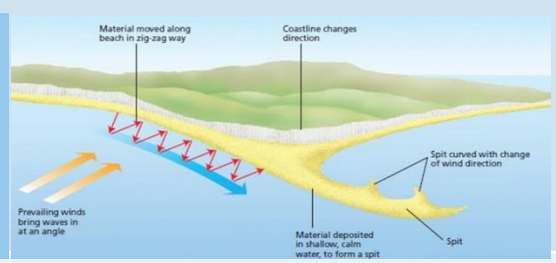
YEAR 8 COASTAL LANDSCAPES

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.

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.

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.

Mass Movement

A large movement of soil and rock debris that moves down slopes in response to the pull of gravity in a vertical direction.

1	Rain saturates the permeable rock above the impermeable rock making it heavy.
2	Waves or a river will erode the base of the slope making it unstable.
3	Eventually the weight of the permeable rock above the impermeable rock weakens and collapses.
4	The debris at the base of the cliff is then removed and transported by waves or river.

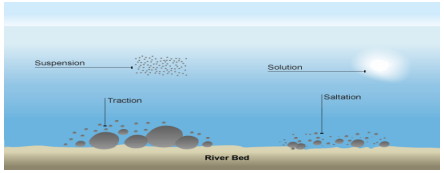
Types of Weathering

Weathering is the breakdown of rocks where they are.

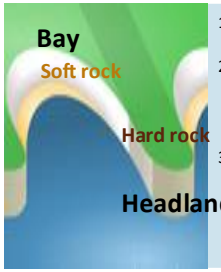
Chemical	Breakdown of rock by changing its chemical composition.
Physical	Breakdown of rock without changing its chemical composition.
Biological	The breakdown of rocks through the action of plants and animals

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.



Formation of Bays and Headlands



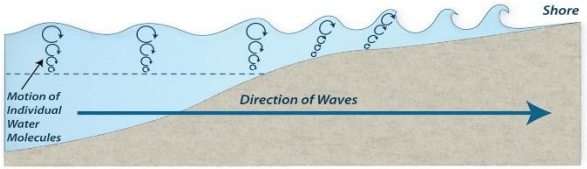
1) Waves attack the coastline.
2) Softer rock is eroded by the sea quicker forming a bay, calm area cases deposition.
3) More resistant rock is left jutting out into the sea. This is a headland and is now more vulnerable to erosion.

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.

Why do waves break?

1	Waves start out at sea.
2	As waves approaches the shore, friction slows the base.
3	This causes the orbit to become elliptical.
4	Until the top of the wave breaks over.



Mechanical Weathering Example: Freeze-thaw weathering

Stage One
Water seeps into cracks and fractures in the rock.

Stage Two
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 Coastal Stack

Example: Old Harry Rocks, Dorset

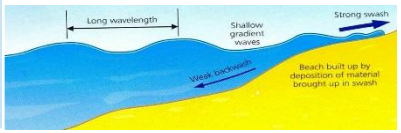
1) Hydraulic action widens cracks in the cliff face over time.
2) Abrasion forms a wave cut notch between HT and LT.
3) Further abrasion widens the wave cut notch to from a cave.
4) Caves from both sides of the headland break through to form an arch.
5) Weather above/erosion below –arch collapses leaving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

Size of waves

- **Fetch how far the wave has travelled**
- **Strength of the wind.**
- **How long the wind has been blowing for.**

Types of Waves

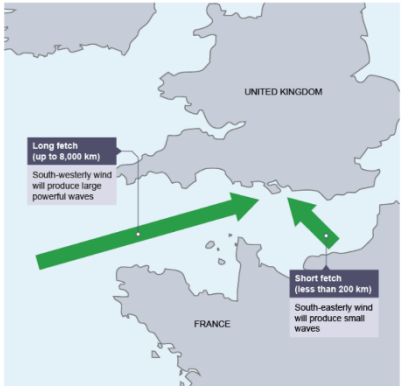
Constructive Waves	Destructive Waves
This wave has a swash that is stronger than the backwash. This therefore builds up the coast.	This wave has a backwash that is stronger than the swash. This therefore erodes the coast.



Coastal Defences

Hard Engineering Defences		
Groynes	Wood barriers prevent longshore drift, so the beach can build up.	✓ Beach still accessible. ✗ No deposition further down coast = erodes faster.
Sea Walls	Concrete walls break up the energy of the wave . Has a lip to stop waves going over.	✓ Long life span ✓ Protects from flooding ✗ Curved shape encourages erosion of beach deposits.
Gabions or Rip Rap	Cages of rocks/boulders absorb the waves energy, protecting the cliff behind.	✓ Cheap ✓ Local material can be used to look less strange. ✗ Will need replacing.
Soft Engineering Defences		
Beach Nourishment	Beaches built up with sand, so waves have to travel further before eroding cliffs.	✓ Cheap ✓ Beach for tourists. ✗ Storms = need replacing. ✗ Offshore dredging damages ecology.
Managed Retreat	Low value areas of the coast are left to flood & erode.	✓ Reduce flood risk ✓ Creates wildlife habitats. ✗ Compensation for land.

how long the wind has been blowing for



WAVES

When the wind blows over the sea, it creates waves. The size and energy of the wave depends on certain factors:

- the **fetch** - how far the wave has travelled
- the strength of the wind

In the UK this means:
Waves from the south west are much bigger and stronger than those from the south east.

Case Study: Southwold

Location and Background

Located on the East coast of Suffolk. The town is a popular sea resort for tourists to visit all year round.

Although once home to a number of different industries, Southwold's economy is mainly based on services, and particularly hotels, holiday accommodation, catering, and tourism.

With the surrounding areas largely given over to agriculture, the town is an important commercial centre for the area, with a number of independent shops, cafés and restaurants; and a market on Mondays and Thursdays.

Geomorphic Processes

- Geology-clay, silt, sand
- Southwold-beach is sand and shingle
- Longshore drift travels from north to south

Management

The town's front line sea defences were upgraded in 2005/2006 with a new coastal management scheme which included:

- a section of eight new short rock groynes to the north of the pier,
- eight new traditional timber groynes south of the pier,
- improvements to the promenade sea wall and beach recharge between the groynes.
- These works were justified in recognition of Southwold's economic status and value as a Blue Flag beach. Cost £7m