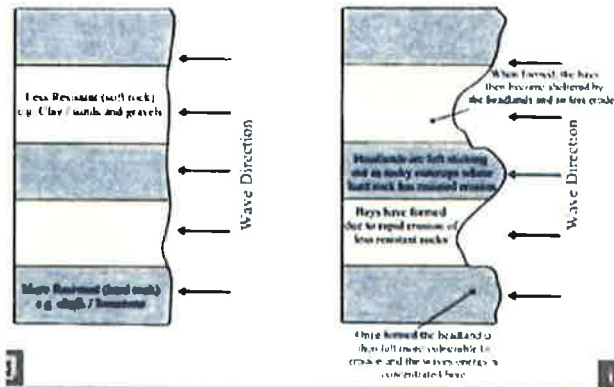


Topic 4A: Coastal Change and Conflict

Headlands and bays: Bays form due to rapid erosion of soft rock. Once formed bays are sheltered by headlands. Headlands are left sticking out where the hard rock has resisted erosion. Once formed however the headlands are more vulnerable to erosion. These are generally found along discordant coastlines.

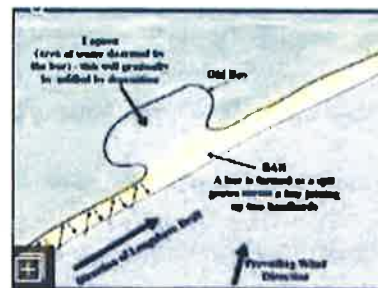
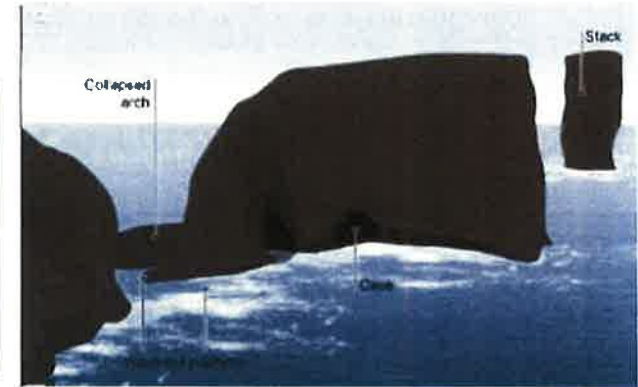
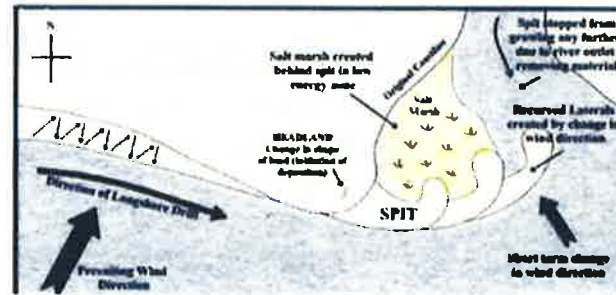


Hard rock coastal landforms created by erosion:

Caves, arches, stacks and stumps: A cave is formed when a joint/fault in a rock is eroded and deepens. This can then develop into an arch when two caves form back to back from either side of a headland and meet in the middle. When an arch collapses, it creates a stack. When a stack collapses it creates a stump.

Depositional landforms:

Beaches—can be straight or curved. Curved beaches are formed by waves refracting or bending as they enter a bay. They can be sandy or pebbly (shingle). Shingle beaches are found where cliffs are being eroded. Ridges in a beach parallel to the sea are called berms and the one highest up the beach shows where the highest tide reaches. **Spits**—narrow projections of sand or shingle that are attached to the land at one end. They extend across a bay or estuary or where the coastline changes direction. They are formed by longshore drift powered by a strong prevailing wind. **Bars**—form in the same way as spits, with longshore drift depositing material away from the coast until a long ridge is built up. However, bars grow right across the bay, cutting off the water to form a lagoon.



Exam questions:

1. Explain how a wave-cut platform is formed (4)
2. Briefly describe how spits are formed (2)
3. Explain the formation of a stack (6)
4. Explain how beaches are formed (4)

Hard rock coastal landforms created by erosion:

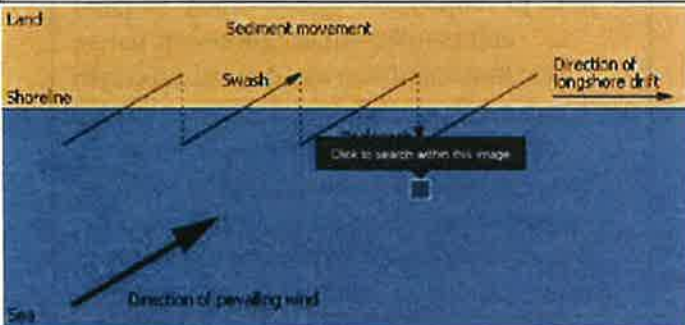
Wave-cut platform: A wave-cut notch is created when erosion occurs at the base of a cliff. As undercutting occurs the notch gets bigger. The rock will overhang the notch. The overhang will collapse and the cliff will retreat. This will create a wave-cut platform which is visible during low tide and submerged during high tide.

Transportation and deposition

Longshore drift— Waves approach the sea at an angle, swash pushes material up the beach at the same angle as the prevailing wind. Backwash carries the sediment back down the beach at a right angle due to gravity. This moves material along the coasts. Traction— large boulders are rolled along the sea Saltation—smaller stones are bounced along the sea floor.

Suspension—sand and small particles are carried along in the flow.

Solution—some minerals are dissolved in seawater. Deposition - Waves drop the material it is carrying as it loses energy, it generally happens in sheltered areas such as bays, in calm conditions and with a gentle gradient.

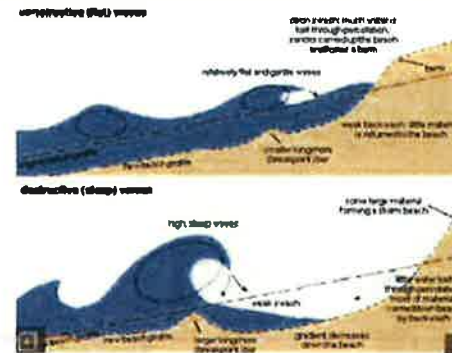


Exam questions:

1. Identify two landforms that are characteristic of discordant coasts (2)
2. Explain how the UK's climate contributes to coastal erosion (4)
3. Describe two ways in which waves erode a coast (2)
4. Explain how geological structure can influence the erosion of a coastal headland (4)
5. Explain the factors that lead to a fast rate of coastal retreat (4)
6. Draw a diagram to show the stages of freeze-thaw weathering (3)
7. Describe the differences between a constructive wave and destructive wave (4)
8. Explain the process of longshore drift (4)

Types of waves:

Constructive waves— Have a strong swash and weak backwash, small waves under 1m high. Encourage deposition.
Destructive waves—Strong backwash, weak swash, taller than 1m. Encourage erosion.



Concordant and discordant coasts—
Concordant coasts are made up of the same rock type, parallel to the sea. On discordant coasts have alternating rock types perpendicular to the sea forming headlands and bays.
Coastal retreat—when coasts move further in land as cliffs collapse into the sea due to erosion.



Rates of erosion:

This can be affected by: Geology, wave climate—fetch, direction, height, local currents and tidal range and groundwater levels—saturated cliffs are more vulnerable to erosion.

Three types of weathering:

Mechanical weathering— freeze-thaw is most common in colder climates. When the water freezes in joints and faults it expands and causes the faults and joints to widen and eventually break away.
Chemical weathering—this happens when the rocks mineral composition is changed. Granite contains feldspar which turns to clay when it reacts with water making it easier to erode. Limestone is dissolved by carbonation as it is alkali and sea water is acidic.
Biological weathering—Caused by plants and animals, this helps speed up erosion. Trees roots can cause cracks and faults to be created and bird poo (guano) can dissolve minerals in rocks.

Geography Knowledge Organiser **Coasts**





KPI Name:

To assess the effectiveness of coastal management strategies along a specific stretch of coastline.

8. Hard Engineering:

When man made structures are used to manage the coastline and slow erosion, it is called hard engineering.

Hard Engineering:

Method:	Description:	Advantages:	Disadvantages:
<p>Sea walls</p> 	<p>These are high, concrete walls which absorb the energy from waves.</p>	<p>They last a long time.</p> <p>They provide a walkway for tourists above the beach.</p>	<p>They are expensive.</p>
<p>Groynes</p> 	<p>These are long wooden fences which are built out to sea to prevent longshore drift, creating a barrier between the cliffs and the sea.</p>	<p>They are cheap (when they are made of wood).</p>	<p>They can increase erosion further along the coast.</p> <p>They need replacing regularly (when they are made of wood).</p>
<p>Rock armour</p> 	<p>These are large rocks which are placed at the base of cliffs to absorb the force of waves and stop cliffs from eroding.</p>	<p>These are more natural looking than other methods.</p>	<p>They can make areas of beach unappealing to tourists.</p>
<p>Gabions</p> 	<p>These are rocks or boulders which are kept in mesh cages by the coast. They protect areas from destructive waves.</p>	<p>They are cheap.</p>	<p>They are weak and need replacing regularly.</p>

Key words and terms:

Hard engineering:

The control of natural processes, such as erosion or flooding, by building man-made structures.

Soft engineering:

Projects which work with the environment to control natural processes, such as erosion or flooding.

Sand dune:

A hill of sand.

Salt marsh:

A partially flooded area near the coast which is flooded and drained by saltwater brought in by the sea.





Geography Knowledge Organiser Coasts**KPI Name:**

To assess the effectiveness of coastal management strategies along a specific stretch of coastline.

9. Soft Engineering:

When people work with the environment to manage coastal erosion, it is called soft engineering.

Soft Engineering:

Method:	Description:	Advantages:	Disadvantages:
Beach nourishment 	This is when beaches are built up by adding more sand to existing beaches to absorb the energy of the waves instead of cliffs.	Beaches look natural and can be appealing for tourists.	The sand has to be taken from other sites, often destroyed habitats. Sand has to be replaced regularly.
Sand dune regeneration 	Sand dunes are mounds of sand which are built around wooden structures to absorb the energy of the waves instead of cliffs.	The sand dunes can become habitats for animals and plants.	Sand dunes need regular maintenance.
Salt marsh creation 	This is when an area is allowed to flood , creating a salt marsh. This reduces the risk of flooding in other areas.	Salt marshes are habitats for many animal and plant species.	Some people lose land in order to create the salt marsh.
Managed retreat 	This is when existing defences are abandoned and new defences are built further inland.	Managed retreat does not require any new defences to be built.	Some people lose land to flooding.

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