

Coastal Landscapes

Wave Types

Learning objective:

-**Examine** the influence of waves

Learning Outcomes:

- Explain** how waves are *formed*
- Produce** a diagram and explain the key *characteristics* of a wave
- Compare** the key *characteristics* of constructive and destructive waves

The Big Picture – Coastal Landscapes

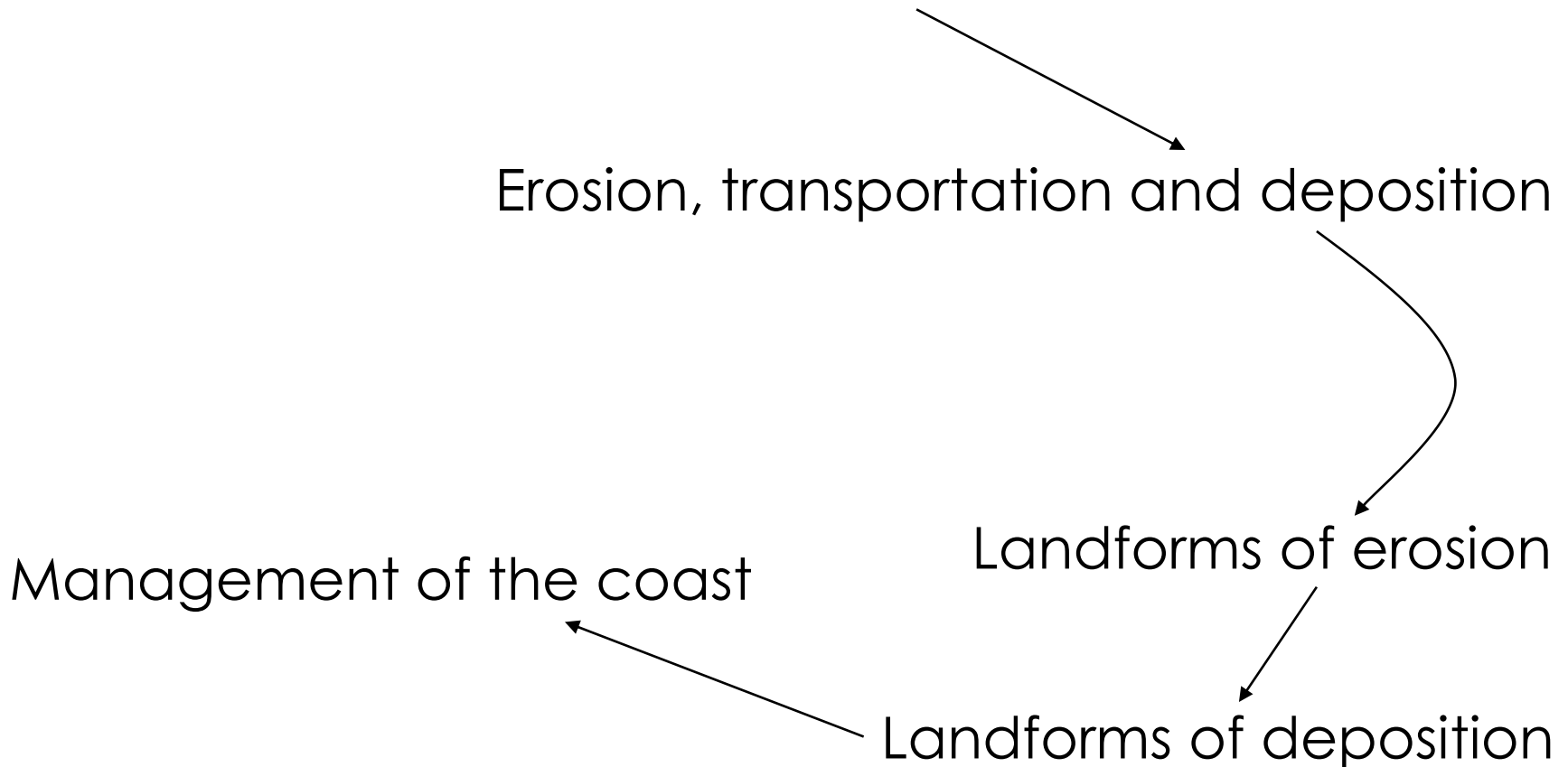
How the coastline is shaped by waves

Erosion, transportation and deposition

Landforms of erosion

Landforms of deposition

Management of the coast



To make waves...

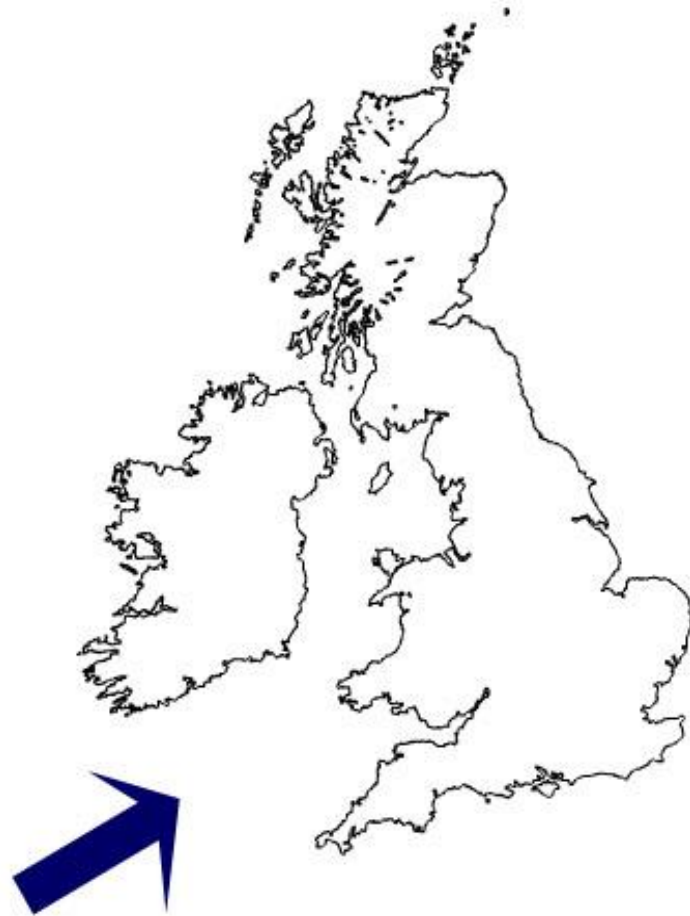
1. Wind blows over a lot of open water in the sea (the *fetch*)
2. The wind causes friction with the water surface
3. Ripples get bigger and develop into waves
4. The waves made are more powerful if there is a longer fetch



Why are waves generally larger in the south west?

Wave energy depends on the **fetch**, the **strength** of the wind and the length of **time** over which the wind has blown.

fetch = the distance over which the wind has blown



Other causes of waves?



Asian Tsunami 2004:

Shaking the seabed can also cause waves.

The waves are called tsunami's,

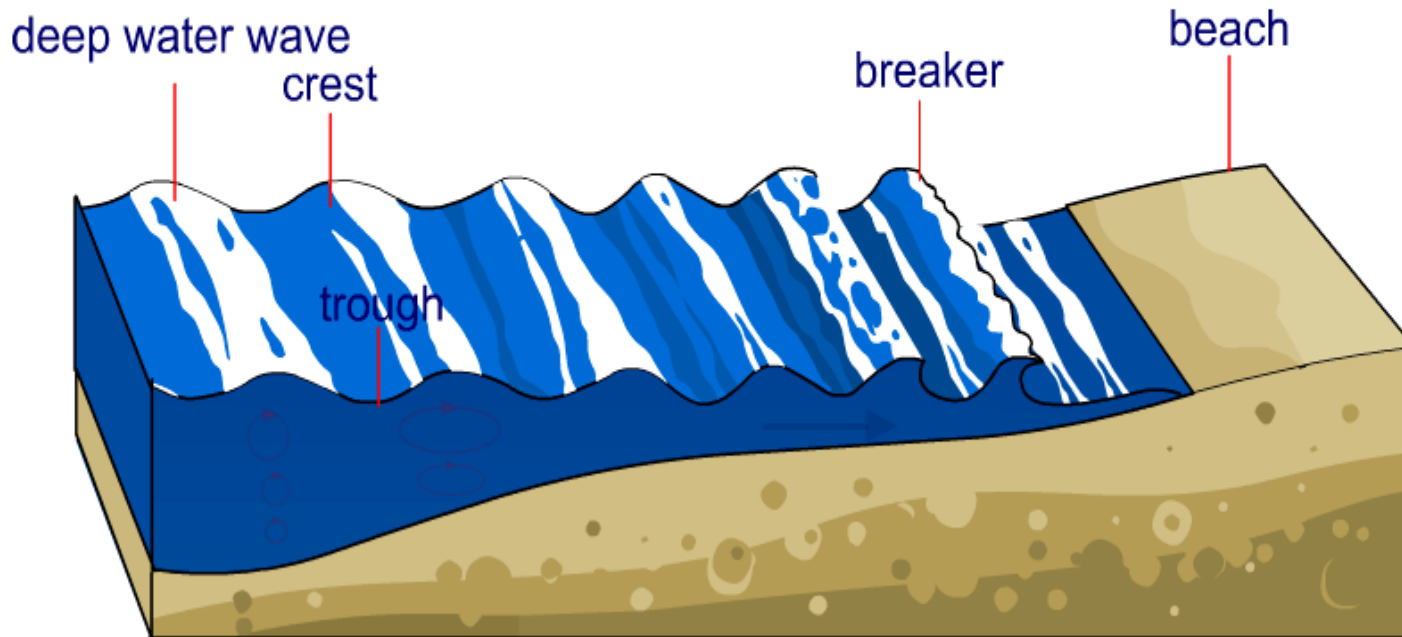
Very destructive
– 240,000 dead

Why do waves break?

wave length increases

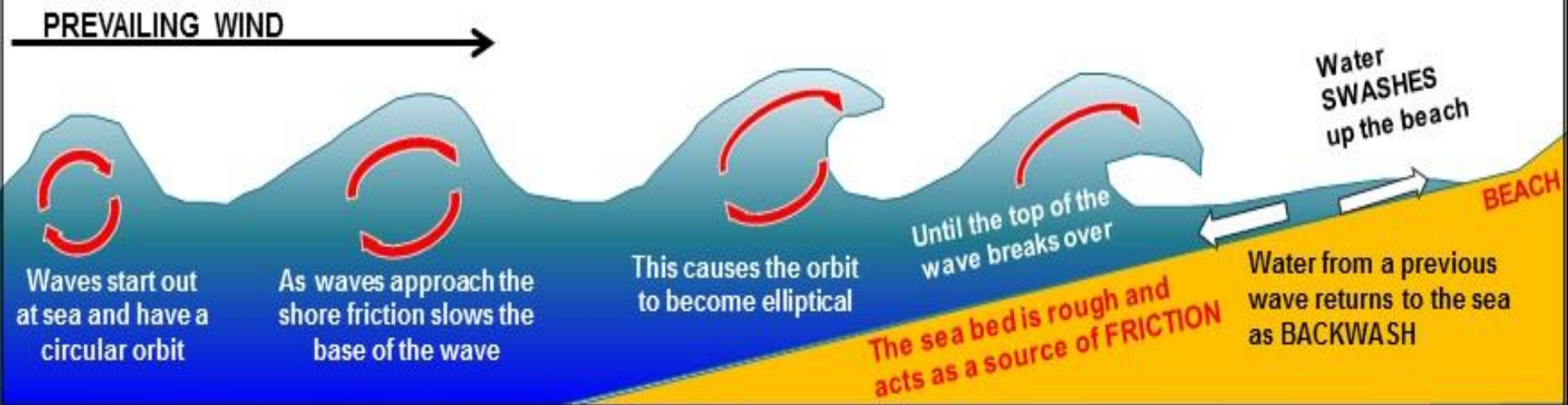


a.



The bottom of the wave touches the sand and slows down due to increased friction. The top of the wave becomes higher and steeper until it topples over.

Why waves break



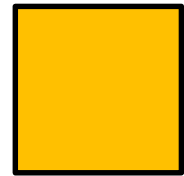
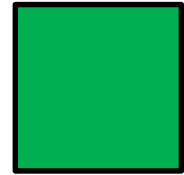
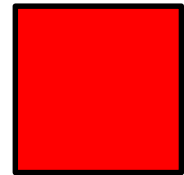
What happens when waves reach the coast?

1. Waves meet the coast and then there is a forward movement of water
2. The base of the wave is in contact with the seabed creating friction
3. The **crest** of the wave rises up and breaks as it moves faster than the base
4. The energy of the breaking wave rushing up beach is **swash**
5. Water flowing back to the sea is **backwash**

Explain what happens when waves reach the coast.

Try to include as many keywords from the list as you can.

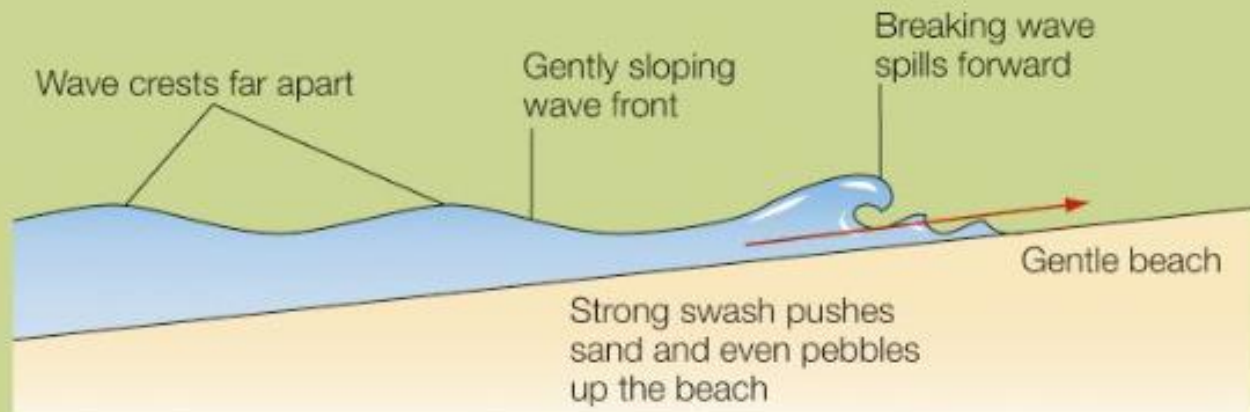
- waves
- elliptical
- circular
- seabed
- movement
- coast
- swash
- friction
- crest
- breaks
- breaker
- backwash



When *waves* meet the *coast* there is a forward *movement* of water. The wave *breaks* because the base is ...

Constructive waves

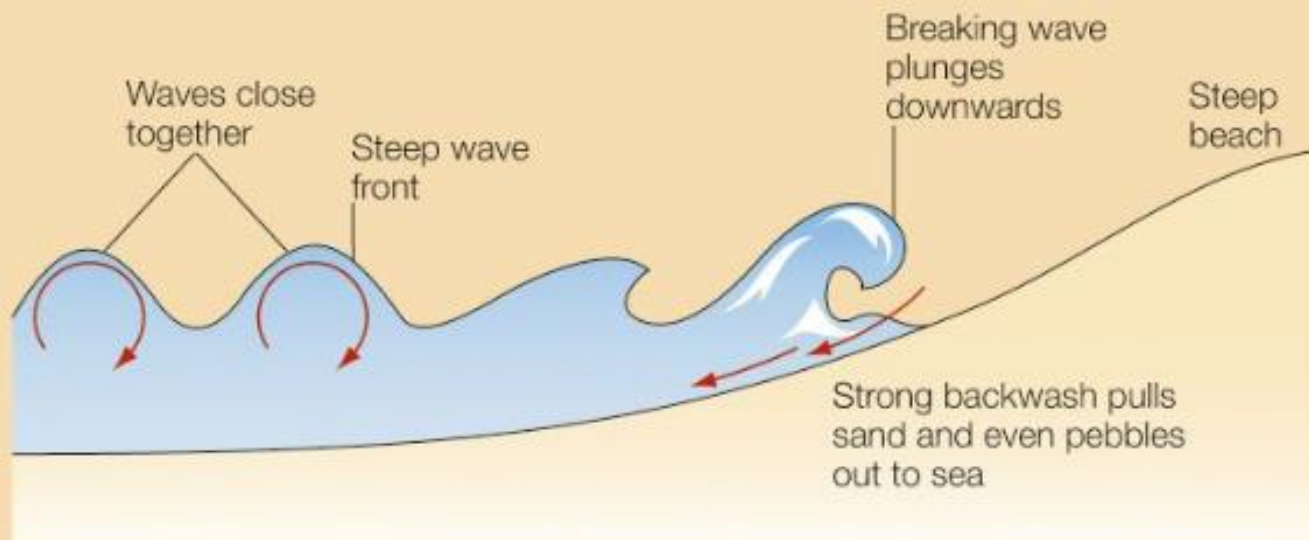
These are low waves that surge up the beach and 'spill' with a powerful swash (diagram **D**). They carry and deposit large amounts of sand and pebbles and 'construct' the beach making it more extensive. Surfers prefer constructive waves because they give longer rides (photo **A**)! These waves are formed by storms often hundreds of kilometres away.



D *Constructive waves*

Destructive waves

These are formed by local storms close to the coast, and they can 'destroy' the beach – hence their name. They are closely spaced and often interfere with each other producing a chaotic swirling mass of water. They become high and steep before plunging down onto the beach (diagram **E**). There is little forward motion (swash) when a destructive wave breaks but a powerful backwash. This explains the removal of sand and pebbles and the gradual destruction of the beach.



E *Destructive waves*



Odd one out?



Challenge Questions!

- Why is the SW of the UK a popular area for surfing?
- How else might waves be destructive?