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91426



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Level 3 Geography 2022

91426 Demonstrate understanding of how interacting natural processes shape a New Zealand geographic environment

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of how interacting natural processes shape a New Zealand geographic environment.	Demonstrate in-depth understanding of how interacting natural processes shape a New Zealand geographic environment.	Demonstrate comprehensive understanding of how interacting natural processes shape a New Zealand geographic environment.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (XXXX). This area may be cut off when the booklet is marked.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Merit

TOTAL

06

ASSESSOR'S USE ONLY

INSTRUCTIONS

Identify a **New Zealand geographic environment** and the **interacting natural processes** that shape it, in the space below.

New Zealand geographic environment: Omanha-Tawharaui Coastal Environment (OTCE)

Interacting natural processes that shape this environment: Climate, Marine, & Geological
processes interact to create change in the OTCE

You may use the space below to plan your response. Begin your answer on page 3.

PLANNING

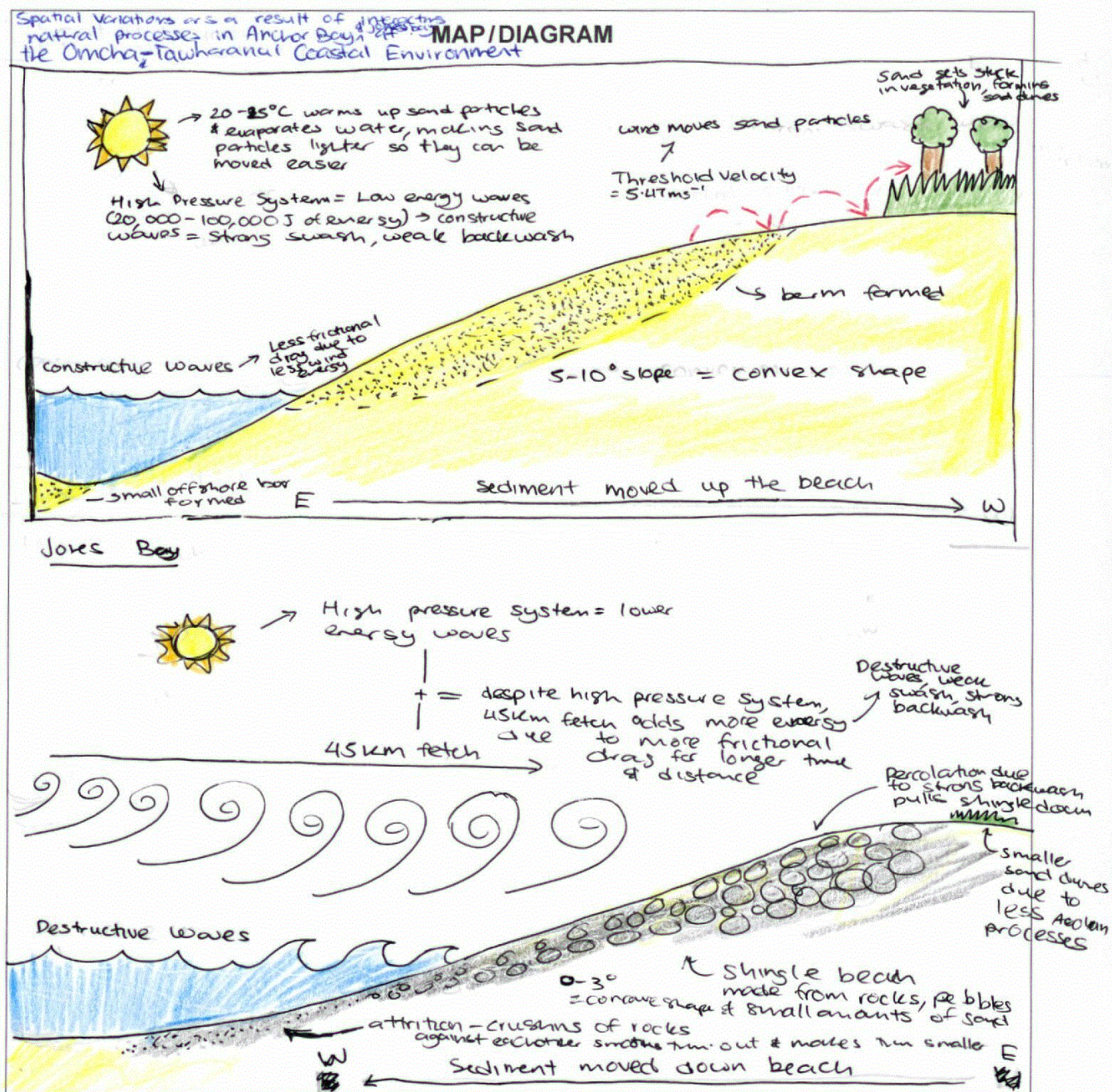
QUESTION

Analyse how different processes operate and interact to create spatial variations in your chosen geographic environment.

Your analysis should include:

- what the spatial variations are in your geographic environment
- why different processes operate in different places in the environment
- how the interactions cause spatial variations in features, elements, or processes
- integrated comprehensive supporting case study evidence.

Use the space below to construct a map or diagram to support your written response. You may also include additional diagrams and maps in your response.



Spatial variations are the results of interacting natural processes operating differently over different areas producing change in the natural environment. The Ōmaha-Tāwharanui Coastal Environment^(OTCE) is located 70 km North of Auckland. It consists of 2 beaches on either side - Anchor Bay & Jones Bay. Through interacting climate, marine, & geological processes, the spatial variations of the 2 beaches can be very different.

In Anchor Bay, the beach sediment is mainly sand particles. In Summer, Anchor Bay has a convex shape with a gradient of $5-10^\circ$. Anchor Bay has a small offshore bar, a large berm, & sand dunes. In Summer, there is a high pressure system that produces low energy waves that have energy's of $20,000 - 100,000 \text{ J}$. This results in constructive waves at Anchor Bay that have strong swashes & weak backwashes. A strong swash provides enough energy for the wave to lift sand from the ocean & carry it to deposit it on the beach. This deposition of sand takes away from the offshore bar, making it smaller, & adds to the berm, making it bigger. From here, the hot climate of the summer weather, reaching temperatures of $20-25^\circ\text{C}$, heats up & sand & evaporates the water from the sand, making it drier & lighter. Despite the low energy wind, the threshold ~~begin~~ velocity (minimum energy needed to lift up sand by wind & transport it) of 5.47 ms^{-1} is reached due to lighter, easier to move sand. This threshold velocity of wind lifts the sand & moves it along. This process repeats, as the sand particles move up the beach until they reach

the vegetation which acts as a barrier, stopping the wind from picking up the sand & moving it. This collection of sand & vegetation forms sand dunes. This is the profile of Anchor Bay during summer. As seen, the interaction (geographical concept) of climate (High pressure system, temperature), marine (constructive waves with strong swash, weak backwash) & geology (sand particles & vegetation) all interact with each other to change the spatial variations within Anchor Bay.

In Jones Bay, however, due to different interactions, the spatial variations are very different. In summer, Jones Bay has a concave shape with a gradient of $0-3^\circ$. Jones Bay ~~has~~ has a negligible offshore bar & the lack of a berm due to destructive waves is observed. Jones Bay's primary beach sediment is shingle (pebbles, rocks, & low amounts of sand). In summer, there is also a high pressure system that produces low energy waves, however, due to the 450m long fetch (fetch is the distance wind travels between the last barrier & the beach shore), waves can build up energy as there is more frictional drag from the wind & the long fetch. This overall, gives the waves more energy & makes these waves destructive. Destructive waves have weak swashes but strong backwashes. This strong backwash is further increased due to percolation (interaction between marine & geology). Percolation is where water is flushed through gaps between beach sediment (shingle). As the gaps between shingle is large, more water can be flushed, thus the rate of percolation increases, increasing the strength of the backwash.

As backwash is stronger, the shingles can be pulled down the beach, creating the concave shape seen. Furthermore, as the shingle get pulled down, attrition occurs as the shingle bang into each other & chip away, making the shingles smaller & smoother. This is also why you can see in Jones Bay that as you go down the beach, shingle are much smaller as they have been pulled down by the strong backwash & attrition has occurred while shingle further up has not been affected by the backwash. As the sand is wet due to more water being pushed further up the beach in Jones Bay compared to Anchor Bay, less Aeolian processes occur, therefore smaller sand dunes form near the vegetation. As seen, different process such as climate (long fetch, stronger wind), marine (destructive waves, strong backwash, percolation) & geology (shingles & attrition) all interact differently in Jones Bay to create different spatial variations.

Overall, the spatial variations between Jones Bay & Anchor Bay occur due to different interactions between processes such as climate, marine, & geology to create different spatial variations, & different profiles.

Merit Exemplar 2022

Subject	Geography	Standard	91426	Total score	06
Q	Grade score	Annotation			
1	M6	Answer is detailed in the annotations on the diagram and within the written answer. Detailed supporting case study specific evidence is included. Reasons for variations caused by different operating processes are analysed in detail. The candidate needed to integrate more evidence throughout their response and analyse with insight in order to achieve Excellence.			