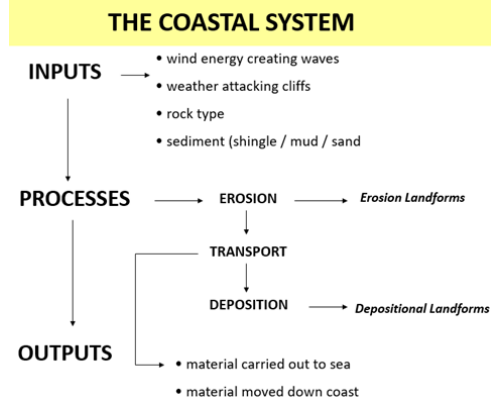


# COASTS

## 1. THE COASTAL SYSTEM

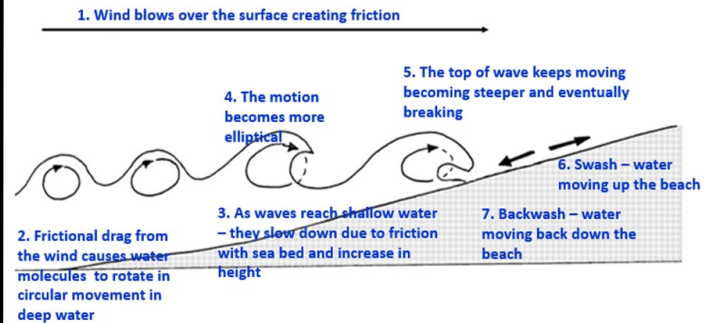
The coast is the **meeting point between the land and sea.**

These areas are **dynamic** — constantly changing due to **erosion, transport and deposition.**



## 2. WAVES AND WAVE TYPES

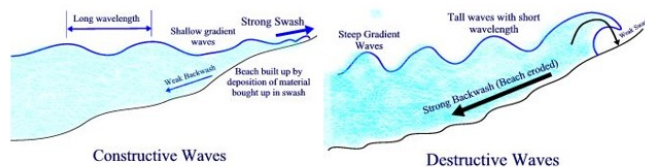
Energy driving change at the coast is from the wind which transfers energy to the sea creating waves.



The strength of wave is affected by (i) wind speed (ii) duration and (iii) the fetch

There are **TWO** types of waves..

Types of waves:



### Constructive Waves

- Low energy
- Low frequency (8-10 per minute)
- Gently sloping wave front
- Long wavelength
- Stronger swash than backwash

Tend to deposit / build up a beach

### Destructive Waves

- High Energy
- High frequency (10-14 per minute)
- Steep wave front
- Short wavelength
- Stronger backwash than swash

Tend to destroy / erode a beach.

## 3. WEATHERING AT THE COAST

Weathering is the **breakdown of rocks in situ** (i.e. where they are).

There are **2 main types of weathering at the coast:**

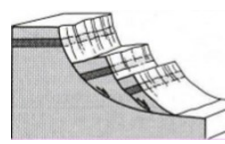
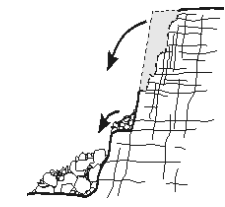
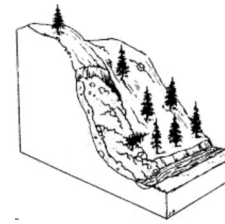
- **Chemical Weathering** — caused by chemical changes breaking up rocks or causing rocks and minerals to dissolve. Examples include:
  - Carbonation**
  - Oxidation**
- **Physical Weathering** — they physical disintegration of rocks into rock fragments. One example is **Freeze Thaw**—where water gets into cracks in the rock—when night temperatures fall below freezing, the water freezes, expands and puts pressure on the rock. The repeated freezing-thawing gradually breaks rock apart.

## 4. MASS MOVEMENT AT THE COAST

Mass Movement is when material moves downslope due to gravity.

Three main types at the coast:

1. **SLIDING** - occurs on pre-weakened cliffs. Often where heavy rain saturates the cliff and adds weight which results in material sliding downwards.
2. **ROCKFALLS** - cliff faces affected by freeze-thaw will have loose rocks falling and gathering at the base of the slope.
3. **SLUMPING** - material is rotated backwards into the cliff as it gives way.



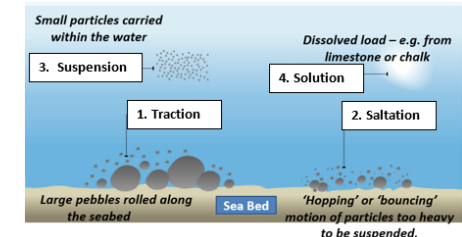
## 5. COASTAL EROSION

Erosion is the **breakdown and removal of rocks**

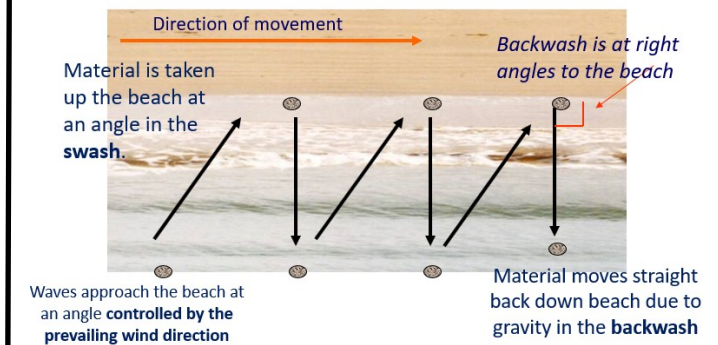
- **ABRASION** — rocks etc. are flung against the cliff by waves etc. gradually scraping the cliff face away.
- **ATTRITION** — rock fragments carried by waves get smaller and more rounded as they knock against each other.
- **HYDRAULIC POWER** — relentless battering of base of cliffs by waves can force water into joints and faults compressing air in them and causing mini-explosions breaking rock apart.
- **CORROSION (solution)** - the dissolving of soluble chemicals in rock by sea water

## 6. COASTAL TRANSPORT

Material held within the water will be moved in one of four ways (see diagram opposite).



Material moves along the coastline by **Longshore Drift** (see below)



## 7. COASTAL DEPOSITION

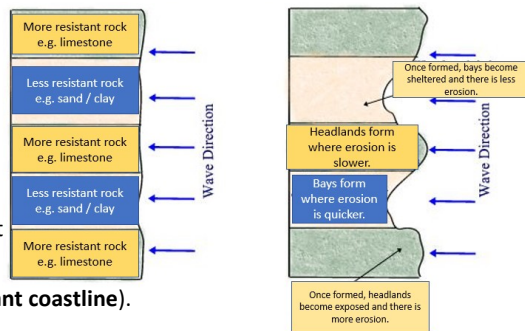
When water loses energy, material carried by the sea is deposited. This is common in a number of areas:

- Constructive waves (with a larger swash than backwash)
- Where wide beaches break the waves
- In sheltered bays
- Where coastal management e.g. groynes breaks the wave

### COASTS continued..

#### 8. EROSION FEATURES (i) BAYS AND HEADLANDS

Headlands and bays form where there is hard and soft rock at

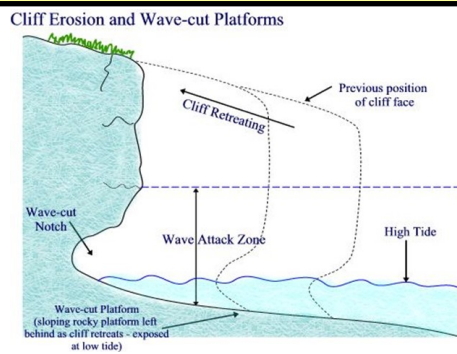


a (discordant coastline).

The hard rock erodes slower than the soft rock, sticking out as a headland. The softer rock erodes in to form a bay.

#### 9. EROSION FEATURES (ii) CLIFFS & WAVE-CUT PLATFORMS

- Maximum erosion is at the base of the cliff—creating a **wave-cut notch**
- The cliff is undercut and eventually will collapse
- The process is repeated & the cliff retreats
- Leaves behind a gentle-sloping area known as a **wave-cut**

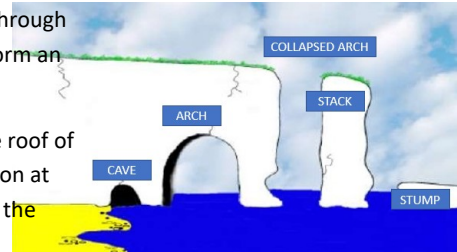


#### 10. EROSION FEATURES (iii) Erosion of a Headland

When a headland has formed it becomes exposed to more erosion and a sequence of erosion features **cave, arch, stack, stump**.

A cave is eroded through the headland to form an arch

Weathering of the roof of the arch and erosion at the base weakens the roof of the arch.



The roof of the arch collapses forming a stack. The stack eroded at the base by hydraulic action & abrasion & eventually collapses form a stump, covered at high tide.

#### 11. COASTAL DEPOSITION FEATURES

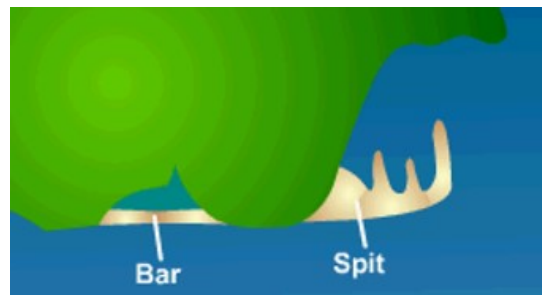
Where material is deposited at the coast several features may form.



**Sand Dunes** - mounds of loose sand formed as wind has blown

**Spit** - a ridge of land sticking out from the land into the sea.

**Bar** - a ridge of land which has grown across a bay joining two headlands



#### APPLYING YOUR KNOWLEDGE...

- Describe the main differences between destructive and constructive waves.
- Describe the main processes of coastal erosion.
- Explain how material is moved along a coastline
- Describe and explain how on feature of coastal erosion is formed.

*Now Challenge yourself even further!*

**Watch this video on coastal management** [https://timeforgeography.co.uk/videos\\_list/coasts/hard-engineering-approaches-coastal-management/](https://timeforgeography.co.uk/videos_list/coasts/hard-engineering-approaches-coastal-management/)

**This is hard engineering — what do you think soft is??**

**Question:** Why do you think some areas of coastline are protected from coastal erosion whilst others aren't?

#### OTHER RESOURCES

**BBC Bitesize —Coasts**

<https://www.bbc.co.uk/bitesize/topics/zs3ptyc>

**Class Clips (Video) - BBC Coasts** <https://www.bbc.co.uk/bitesize/topics/z6bd7ty/resources/1>

#### KS3 Schoology



Key Term	Definition
Abrasion	rocks scraping away against cliffs
Arch	An opening through a headland
Attrition	Rocks in the sea smash again each other breaking down
Backwash	The movement of material down a beach
Bay	Indent in the coastline between two headlands.
Bar	A strip of deposited material joining two headlands
Beach	Material lying between the high and low tide mark.
Cliff	Steep rock face along a coastline
Coast	The meeting point between the land and sea.
Concordant	Where the same type of rock is parallel to the coastline
Constructive Waves	Gentle, low energy waves, swash > backwash
Destructive Waves	Frequent, high energy waves, backwash < swash
Discordant Coastline	Different types of rock outcrop at 90o to the coastline
Deposition	Where material is dropped due to a loss off energy
Erosion	The breakdown and removal of rocks
Estuary	A tidal river mouth (where freshwater meets saltwater)
Fetch	Distance of open water over which the wind has blown
Headland	Resistant areas of land sticking out into the sea.
Hydraulic Power	Force of water hitting cliffs, breaks them down & waves force water into crack compressing air forcing rock apart
Load	The material carried by water
Longshore Drift	The movement of material along a coastline
Mass Movement	Material moving down slope due to the pull of gravity.
Prevailing Wind	The main direction from which the wind is coming from
Saltation	The 'hoping' / 'bouncing' motion of particles along the bed.
Solution	Dissolved load - e.g. from limestone or chalk
Stack	An isolated pillar of rock separated from a headland
Stump	Isolated section of rock in front of a stack
Suspension	Small particles carried within the water
Swash	The movement of material up a beach
Spit	Narrow ridge of sand/shingle sticking out from a coastline
Traction	Large pebbles rolled along the seabed
Wave-Cut Platform	Gently sloping rock platform often covered at high tide

To test yourself Read, cover ,write, check OR try this quizlet [tiny.cc/ks3coasts](https://www.tiny.cc/ks3coasts)