Exercise walk-through

3.2
Option: Oceans and coastal margins

International Baccalaureate · IB Diploma · Geography · HL

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**.

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

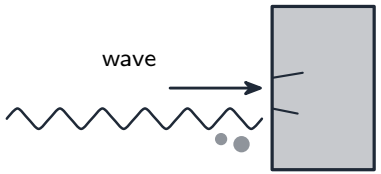
Fieldwork: geographic inquiry and sampling

- 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.

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

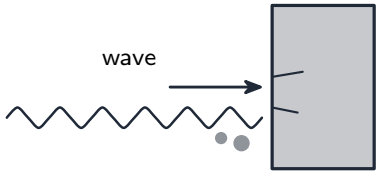
Exercise 2.1

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



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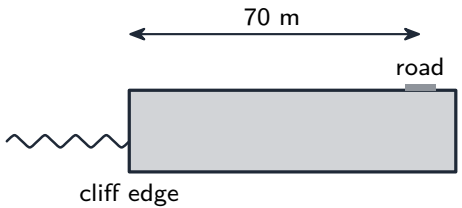


2.1

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

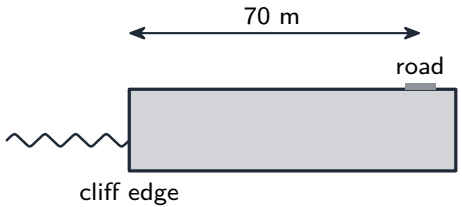
Exercise 2.2

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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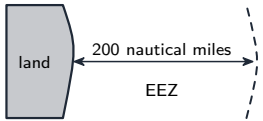


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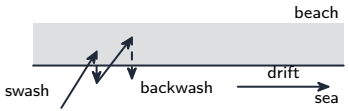
$70 \div 2 =$ **35** years; any one: storms remove large pieces in one event / sea-level rise / groynes up the coast reduce the sand reaching this beach

Exercises 2.3·2.4

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

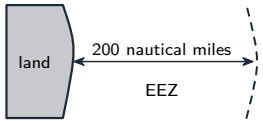


2.4 Explain how **longshore drift** moves sand along a beach. [3]



Exercises 2.3·2.4

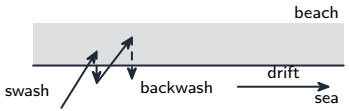
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2.3

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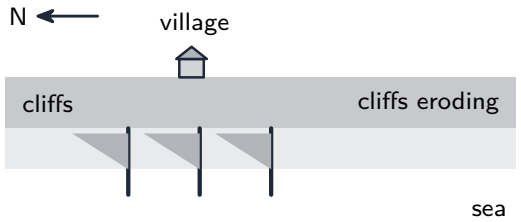
(a) Using the diagram, identify the direction of longshore drift and give **one** piece of evidence. [2]

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

Exercise 3.1 (b)

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

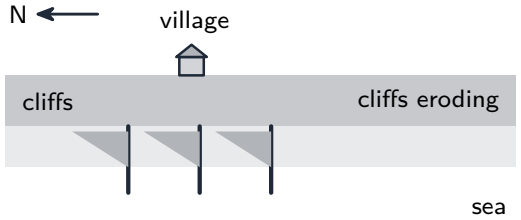
(b) Explain why the cliffs south of the groynes are eroding faster than before. [4]



Exercise 3.1 (b)

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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

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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