Exercise walk-through

3.2
Option: Oceans and coastal margins

International Baccalaureate · IB Diploma · Geography · SL

Extreme environments

- **Extreme environments** are cold (high mountains, polar and glacial areas) or dry (hot deserts).
- Ice erodes valleys into a U shape and leaves piles of rock called **moraines** .
- In hot deserts, wind builds dunes and rare flash floods cut steep valleys called wadis.
- People see these places as both **opportunities** (minerals, tourism, solar energy, scientific research) and **challenges** (cold or heat, little water, poor access, a fragile environment).

Geophysical hazards

- The Earth's surface is broken into **tectonic plates** that move a few centimetres a year.
- Most volcanoes and earthquakes happen at **plate margins** :
- **Hazard risk** grows with three things: how strong and frequent the hazard is, how many people and buildings are in its path (**exposure**), and how easily they are harmed (**vulnerability**).
- Poverty, weak buildings and poor warning systems raise **vulnerability**.

$$\text{risk} = \text{hazard} \times \text{exposure} \times \text{vulnerability}$$

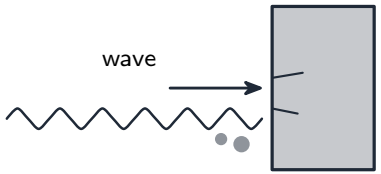
Fieldwork: geographic inquiry and sampling

- The fieldwork report is worth 25% at SL and 20% at HL.
- It is a report of up to 2,500 words, marked out of 25, on **primary data** that you collect yourself in the field.
- You cannot measure everything, so you take a sample:
- **Worked example.** Question: *Does the number of pedestrians fall with distance from the central square?* **Hypothesis**: pedestrian numbers fall as distance increases.

$$r_s = 1 - \frac{6\sum d^2}{n(n^2-1)} = 1 - \frac{6 \times 158}{8 \times 63} = 1 - \frac{948}{504} \approx -0.88$$

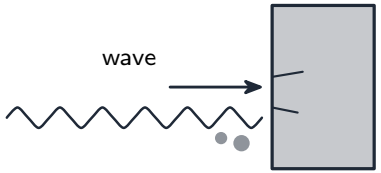
Exercise 2.1

2.1 Distinguish between **hydraulic action** and **abrasion**. [2]



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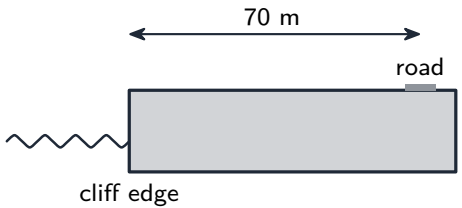


2.1

hydraulic action: the force of water, and air compressed in cracks, breaks the rock apart;
abrasion: rocks and sand carried by waves are thrown against the cliff and wear it away

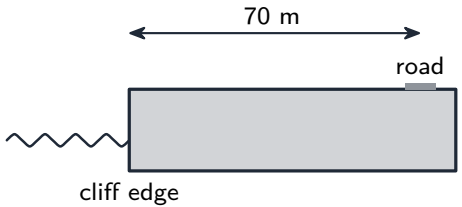
Exercise 2.2

2.2 A cliff on the Holderness coast retreats about 2 m a year. A road is 70 m from the cliff edge. Calculate how many years it will take for the edge to reach the road, and give **one** reason why it could be sooner. [3]



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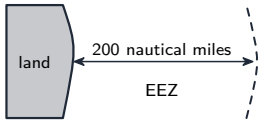


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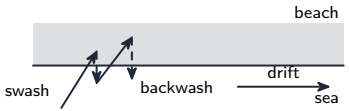
$70 \div 2 =$ **35** years; any one: storms remove large pieces in one event / sea-level rise / groynes up the coast reduce the sand reaching this beach

Exercises 2.3·2.4

2.3 Define an **exclusive economic zone** (EEZ). [2]

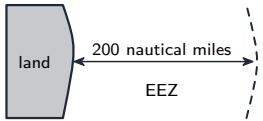


2.4 Explain how **longshore drift** moves sand along a beach. [3]



Exercises 2.3·2.4

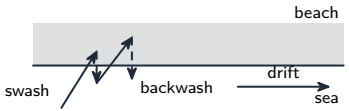
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the area of sea up to 200 nautical miles from a country's coast; in which the country controls resources such as fishing, oil and gas

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2.4

waves approach at an angle, set by the main wind direction; the swash carries sand up the beach at that angle, and the backwash pulls it straight back down the slope; repeated many times, the sand moves in a zig-zag along the coast in the direction of the main waves

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Exercise 2.5

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any two, explained: roots slow waves and hold mud, so they protect coasts from storms and erosion; nurseries for young fish, which supports fishing and food; they store large amounts of carbon in mud, which helps limit climate change; wood, honey and tourism give income to local people

Exercise 3.1 (a)

3.1 *(Paper 1 style.)* The diagram shows a coast where groynes were built to protect a village.

(a) Using the diagram, identify the direction of longshore drift and give **one** piece of evidence. [2]

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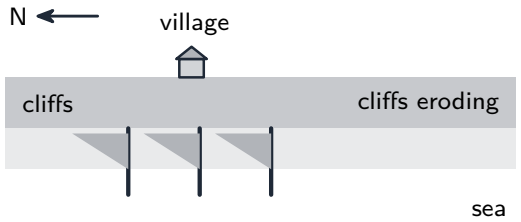
(a) Using the diagram, identify the direction of longshore drift and give **one** piece of evidence. [2]

(a) from north to south; sand has built up on the north side of each groyne

Exercise 3.1 (b)

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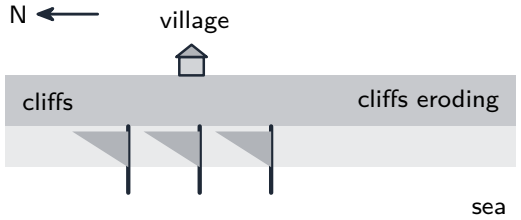
(b) Explain why the cliffs south of the groynes are eroding faster than before. [4]



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(b) the groynes trap sand moving south by longshore drift; so less sand reaches the beach further south; a smaller beach absorbs less wave energy; so more wave energy reaches the soft clay cliffs, which erode faster (the Mappleton effect on Holderness)

Exercise 3.2

3.2 "Managed realignment is the best way to manage coasts in the future." Discuss this statement. [10]

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Mark with the markbands: [9-10] focused on the command term, detailed and accurate knowledge, well-developed explanation, specific named examples (places, dates, numbers), balanced evaluation and a supported conclusion; [7-8] mostly focused, good knowledge and examples, some evaluation; [5-6] relevant knowledge and examples, explanation partly developed, little evaluation; [3-4] general knowledge, few examples, mostly description; [1-2] little that is relevant. Points that may be included: managed realignment works with nature: at Medmerry (2013) defences were moved inland and a salt marsh formed; the marsh absorbs wave energy and protects homes behind it, and creates habitat for birds; cheaper over time than repairing hard defences as sea levels rise; but farmland and some homes are lost, and owners may not be paid enough; it needs low, empty land, so it does not suit cities or ports; hard engineering protects high-value places: sea walls

and groynes protected Mappleton village; but hard defences are costly, reflect waves and move erosion along the coast; mangrove planting is a soft option on tropical coasts; conclusion: realignment is the best choice for low-value rural coasts, but cities will still need hard defences, so a mix will be used