

# Seawalls

## Designing Eco-Friendly Seawalls

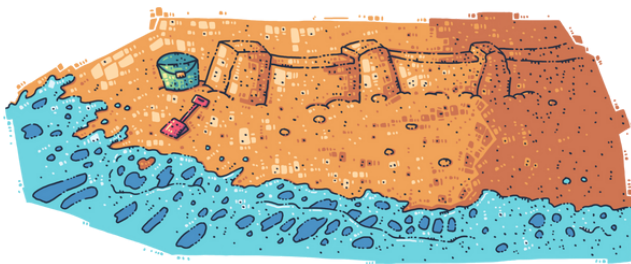
### Keywords:

seawalls, coastal protection, natural materials, sustainable design, erosion control

### Target group:

primary school pupils  
(ages 6-11)

### Objectives:



This activity introduces pupils to the concept of seawalls and their role in protecting coastal environments from erosion and storm damage. Pupils will explore how sustainable materials and nature-based design strategies can be used to create environmentally responsible coastal defences.

Through collaboration, model building, and storytelling, pupils will learn to combine practical protection with ecological awareness. By the end of the activity, they will be able to explain the function of seawalls, identify sustainable design elements, and present an eco-friendly seawall solution that reflects both scientific understanding and creative thinking.

### General Guideline on Time Allocation:

The duration needed to carry out this activity may vary depending on the specific group of children. Teachers are encouraged to adapt the implementation according to the needs, interests, and dynamics of the group.

In the preparatory phase, teachers may use a variety of activities to introduce and contextualize the chosen topic. These can include discussions, videos, drawings, storytelling, or even a field trip, depending on the age and background knowledge of the children.

The main construction phase, during which children plan and build their urban element using LEGO bricks, should typically not exceed 45 to 60 minutes. However, this phase often stimulates further curiosity and questions among the children, potentially leading to extended engagement or follow-up activities. For more detailed instructions and pedagogical support on how to implement activities of INNO-kids project, please download the Teacher's Methodological Guide.



## Materials and Resources Needed:

- Coastal maps or diagrams (to provide context and visualise different shoreline conditions)
- Whiteboard and markers (for group brainstorming and sketching designs)
- Craft materials: paper, coloured pencils, markers, glue, scissors (for planning and detailing)
- LEGO bricks or other construction sets (to build models of seawalls and coastal elements)
- Natural material samples: small stones, shells, twigs, sand, or plant fibres (for inspiration and integration into models)
- Design templates or grid paper (for planning scale models and layout)
- Tablets or computers with educational apps or simulation tools (to explore real-world seawall designs and test ideas virtually)

*Note: Encourage pupils to use a mix of natural and recycled materials creatively. If LEGO or digital tools are not available, pupils can sketch and build with basic materials and imagination.*

## Introduction:

Begin the activity by introducing the concept of seawalls and their purpose in protecting coastlines from erosion, storm surges, and rising sea levels. Use visual aids such as maps or photographs to illustrate real-world examples of coastal areas affected by wave action. Present examples of eco-friendly seawall designs that use natural materials, living elements, or curved shapes to reduce environmental impact.

Pose the central question of the activity: "How can we design a seawall that protects the coast while also helping nature thrive?"

## Procedure:

### Preparation:

- Begin by reviewing the function of seawalls and their importance in coastal protection. Explain how strong waves, storms, and rising sea levels can erode coastlines and threaten communities.
- Discuss the environmental impact of traditional seawalls, such as disruption to marine habitats or loss of natural beach areas. Introduce sustainable alternatives that incorporate natural materials, curved designs, and vegetation to reduce ecological damage.





### Construction:

- Provide each group with materials for building their seawall models, including LEGO bricks, natural samples, and craft supplies. Encourage pupils to begin by planning their design on paper, considering both form and function.
- Guide them to think about essential features such as stability, erosion control, and environmental friendliness. Prompt them to consider integrating natural elements — like rocks, plant buffers, or curved shapes — to reduce wave impact and support nearby ecosystems.

### Details:

- As pupils construct their models, circulate among the groups to ask reflective questions: How does your seawall slow down the force of the waves? What natural materials or living elements have you included, and why? How does your design protect both people and marine life?
- Encourage pupils to think like coastal engineers and environmental designers as they develop their seawall models. Challenge them to find creative solutions that balance strength, function, and ecological sensitivity.
- Reinforce the idea that well-designed seawalls not only protect the land but also preserve the beauty and biodiversity of coastal environments.

### Stories:

- Invite pupils to create short stories or scenarios based on the seawalls they have designed. Ask them to imagine a day when a strong storm hits the coastline and their seawall protects the nearby town, wildlife, or natural habitat.
- Assign optional roles within each group—such as a local resident, marine biologist, or city planner—and encourage pupils to describe how their seawall benefits different stakeholders.

### Presentation:

- Invite each group to present their eco-friendly seawall model to the class. Pupils should explain their design process, highlight the natural and sustainable materials they used, and describe how their seawall protects both the coastline and the surrounding environment.
- After each presentation, allow time for questions, comments, and constructive peer feedback.





## Tips:

- Stimulate creativity by encouraging pupils to experiment with natural shapes, textures, and forms in their seawall designs.
- Use real-world examples of sustainable seawalls to inspire and provide context — highlight projects that successfully combine engineering and ecology.

## Additional Considerations:

### Differentiation:

Provide additional support or simplified instructions for pupils who may require extra assistance. For advanced pupils, offer extension tasks such as researching further sustainable practices or designing more complex models.

### Assessment:

Assess pupils based on their participation and engagement during discussions and hands-on activities. Evaluate the creativity, effort, collaboration, depth of understanding demonstrated in their models, critical thinking, ability to provide constructive feedback and presentation skills.

### Extension Activities:

- Explore real-life coastal protection projects using videos or virtual tours.
- Invite a local expert (e.g., marine biologist, engineer) to speak about erosion and sustainable solutions.
- Collaborate with local environmental groups or coastal authorities to learn about nearby shoreline challenges. Pupils can create posters, presentations, or even model exhibitions to raise awareness about sustainable coastal protection.

## Curriculum Connections:

This activity integrates:

**Science** (*coastal ecosystems, the role of seawalls in erosion control*)

**Social Studies** (*sustainable design*)

**Art** (*creativity design, artistic expression and spatial awareness*)

**Mathematics** (*measuring and planning the layout of models, design and scaling*)

**Language** (*storytelling and presentation skills*)

**Technology** (*digital tools for research and visualization*)

## SDG Connections:

- **SDG 11:** Sustainable Cities and Communities – Pupils design infrastructure that protects coastal areas while maintaining harmony with the natural environment.
- **SDG 13:** Climate Action – The activity highlights how sustainable seawalls help reduce climate-related risks.
- **SDG 14:** Life Below Water – Pupils learn how eco-friendly seawall designs can support marine biodiversity and protect fragile coastal ecosystems.