



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

Exemplar for Internal Achievement Standard

Geography Level 3

This exemplar supports assessment against:

Achievement Standard 91430

Conduct geographic research with consultation

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

New Zealand Qualification Authority

To support internal assessment from 2025

	Grade Boundary: Low Excellence
1.	For Excellence, the student needs to conduct comprehensive geographic research with consultation. This involves: - critically analysing findings, incorporating the relevance of geographic concepts - critically evaluating the research process by building on the detailed evaluation through a discussion of alternative research methods and their implications. The requirement to incorporate the relevance of geographic concepts in the findings is an amendment to version 3 of the standard, published in December 2024. The current samples of student evidence do not completely exemplify this, as they are responses to version 2. These exemplars will be updated when evidence for version 3 of the standard becomes available. The student has demonstrated critical thinking in their analysis and evaluation of the research process. The student uses appropriate terminology and statistical evidence when critically analysing the findings relating to the socio-cultural costs and benefits of tourism (1) (2). Evidence for version 3 would incorporate further development of the relevance of the geographic concepts of perception (2), perspectives and sustainable development. Relevant secondary data (3) has been effectively incorporated to support detailed and critical analysis. Several aspects of the research process are evaluated, with the strength and/or weakness directly linked to the validity of the findings/conclusion. The strength of the planning resulted in 'sufficient valid evidence' and 'realistically achievable' methods (4). The planning is critically evaluated (5), showing depth of understanding of the aim and research methods used. Alternative methods for collecting evidence (6) and presenting data (7) are discussed, identifying how they would enhance the accuracy and depth of the findings and conclusion. For a more secure Excellence, the student could apply more of the collected and presented data to add depth to the analysis. Data could also be presented more effectively as suggested in the evaluation (7).

Research Hypothesis

Tourism development has socio-cultural benefits for the residents of Rotorua.

Analysis of the findings:

The cultural benefits ... the Māori are able to promote and preserve their culture, practices and beliefs, Māoritanga; and international tourists will be able to learn and experience Manaakitanga while they are in Rotorua.

While the socio-cultural benefits were acknowledged there was conflicting responses to questions relating to the direct impacts of tourism... The data presented in graph 4 clearly shows that 28% of respondents indicated that they were adversely affected by tourism. This anomaly made it necessary to identify the different perspectives of the respondents which led me to examine the data presented by each respondent rather than each question (1).

The people employed in the tourism industry responded the most positively to the other question relating to the socio-cultural benefits...

Question 7 focused directly on the effects of the tourism industry on the residents... Due to estimates of 20% of residents being directly employed in the tourism industry and a further 5% indirectly employed, interaction between the tourism industry (including the tourists) will occur daily for many residents in the district... The analysis does not differentiate between the positive and negative effects on individual respondents and requires further analysis to more convincingly answer the hypothesis. The findings clearly highlight the polarity between different occupations and the perception of tourism impacts on individuals based on occupation (2)...

Further analysis of the comments made by respondents will highlight the socio-cultural benefits and costs due to tourism development. For example, respondent N°7 answered.... Also secondary evidence of Council developments (information involving community based activities and public projects) have been collected from the Rotorua District Library and the District Council. Within the District plan there are predictions (3) of inflation, rates ...schemes to improve lake quality, roading and other aspects of infrastructure ... These are examples of sustainable development for both residents and the tourism industry.

Evaluation of the research process

The hypothesis... is clear and concise and allowed me to develop appropriate research methods to investigate the socio-cultural effects of tourism development. The data collection methods including... resulted in sufficient valid evidence to accept the hypothesis. Thorough planning and pre fieldwork research gave a clear understanding of the data which was available and the methods which were realistically achievable in the time available...(4)

One variable not considered in the planning was that we were in Rotorua in an 'off-peak' time, which may not have had a significant impact on my results as the focus was benefits of tourism development, but perceptions may have been different... If I were to investigate

short term affects caused by tourism development, a holiday weekend would be the most appropriate time to conduct the research... (5)

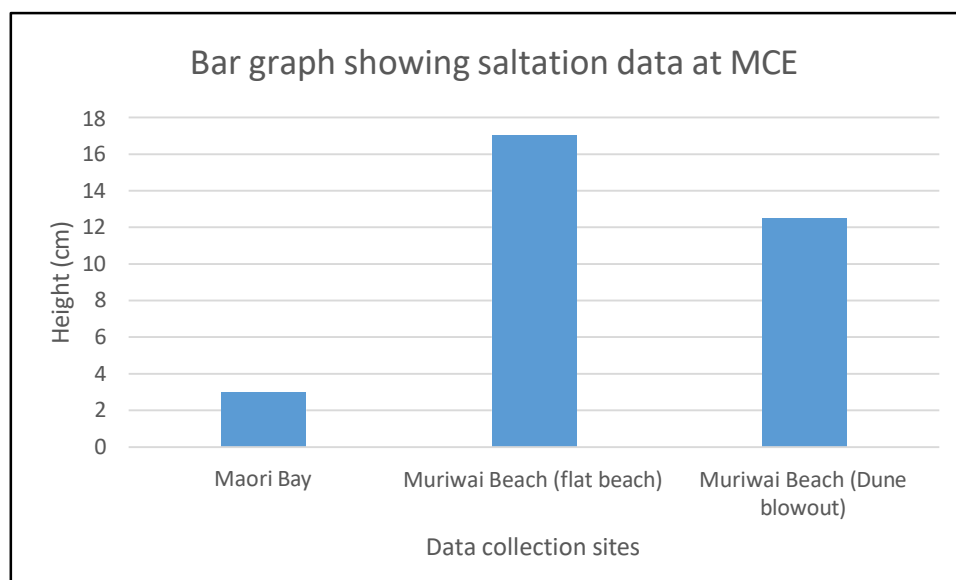
The questionnaire provided a range of relevant data that could be clearly displayed and interpreted....The time of day and week did influence this data...

Alternate methods could be conducting other geographic research processes. For example, a people count to highlight whether congestion of pedestrian traffic is an issue for certain areas in the CBD, and if there were differences in density in mall entrances compared with in/outside the mall. This is provided evidence to further validate the resident responses relating to their impression of the impacts...(6)

Other alternate methods include spatial representation of the CBD. This would involve sketching a section of Tutanekai Street and grouping certain stores or businesses into whether their target market is locals or tourist. This would highlight whether the CBD is really meeting the needs of the residents. This data could be presented using a choropleth technique or précis sketch. Although these diagrams are not accurate representations, it is a spatial representation of the facilities available for residents (7).

	Grade Boundary: High Merit
2.	For Merit, the student needs to conduct in-depth geographic research with consultation. This involves: - effectively presenting spatial, statistical and visual data, using the correct geographic conventions and terminology - analysing findings, in detail, incorporating the relevance of geographic concepts - providing a detailed conclusion that relates to the aim - evaluating in detail the research process, and how this affects the validity of the research findings and/or conclusions. The requirement to incorporate the relevance of geographic concepts in the findings is an amendment to version 3 of the standard published in December 2024. The current samples of student evidence do not completely exemplify this as they are responses to version 2. These exemplars will be updated when evidence for version 3 of the standard becomes available. This student has provided detailed analysis of the collected data relating to the processes of sediment transport such as longshore drift and saltation. The analysis includes how processes operate differently in different parts of the selected environment. The analysis of the findings includes statistical evidence (1) (2) (3), technical detail (4) and appropriate use of geographic terminology and location detail. The concept of process is incorporated throughout the findings which has been encouraged with its inclusion in the research aim. 91430 version 3 requires the analysis of the findings to demonstrate explicit understanding of the relevance of geographic concepts which a concept additional to 'process' would need to be used. In the evaluation, the strengths of using photographs to collect data is explained through their support when drawing accurate annotated field sketches (6). Photographs also provided another dimension to the saltation data (7) to allow for more in-depth analysis. The evaluation explains the implications of weather conditions. This shows in-depth understanding of the processes being examined and research techniques (8). To reach Excellence, the student could further develop the analysis (3) to emphasise the anomalies and provide a more critical analysis, as shown when explaining saltation rates (5). The critical analysis of findings will incorporate the relevance of geographic concepts. A critical evaluation requires the student to discuss alternative research methods and their implications. Explaining the implications of revisiting the site to gather additional saltation data under different conditions (9) would provide a more comprehensive response.

Aim: To determine how and why natural processes operating in the MCE vary from place to place.



From the graph it can be seen that the process of saltation is of little significance at Maori Bay. This is evident by the fact that at Maori Bay, the Aeolian transportation sub-process of saltation only carried sediment to a maximum height of 3cm. It is of greater significance at Muriwai Beach where the sediment was carried to a maximum height of 17cm on dry sand and 12.5cm in a dune blowout (1).

Wind direction on the day of recording varied from west to northwest. The prevailing wind at Maori Bay is a westerly. Wind blowing from the NW will not be as strong due to physical obstacles of Otakamiro Pont (headland) and Motutara Island (stack)... The critical wind speed for saltation is 20kmh which means that the recorded average wind speed during the data collection time was on 1/3 of that required for the process of saltation to operate. Our result therefore could be a consequence of wind gusts which would explain the very limited degree of sediment lift (3cm) (2).

The process of saltation was much more significant at Muriwai Beach... The bar graph from the saltation experiment in the dune blowout on Muriwai Beach has an interesting result in comparison to the saltation experiment done on dry sand at Muriwai beach... The stick on the dune was in a more sheltered position which can explain the lower maximum height 12.5cm as opposed to 17cm, but it also was embedded and surrounded with sand on the edges of the dune being above the stick which led us to think that sand would appear to be lifted higher...(3)

Precipitation is another factor influencing rates of saltation. There is very clear evidence that there were water droplets present that caused the sediment (be it feldspar or titanomagnetite) to stick together. This makes it harder for the sand particles to saltate as more force (strong wind) is required to transport them. Additionally, titanomagnetite is iron

sand, and it has some magnetic properties which cause the sediment to stick a bit more compared to feldspar (white sand) (4). However, this factor could have less influence on saltation at Maori Bay due to the research area having a very small tidal range, consequently saltation would be marginal due to the sand being damp...Muriwai beach has a long inter-tidal range of 3 metres and a large backshore area, so the action of wind and the sun allows the sand to dry out. This makes the sediment more mobile-easily transported (5)...

Evaluation

A strength of data collection was the photos which provide visual evidence of the research techniques and results and the research site...The wide angle shot of our research location at Maori Bay and significant relief features...allowed me to draw more accurate annotated précis sketches and identify wave action (6). These photos also helped explain the change in longshore drift and other anomalies... Annotation of the photos further supported the analysis...The photos of the saltation sticks show the spread of sand grains which is as important as the actual recorded height which has been recorded and graphed... Without the photos of the sticks only one aspect of saltation would be recorded...(7)

The visual evidence helps confirm the validity of my results as it shows that they have neither been exaggerated nor fabricated...

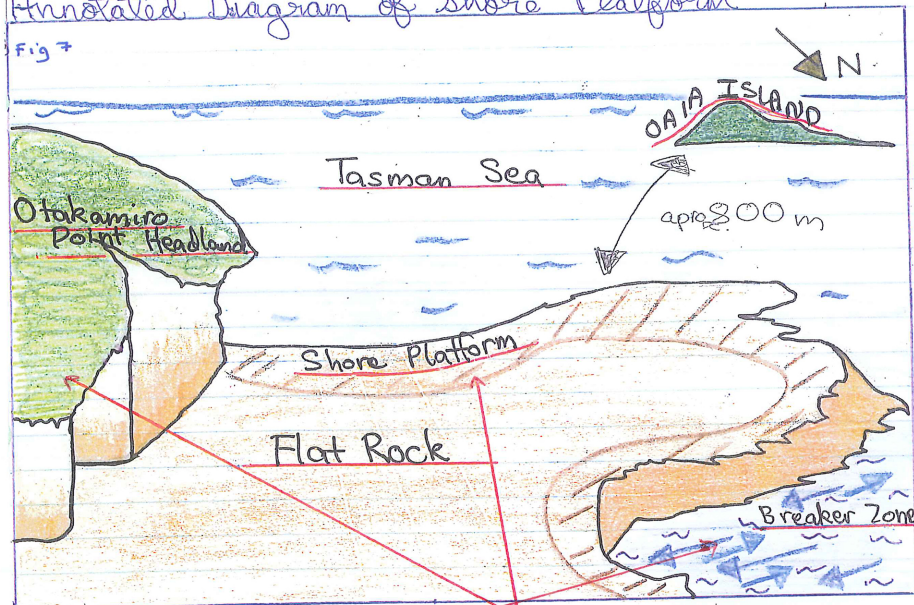
Our results for saltation were compromised due to the location of the sticks used to measure sand movement...and the occurrence of rain...The result of saltation occurring to a greater extent on Muriwai Beach than Maori Bay would probably be accurate due to the different tidal range...wet sand...but the rain clearly impacted the results. The data collected pertaining to the process of saltation can explain why sand dunes are able to form on Muriwai Beach and not on Maori Bay... (8).

An alternative method would be to go back to the location more than once at different times of the day which would give me a more accurate indication of saltation rates (9)...

	Grade Boundary: Low Merit
3.	For Merit, the student needs to conduct in-depth geographic research with consultation. This involves: - effectively presenting spatial, statistical and visual data, using the correct geographic conventions and terminology - analysing findings, in detail, incorporating the relevance of geographic concepts - providing a detailed conclusion that relates to the aim - evaluating in detail the research process, and how this affects the validity of the research findings and/or conclusions. The requirement to incorporate the relevance of geographic concepts in the findings is an amendment to version 3 of the standard published in December 2024. The current samples of student evidence do not completely exemplify this as they are responses to version 2. These exemplars will be updated when evidence for version 3 of the standard becomes available. This student has presented data as a layout which uses the correct geographic conventions and provides an effective overview of each research site (1). The complete report included layouts for each of the sites, a map showing site locations and graphs that combined data for each site. The analysis demonstrates sound interpretation of the collected spatial data in relation to the coastal processes being researched (2). The collected and presented data relating to longshore drift is analysed with supporting statistical evidence (3). 91430 version 3 requires the analysis of the findings to demonstrate explicit understanding of the relevance of geographic concepts. A conclusion follows the analysis of each site (4) and the analysis of the combined longshore drift data (5) which directly relates to the research aim. The evaluation of the research process examines the main components of the process and suggests how the validity of the results could be affected (8). For a more secure Merit, the student could make direct links to the collected and presented data in the conclusion. For example, use of supporting statistical evidence (6) or reference to relevant diagrams such as Fig. 18 for Littoral drift (7). The student could more directly explain how the research process affected the validity of the research findings/conclusions (8) and provide detail through reference to specific research techniques.

Annotated Diagram of Shore Platform

Fig 7

Breaker Zone

- When waves hit platform they refract.

Otakekimo Point Headland

- Molokai 17 million years ago
- uplifted 1 million years ago
- Highest point 40m

Shore Platform

- Extends into Tasman Sea 450m
- Approx 100m wide
- Made of hard igneous rock
- Blow hole
- High tide surf breaks over the rock/erodes outer edges
- Water depth 6-8m in cave
- Lave at Northern side of headland 20m high, 100m wide

Diagram of Littoral Drift occurring on Shore Platform



Fig 10

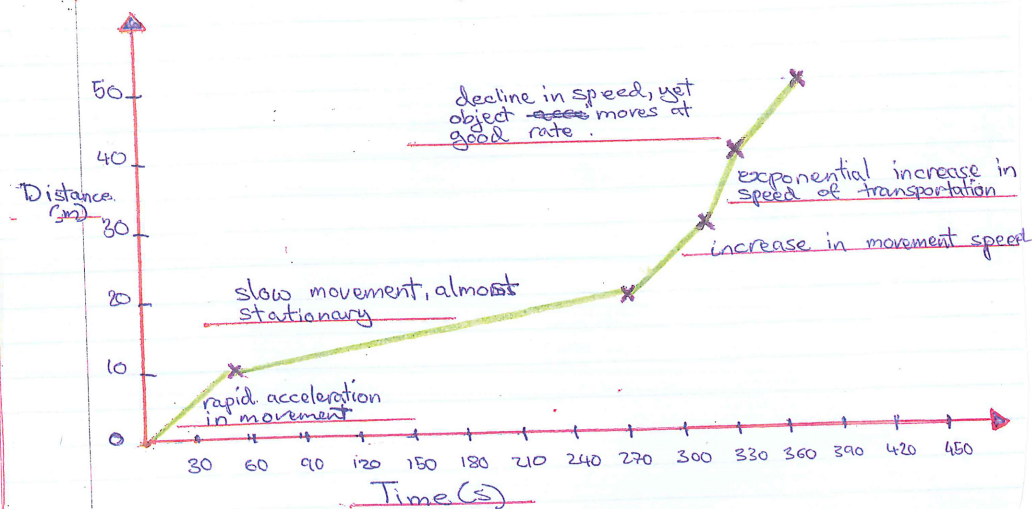
Distance vs Time Results Table for Experiment with Capsicum

Fig 16

Distance (m)	0	10	20	30	40	50
Time (s)	0	56	4:56	5:30	5:59	6:24

Fig 17

Distance vs Time Graph with Results from Capsicum Experiment



Annotated Photo of Shore Platform

Fig 8

Breaker Zone
waves refractingArea where experiment
will take place

Shore Platform

Vegetation/Bush

Pillow lava

Research Aim: To examine how the processes of wave action and longshore drift operate and interact along the Muriwai Coastal Environment.

Analysis of findings:

The first site is near the dune blowouts shown in Fig 5 and 6...

...Fig. 7 and 8 provide a spatial and visual interpretation of the Otakamiro Point Headland - shore platform and the breaker zone. There is evidence that this is mainly an erosion zone but as it is largely volcanic or igneous rock it does not provide large volumes of sediment like... Nor does sediment carried by longshore drift become deposited here on the headland because ... The data shows that sediment transport does occur in this section of the MCE (2)...

...The float took 6 minutes and 24sec to travel 50 m... The trend seemed to be different in the swash and backwash zones evident by the float crossing the first 10m in just 56 seconds. It is clear that the refraction of waves at about 120 degrees after hitting the headland caused them to carry the float backwards, thus halting its progress. This can be proven by the float taking 4 minutes to cross the next 10 metres (3). However, beyond this point the float moved more steadily but the influence could be attributed to the action of wind as much as waves... the waves at this point were pushed by the southerly wind northward and no refraction occurred.

In conclusion for this part of the MCE, longshore drift is occurring in a Northerly direction while not evident in the breaker zone of the shore platform, the wind interacting with refraction of waves ensure that it is happening (4)...

Conclusion

The aim of the research which focused on the processes of wave action and longshore drift along the Muriwai Coastal Environment and the evidence clearly indicated that longshore drift is occurring northward (5)... The evidence also shows that several interactions influence the characteristics of this drift, for example wind can accelerate movement of sediment when it is in the same direction as the waves (northward and southerly wind) (6)...

The process of longshore drift occurs when south westerly winds cause waves to strike the shoreline obliquely, to wash carried sediment sideways (7). The backwash returns the sediment at right angles to the shore, as it eventually travels northwards...

Evaluation

My research aim was clear and very specific so I knew what information was needed to make valid conclusions. The aim gave direction to the planning so I could decide on the best data collection methods for long shore drift... Data from the three sites was collected in the same way so the results could be presented using the same techniques and scales which made for easy comparison... The only difference would relate to the change in conditions like wind and tide between taking recordings at the first and last sites, this could influence results (8).

	Grade Boundary: High Achieved
4.	For Achieved, the student needs to conduct geographic research with consultation. This involves: • identifying the aim of the research • planning the research • collecting and recording data relevant to the aim of the research • presenting, using the correct geographic conventions and terminology, spatial, statistical and/or visual data • analysing findings incorporating the relevance of geographic concepts • providing a conclusion that relates to the aim of the research • providing an evaluation of the research process and how this affects the validity of the research findings. The requirement to incorporate the relevance of geographic concepts in the findings is an amendment to version 3 of the standard published in December 2024. The current samples of student evidence do not completely exemplify this as they are responses to version 2. These exemplars will be updated when evidence for version 3 of the standard becomes available. This student has demonstrated understanding of the research process through detailed planning, providing a platform for structured research. The planning begins with an effective aim which is unpacked to identify the required data (1) and methods of collecting, processing (2) and presenting (3). The data presented included a map and annotated photographs showing use of the correct geographic conventions which are also evident on the table (4) and profile diagram (5). The comparative beach profile diagram allows for comparison of the evidence and is supported with the table. The findings (6, 7) demonstrate skills of analysis where selected primary wave data is used to examine the “subtle differences” identified in the profiles. Direct links are made between wave frequency and beach profiles (8). This demonstrates understanding of the data in relation to the research aim. Geographic concepts of process and location are incorporated into the findings. This evidence would be developed further in version 3. The conclusion (9) directly addresses the aim, showing understanding of the collected evidence, related geographic processes and use of appropriate terminology. To reach Merit, the student could have used more of the collected data to strengthen the analysis of the findings and the conclusion. The additional data could have supported further discussion of relationships between the processes that contributed to the beach profiles. The relevance of geographic concepts would be incorporated within a detailed analysis of findings. Annotating the profiles or displaying them on the map could enhance the presentation by showing the spatial element of the research.

Research question:

How do natural processes influence the shapes of beach profiles at Ruakaka Beach and Waipu Bay and are they considered characteristic of constructive or destructive beach processes?

Different processes on a beach can erode, transport and deposit sediment... to research this question these processes will need to be identified by first analysing the wave characteristics ... dune vegetation growth ... (1)

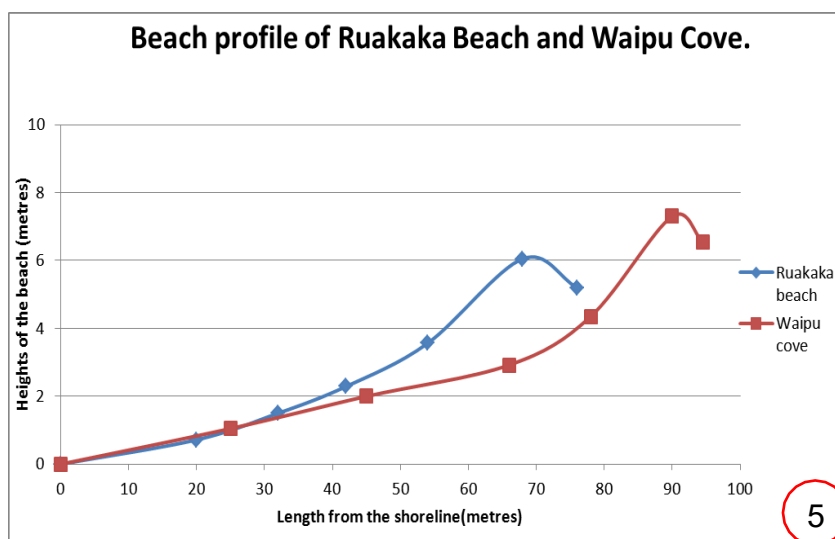
At Ruakaka Beach and Waipu Bay we will record wave data such as height, frequency, angle to the shoreline... be able to calculate the waves' period and length... Beach profiles data will be collected using at both locations...

Longshore drift will be calculated by ...

To construct beach profiles of both locations an inclinometer will be used ... this will required processing data using trigonometry to determine slope angles (2)...

...Data will be presented in both tables to show the final calculations and also graphs for visual representation... Profiles will be shown together to make it easy to compare the evidence (3)...

4 Slope data			
Ruakaka Beach		Waipu Cove	
Length (m)	Height (m)	Length (m)	Height (m)
0	0	0	0
20	0.75	25	1.05
32	1.5	45	2
42	2.29	66	2.90
54	3.55	78	4.35
68	6.05	90	7.1
76	5.2	94.5	6.54



The beach profiles are clearly similar, but the graph shows a number of subtle differences when the profiles are displayed together.

At Waipu Cove the foredune is very steep, while the beach face is a relatively gentle slope from the start of the measurement to the area that I decided was the Mean High Water Level. 75m from the water it is still less than 4m high. From here the

beach began to slope more steeply rising over 2.5 metres in just over 4m and where there was a small berm... The final height of the foredune in 7m (6).

At Ruakaka the beach has much less variation in the angle of the slope. The gradient of the beach is steeper at Ruakaka reaching 6m in height less than 70m from the shore line. The foredune at Ruakaka is evenly sloping and reaches a final height of 6m. There is a clear berm and the beach face is steeply sloped. The foredune is much less sloped and is not as high as the fore dune at Waipu Cove (7)...

The wave data for both beaches proves them to be constructive and this explains the fairly gently slopes. Wave frequency of 6-8 per minute was the average and this strongly supports the building up of the beaches through deposition of sediment...(8)

Wave heights are also characteristic of waves that will be depositing sediment and thereby building up the beaches. At Ruakaka wave height was 0.682m and at Waipu Cove it was 0.694m...

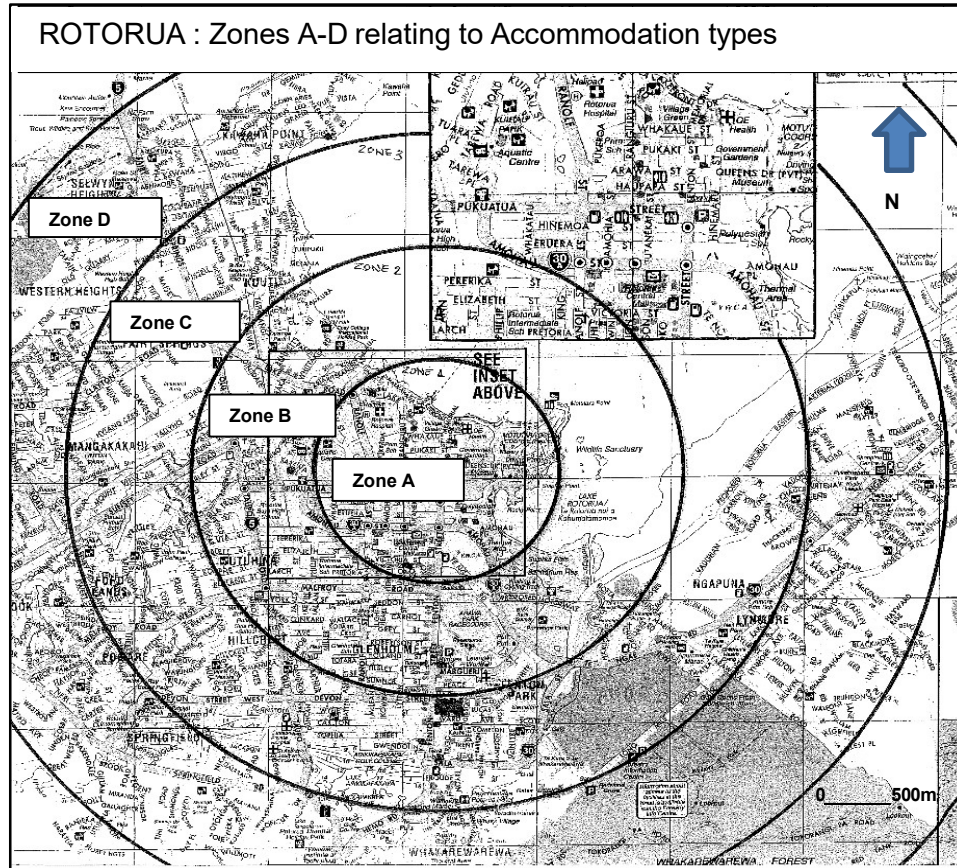
In conclusion the wave processes and characteristics clearly influenced the gentle beach profiles at Ruakaka and Waipu Cove. Constructive waves were evident and they were depositing sediment carried by the process of longshore drift... The wave frequency and height were considerably less than what would be needed to erode the beaches. To be destructive the frequency would need to be about 14 waves per minutes and have a strong backwash and thereby removing sediment. The wave data recorded showed a frequency of between 6 and 8 waves per minute with a strong swash which deposited sediment up the beach...(9)

The sediment deposited by the waves was further transported by the predominant south easterly winds which created the dunes...

	Grade Boundary: Low Achieved
5.	For Achieved, the student needs to conduct geographic research with consultation. This involves: • identifying the aim of the research • planning the research • collecting and recording data relevant to the aim of the research. • presenting, using the correct geographic conventions and terminology, spatial, statistical and/or visual data • analysing findings incorporating the relevance of geographic concepts • providing a conclusion that relates to the aim of the research • providing an evaluation of the research process and how this affects the validity of the research findings. The requirement to incorporate the relevance of geographic concepts in the findings is an amendment to version 3 of the standard published in December 2024. The current samples of student evidence do not completely exemplify this as they are responses to 91430 version 2. These exemplars will be updated when evidence for version 3 of the standard becomes available. This student has planned their research showing understanding of the type of data needed to address their aim (1). Correct geographic conventions are used, with maps and graphs to accurately present the collected data (2). A simple analysis of the findings is made, with the student interpreting the collected data to explain the spatial patterns (4). The analysis of findings incorporates the relevance of accessibility (4) as well as location, pattern, distribution, etc. The inclusion of concepts in the aim supports their use throughout the research report. A conclusion is provided that relates to the research aim (5). For a more secure Achieved, the student could develop descriptive evidence and use more geographic terminology to show the complexity of understanding required at curriculum level 8. The analysis needs to more clearly link to the presented data. This could be achieved through further processing and application of statistical evidence. For example, the data could be converted to percentages, showing 69% of all accommodation was motels with 60% of motels located in Zone B (3). The student needs to consider how the identified strengths and weaknesses of the research process affected the validity of the findings. For example, the use of accurate Google maps (6) for recording and presenting the data would aid with accuracy of location evidence and ensure validity of the findings.

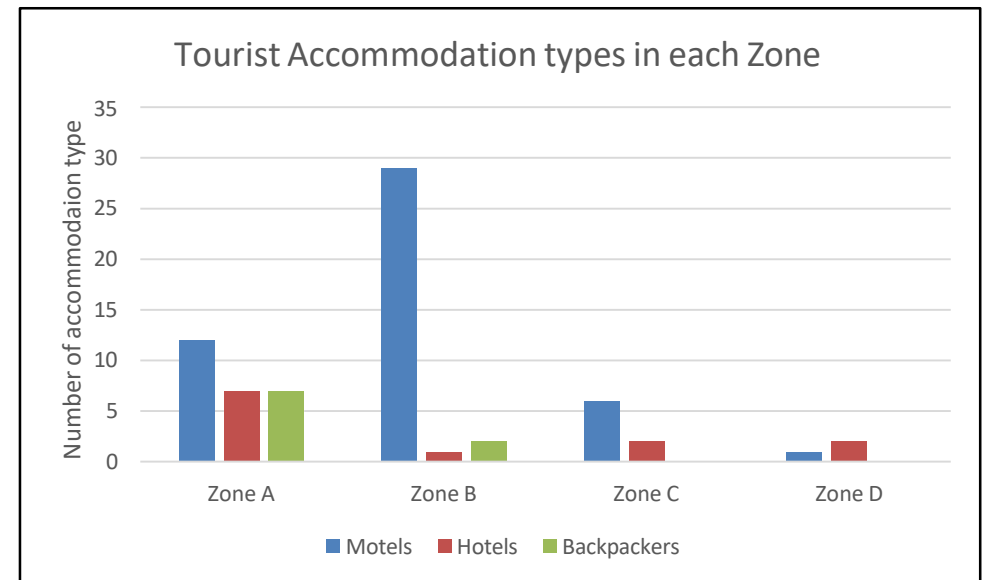
Aim: To identify if the distribution of accommodation in Rotorua forms spatial patterns and possible reasons for any pattern.

Plan: Data collection: Primary data will be collected by travelling through the main commercial areas of Rotorua where we will count the different types of accommodation and record their location and type on a map. We will take photos of different accommodation types and locations. We will also survey people at some of the motels, hotels and backpackers to get ideas as to the advantages and disadvantages of the location (1). Secondary data will come from a visit to the tourist centre, notes from a speaker and the internet...



2

	Zone A	Zone B	Zone C	Zone D
Motels	12	29	6	1
Hotels	7	1	2	2
Backpackers	7	2	0	0



Analysis of the findings:

...There is a clear spatial pattern that shows that most hotel accommodation is in the Zone A which is the CBD. The hotels outside this area are located next to major attractions like Whakarewarewa or around the lake ...The advantages given for the locations of hotels was that they were either very close to the attractions and services of the CBD or provided easy access to the lake or nearby attraction. Many of the people surveyed at hotels were on tours so they did not have their own transport...

The main type of accommodation in our sample was motels 48/69 and 29 of these are located in Zone B (3). Most motels are on Fenton Street which links the CBD with major attractions like Whakarewarewa thermal area and Te Puia and extends through 3 Zones on the map. They form a linear spatial pattern. The motel owners said the advantage of this location is that Fenton St is a main access in to Rotorua from the South and it is known as the motel strip... Motels are designed for the accommodation of motorists therefore it is important that they are located on major roads to ensure the highest chance of being seen by motorists... accessibility is the most important location factor (4)...

Motels that don't follow this trend are those that are located nearer the lake or near key attractions like...

Backpackers are the smallest group in the sample and are mostly in the CBD...

Conclusion: The distribution of accommodation creates clear spatial patterns and the main reason for the patterns relates to accessibility (5)... Some of the patterns are similar for example the concentration in the CBD but others are different. The linear pattern of motels is not shown with other forms of accommodation ...

Evaluation:

A major weakness of my research was the limited time available to collect data. When we planned the research we selected the areas we needed to cover, but didn't consider the time needed to cover such a big area...Because time was short I forgot to record actual addresses which made it hard to check the location when I was later plotting the data. The maps from the internet were also helpful for both recording and presenting the data (6)... Using the internet was helpful to check that we didn't miss any major areas with accommodation...