



How Resilient is our Coast? Become a Coastal Defender!

Primary Geography

Helen Bielec and Alex Scott

Shakespeare Primary, Fleetwood and JBA Trust

Specialist knowledge for teachers

The diverse coastline of Morecambe Bay supports communities, infrastructure and nature, including internationally protected habitats and wildlife. All these areas are vulnerable to the impacts of climate change, including sea level rise and increased frequency of storms which can cause flooding and erosion.

A report published by the UK Government's Climate Change Committee **Managing the coast in a changing climate** found that coastal communities, infrastructure and landscapes already face threats from flooding and coastal erosion and these threats will increase in the future. Long term commitment to sustainable coastal adaptation is needed to improve the resilience of coastal communities.

Coastal defences play a crucial role in protecting our coastline, safeguarding the local economies, habitats, historic landscapes and cultural heritage that are central to local identity and biodiversity. Alongside engineered flood defence structures like sea walls and rock armour, nature-based defences like salt marsh and sand dunes also have an important role to play in coastal resilience.

Enabling communities and habitats to become more resilient to climate risks will help them thrive now and in the future.

Our role play game 'Coastal Defenders' puts pupils at the heart of decision making - facing challenges as a team and using their resources and knowledge to protect their community and natural environment.

In the UK, the long-term strategy for managing risks from coastal erosion, flooding and sea-level risk is outlined in a Shoreline Management Plan (SMP).

It aims to balance environmental, economic and social costs and benefits of protecting the coastline and help guide decisions over 50-100 years. The coastline of Morecambe Bay is divided into different sections, each with their own SMP: **Rossall Point to Hodbarrow Point 11C | Shoreline Management Plans.**

The coastline at Fleetwood is a fantastic example of decision-making in action - here, the Wyre Beach Management Scheme is a £40 million coastal defence project that will reduce the risk of erosion and flooding to over 11,000 properties and critical infrastructure.

A high natural beach is an excellent coastal defence, however frequent storms have washed away a significant amount of beach material at Fleetwood. Lower beach levels allow bigger waves to break, increasing the risk of erosion and undermining sea defences and sea walls.

Engineered structures such as rock groynes reduce the energy of waves across the headland, helping stabilise the beach and keep beach material in place during stormy weather, protecting against erosion and overtopping.

Natural coastal habitats, like salt marsh and sand dunes, can also help to protect the shoreline by absorbing wave energy and stabilising sediments. They can be used in combination with traditional 'hard' engineering flood defences and offer many other benefits, sequestering carbon and improving biodiversity. Nature-based solutions can also involve the local community through **co-creation activities.**



▶ Although our resources focus on the coastline at Fleetwood, they can be transferred anywhere in Morecambe Bay. All the SMPs for the diverse coastal areas within Morecambe Bay can be found [here](#) and can be woven into our 'Coastal Defenders' game and teaching resources.

Our resources will immerse pupils in their local coastal environment, building their understanding of how people care for the coast, coastal processes, climate change and the impact of human decisions on communities and nature.

Curriculum aims and objectives

- Physical Geography (Erosion/Deposition): Understand how waves, wind, and human activity shape coastlines.
- Human Geography (Coastal Management): Examine why and how people protect the coast, including the costs and benefits of different strategies.
- Fieldwork & Mapping: Use maps to identify coastal features and observe coastal defences in the local area. Make maps to show coastal features and identify where coastal defences could be used.
- Sustainability: Discuss the environmental impact of coastal defences and long-term solutions.



The collaborative work and role play in the interactive game (Coastal Defenders) is complemented by prior learning about different types of sea defences, and beach visits learning about tides, developing their mapping skills and observing features of their coastal area.

Through meaningful outdoor experiences, children observe, explore and investigate geographical features in context, helping them to deepen their understanding of both physical and human geography.

The resources enable pupils to develop enquiry, fieldwork and teamwork skills, fostering a sense of responsibility and developing a personal connection to the local and global coastal environment. Children will be able to identify hard and soft sea defences, including nature-based solutions, and be able to give examples of how our coastal community can build resilience to the effects of climatic change of sea level rise, coastal erosion and flooding.

Head

Pupils will explore hard and soft sea defences, considering sustainability, trade-offs and their impact on local coastlines. They will build geographical skills through enquiry, fieldwork, and discussion, seeing themselves as positive changemakers.

Heart

Pupils connect learning to local climate issues. Through collaborative work and role play, children develop empathy, shared responsibility, and a personal connection to caring for their environment.

Hands:

In the Coastal Defenders game, pupils collaborate to decide how best to protect the coastline. Through hands on teamwork, they investigate climate related challenges, consider different viewpoints, and develop discussion, problem solving, critical thinking and empathy, before sharing their ideas in real world contexts.

Examples in Practice

Following a series of classroom and beach based activities, pupils will explore the challenges facing our coastline and develop an understanding of how the climate is changing and the impact it could have on their community.

Coastal Defenders – Interactive Role Play Game

This fun role play game uses physical materials to promote discussion and problem solving, and to encourage curiosity, critical thinking and empathy. Pupils explore different community perspectives in the context of making decisions to protect their coastline given realistic constraints and challenges (for example budget, time, and balancing the needs of different stakeholders). Our central game character is a Curlew (to be named by the pupils) who explains the game and the different coastal defences (both natural and engineered).

Our coast is a bit like a superhero with a strong shield. The shield helps protect it from big waves and storms.

But even superheroes can get tired or need repairs.

Our coast is strong, but we still need to look after it.



How to play

The rules!

You will be working in teams (~ 8-10)

At the start of the game, each team will have:

- 'Beach in a Box' to make your coastline
- Coastal Defences cards
- Tokens (your money to buy defences!)

1. Start by creating your coastline using the Beach in a Box resources
2. Use your defence/asset cards to decide what you're going to build and where it should go
3. Come and buy your defences from your teacher!
4. Place your defences on the map
5. Find out how people feel about your choices

WILD CARD

Budget cut!
The council has less money this year so your team must remove ONE defence.

IMPACT

Choose which defence is least important and remove it.
How does this affect flood and erosion risk?
How does it affect nature?

Fleetwood Beach (Credit: Helen Bielec)

Groynes

Groynes are timber or rock structures built at right angles to the beach. They are designed to interrupt the movement of sand and shingle along the coastline (longshore drift), trapping sediment and allowing the beach to build up over time.

By increasing beach levels, groynes help to reduce coastal erosion and provide greater protection from wave action.

However, they can lead to reduced sediment supply further along the coast, which may increase erosion in those areas.

Cost (per km)	£7 million
Carbon footprint	2
Lifespan of asset	20 years
Build time	12 months

Advantages	Disadvantages
Traps sand and shingle, helping to build up the beach Reduces coastal erosion	Can increase erosion further along the coast Requires ongoing maintenance

Adaptations to extend impact

Adaptations for younger pupils (KS1):

- Coastal Defenders Game – the game can be simplified by taking out or limiting the wildcards and storm cards. Focus on only two types of sea defences to create comparison opportunities.

Adaptations for place:

- Use images of your local area in the classroom slides and use local Shoreline Management Plans

Extension activities:

- Visit the MBC website for Beach School session ideas



For Further Information:

Some of the websites referenced can be found here:

- <https://www.theccc.org.uk/publication/managing-the-coast-in-a-changing-climate/>
- <https://environment.data.gov.uk/shoreline-planning/subsection/SMP22/11C>
- <https://research.lancaster-university.uk/en/publications/coastal-nature-lab-crafting-nature-based-solutions-for-community-/>
- <https://environment.data.gov.uk/shoreline-planning/subsection/SMP22/11C>

