



	Keyword	Meaning
1	Constructive Waves	Waves that have a weak swash and a strong backwash. They are less powerful. They have low energy and they build beaches.
2	Destructive Waves	Waves have a strong swash and a weak backwash. They are big strong waves made when the wind is powerful. They have high energy and they erode the coast.
3	Beaches	Formed by constructive waves. Sand beaches are flat and wide, shingle are steep and narrow.
4	Sand Dunes	Sand is moved by longshore drift, obstacles cause wind speed to drop so sand is deposited. Plants and grass grow (colonise). The embryo dune becomes a mature dune over time.
5	Spits	If there is a bend in the coastline, longshore drift continues and builds up a spit.
6	Hard Engineering	Man made structures used to protect coastlines from erosion and flooding. E.g. Sea wall
7	Soft Engineering	Working with the natural environment to protect coastlines from erosion and flooding. E.g. Beach renourishment
8	Holderness Coast	Fastest eroding coastline in Europe located in the NE of England. Due to rock type of clay and boulder and prevailing wind direction which moves sediment southwards.

## Types of Erosion

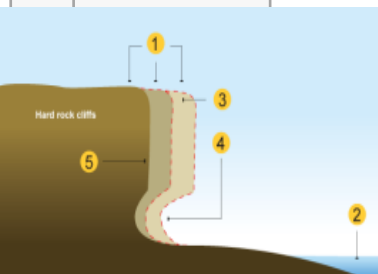
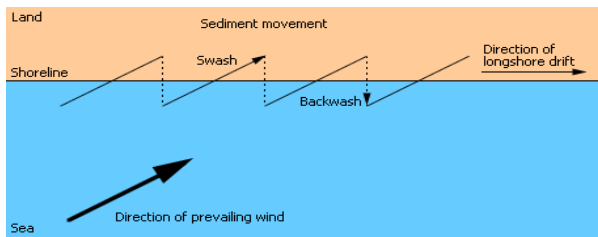
<b>Hydraulic action</b>	Air may become trapped in joints and cracks on a cliff face. When a wave breaks, the trapped air is compressed which weakens the cliff and causes erosion.
<b>Abrasion</b>	Bits of rock and sand in waves grind down cliff surfaces like sandpaper.
<b>Attrition</b>	Waves smash rocks and pebbles on the shore into each other, and they break and become smoother.
<b>Solution</b>	Acids contained in sea water will dissolve some types of rock such as chalk or limestone.

## Types of Weathering

Biological	Chemical	Physical
When plants wear away rocks because the roots get into the cracks. Or animals burrow into the cracks.	Carbon dioxide from the air dissolves into the rainwater making it acidic. Limestone and chalk are easily eroded.	Freeze thaw weathering is when water gets into a crack and freezes. As it freezes it expands and breaks the rock apart.

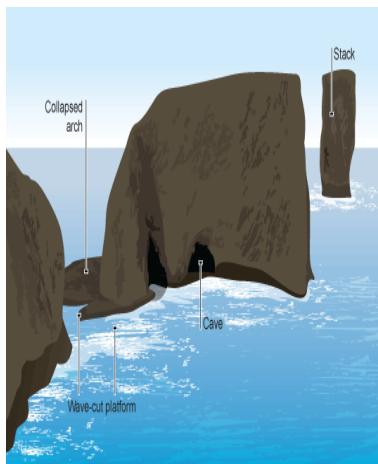
### Longshore drift

1. Waves approach the coast at an angle.
2. Swash carries sediment up the beach at an angle.
3. Backwash carries sediment down the beach with gravity – at right angles to the beach.
4. This creates a zig-zag movement of sediment along the beach.



### Wave cut platform

1. Weather weakens the top of the cliff.
2. The sea attacks the base of the cliff forming a wave-cut notch.
3. The notch increases in size causing the cliff to collapse.
4. The backwash carries the rubble towards the sea forming a wave-cut platform.
5. The process repeats and the cliff continues to retreat.

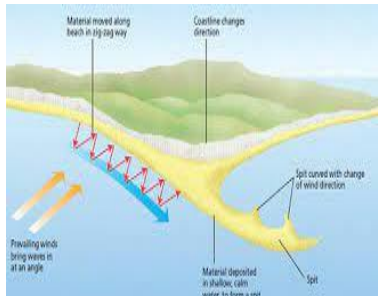


### Caves, Arches, Stacks and Stumps

1. **Caves** occur when waves force their way into cracks in the cliff face. Water contains sand and other materials that grind away at the rock until the cracks become a cave. This is hydraulic action.
2. If the cave is formed in a headland, it may eventually break through to the other side forming an **arch**.
3. The arch will gradually become bigger until it can no longer support the top of the arch. When the arch **collapses**, it leaves the headland on one side and a **stack** (a tall column of rock) on the other.
4. The stack will be attacked at the base in the same way that a wave-cut notch is formed. This weakens the structure and it will eventually **collapse** to form a **stump**.

### Formation of a spit

1. Longshore drift moves material along the coastline.
2. A **spit** forms when the material is deposited.
3. Over time, the spit grows and develops a **hook** if wind
4. direction changes further out.
5. Waves cannot get past a spit, which creates a
6. sheltered area where silt is deposited and mud flats or **salt marshes** form.



## Coastal Management Strategies

Defence	Advantages	Disadvantages
Sea wall	Straight and curved concrete walls built to reflect wave energy and protect land behind it.	Can be considered unattractive. Expensive – usually £5000-10000 per metre and need constant maintenance.
Groynes	Helps reduce longshore drift by trapping material. Wood groynes cost £100,000 each.	Wood groynes have a short lifespan and need replacing every 10-15 years.
Beach Renourishment	Maintains the size of the beach, absorbs wave energy. More attractive and natural. £2000 per metre.	Needs to be frequently replaced as it is easily washed away. Materials has to be dredged from elsewhere.
Managed retreat	Nature takes its course, less valuable land allowed to flood. Creates new habitats.	Often loses farmland, and requires compensation to be paid to the land owner.