection at location 1, when it was sunny and calm to gusty and drizzling when we were at location 2.
- Change in type of vegetation from trees higher than 2.5m e.g. beech and ponga at location 1 to mostly shrubs and tussock at location 2, which meant we were more exposed at location 2 (2).

The findings from the vegetation data include diversity of tree species, height and circumference of trees. Location is an important concept when we examine the characteristics of the soil and the climate at one location and how this results in a special type of vegetation (3).

	Location 1	Location 2
Site 1	2.2 metres	0.3 metres
Site 2	0.47 metres	0.6 metres
Site 3	1.7 metres	0.6 metres

The table shows that the average tree height at each location is very different and this can be explained by the higher altitude. Location 1 had taller trees species, including beech trees (2+metres) and ponga, but location 2 was mostly shrubs e.g. leatherwood and mosses which are only half a metre tall. These higher altitude plants can survive the harsher conditions as they are largely ground covers and have small leathery leaves like the hebes (4). Height of tree also relates to soil and slope. Location 2 had thin rocky soils and steep slope so trees weren't able to extend their roots into the ground. The plants here had spreading roots and were mostly ground covers. Being low to the ground also protected them from the wind…

Conclusion:

To answer our research question, it is clear that relief influences the other elements of the ecosystem and this is shown though reference to the altitude of each site. At the higher altitude the wind speed was recorded at 8km/hr, but at location 1 it was calm. This is partly relating to altitude because it was more exposed at the higher altitude and at location 1 we were in the bush. The temperatures were also cooler at the higher altitude showing...

There was also a big change in the vegetation from trees to tussock higher up the mountain… Soil varied also being coarser higher up the mountain (5)…

In conclusion there is evidence of interaction between the elements we gathered data for. For example, air temperature interacts with soil temperature and this explains the similar data for both elements, but moisture is another factor that influences this interaction …

	Grade Boundary: High Achieved
4.	For Achieved, the student needs to conduct geographic research with guidance. This involves: • identifying the aim and planning the research • collecting, recording and presenting data relevant to the research aim, using correct conventions and a combination of methods • explaining the findings incorporating relevant geographic concepts • providing a conclusion(s) that relates to the aim • describing the strength(s) and/or weakness(es) of the research process and how this affects the validity of the research findings. The student has provided clear explanations of the findings incorporating the geographic concepts of 'process' (2) and 'change'. A conclusion is provided which directly relates to the research aim (4). Throughout the explanation of the findings and conclusion the student demonstrates a sound understanding of the research aim. The evaluation includes a description of both a strength and weakness of the research process, with the strength linked to the validity of the research findings. A strength of the research process is explained with some detail, including how it impacts on the validity of the research findings (6) which demonstrates a Merit level response. To reach Merit, the student could continue to use detailed evidence from the collected data (1) (5), throughout the explanation of the findings and the conclusion. For example, river volume (3) could have been calculated to support the explanation relating to different river processes. In the evaluation the student needs develop the description of the 'weakness' (7) further to explain how it affects the validity of the findings and/or conclusions.

Student 4_High Achieved

Research Question: How do characteristics of the Wairoa River and valley change with distance from the headwaters?

Presented data was similar to that presented by Student 5, but correct conventions were used and overall a high degree of accuracy was evident.

Findings

River cross sections: The width and depth of the Wairoa river channel is different in the three cross sections.

In site A the river is approximately 5-6 metres wide and averages about 0.7metres deep. This cross section also shows a very uneven bed with 3 small channels within the larger channel, as there were lots of large boulders (1). River erosion processes explain these characteristics… Large boulders have been eroded from the river banks but they haven't been broken down or carried away by the water (2). These would only be moved when the river is in flood… the cross section shows that the total volume of water is fairly small (3)…

Research Conclusion:

I can conclude from the collected and presented evidence that the characteristics of river depth, width and shape of surrounding land, change as you move from the headwaters to the mouth (4). The valley shape in the headwaters is a steep V shaped gradient which has been created by the river eroding vertically. At site C the valley shape changes to a flatter, gentle gradient nearer the mouth and flood plains have been formed through a combination of river erosion and deposition.

The width and depth of the river channel also changed and this relates to the overall widening of the river valley. At site C the river channel was 20m or more, wider than in the headwaters at site A and from our measurements the depth increased by about 5m (5). The channel sediment size and shape …The processes of erosion and deposition can explain the changes in the rivers characteristics at each site…

Overall each of the characteristics differ from the headwaters to the mouth but they each relate to the river process dominant at each site.

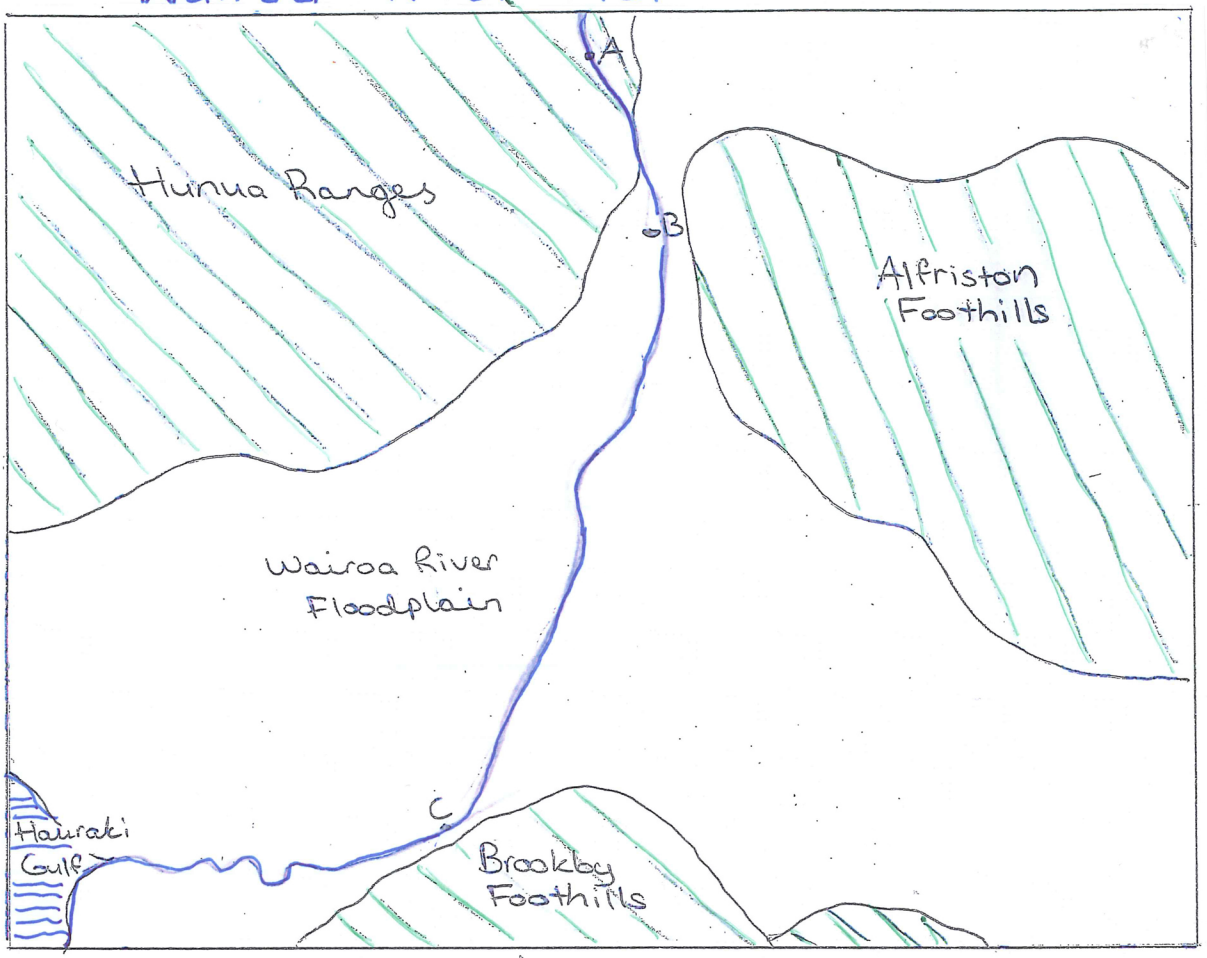
Research evaluation:

I think the strength of my research process was the collection of a range of data relevant to the aim. To collect this data the same method was used at each of the three sites to ensure they would be valid and as accurate as possible. I took river measurements for channel width, depth and rates of water flow using… Field sketches and photographs accurately and clearly show the wider valley characteristics. The river channel data allowed me to draw cross accurate detailed sections which accurately showed the different characteristics of the river channel. From the detailed and accurate cross sections it was possible to write valid and detailed findings (6).

There was only a minor weakness which was the data collection at Site A. It had lots of rapids so it was hard to measure depth accurately. The big boulders also made it hard to stand in some parts… (7).

	Grade Boundary: Low Achieved
5.	For Achieved, the student needs to conduct geographic research with guidance. This involves: • identifying the aim and planning the research • collecting, recording and presenting data relevant to the research aim, using correct conventions and a combination of methods • explaining the findings incorporating relevant geographic concepts • providing a conclusion(s) that relates to the aim • describing the strength(s) and/or weakness(es) of the research process and how this affects the validity of the research findings. The student has collected and recorded data relevant to the aim of the research and presented data using a combination of methods (1). The findings have been explained incorporating the geographic concepts of 'change' (2) and 'process' (3). A conclusion is provided which relates to the aim (4) and shows understanding of the research context. The evaluation focuses on a strength of the research process (5). For a more secure Achieved, the student could improve the quality of their presented data. The use of correct conventions such as specific titles, orientation and scale for the map, and axes labels on the cross section is expected. It is only inferred how the identified strength of the research process affects the validity of the research findings (6). A more explicit description is needed, with a sentence such as: '*The visual evidence such as photographs and field sketches supported the statistical data shown on the graphs, and this helps to prove that this evidence is valid*'.

Wairoa River Map

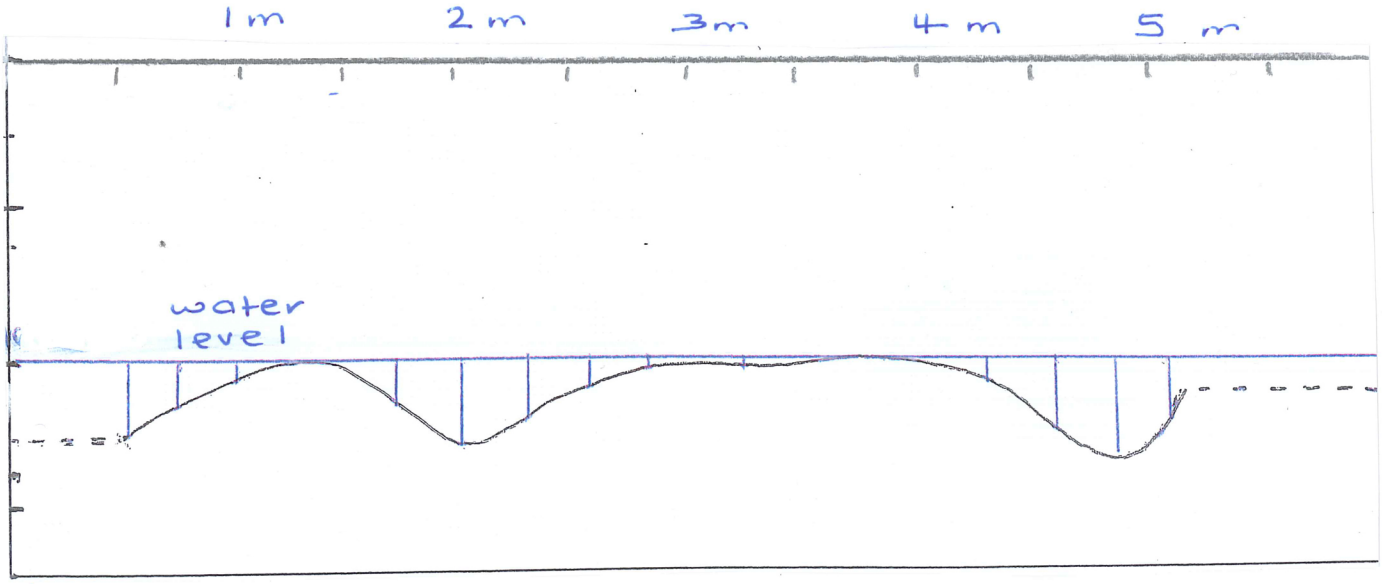


River data summary – SITE A

1

Interval	Distance m	Depth (M)	Interval	Distance	Depth (M)
1	0.5	0.92	6	3	0.78
2	1	0.85	7	3.5	0.78
3	1.5	0.78	8	4	0.72
4	2	0.95	9	4.5	0.85
5	2.5	0.83	10	5	1.0

Cross section



Student 5_Low Achieved

RESEARCH AIM/QUESTION: How do characteristics of the Wairoa River and Valley change with distance from the headwaters?

Presented data also included photographs of each site with labels.

FINDINGS

Several characteristics of the river change between the headwaters and the mouth. The shape is a characteristic that can be seen by looking at the gradient of the slope either side of the river, as shown in the photos. It is one characteristic that changes from the headwaters to the mouth. At site A the valley has a steep V shape but as you move downstream the gradient changes and the river valley becomes much wider (2). At site A the river is vertically eroding cutting a deep channel, but at site C the river is eroding horizontally resulting in a wider channel. The field sketches show that there are large flood plains around site C but there are none at Site A, which shows that deposition after flooding affects the characteristics of this lower part of the river. Clearly the river processes of erosion at each site and deposition closer to the mouth, are responsible for the different characteristics (3).

CONCLUSION

The characteristics of the Wairoa River and Valley clearly changed between the headwaters and the mouth. The most obvious are the shape of the river valley and the size of the river (4). The river valley is a V shape near the headwaters but becomes a wider U shaped valley nearer the mouth, see my field sketches… This is the because of river erosion…The Wairoa River also becomes much wider and deeper near the mouth …

EVALUATION

A major strength of my research was that I collected a variety of different data about the aim and used the same collection methods at each site (5). I took river channel measurements, field sketches and photographs to make sure I had data for the main characteristics of the river and the valley. This meant that I had lots of data to show differences… (6).

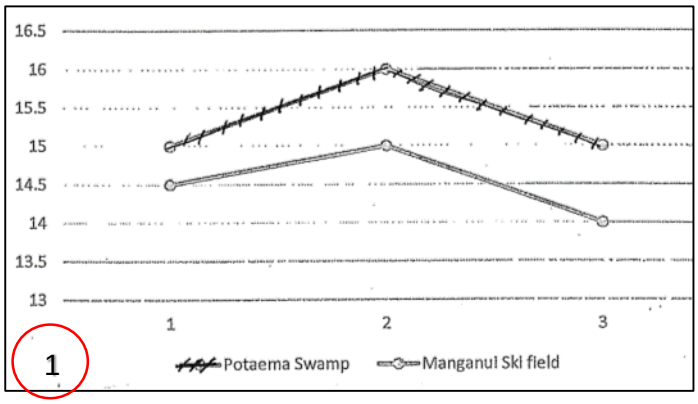
	Grade Boundary: High Not Achieved
6.	For Achieved, the student needs to conduct geographic research with guidance. This involves: • identifying the aim and planning the research • collecting, recording and presenting data relevant to the research aim, using correct conventions and a combination of methods • explaining the findings incorporating relevant geographic concepts • providing a conclusion(s) that relates to the aim • describing the strength(s) and/or weakness(es) of the research process and how this affects the validity of the research findings. The student research report included the raw primary data, providing evidence for the collection and recording of data relevant to the research aim. By combining data for the two locations, the student shows a focus on comparing sites as required by the aim (2). The conclusion directly relates to the aim (3) and the generalisations (4) are supported with the presented evidence. The evaluation describes a strength of the research process including how the data collection method affected the validity of the findings (5). To reach Achieved, the student could show the use of correct conventions by labelling graph axes and providing more accurate titles for the presented data (1). A map needs to be included to show the spatial dimension of the research and meet the requirement for using a combination of methods. The descriptions of the findings need to be developed further to provide explanations of what the collected and presented evidence shows, incorporating relevant geographic concepts.

Geography 91244 - Student 6 -High Not Achieved

Aim: How altitude affects, climate, soil and vegetation at different altitudes on Mount Taranaki.

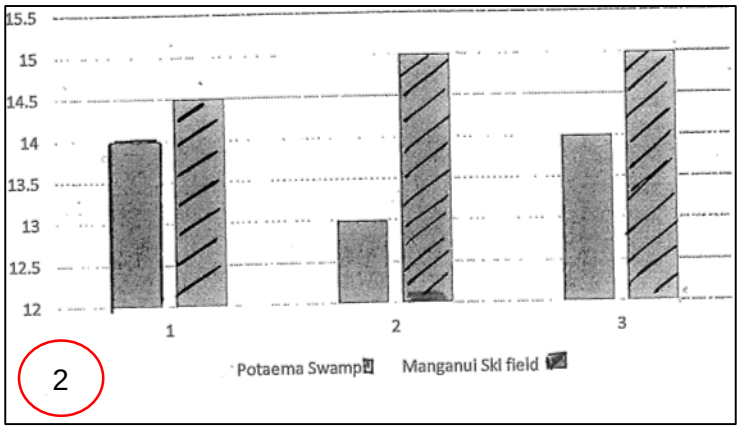
Findings:

Graph of Air temperature:



There wasn't much of a difference between the air temperatures of the two locations. In both locations there was the same pattern with the second site being the warmer. Potaema Swamp is warmer overall than on the ski field with temperatures between 15°C and 16°C. The graph shows that the higher the altitude the lower the temperature, this could be caused by the fact that it is more exposed and windier higher up.

Graph showing soil temperature:



The soil temperature was higher at the ski field than lower down the mountain. This is really noticeable on the graph for the second site at both locations. I was surprised the soil temperature was a lot warmer up at the higher altitude. I think the soil was warmer at the second location because it had the sun on it for longer as we took the temperature at the end of the day and it had longer to heat up than the first location.

Conclusion:

The aim of the research was to find out how altitude affects, climate, soil and vegetation on Mount Taranaki (3). Two locations were studied, one at a lower altitude, Potaema Swamp and the second up the mountain at the Manganui Ski field. I found that as the altitude increased the climate became cooler and windier. The vegetation was tall trees at the lower altitude but only shrubs and moss up at the ski field (4). As well as the size of plants changing, the leaves and types of plant are also different. The loss of trees at the higher altitude meant there was no protection from the wind and this made it colder…

Evaluation:

A strength of collecting the data was that each person collected all the samples for one set of data. I collected all the air temperatures and because it was done the same way at each site for both locations this made sure that it was tested the same each time making the results accurate. Another way we checked that our results were accurate was by comparing them with other groups and they were similar. This means that the findings are quite valid because they are based on accurate data (5).