

As you come into the classroom:

Have a look at this picture

Can you describe what you can see?

What do you think today's lesson is going to be about?





Coastal Defences

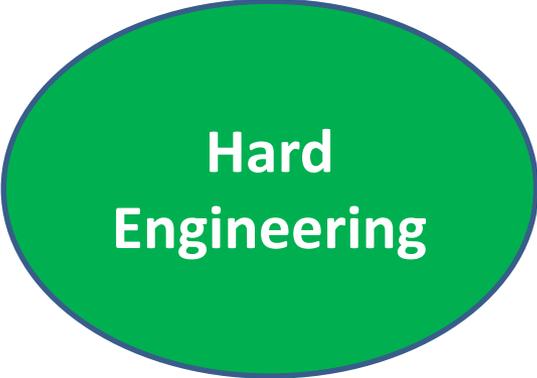
Lesson objectives:

C/D- To be able to state three different coastal defences

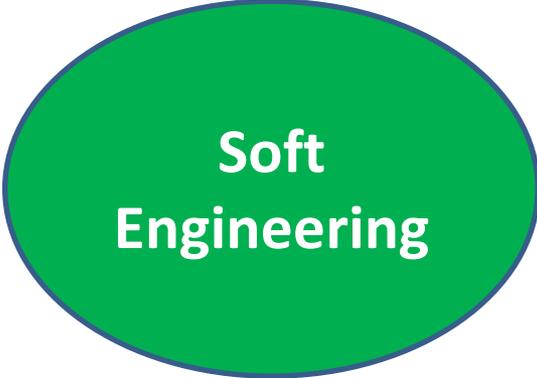
B- To be able to state at least 4 different coastal defences and give a positive and negative for each one

A/A*- To be able to do all of the above and be able to evaluate what you think is the effectiveness of the sea defences

There are two different types of coastal engineering:



**Hard
Engineering**



**Soft
Engineering**

What do you think these words could mean?

A technique involving the construction of significant man-made structures to manage the coastline.

e.g. Sea walls and Rock armour

Hard Engineering



Write down your own definition of **HARD** Engineering

Stretch and challenge: Write down a list of as many different HARD Engineering approaches you can think of.

Soft Engineering

A technique involving the construction of more environmentally friendly, less damaging and arguably more sustainable management solutions.

e.g. beach nourishment or managed retreat



Write down your own definition of **SOFT** Engineering

Stretch and challenge: Write down a list of as many different SOFT Engineering approaches you can think of.



GROYNES



DUNE REGENERATION



SEA WALL



BEACH NOURISHMENT



ROCK ARMOUR



MARSH CREATION (Managed retreat)



Resources

SEA WALL

Description



Concrete or rock barrier built at the foot of cliffs or at the top of a beach. Has a curved face to reflect the waves back into the sea. Usually 3-5m high

Cost

Up to £10 million per km (south sea zones)

<u>Advantages</u>	<u>Disadvantages</u>
<ol style="list-style-type: none">1. Effective at stopping the sea.2. Often has a walkway or promenade for people to walk along	<ol style="list-style-type: none">1. Can Block views and is unnatural to look at2. Very expensive to build and look after

GROYNES

Description



Timber or rock structures built out to sea from the coast. They trap sediment being moved by long shore drift and broaden the beach. The wider beach acts as a buffer to incoming waves, reducing wave attack on the coast.

Cost

Up to £5,000 per meter.

Advantages

1. A bigger beach can attract more tourist.
2. Provide useful structures for fishing
3. Not too expensive

Disadvantages

1. They stop other beaches from getting sediment and often lead to more erosion elsewhere. The problem is not so much solved but shifted
2. Groynes are unnatural and can be unattractive

ROCK ARMOUR

Description



Piles of large boulders dumped at the foot of a cliff. The rock force waves to break, absorbing their energy and protecting the cliffs.

Barges are used to transport the boulders by sea.

Cost

Approximately £1000-£4000 per meter

Advantages

1. Quite cheap and easy to look after
2. Can provide interest to the coast. Often used for fishing

Disadvantages

1. Rocks come from other parts of the coastline or even from abroad. Can be expensive to transport.
2. They do not fit in with local geology.
3. Can block views

BEACH NOURISHMENT

Description



Adding sand or shingle to a beach to make it higher or broader. The sediment is usually from local areas so that it blends in with the existing beach material.

Cost

Approximately £3000 per meter²

Advantages

1. Quite cheap and easy to maintain
2. Blends in with existing beach
3. A bigger beach can attract more tourists

Disadvantages

1. Needs constant maintain unless structures are built to retain the beach such as groynes.

DUNE REGENERATION

Description

Sand dunes are good buffers to the sea but they are easily damaged, especially by walkers. Marram grass can be planted to stabilise the dunes and help them develop. Areas can be fenced to keep people off newly planted dunes



Cost

Approximately £2000 per 100m

Advantages

1. Keeps a natural coastal environment that is popular with wildlife and people.
2. Quite cheap

Disadvantages

1. Takes time to plant the marram grass and fence of areas.
2. People do not like being stopped from accessing certain area
3. Can be damaged by storms.

MARSH CREATION (Managed Retreat)



Description

This involves allowing low-lying coastal areas to be flooded by the sea to become salt marshes. This is an example of managed retreat. Salt Marshes are effective barriers to the sea.

Cost

Depends on the value of the land. Arable land costs somewhere in the region of £5000 to £10,000 per hectare.

Advantages

1. A cheap option compared with hard engineering.
2. Creates habitat for wildlife

Disadvantages

1. Land will be lost as it flooded by sea water,
2. Farmers or landowners will need to be paid for this lost land.

GABIONS



Description

Cages of boulders built into the cliff face consisting of smaller rocks. These small rocks help to absorb the wave energy.

Cost

Approximately £350 per meter.

Advantages

1. Effective where dealing with severe erosion is taking place.
2. Cheaper than sea wall

Disadvantages

1. Environmental ugly (usually used in very large numbers)

WOODEN REVETMENT

Description

This is very similar to a Groyne. The wooden structure breaks the force of the wave and traps beach material behind it.

Cost

Approximately £1000 per meter.



Advantages

1. Effective at breaking the force of the waves,
2. Creates a bigger beach

Disadvantages

1. Environmentally ugly
2. Does not give total protection to base of a cliff
3. May need replacing quicker than other options