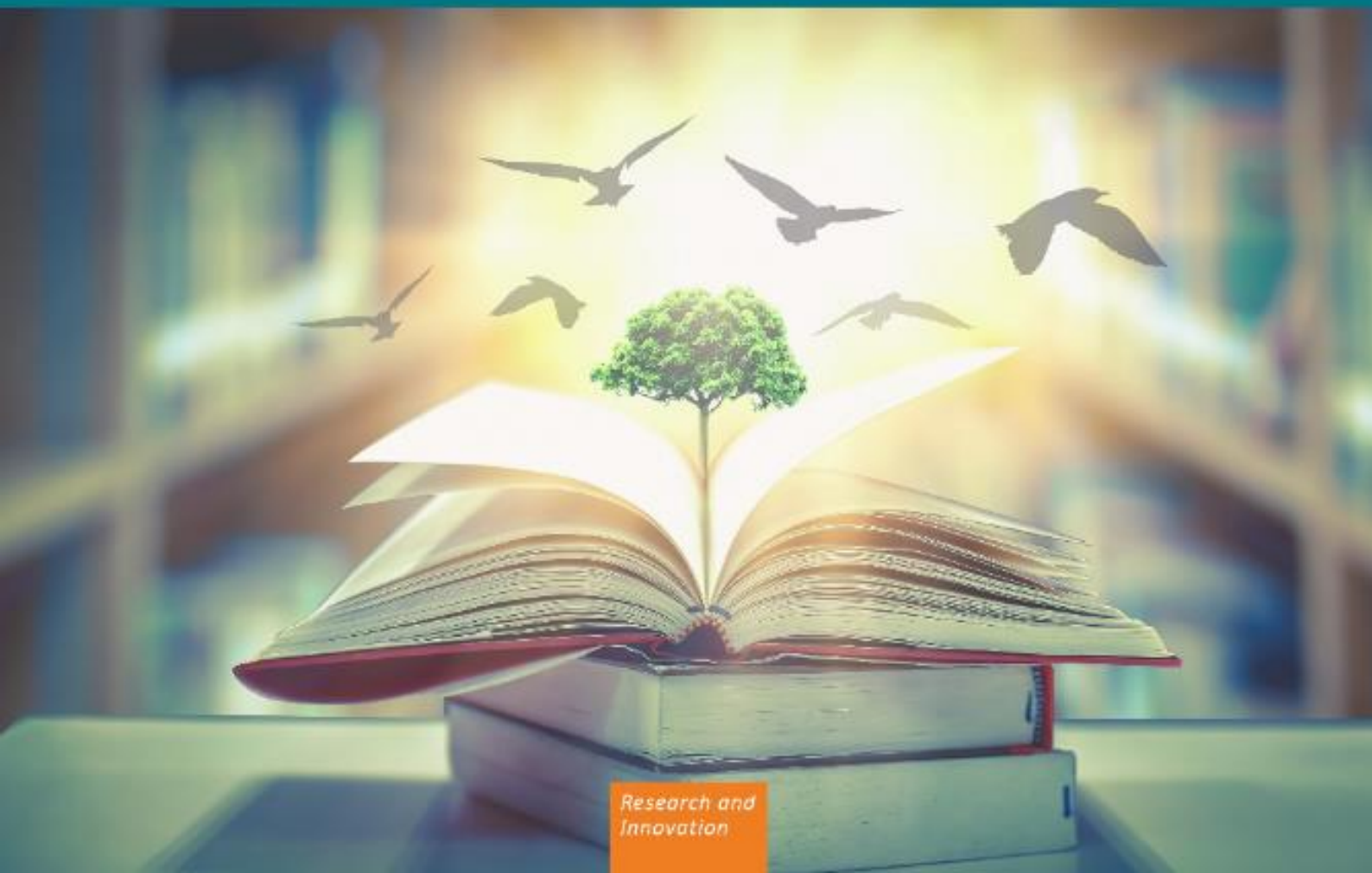
European Commission

NATURE-BASED SOLUTIONS LEARNING SCENARIO

S.O.C: Save Our Coasts (and Souls)



Research and Innovation

S.O.C: Save Our Coasts (and Souls)

European Commission
Directorate-General for Research and Innovation
Healthy Planet – C3 - Climate and Planetary Boundaries
CDMA 03/154
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Manuscript completed in October 2020.

1st edition.

Luxembourg: Publications Office of the European Union, 2020

About the NBS project

The NBS project is initiated and funded by the European Commission Directorate-General for Research and Innovation and coordinated by PPMI, in collaboration with European Schoolnet (EUN). PPMI (www.ppmi.lt/en) is a leading European research and policy analysis centre, aiming to help public sector and civil society leaders from around the world, presenting evidence in a way that is simple, clear and ready to use. European Schoolnet (www.eun.org) is the network of 34 European Ministries of Education, based in Brussels. EUN aims to bring innovation in teaching and learning to its key stakeholders: Ministries of Education, schools, teachers, researchers, and industry partners. Find out more about nature-based solutions: https://ec.europa.eu/research/environment/index.cfm?pg=nbs and all the NBS Learning Scenarios created in this project as well as the overall reports can be found at http://www.scientix.eu/pilots/nbs-project

The NBS project pilot has also been supported by the STE(A)M Partnerships programme of Scientix, funded from the European Union's H2020 research and innovation programme – project Scientix 4 (Grant Agreement N. 101000063), coordinated by European Schoolnet (EUN). The content of the document is the sole responsibility of the organizer and it does not represent the opinion of the European Commission (EC), and the EC is not responsible for any use that might be made of information contained.

EUROPEAN COMMISSION

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Directorate-General for Research and Innovation

2020 EN

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ABSTRACT

Coastal erosion is a natural process consisting of the wearing away of the land by the sea. Students will learn about how this process happens and then describe how human action may spread erosion hazards. They will then decide how to mitigate these risks, considering both the pros and cons of different available solutions.

Keywords

Coasts, erosion, landscape, mitigation, resilience.

1. Introduction

> *"Nature-based solutions (NBS) are solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes, and seascapes, through locally adapted, resource-efficient and systemic interventions. Nature-based solutions must therefore benefit biodiversity and support the delivery of a range of ecosystem services."*
> *https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en*

To use this Learning Scenario more effectively, teachers are encouraged to:

- Check out the list of recent EU publications on Nature-Based solutions
- Read about Nature-based solutions: Transforming cities, enhancing well-being (also available as a PDF)
- Contact local NBS practitioners or scientists working in their area (they can be found through Oppla).
- Use the "Ask Oppla" service to request help in case of any technical/scientific question on NBS.

2. Overview

Overview	
Subject	Science, Physics, Geography
NBS topic	Disaster Risk Reduction
Recommended age of students	14-15 years old
Preparation time	1 hour to prepare an introductory PowerPoint presentation where students will be introduced to the concept of hydrogeological instability and – in this case – the reasons why Italy is particularly prone to it. This presentation will also need to illustrate the reasons why the prevention of landslide and flood risk is more effective than post-disaster interventions. The PowerPoint presentation must be prepared and shown to the students before the implementation of this learning scenario.
Teaching time	1 hour and a half
Online teaching material	Map of flood-prone areas in Italy: http://old.enea.it/com/web/convegni/work200307/MappaAllagamento.pdf Rising tides: understanding sea level rise. NASA climate change: https://www.youtube.com/watch?v=cXzfOpZSmk8

Overview	
	The ocean game: https://www.latimes.com/projects/la-me-climate-change-ocean-game/
Tools and platforms	Sea level rise viewer tool: https://coast.noaa.gov/slr/#/layer/slr/0/-781972.882655675/5424343.399835462/4/satellite/none/0.8/2050/interHigh/midAccretion Collaborative mind maps generator: https://coggle.it
Offline teaching material	Mobile devices with Internet connection.
NBS resources used	European Commission Directorate General for Research and Innovation Report (2020) – "Nature-based Solutions for Flood Mitigation and Coastal Resilience": https://op.europa.eu/en/publication-detail/-/publication/d6e80dca-d530-11ea-adf7-01aa75ed71a1/language-en/format-PDF/source-190745024 NAIAD Case Studies: Brague Demonstration Site (France) https://oppla.eu/casestudy/19924 https://oppla.eu/sites/default/files/uploads/2019-09-naiad-case-study-brague.pdf

3. Integration into the curriculum

This Coastal erosion is part of the national curriculum for Geography in Italy, both in intermediate and upper secondary schools (Licei).

This natural process is also analyzed in Physics and Science classes in upper secondary schools (Earth study).

4. Aim of the lesson

The purpose of this LS is to let students work in groups of three to four to investigate the causes and effects of coastal erosion, using elevation data to predict and make hypotheses and inferences about the erosion process, and discussing how humans should respond to the risks arising from coastal erosion processes.

5. Outcome of the lesson

Students will understand the causes of coastal erosion and will be able to identify the areas where this process is most likely to occur, devising nature-based solutions to protect different types of coastlines.

6. Trends

The main approach in this LS is inquiry-based learning: students identify and research the given topic to develop knowledge and solutions. Inquiry-based learning prioritizes problems that require critical and creative thinking so that students can enhance their ability to ask questions, design Web searches, interpret data, provide explanations and argumentations, and communicate findings.

7. 21st century skills

Students are asked to think about a real problem that affects our coasts and, by analyzing and comparing data from different local beaches, make inferences and come up with conclusions and proposals on how to reduce environmental damage due to coastal erosion.

Collaboration and creativity are a must. Also, this LS is highly student-centered.

8. Activities

Name of activity	Procedure	Time
Map interpretation	Look at the map of flood-prone areas in Italy: which one is at greatest risk and what colour is it marked with? How many metres could the sea level rise in this area by 2100?	10 minutes
Discussion task	Discuss with your classmates the consequences that a sea rise of more than one metre could have on the inhabitants of the Italian coastal areas: list and rank them.	20 minutes
Case study analysis (Teamwork)	Students analyse the NAIAD Case Studies: Brague Demonstration Site (France) to define the flood alleviation strategies studied for the Brague catchment. Then they answer this question: could the same solutions be adopted for some of the flood-prone areas in Italy you examined in the previous task? Discuss with members of your team.	30 minutes
Prediction task	Students are put in pairs or groups and use the Sea Level Rise Viewer tool to simulate what might happen to the Italian coastline in the future due to rising seas.	30 minutes
Homework / web-search	Students explore the European Commission's report "Nature-based Solutions for Flood Mitigation and Coastal Resilience" (2020). They are asked to research if some of the strategies and practical actions described in the report have been applied in Italy.	Homework
Video and creation of an interactive mind map	Students watch the NASA video *Rising Tides: Understanding Sea Level Rise,* taking notes on the key concepts. Then, they have to illustrate the main ideas in a mind map created with Coggle which will be shown on an interactive whiteboard.	10 minutes
The ocean game	Students are put in teams to play The Ocean Game in the lab room. In this game, students' job is to make smart decisions that will reduce and minimise the effect of sea erosion on the coasts. The best action plan is shared in a plenary session with the whole class.	25 minutes

9. Assessment

The evaluation method was informal and ongoing. Self-assessment was strongly supported with post-task reflection questions.

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OPEN DATA FROM THE EU
The EU Open Data Portal (http://data.europa.eu/euodp/en) provides access to datasets from the EU. Data can be downloaded and reused for free, for both commercial and non-commercial purposes.

In this learning scenario, students are familiarised with the concept of social and environmental justice through the story, photos, and videos of Foxy Travel – a fox who likes travelling across Europe. Via web 2.0 apps (for example: Padlet, MindMup, WordItOut), students analyse Foxy's "environmental" photos to build a socio-environmental fair neighbourhood in which they would like to live using recycled materials. But before the building commences, they have to discuss and collaborate with their classmates in order to understand the principles of nature-based solutions (NBS).

Studies and reports

Publications Office
of the European Union