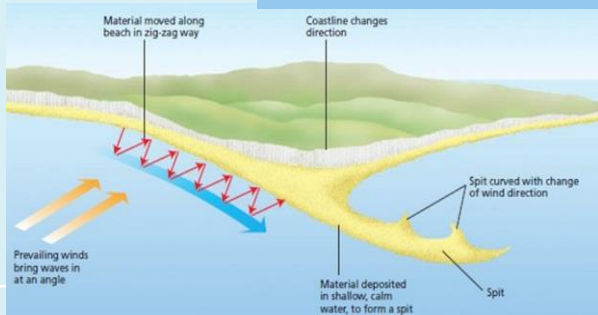


Formation of Coastal Spits - Deposition

Example: Spurn Head, Holderness Coast.



- 1) Swash moves up the beach at the angle of the prevailing wind.
- 2) Backwash moves down the beach at 90° to coastline, due to gravity.
- 3) Zigzag movement (Longshore Drift) transports material along beach.
- 4) Deposition causes beach to extend, until reaching a river estuary.
- 5) Change in prevailing wind direction forms a hook.
- 6) Sheltered area behind spit encourages deposition, salt marsh forms.

How do waves form?

Waves are created by wind blowing over the surface of the sea. As the wind blows over the sea, friction is created - producing a swell in the water.

Types of Weathering

Weathering is the breakdown of rocks where they are.

Carbonation	Breakdown of rock by changing its chemical composition.
Mechanical	Breakdown of rock without changing its chemical composition.

What is Deposition?

When the sea or river loses energy, it drops the sand, rock particles and pebbles it has been carrying. This is called deposition.

Types of Transportation

A natural process by which eroded material is carried/transported.




Solution	Minerals dissolve in water and are carried along.
Suspension	Sediment is carried along in the flow of the water.
Saltation	Pebbles that bounce along the sea/river bed.
Traction	Boulders that roll along a river/sea bed by the force of the flowing water.

Types of Erosion

The break down and transport of rocks - smooth, round and sorted.

Attrition	Rocks that bash together to become smooth/smaller.
Solution	A chemical reaction that dissolves rocks.
Abrasion	Rocks hurled at the base of a cliff to break pieces apart.
Hydraulic Action	Water enters cracks in the cliff, air compresses, causing the crack to expand.

Mechanical Weathering Example: Freeze-thaw weathering

Stage One		Stage Two	
Water seeps into cracks and fractures in the rock.		When the water freezes, it expands about 9%. This wedges apart the rock.	
		Stage Three	
		With repeated freeze-thaw cycles, the rock breaks off.	

Formation of Bays and Headlands

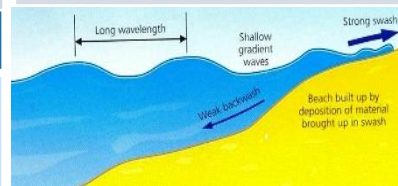


- 1) Waves attack the coastline.
- 2) Softer rock is eroded by the sea quicker forming a bay, calm area cases deposition.
- 3) More resistant rock is left jutting out into the sea. This is a headland and is now vulnerable to erosion.

Types of Waves

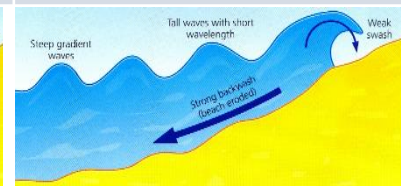
Constructive Waves

This wave has a **swash** that is **stronger** than the backwash. This therefore builds up the coast.

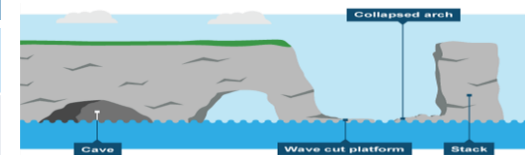


Destructive Waves

This wave has a **backwash** that is **stronger** than the swash. This therefore erodes the coast.



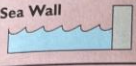

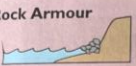
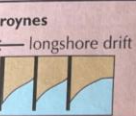

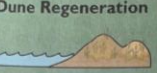
Formation of Coastal Stack



Example:
Old Harry
Rocks,
Dorset

- 1) Hydraulic action widens cracks in the cliff face over time.
- 2) Abrasion forms a wave cut notch between HT and LT.
- 3) Further abrasion widens the wave cut notch to form a cave.
- 4) Caves from both sides of the headland break through to form an arch.
- 5) Weather above/erosion below -arch collapses leaving stack.
- 6) Further weathering and erosion leaves a stump.

Hard and soft engineering strategies

	Defence	What it is	Benefits	Costs
Hard Engineering	Sea Wall	 A <u>wall</u> made out of a hard material like <u>concrete</u> that <u>reflects waves</u> back to sea.	It <u>prevents erosion</u> of the coast. It also acts as a <u>barrier</u> to <u>prevent flooding</u> .	It creates a <u>strong backwash</u> that <u>erodes</u> under the wall. <u>Expensive</u> to build and maintain.
	Gabions	 A <u>wall</u> of <u>wire cages</u> filled with <u>rocks</u> , usually built at the foot of cliffs.	Gabions <u>absorb wave energy</u> and so reduce erosion. They're <u>cheap</u> and <u>easy to build</u> .	They're <u>ugly</u> to look at and the wire cages can <u>corrode</u> over time.
	Rock Armour	 <u>Boulders</u> that are <u>piled up</u> along the coast. (It's also sometimes called <u>rip-rap</u> .)	It <u>absorbs wave energy</u> , reducing erosion and flooding. It's a fairly <u>cheap</u> defence.	Boulders can be <u>moved</u> <u>around</u> by <u>strong waves</u> , so they need to be <u>replaced</u> .
	Groynes	 Wooden or stone <u>fences</u> that are built at <u>right angles</u> to the coast. They <u>trap material</u> transported by longshore drift.	They create <u>wider beaches</u> which <u>slow</u> the <u>waves</u> . This gives greater protection from flooding and erosion. They're a fairly <u>cheap</u> defence.	They <u>starve beaches</u> further down the coast of sand, making them <u>narrower</u> . Narrow beaches don't protect the coast as well, leading to <u>greater erosion</u> .
Soft Engineering	Beach Nourishment and Reprofiling	 <u>Sand</u> and <u>shingle</u> from elsewhere (e.g. from the <u>seabed</u>) or from lower down the beach that's <u>added</u> to the upper part of beaches.	It creates <u>wider beaches</u> which <u>slow</u> the <u>waves</u> . This gives greater protection from flooding and erosion.	Taking material from the seabed can <u>kill organisms</u> like sponges and corals. It's a <u>very expensive</u> defence. It has to be <u>repeated</u> .
	Dune Regeneration	 <u>Creating</u> or <u>restoring</u> sand dunes by <u>nourishment</u> , or by <u>planting vegetation</u> to stabilise the sand.	Dunes create a <u>barrier</u> between land and sea and absorb wave energy, preventing flooding and erosion. <u>Stabilisation</u> is <u>cheap</u> .	The protection is <u>limited</u> to a <u>small area</u> . <u>Nourishment</u> is <u>very expensive</u> .

Erosion is a natural process which shapes cliffs. Over time, erosion can cause cliff collapse - therefore the coastline needs to be managed. **Hard engineering** involves building artificial structures which try to control natural processes. Each engineering strategy has its advantages and disadvantages.

Soft engineering does not involve building artificial structures but takes a more sustainable and natural approach to managing the coast. Each strategy has its advantages and disadvantages for use.

Question: "To what extent can the coastal management on the Holderness Coast be considered a success?"

1. **BUG** the question by boxing the command word and underlining the content you need to write about.
2. List the key vocabulary you will use.
3. Create a plan of what you would write in each paragraph.
4. Practice writing your answer from memory.
5. Don't forget about SPAG (spelling, punctuation and grammar)

How to find landforms on a map.

