

## You need to know:

- how the processes of weathering and mass movement combine with the action of the waves in shaping the coast.

Student Book  
See pages 94–5

## Why do cliffs collapse?

Because of weathering – the weakening or decay of rock due to the action of weather, plants and animals.

Type of weathering	Example and description
<b>1 Mechanical (physical)</b> – the disintegration of rock	<p><i>Freeze-thaw</i></p> <p>Water collects in cracks in rock.</p> <p>At night, water freezes and expands, making cracks larger.</p> <p>As temperature rises, ice thaws and water seeps deeper into rock.</p> <p>Repeated freezing and thawing makes rock fragments break off. They collect as scree at the cliff foot.</p>
<b>2 Chemical</b> – caused by chemical changes	<p><i>Carbonation</i></p> <p>Rainwater absorbs CO<sub>2</sub> from the air becoming slightly acidic.</p> <p>Contact with alkaline rocks, e.g. limestone, produces a chemical reaction causing rocks to slowly dissolve.</p>
<b>3 Biological</b> – caused by the actions of flora and fauna	Plant roots grow in cracks in rocks, and animals (e.g. rabbits) burrow into weak rocks

## What is mass movement?

It's the downward movement (**sliding**) of weathered material and rock under the influence of gravity. Figure 1 shows some of the types of mass movement found at the coast.

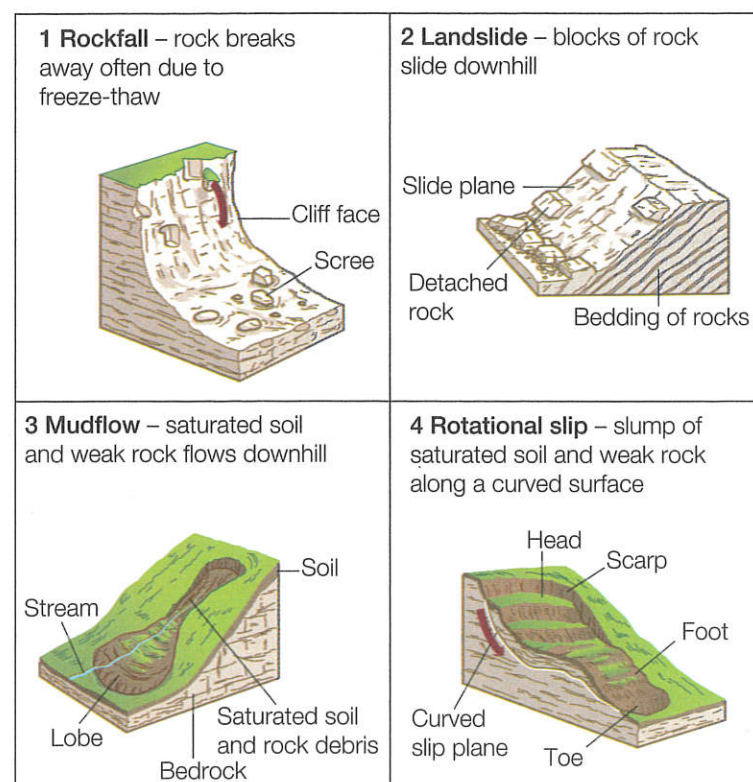


Figure 1 Types of mass movement at the coast



## Six Second Summary

- Weathering is the weakening and breakdown of rock.
- Three** main types are mechanical (physical), chemical and biological.
- Mass movement is the downward movement of material. **Four** main examples are rockfall, landslide, mudflow and rotational slip.



## Over to you

From memory, draw a diagram to show the process of freeze-thaw weathering. Add detailed labels.

## You need to know:

- how the processes of erosion and deposition combine with the action of the waves to shape the coast.

Student Book  
See pages 96–7

## What is coastal erosion?

**Erosion** means wearing away the landscape. The processes of coastal erosion are shown in the table.

<b>1 Solution</b>	Dissolving of soluble chemicals in rock, e.g. limestone
<b>2 Corrasion</b>	Rock fragments picked up by the sea are thrown at the cliff. They scrape and wear away the rock.
<b>3 Abrasion</b>	The 'sandpapering' effect of pebbles grinding over a rocky platform.
<b>4 Attrition</b>	Rock fragments carried by the sea knock against each other becoming smaller/more rounded.
<b>5 Hydraulic power</b>	The power of the waves as they hit a cliff. Trapped air is forced into cracks in the rock eventually causing it to break up.

Figure 1 Processes of coastal erosion

## Why is sediment deposited?

**Deposition** happens when water slows down and waves lose their energy.

- Beaches are formed of sediment deposited in bays.
- Mudflats and saltmarshes are often found in sheltered estuaries behind spits.



## Six Second Summary

- There are **five** processes of coastal erosion.
- There are **four** ways sediment is transported along the coast.
- Longshore drift moves sediment along the coast.
- Deposition happens when waves lose their energy.



## Over to you

From memory, draw a diagram to show the **five** processes of coastal erosion. Add annotations to explain the processes.

## How is sediment transported?

Sediment transport occurs in four different ways – see the diagram.

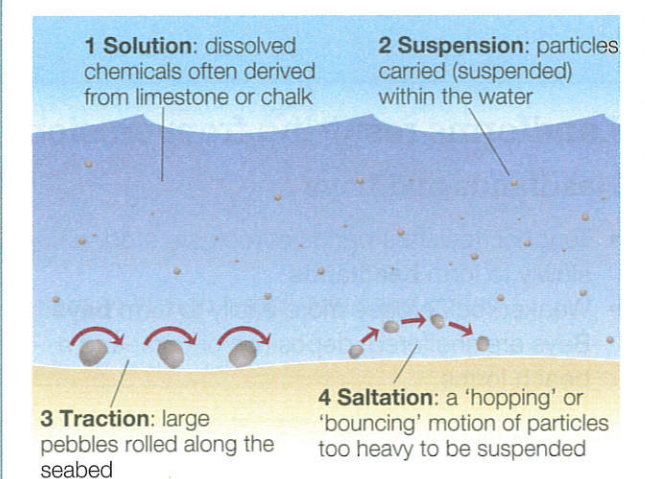


Figure 2 Types of coastal transport

## Longshore drift

The movement of sediment depends on the direction that waves approach the coast, as a result of the prevailing wind direction.

- Where waves approach 'head on' sediment moves up and down the beach.
- Where waves approach at an angle, sediment moves along the beach in a zigzag pattern. This is called **longshore drift**.

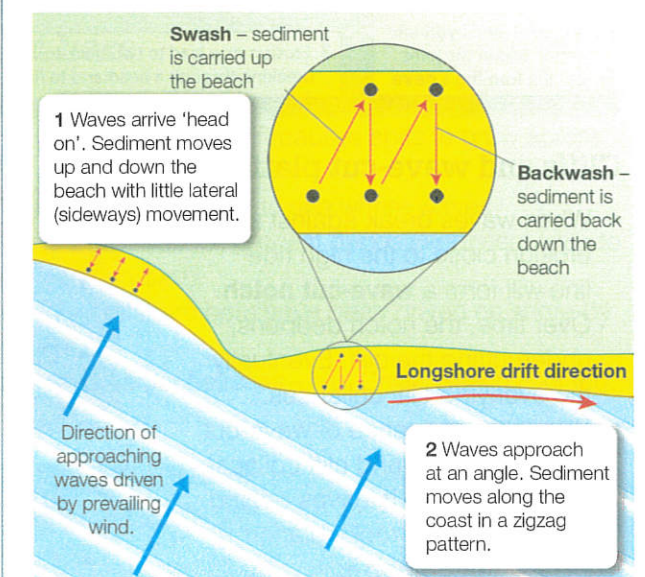


Figure 3 Longshore drift



## You need to know:

- that a landform is a natural feature formed by the processes of erosion, transportation and deposition
- about the characteristics and formation of coastal landforms.

Student Book  
See pages 98–9

## What factors influence coastal landforms?

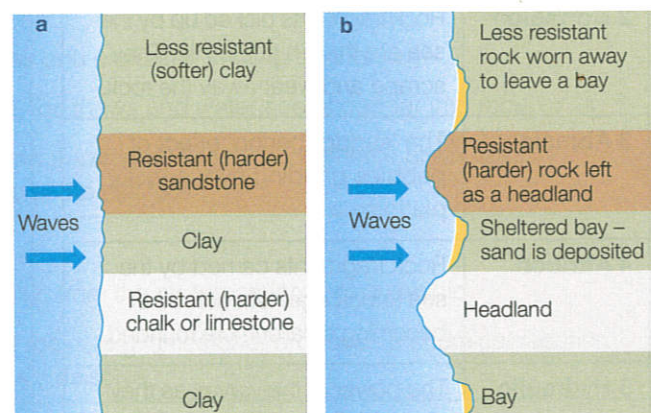
- 1 Rock type** – some rocks (e.g. granite, limestone) are tougher and more resistant to erosion than others. Softer rocks (e.g. clays, sands) are more easily eroded.
- 2 Geological structure** – includes the way that rock has been *folded* or tilted. *Faults* (cracks) form lines of weakness.

## Landforms resulting from erosion

## Headlands and bays

- Tougher, resistant bands of rock are eroded slowly to form **headlands**.
- Weaker rock erodes more easily to form **bays**. Bays are sheltered, deposition occurs, and a beach forms.

Figure 1 Formation of headlands and bays



## Caves, arches and stacks

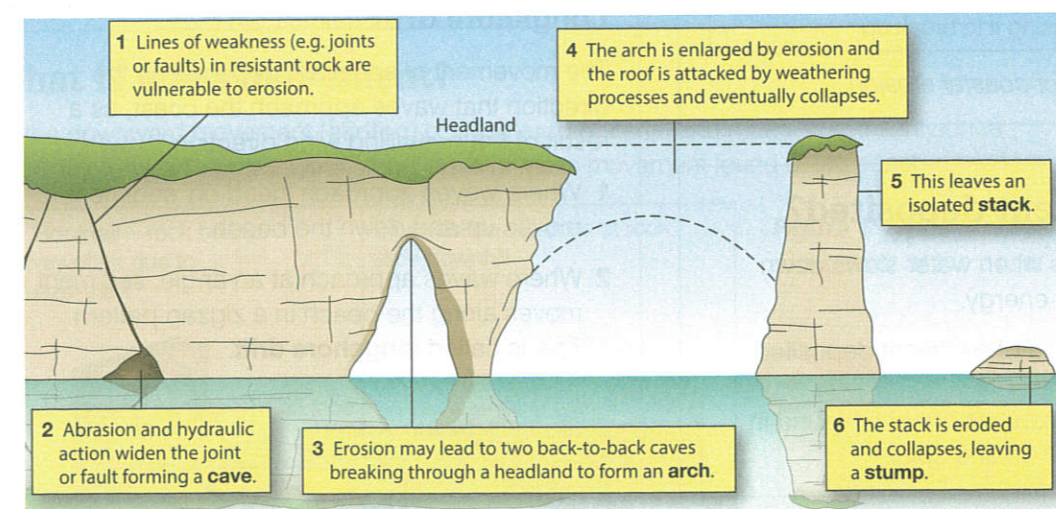


Figure 2 Formation of caves, stacks and arches

## Cliffs and wave-cut platforms

- When waves break against a **cliff**, erosion close to the high tide line will form a **wave-cut notch**. Over time, the notch deepens, undercutting the cliff. Eventually the overlying cliff collapses.
- Through a sequence of wave-cut notch formation and cliff collapse, the cliff retreats. It leaves behind a gently sloping rocky platform – a **wave-cut platform**.



## Six Second Summary

- Coastal landforms are influenced by rock type and geological structure.
- Different types of rock erode at different rates.
- Coastal erosion produces distinctive landforms.



## Over to you

- Close your book and name **five** coastal erosion landforms.
- Sketch an annotated diagram to show how **two** of them form.

## You need to know:

- about the characteristics and formation of landforms resulting from coastal deposition.

Student Book  
See pages 100–1

## Beaches

Beaches are deposits of sand and shingle.

- Sandy beaches are mainly found in sheltered bays and are created by constructive waves.
- Along high-energy coasts (e.g. England's southern coast) sand is washed away leaving behind a pebble beach.
- The diagram shows the profile of a typical sandy beach, including **sand dunes**.

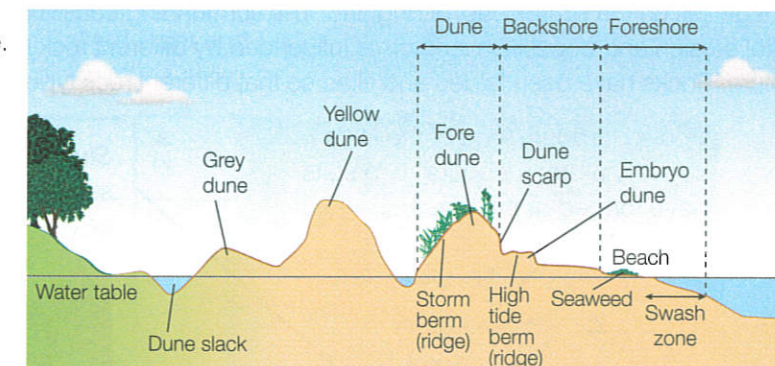


Figure 1 Cross-section through beach and sand dunes

## Sand dunes

At the back of the beach, sand blown inland can build up to form **dunes**.

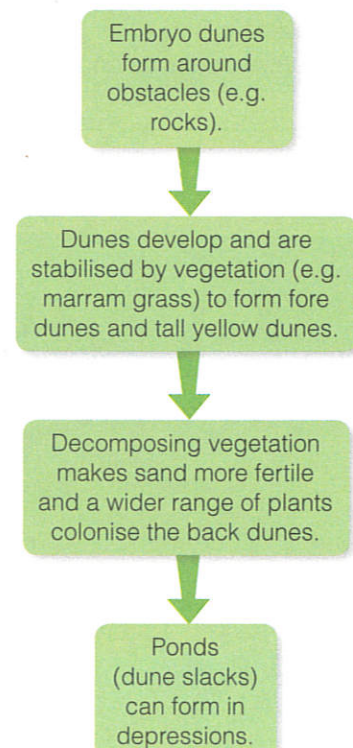


Figure 2 Development of sand dunes

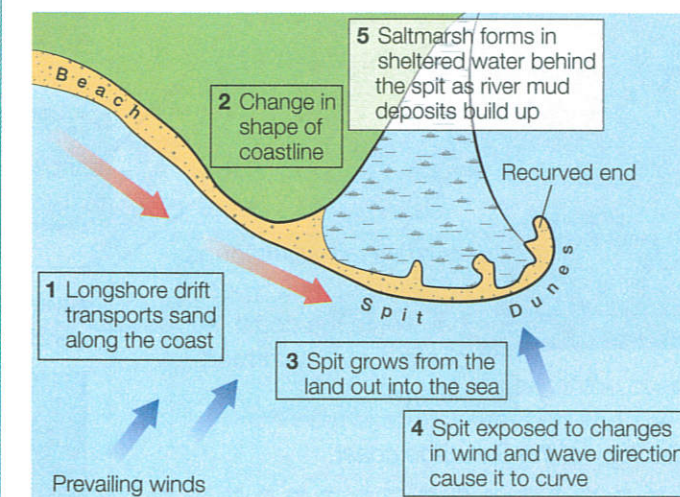


Figure 3 Formation of a spit

## Spits and bars

- A **spit** is a long finger of sand or shingle jutting out into the sea.
- **Bars** form when longshore drift causes spits to grow across a bay.
- **Offshore bars** form further out to sea where waves approaching a gently sloping coast deposit sediment (due to friction with the sea bed).
- In the UK, some offshore bars have been driven on shore by rising sea levels.
- These are called **barrier beaches** – e.g. Chesil Beach (Dorset).



## Six Second Summary

- Coastal deposition creates landforms such as beaches, sand dunes, spits and bars.



## Over to you

Create a word cloud of words to do with coastal deposition processes and landforms.



## You need to know:

- an example of a coastline in the UK
- how to identify if its landforms are caused by erosion and deposition.

Student Book  
See pages 102–3

## Swanage, Dorset

Swanage lies on the south coast of England. The surrounding coastline has a range of coastal erosion and deposition landforms influenced by different rock types and geological structure. Rocks have been folded and tilted so that different rock types reach the coast.

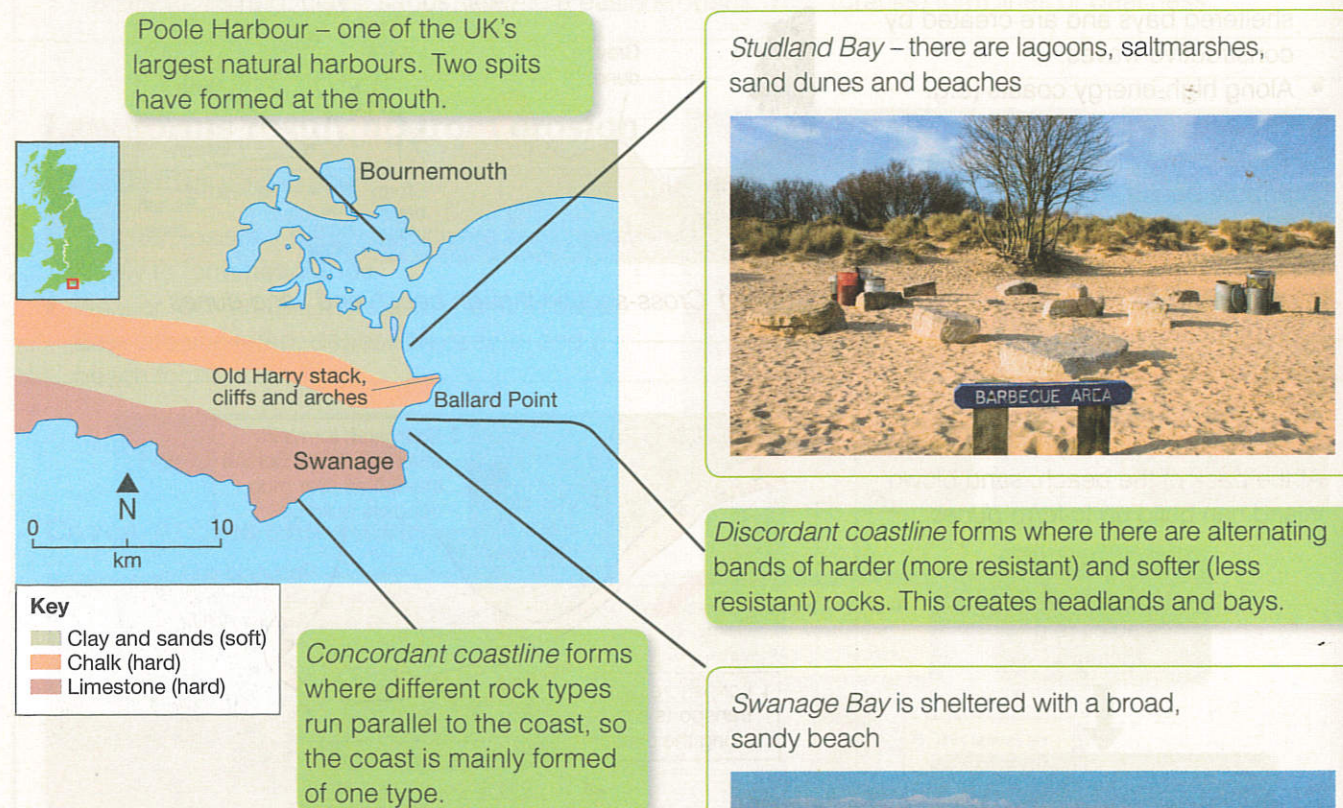


Figure 1 Geology of the Swanage coast

## Add a WOW! factor

Swanage sits on the Jurassic Coast – so-called because it is important from a geological point of view, and Jurassic is the name of a geological period.

## Six Second Summary

Different rock types and geological structure are important factors in the formation of erosional and depositional landforms around the coast near Swanage.

## Over to you

Learn this example!

- Where is Swanage?
- What factors affect the formation of the features on this coastline?
- What are concordant/discordant coasts? Which of these applies to Swanage?
- What coastal features can you identify and name?
- How have they formed?

## You need to know:

- how to use map and photo evidence to identify coastal landforms of erosion and deposition.

Student Book  
See pages 104–5

## Using an OS map extract and photo

Figure 1 is an extract from an OS map of the Swanage coast. Figure 2 is an aerial view of the coast between Ballard Point and the Foreland. See Figure 1 opposite for the geology of the area.



Figure 1 1:50 000 OS map extract of Swanage coast

## Big Idea

You need to be able to identify these features:

**headlands** – The Foreland (Handfast Point), Ballard Point, Peveril Point, Durlston Head

**bays** – Studland Bay, Swanage Bay, Durlston Bay

**beaches** – in Studland Bay and Swanage Bay

**stack** – Old Harry.



Figure 2 Aerial view of the coastline between Ballard Point and The Foreland

## Six Second Summary

OS maps can be used to identify landforms and to help interpret photos.

## Over to you

Create a spider diagram with **one** leg for each different type of landform (headland etc.) you can identify on the OS map.

Include one example for each type of landform with a 6-figure grid reference.

Colour code the landforms as either:

- erosion features
- deposition features.