Coastal landscapes

What factors affect coastal erosion?

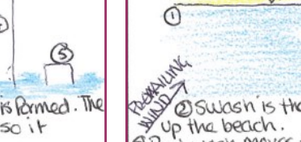
Types of wave
Destructive waves have a strong backwash to erode beaches. Constructive waves have a weak backwash so can not erode the beach as easily.

Geology
Types of rock. Hard rocks (like granite), erode at a much slow rate that soft rock (like sandstone)

Seasonality
This relates to the different seasons in the year (summer, spring, autumn and winter). In the winter months more storms bring bigger waves and freeze thaw weathering occurs.

Fetch
The UK has a prevailing wind that comes from the south west, across the Atlantic Ocean. This has a large fetch, which is the distance over which the wind blows over open water. (big fetch = big waves)

There are two types of wave:

Constructive	Destructive
	
Strong swash, weak backwash Deposition occurs Calm conditions, light winds Long in relation to height Gentle waves (6 to 9 per minute)	Strong backwash, weak swash Storm conditions, high winds Erosion rates are high High in proportion to length Frequent waves (11 to 15 per minute)

The effects of coastal recession

Background information:
The village of Happisburgh is located in North Norfolk
It is one of the fastest eroding coastlines in the UK.

Effects on people

Since 1995 approximately 25 houses have collapsed into the sea

House prices have dropped from £80,000 to £1

Beach road has been partially destroyed, making transport in the area difficult

There is a grade II listed lighthouse at Happisburgh the is close to being washed into the sea

Effects on the environment

Land is lost at a rate of about 5 metres per year

The sand dunes (at Sea Palling) are being eroded away – destroying natural habitats

Coastal defences

There are TWO types of coastal defence:

	Hard engineering	Soft engineering
Advantage	Very effective at stopping erosion Effective for many years Absorbs or reflects wave power	Less expensive than hard engineering methods Looks natural Little impact on the environment
Disadvantage	Expensive to build Unattractive and causes visual pollution May affect the natural environment	Short term option Often requires maintenance (long-term costly)

Types of hard and soft engineering

Sea wall—Hard engineering
This is a large wall built at the bottom of cliffs (sometimes curved) to absorb or reflect the waves energy

Rip-rap—Hard engineering
Large rocks placed in front of the cliff to absorb wave energy.

Groynes—Hard engineering
Wooden walls stretching out to sea to prevent longshore drift, so the beach stays. (the beach is a natural defence)

Beach replenishment—Soft engineering
The placing of sand and pebbles onto the beach (the beach is a natural defence)

Managed retreat—soft engineering
Land with no value is left to erode with no intervention

Cliff regarding—Soft engineering
Wooden walls stretching out to sea to prevent longshore drift, so the beach stays. (the beach is a natural defence)

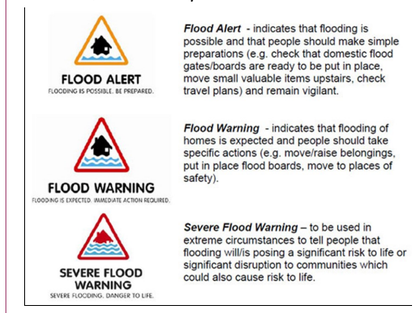
The Environment Agency

The Environment Agency also plays an important role in managing coastlines across the UK to reduce flooding. They have the following roles/ responsibilities:

Monitor sea levels across the UK

Provide assistance to areas experiencing floods (e.g. giving sandbags)

Provide flood warning to advise people when a flood is likely



Key processes

Erosion - The wearing away of rocks by the waves,

Hydraulic action - The force of water against the coast, wearing it away

Corrosion - The chemicals in the sea water slowly dissolve rocks on the coast

Attrition - Material carried by the waves bump into each other and are broken down into smaller particles.

Abrasion - Waves throw particles (rocks/sand) against the cliff rock, wearing it away

Deposition - This is the laying down or **dropping** of material that had been carried in the water. This can create a beach.

Sliding – This is similar to the slumping, however the land moves down a flat slope, not in a rotational way.

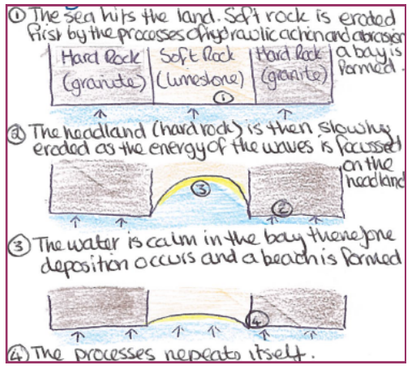
Slumping – When the ground becomes saturated (wet), and falls down a slope in a rapid movement. This occurs with a rotational (curved) movement

Solution – minerals are **dissolved** into the water and transported

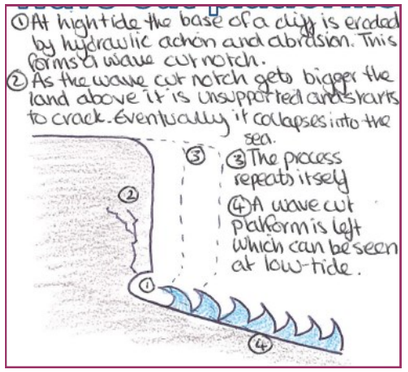
Suspension – small particles are carried **within** the water

Solution – minerals are **dissolved** into the water and transported

Bays and headlands



Cliffs and wave cut platforms



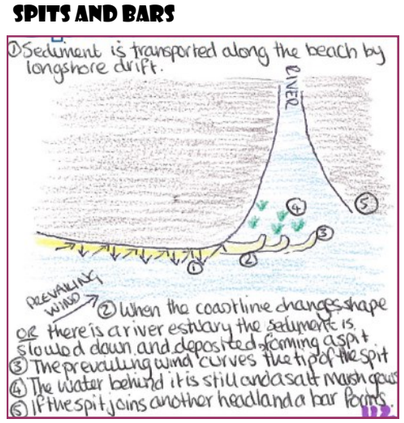
Beaches

- A beach is an area of land between the high tide and low tide levels on the coast.
- It is made up of sand, pebbles, mud and silt.
- A beach is created by constructive waves depositing material and usually ha

Cave, arch, stack, stump

Longshore drift

Spits and bars



Human and physical affects on the landscape

Example: Isle of Purbeck

Geology (physical)

The coastline is discordant with varying rock types. This leads to the creation of headlands (Ballard Point) and bays (Swanage Bay)

Erosion and weathering (physical)
Coastal erosion and weathering along the headlands (e.g. Ballard Point) has led to the creation caves, arches, stacks and stumps

Landslips (physical)
The coastline south of Ballard Point has frequent landslips causing coastal recession.

Tourism (human)
The coastline around Studland Bay is owned and protected by the National Trust. As it is a tourist hotspot, the National Trust limit the number of people who can come onto the beach, so they do not litter the area or cause human erosion.

Coastal defences (human)
Coastal defences have been built at Swanage Bay. 18 groynes have created larger beaches

Agriculture (human)
As farmland areas have been created, natural habitats have been taken over and deforestation of areas has taken place. Also old wetlands (marshland) are drained of water so that they can be used for farming

Urbanisation and industry (human)
As urban areas have been built, natural habitats have been built upon and deforestation of areas has taken place. Also old wetlands (marshland) are drained of water so that they can be built on.