

# Knowledge Organiser Coasts

**Coastal zone:** The coastal zone is the place where the land meets the sea.

## Wave types

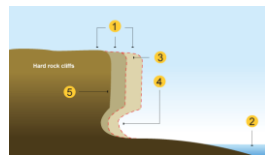
Destructive waves have a strong swash and a weak backwash. They are big strong waves made when the wind is powerful. They have high energy and they erode the coast.

Constructive waves have a weak swash and a strong backwash. They are less powerful. They have low energy and they build beaches.

Hydraulic action	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.
Abrasion	Bits of rock and sand in waves grind down cliff surfaces like sandpaper.
Attrition	Waves smash rocks and pebbles on the shore into each other, and they break and become smoother.
Solution	Acids contained in sea water will dissolve some types of rock such as chalk or limestone.

## Weathering

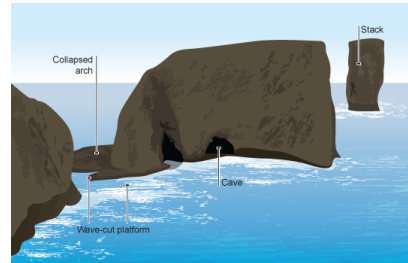
Biological	Chemical	Physical
When plants wear away rocks because the roots get into the cracks. Or animals burrow into the cracks.	Carbon dioxide from the air dissolves into the rainwater making it acidic. Limestone and chalk are easily eroded.	Freeze thaw weathering is when water gets into a crack and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



### Wave cut platform

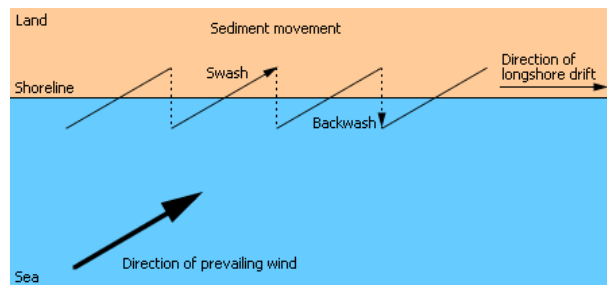
1. Weather weakens the top of the cliff.
2. The sea attacks the base of the cliff forming a wave-cut notch.
3. The notch increases in size causing the cliff to collapse.
4. The backwash carries the rubble towards the sea forming a wave-cut platform.
5. The process repeats and the cliff continues to retreat.

## 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**.

## 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.

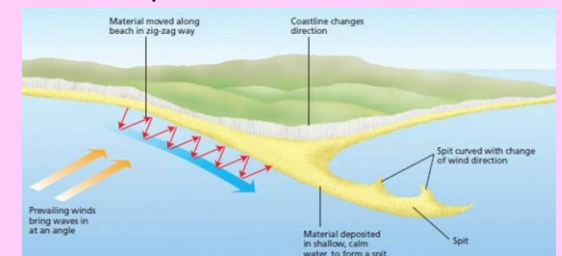
## Depositional landforms

1. **Beaches** - formed by constructive waves. Sand beaches are flat and wide, shingle are steep and narrow.
2. **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.
3. **Spits** - if there is a bend in the coastline, longshore drift continues and builds up a spit.

## Coastal management strategies

Hard Engineering	Soft Engineering
man-made structures e.g. Sea wall, gabions, rock armour, groynes. E.g. Sea wall—a wall made of concrete that reflects waves back to the sea. Positive—prevents flooding. Negative—creates a strong backwash. Expensive to build and maintain.	Beach nourishment, Dune regeneration E.g. Dune regeneration—creating sand dunes by planting vegetation to stabilise it. Positive: provides a barrier, is cheap. Negative - Nourishment is expensive and limited to a small area.

## 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 direction changes further out.
4. Waves cannot get past a spit, which creates a sheltered area where silt is deposited and mud flats or **salt marshes** form.