SHORE

Empower students as agents of change

D2.7 TEACHERS ROUTES

for

BLUE SCHOOL and CURRICULA 3

July, 2025

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List of acronyms

Acronym	Full name
EC	European Commission
EU	European Union
SHORE	SHORE: EmpOweR Students as the agents of cHangE
DG-MARE	DG for Maritime Affairs and Fisheries
CH	SHORE's seven Country Hubs
NGO	Non-profit Organization

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TEACHERS ROUTES for BLUE SCHOOL and CURRICULA 3

1. INTRODUCTION

Water is essential to life and planetary health. It serves as a fundamental human need, a habitat for countless species, the planet's largest carbon sink, a vital transport corridor, and a shared global resource. Oceans and seas (marine waters) make up approximately 96% of all Earth's water, while the remaining 4% exists as freshwater in rivers, lakes, glaciers, and groundwater. Despite this significance, both marine and freshwater ecosystems are rapidly degrading, and existing protection efforts have fallen short, as noted in the implementation of the Marine Strategy Framework Directive (2008/56/EC). Human activities are accelerating this degradation, posing serious risks to the health, well-being, and prosperity of European societies.

The 2021 European Schoolnet report, "Curriculum Analysis - Ocean Literacy for All", revealed a troubling trend: despite covering most of the planet, Earth's water bodies are largely absent from school curricula across Europe. This "ocean blindness" reflects a broader societal disconnect. The report concluded that "European school curricula reflect the general 'ocean blindness' of society - referring to the widespread lack of awareness, understanding, and visibility of the hydrosphere and its vital role in sustaining life on Earth—both in society and in formal education systems. Addressing this issue is crucial for empowering citizens to engage in meaningful change through deliberative democracy, social innovation, citizen science, and public awareness initiatives.

Youth, in particular, must be recognized as powerful agents of change. As the ECOSOC Youth Forum emphasized in its session "Youth Taking Action to Implement the 2030 Agenda", involving young people benefits both individuals and society. Yet, from primary through secondary education, students receive minimal exposure to ocean-related topics, especially those living far from any water body or from inland communities. This limited engagement is compounded by the fact that formal education systems across Europe remain largely siloed and disciplinary-based, often failing to reflect the interconnected nature of real-world environmental challenges. In contrast, blue literacy (*acquiring skills,*

values, and civic engagement related to water stewardship) and blue education (*how we learn and act to care for Earth's water bodies and solve real-world environment and societal problems*) both embrace collaborative, interdisciplinary approaches, encouraging learners to explore the links between environmental, social, and economic systems. The absence of such integrated learning hampers young people's understanding of the hydrosphere's vital role in producing oxygen, regulating climate, and sustaining biodiversity—leaving them without the skills, motivation, or agency to learn about – and contribute toward solving the urgent challenges of sustainability. This will not change unless environmental issues become personally relevant, locally rooted, and systemically addressed through education and hands-on learning. To build a generation capable of leading the green and blue transitions, national education standards must be reformed to embed blue education across curricula—not as an optional topic, but as a core component of future-ready learning. The time to act is now—through policy, practice, and public engagement—to ensure that our schools prepare students not just to understand the planet, but to restore and protect the only planet humans across the globe call home.

Collaborative cross-sector action is essential to meet the ambitions of the EU Green Deal, the EU Mission Ocean: "Restore Our Ocean and Waters by 2030," the Sustainable Development Goals (SDGs), and the Twin Transition toward decarbonization and digitalization. These initiatives cannot succeed through isolated efforts—they require the full engagement of the multiple helix of a community, including academia, government, civil society, and industry. A key challenge lies in building public awareness and fostering a sense of shared responsibility—particularly among youth. SHORE supports this effort by working with schools and communities to promote lifelong learning through open-schooling methodologies that enable inclusive, locally-grounded collaboration. By helping people—especially young learners—develop a personal, emotional connection to Earth's water systems, SHORE transforms sustainability goals from abstract global targets into concrete, lived experiences. In doing so, SHORE contributes to the Decade of Action by advancing effective implementation of Mission Ocean objectives and supporting Europe's strategic priorities through blue literacy, civic engagement, and community-based innovation.

1.1 SHORE – A Horizon "Sister" Project

SHORE is one of three "sister projects" of the Horizon-CSA call, HORIZON-MISS-2022-OCEAN-01, joining PROBLEU and Blue-Lights to support the EU Mission Ocean, "Restore Our Oceans and Waters by 2030". To equip communities with the knowledge and inspiration needed to understand the vital role of Earth's hydrosphere in their lives, SHORE promotes a wide range of activities that help individuals recognize how their actions impact marine and freshwater environments and how they can collaborate with others to address common environmental challenges impacting their communities. These efforts are strategically implemented across SHORE's interconnected work packages — enhancing Blue Skills through WP2, fostering community engagement via WP3, supporting blue school projects through cascade funding in WP6, and enabling dynamic online interactions via the community platform managed in WP4. All work packages operate in synchronized coordination under the direction of Project Management WP1, ensuring alignment through WP5 for Communications and Dissemination, which drives internal cohesion and steers communications and dissemination efforts to reach the broadest possible audience. This integrated approach enables SHORE to effectively support the strategic goals of the EU Mission Ocean, Youth4Ocean, and NEBS initiatives, advancing blue literacy, youth empowerment, and sustainable development across Europe.

Fourteen partners form the SHORE consortium to cover the project's five targeted regions that focus on activities on both marine and freshwater environments:

PARTNER		ROLE
Yildiz Technical University - YTU **WP1 Lead**	Turkey	COO, Project Management
Euronovia - EURN **WP5 Lead**	France	Communications and Dissemination
Mare Nostrum - MAREN **WP3 Lead**	Romania	**(Black Sea/Danube River)** Romania Country Hub
University of Padova - UNIPD	Italy	**(Mediterranean Sea)** Italy Country Hub Co-Host with Museo dei Bambini
RKSoft - RK **WP4.1 Task Lead**	Turkey	Community Platform

Kinderburo Universitat Wien – KUW	Austria	**(Danube River/Rhine River)** Austria Country Hub
Turk Denz Arastirmalari Vakfi -TDAV	Turkey	**(Black Sea/Mediterranean Sea)** Turkey Country Hub
Museo dei Bambini - MDB	Italy	**(Mediterranean Sea)** Italy Country Hub Co-Host with UNIPD
Budapest University - BME	Hungary	**(Danube River)** Hungary Country Hub Host
Global Skills Network – GSN **WP2 Lead**	Estonia	**(Baltic Sea)** Estonia Country Hub Host at the Baltic Living Lab, http://balticlivinglab.com
F6S Network - F6S **WP6 Lead**	Ireland	Open Calls
Crowd Helix - CROWDH	UK	Ocean Helix Host
Akademia WSB	Poland	**(Baltic Sea)** Poland Country Hub Host
EU&Pro – EU&P **WP4 Lead**	Czech Republic	Regional Base Analysis/Behavioral Surveys Lead / Ambassador Award organizer

Table 1: SHORE consortium

The main objective of SHORE is to enhance blue literacy in primary and secondary schools by supporting teachers in delivering a multidimensional, consortium-coordinated approach. The aim is to equip young people, targeting students ages 7-18, with the skills and knowledge they need to become informed and responsible eco-citizens, transformed into Agents of Change.

SHORE's specific objectives include expanding and strengthening ocean and water literacy—collectively referred to as blue literacy—among children, young people, and educators in primary and secondary schools. This is achieved in collaboration with the Network of European Blue Schools (NEBS) and EU4Ocean Coalition, and in close cooperation with communities through open-schooling methodologies. The European Union defines the Blue Economy (BE) as encompassing all economic activities connected to oceans, seas, and coasts—both directly and indirectly. At its core, the EUBE emphasizes the sustainable use of marine resources to drive economic growth, create jobs, and protect ecosystem health. It includes traditional sectors such as fisheries, aquaculture, coastal tourism, shipping, and shipbuilding, as well as emerging industries like offshore renewable energy, blue biotechnology, marine mineral extraction, and desalination. EUBE policy prioritizes environmental sustainability alongside economic development, supporting key initiatives such as the European Green Deal and the Twin Transition. It integrates blue literacy, actions to mitigate climate-change, and restorative

biodiversity strategies to promote cross-sectoral cooperation, innovation, and circular economy principles, while minimizing ecological impact. The policy also emphasizes regional cooperation, with tailored approaches for areas such as the Baltic Sea, Black Sea, and the Mediterranean, three of SHORE's five regional foci, and encourages collaboration both within the EU and with non-EU neighboring countries. SHORE aligns with this vision by incorporating Blue Economy principles across its work packages. Through its workpackage WP2, SHORE focuses on developing blue skills around five key thematic area and associated sub-topics. Ultimately, the EUBE is about making the Earth's waters a source of prosperity and well-being without compromising ecological integrity. To support this goal, SHORE raises awareness by acting as a bridge between researchers, formal and non-formal educators, and community stakeholders—empowering present and future generations to contribute to sustainable development and climate resilience.

2. BLUE SCHOOLS / NETWORK OF EUROPEAN BLUE SCHOOLS

2.1 Promoting the Blue School Concept

The Network of European Blue Schools (NEBS) was established by the EU4Ocean Coalition and supported by DG MARE as a dynamic platform for schools and educators committed to engaging students with ocean-related topics and nurturing a new generation of ocean-literate citizens. SHORE is fully aligned with the guiding philosophy of NEBS, which emphasizes the importance of fostering curiosity, critical thinking, and environmental responsibility in young people. By supporting schools with their developing blue literacy teaching and learning tools and making meaningful connections to Earth's hydrosphere, SHORE actively contributes to NEBS' mission of preparing a new generation of informed, engaged citizens by fostering curiosity, critical thinking, and environmental responsibility in young people, that is essential for building a sustainable future.

SHORE's seven country hubs play a key role in guiding and mentoring schools through the process of joining the NEBS, a requirement linked to eligibility for funding provided

through the open calls. Programming includes cascade funding for up to 100 projects during the 36-month lifespan of the project, with each blue school project able to receive up to 10,000EUR funding. On the path to becoming a NEBS member, both teachers and students deepen their understanding of the role Earth's hydrosphere plays in our lives and cultivate a shared sense of responsibility for protecting our planet. This journey echoes SHORE's mission to empower students as Agents of Change through active, inquiry-based learning that bridges formal education with real-world impact, strengthening a shared commitment between the NEBS and SHORE towards:

☑ Building a more ocean-literate society where schools are catalysts for change

☑ Creating lasting partnerships between ocean professionals and educational communities

☑ Supporting a Europe-wide network for teachers to exchange ideas, resources, and inspiration

By working in tandem, SHORE and NEBS amplify each other's impact, fostering lifelong learning, civic engagement, and a deep-rooted connection to our blue planet.

2.2 The Network of European Blue Schools - NEBS

Schools wanting to become a certified EU Blue School must create a blue project that addresses compulsory criteria outlined in the handbook, which also emphasizes the teaching principles behind the European Blue School initiative and the European Blue School certification process. It is designed to meet the teachers where they are on their blue literacy journey and includes a wealth of useful resources and best practice to inspire teachers to find connections between a school and the ocean/other water bodies. It has built in flexibility to encourage and support teachers across all disciplines to bring the ocean to their classrooms, whether through biology, physics, chemistry, technology, mathematics, history, literature, or the arts. By becoming a European Blue School, teachers have the opportunity to:

- be able to work collaboratively with a growing network of European colleagues;
- be supported at every step by the Handbook and Coalition;
- have access to teacher development opportunities in different languages organized by EU4Ocean Coalition members and other European institutions and projects;

- be in line with international initiatives including the UN's Decade of Ocean Science for Sustainable Development.

These activities allow students to explore new societal concepts such as 'Ocean Health', 'Food from the Ocean' and 'Sustainable Use of Resources' in a meaningful way. By becoming a European Blue School, schools give rise to a new generation of ocean-literate citizens. NEBS members are themselves agents of change and inspiration to their students, allowing them to address local to global challenges in the classroom. An agent of change is someone who sees a problem in his or her community, coastal or inland, large or small, and does something to take action for substantial change. European Blue Schools work on real-life issues with real-life ocean professionals that can support them to address ocean topics in school. They are on the front-lines to champion the concept of open schooling, and encourage the development of local partnerships to make the learning context relevant.

2.3 Cooperation / Twinning with Blue Schools

SHORE's Open Calls also promote collaboration, referred to as "twinning", amongst NEBS members, between applicant schools and NEBS members, as well as with schools aspiring to become accredited NEBS members, with the intention of establishing cooperation during the implementation of awarded projects and beyond. Twinning activities aim to promote shared learning among students and teachers with a focus on encouraging learning inside and outside the classroom. Teachers of awarded schools are able to join the European School Education Platform's e-Twinning to run on-site or online activities with their students along with colleagues from both EU countries and those in neighboring regions.

2.4 Supporting School Alignment with the European Green Deal

SHORE also encourages schools to join the European Climate Pact, an EU initiative that empowers them to take meaningful steps toward building a more sustainable Europe by promoting actions aligned with the European Green Deal. Schools that succeed in SHORE's open calls processes make a commitment towards decarbonization, or at least carbon neutrality, in their projects and activities in alignment with the Climate Pact Pledge.

These actions are aimed to mobilize a broad spectrum of society to take practical steps toward achieving the EU's climate goals, particularly those outlined in the European Green Deal, which includes reaching climate neutrality by 2050.

Building on its success of SHORE programming nurturing students as Agents of Change, we also recognize the crucial role teachers can play as pioneers of change in blue literacy by implementing blue education in their classrooms. Projects having been awarded funding from SHORE's first two open calls (OC), with the third open call having ended on 30 June, also align with the EU4Ocean philosophy of promoting ocean literacy and fostering a collective understanding of the ocean's essential role in our lives and the environment as well as the impact human behavior has on the health and well-being of all Earth's water bodies. During the mentoring phase for projects already awarded funding from OC#1 and OC#2, with applications from OC#3 still in the evaluation process, the country hubs encouraged schools to apply for the MakeEUBlue Awards, which honor innovative and outstanding initiatives in the field of ocean literacy in Europe.

3. REGIONAL ANALYSES

3.1 SHORE Targeted Regions

SHORE focuses on five targeted regions: the areas around the Baltic Sea, Black Sea, Mediterranean Sea, Rhine River, and Danube River. These regions were chosen to align with the EU Mission Ocean Mission Implementation Plan, Lighthouse Areas serving as focal points for implementing and demonstrating innovative solutions to restore and protect marine and freshwater ecosystems, and topics related to blue literacy.

Figure 1: SHORE - Open Call Target Areas

The following countries are located in the targeted regions:

Baltic Sea Area	➢**EU:** Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Sweden ➢**Non-EU:** Russia
Black Sea Area	➢**EU:** Bulgaria, Romania ➢**Non-EU:** Georgia, Russia, Turkey, Ukraine
Mediterranean Sea Area	➢**EU:** Croatia, Cyprus, France, Greece, Italy, Malta, Slovenia, Spain ➢**Non-EU:** Albania, Algeria, Bosnia & Herzegovina, Egypt, Israel, Jordan, Lebanon, Libya, Montenegro, Morocco, Tunisia, Turkey
Danube River Area	➢**EU:** Austria, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Romania, Slovakia, Slovenia ➢**Non-EU:** Bosnia and Herzegovina, Moldova, Montenegro, Serbia, Ukraine
Rhine River Area	➢**EU:** Austria, Belgium, France, Germany, Luxembourg, The Netherlands.

Table 2: Countries Located Within SHORE's Targeted Regions

3.2 SEVEN COUNTRY HUBS - UPDATE

Figure 2: Location of SHORE's Seven Country Hubs

SHORE's seven country hubs in Austria, Estonia, Hungary, Italy, Poland, Romania, and Turkey play major roles in several elements of the project's roadmap:

Specific WP2 Goals for the Country Hubs:

- ► Make connections with schools and their community to promote blue literacy
- ► Deliver teacher resources and training activities improved for their region
- ►Translate teaching routes into the Country Hub's language to be accessible via SHORE's community platform
- ► Guide schools in developing Blue School Projects and apply for SHORE open calls

Guide schools for applying to the Network of European Blue Schools

- ► Assist in establishing connections between schools within the Network of European Blue Schools and educators participating in the training to create sprouts for twinning projects

Additional Tasks Assigned to Country Hubs:

- ► Facilitate the success of other SHORE work packages in Country Hub regions
- ► Mentor awardees of the three SHORE open calls

Country Hub reports are required to give a concise overview of the outcome of all initiatives at national/regional level:

➤ Contributions were made to WP2 through the curation and development of Blue Skills teaching and learning content. This included the creation of distinctive teaching routes aligned with five thematic topics, each tailored to three specific learner age groups: 7–10 year olds, 11–14 year olds, and 15–18 year olds. These were translated from English into the languages of the consortium (German, Estonian, Hungarian, Italian, Polish, Romanian, Turkish) utilizing the European Commission's e-translation tool and uploaded to the community platform. It was suggested by our PO, Michela Tagliaferri, that a disclaimer be cited that the e-translation tool was used so the text may not be translated 100% correctly.

➤ Organizing education, learning and mobilization activities (Learn, Act & Mobilize) in WP3.

➤ Disseminating information about SHORE's open calls, as well as those sponsored by the Horizon sister projects: SHORE, ProBleu, Blue Lights, as a coordinated effort, with all three projects aligning their calls within the shared timeframe of March to June, 2025.The following timeline refers to SHORE's OC#3, launched on 22 April 2025 and finalized on 30 June 2025, which will be reported in workpackage WP6:

Figure 3: SHORE - Open Call #3 Timeline

➤ Mentoring awardees of SHORE's OP#2: WP3 coordinated activities that each CH was responsible for completing; each was assigned a number of schools from those receiving funding, establishing a regular communication method with the teacher/project team (online meeting, phone discussions, email, etc.), guided them on applying for the NEBS Certification, and completed the integration of their project into the SHORE community platform.

Project	School Name	Country	Country Hub Mentor
A.Q.U.A.	Liceul Teoretic International de Informatica Bucuresti	Romania	RO-CH
OOOPEPC	Palatul Copiilor Bacau	Romania	RO-CH
HCSC	Scoala Gimnaziala Nr. 29 "Mihai Viteazul"	Romania	RO-CH

WoW	Plevne Ortaokulu Secondary School	Turkey	PO-CH
Blue Future	Fatih Sultan Mehmet Primary School	Turkey	PO-CH
Sea Guardians	Anatolia College	Greece	PO-CH
MARBIOLAGO	2nd High School of Kalivia	Greece	PO-CH
MEDaverse	Ano Syros Primary School	Greece	PO-CH
ZMG project	Budapest X. kerületi Zrínyi Miklós Gimnázium	Hungary	HU-CH
LPMB	Sehit Mehmet Zengin Secondary	Turkey	HU-CH
BeBlueActive	1st Primary School of Agios Nikolaos-Crete-Greece	Greece	HU-CH
TUROMAP	Primary School Palekastro	Greece	EE-CH
Blue Steps	Terme Ortaokulu	Turkey	EE-CH
SEA-SPIRIT	The American College of Greece, Elementary School	Greece	EE-CH
WAVE	Karahantepe Primary School	Turkey	AT-CH
Source to Sea	Niederösterreichische Mittelschule Lunz am See	Austria	AT-CH
WAO NICE	Collège Jules ROMAINS	France	AT-CH
Blue Horizons	GRG 1 Stubenbastei	Austria	AT-CH
WOC	Istituto Tecnico Economico e Tecnologico "G.Garibaldi"	Italy	IT CH
MED_SEA4_SCHOOL	IC via Padre Semeria	Italy	IT CH
KO-WAVE	Skyros High School	Greece	IT CH
BLUEIMPACT	Mandoulides Schools	Greece	IT CH
FOc	Mersin Yenişehir Gelecek Okulları	Turkey	TR CH
BDs	Ozel Antalya Bahcesehir Bati	Turkey	TR CH
FU.SE.	Selim Diniz Ortaokulu	Turkey	TR CH
BH	Hürriyet Secondary School	Turkey	TR CH
BLUE TRACE	Yücel Ballık Ortaokulu	Turkey	TR CH
SOMEK	Sömek Ortaokulu	Turkey	TR CH
Rain2Ocean	İzmir Karşıyaka Zeki Şairoğlu High	Turkey	TR CH
BlueBoss	Istanbul/Beykoz Paşabahçe	Turkey	TR CH

Table 3: Country Hub Mentoring - OC#2 Results of Awarded Funding

The implementation of SHORE programming and the coordination of activities that will engage schools and stakeholders in combating ocean blindness - i.e., the lack of awareness or understanding of the ocean's crucial role in the Earth's ecosystem and human life - are supported by country hubs (CH) located within the five SHORE regions:

Austria – hosted by KUW	Danube River / Rhine River
Estonia – hosted by http://balticlivinglab.com	Baltic Sea
Hungary – hosted by BME	Danube River
Italy – co-hosted by UNIPD and MDB	Mediterranean Sea
Poland – hosted by WSB	Baltic Sea
Romania – hosted by MAREN	Black Sea / Danube River
Turkey - hosted by YTU	Black Sea / Mediterranean Sea

Table 4: SHORE Country Hubs

The seven CHs form the backbone of SHORE as a Horizon sister project to promote blue literacy as it pertains to oceans, seas and rivers. The job of the CHs includes creating links within their regional area by providing an effective support mechanism for guidance, improvements and recommendations for teachers to become involved with Blue Economy actors, including other educators and researchers, nonprofit educators, outreach groups, researchers, professionals and others, in alignment with promoting open-schooling methodologies. Each CH is tasked with assisting in the base analyses that includes an overview of formal education in their localities, outlining challenges and opportunities of working with stakeholders including influencing public policy on incorporating blue literacy in national standards; they must provide guidance to schools in their region to participate in SHORE's open calls and join the NEBS, and promote opportunities for twinning where schools from their region can engage in cross-border collaboration with other schools and with actors of the Blue Economy.

3.3 Base Analyses - UPDATE

The SHORE project set out to develop a roadmap that identifies common challenges and best practices across Europe's diverse water regions, drawing on insights from its seven country hubs in Austria, Estonia, Hungary, Italy, Poland, Romania, and Turkey. Each contributed to this roadmap by first highlighting its unique ecological, cultural, and educational contexts, and then demonstrating how it aligned with a shared educational movement that continues to seek ways to empower students, educators, and communities to actively engage with the aforementioned challenges through context-specific, tailored learning experiences. This coordinated effort supports the broader mission of the EU Mission Ocean, "Restore Our Oceans and Waters by 2030" towards building water-aware societies across Europe and its neighboring countries. The CH similarities lie in the methods and objectives – empowering students and communities to value and protect marine and freshwater ecosystems – while their differences arise from the distinct natural environments and contexts (sea vs. river, longstanding maritime culture vs. inland perspective) that shape the content and emphasis of their programming activity. Together, these regions' efforts are complementary pieces of a larger puzzle: fostering a hydrosphere-literate society across both marine coasts and river basins, thereby addressing the sustainable future of both our oceans and inland waters as an interconnected whole. Thus, the task at hand was to distill key insights from each country hub, ranging from identifying common challenges to designing programs that advance blue literacy as defined above that were highlighted in our Deliverable 2.2.; this report was aimed at drawing out lessons that can strengthen our collective understanding of how Europe can build an inclusive, scalable, and effective approach to educating the next generation of Agents of Change—whether they live by the sea or inland.

The following narratives from each country hub offer a brief update on the baseline analyses conducted under Task 2.1 of WP2.

AUSTRIA (Vienna) While local efforts have established a solid foundation for ocean literacy, the global perspective remains a critical aspect that SHORE is uniquely able to approach. Efforts to help the wider society in Austria truly realize the importance of the ocean and our global water system could be significantly boosted in the short-to-medium term by pursuing two approaches: On the one hand, internationalization enables cross-thematic networking while simultaneously promoting global interconnections. On the other hand, providing ready-made educational materials for everyday school activities will offer the support many teachers need. For the future, SHORE's commitment to a holistic and global approach in Austria may have a lasting impact in how the oceans are perceived, understood and will be protected.

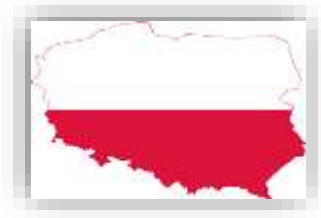
ESTONIA One of three “Baltic” nations, with Lithuania and Latvia, Estonia is characterized by several unique historical, cultural, geographical, and socio-political features. The Baltic countries are heavily influenced by the Baltic Sea with the fisheries sector crucial for employment in coastal regions. It provides jobs not only in fishing but also in processing, marketing, and related services. Small-scale fisheries are particularly vital for sustaining communities in remote regions, which is most of the Estonian landscape. Baltic countries are known for their relatively high levels of digital innovation and economic development within the context of post-Soviet states. Key sectors include information technology, manufacturing, agriculture, and services. Estonia, in particular, is known for its advanced digital infrastructure and e-government services. They serve as fertile testing grounds for alternative energy, particularly wind farming, underwater drones and robotics used to collect data and create high-resolution maps of the sea floor and marine habitats, and satellite and aerial remote sensing technologies that provide comprehensive views of the Baltic Sea's surface, helping to monitor environmental conditions, track algal blooms, and assess the impact of human activities.

These technological advancements join aquariums and science-centers facilities such as the Tallinn Sea Life Museum and University of Tartu Marine Science Institute utilize technology to educate the public about the Baltic Sea. Interactive exhibits, digital displays, and multimedia presentations enhance visitor engagement and learning that not only enhance ocean literacy but also foster a deeper understanding and appreciation of the Baltic Sea's unique environment. They provide powerful tools for education, citizen engagement, and the promotion of sustainable practices. Even though Blue Education is already part of the 7th/8th grade curricula in Estonia, the United Nations Eco-Schools Network, which is very active in the Baltic States, further reinforces the commitment to embedding blue literacy into the core curriculum. The Baltic Living Lab (BLL - https://balticlivinglab.com) serves as SHORE's Estonian Country Hub aimed at mentoring schools to participate in the various sister-project activities of the EU Mission Ocean while enhancing the existing educational framework and enhancing student learning and motivation via open-schooling methodologies. By moving beyond traditional classroom instruction, Estonian teachers engage in hands-on, inquiry-based, and project-based learning, which can be optimized to foster stronger engagement, better retention, and the development of 21st-century skills such as critical thinking, collaboration, and creativity. The BLL also serves the eight EU countries surrounding the Baltic Sea, and has developed targeted outreach strategies to engage schools throughout the region during the 2025-26 school cycle.

HUNGARY Nowadays, the protection of our oceans and other natural waters is among the leading priorities worldwide, but ocean literacy among the population has room for a lot of improvement. In our opinion, learning about "blue" topics should start at school, because the necessary resources are already available in these institutions, and the young target group can be reached with relative ease there. Teachers play a big role in spreading knowledge, so it is very important that they receive adequate support, even from outside the school. The Budapest University of Technology and Economics, as the head of the Hungarian CH, supports the work of teachers in the Danube and Rhine region, the participation of schools in the SHORE project, and the

efforts to join the Blue School Network. These activities, as well as the development of relations with comparable entities in other countries, will greatly promote the active participation of our citizens in the protection of our waters in the future.

ITALY As the Italian Country Hub, the University of Padova is dedicated to supporting proactive schools, some of which are already implementing water-related projects which can benefit from SHORE. The overall goal is to empower the Italian youth in taking action in the preservation of various precious characteristics of the Italian coastline and the Mediterranean. The CH is home to a wide range of marine research initiatives reflecting the wide range of distinctive features of Italian coasts, and interaction of people with the sea. Italy is a country with marked environmental contrasts, and this is also evident in the context of water literacy. Positioned in the center of the Mediterranean, it has, since Antiquity, been actively engaged with the sea in terms of meeting primary needs of the population, supporting industry, and providing transportation routes. However, Italy suffers from a very unequal access to the sea affecting the number of schools enrolled in the Network of European Blue Schools. Indeed, the low number of Blue schools in the country is probably related to the rarity and limited scope of active programs about ocean literacy at the national level. On the other hand, Italy can rely on a strong net of NGOs and blue economy actors and stimulate a very dynamic educational system. In this context, teachers and schools have a relatively large space and significant freedom in developing projects. Against this background the SHORE project presents a major opportunity to effectively boost ocean literacy of the youth population primed to include the sea in their understanding of the world, and to provide the tools required from any agent of change.



Poland Currently in Poland, 'ocean education' does not entail a separate, mandatory block of classes in schools, only the content is. The topics are usually covered in other courses including, among others, geography, biology, Polish language, various inter-subject pathways, often at the discretion of the teacher. According to the

Ministry of Education, the requirements and content specified in the core curriculum are comprehensive and allow teachers to address the most relevant topics in this area. Regardless, schools have the opportunity to organize additional educational activities on topics such as climate and environmental protection, including those that correspond to the special interests of students. In Poland, the students' awareness about climate change is at a very low level, and as a result, they do not effectively undertake activities to explore and efforts to tackle this problem. Thus, one would not be very off-the-mark to claim that, in the eyes of young people, this topic is neither cognitively important nor pragmatically relevant. In Poland most of the schools in the Blue Schools Network are situated at the coastal area of the Baltic Sea. Polish Country Hub is represented by WSB University which, together with a group of experts and dedicated teachers, will promote ocean literacy among youth, students, citizens, teachers and children under temporary protection focus on promoting ocean literacy among students and youth and increasing the number of Blue Schools in Poland. Through active endeavors under the SHORE project, Polish Country Hub aims to provide guidance to educators, teachers and schools regarding the blue curricula, by showing them alternative ways to educate students and promote ocean literacy with special focus on participatory approach and involvement of local communities.

Romania In an era where the health of the global ecosystem is intricately tied to our understanding of our world's vast and mysterious oceans, the blue activities take center stage as a pioneering initiative to enhance ocean literacy in the blue education institutions. The Romanian Country Hub is represented by Mare Nostrum NGO situated along the Black Sea coastline and has been dedicated to fostering a positive shift in mentalities and behaviors for the past 30 years, all aimed at conserving and enhancing the marine environment. Besides the challenges and obstacles faced in advancing ocean literacy education in Romania, there are numerous avenues through which awareness, education, and environmentally conscious behaviors can be introduced and promoted. Achieving long-term success requires embracing creative ways and securing the involvement of a diverse range of stakeholders. We offer guidance, training, enhancements, and recommendations to various stakeholders including teachers,

museum educators, outreach groups, and citizens. The primary rationale for establishing the country hubs is to enhance SHORE's influence by collaborating with regional and local stakeholders, guiding schools in project implementation, and efficiently executing dissemination and communication activities in the Black Sea and Danube regions. One way SHORE can make a significant impact is through its connection with the Black Sea, particularly via Romanian schools. This association is pivotal as it sets the stage for the future rollout of a comprehensive 'Blue Schools' initiative, which aims to enhance Ocean Literacy within the classroom environment. Also, we constantly promote education and training in the fields of marine sciences, we advance Ocean Literacy in Romania in general and the Black Sea and Danube regions in particular, and raise educators' awareness of ocean issues and the need for a sustainable future for our coasts and seas. Another benefit of these efforts is the improved quality of marine sciences education.

Türkiye Bordering two of SHORE's focused regions (Black Sea/Mediterranean Sea), Türkiye presents a unique geographical context for SHORE's efforts. Leveraging the efforts of an international consortium, committed educators, and engagement with numerous local and global stakeholders, SHORE emerges as a formidable advocate for promoting ocean literacy in Türkiye. By adopting a holistic and global approach, SHORE aims to have a lasting impact on how the oceans are perceived, understood, and ultimately protected in Türkiye's context.

3.3.1. Formal Education Overview

Primary School - Primary education for children ages 7-10 lays the groundwork for a lasting passion for learning and equips students with essential skills to succeed academically and socially throughout their lives. The social and emotional skills developed during this stage serve as the foundation for maintaining healthy relationships and emotional wellness in the future. At the primary-school level, play-based and interactive activities are recommended, selected based on students' individual traits, awareness levels and learning styles. Methodologies such as Personalized Education,

Collaborative Learning, Flipped Classroom, Inquiry-Based Learning, Montessori, Project-Based Learning, Student-Centered/Constructivist Approach, and Teacher-Centered Instruction can be counted among the recommended methods for primary school students. The SHORE Consortium is convinced that future-oriented formal ocean literacy needs to start in primary school and be linked to the local environment of the children. This will foster a strong sense of responsibility and empower them to protect and preserve the natural resources within their own community as well as developing an understanding for the global interconnectedness.

Middle School - Bridges curiosity and critical thinking for children ages 11-14. Middle school marks a pivotal stage in students' cognitive and social development, as they transition from concrete understanding to more abstract thinking. Middle-school education plays a crucial role in deepening foundational knowledge while fostering the ability to think critically, ask complex questions, and explore interdisciplinary connections. This is a period where students begin forming their values, interests, and sense of identity—making it a key opportunity to embed environmental awareness and global citizenship. In the context of blue literacy, middle school education should emphasize real-world applications of ocean and water-related topics, linking local issues to global systems and introducing students to the societal relevance of sustainability. Learning activities should be inquiry-driven, collaborative, and challenge-based to sustain engagement and develop problem-solving skills. At this stage, students benefit from methodologies such as Project-Based Learning, Inquiry-Based Learning, Blended Learning, Gamification, and Design Thinking—approaches that combine autonomy with guidance and help students apply knowledge in meaningful ways. SHORE recognizes the unique role middle school plays in nurturing responsible and engaged future citizens. By connecting students with local water systems and enabling them to see their role in global ecological challenges, SHORE supports the development of critical awareness, empathy, and initiative. Through these learning experiences, students are not only prepared for secondary education but also empowered to participate actively in shaping a more sustainable future.

Secondary School - Based on the knowledge gained in primary school, teaching water-related topics to students ages 15-18 illustrates connections between global contexts and complex issues. Students acquire the skills to develop sustainable solutions for social problems. Secondary education has a significant impact on students' lives, offering a variety of subjects and extracurricular activities for them to discover and pursue their interests and passions. It allows students to explore their interests and potential career paths. Moreover, it utilizes formal teaching methods to foster critical thinking and independent learning, prompting students to engage with diverse groups and navigate complex social scenarios. For secondary school students, it is highly recommended to utilize interactive, exploratory applications that facilitate communication with Mission Ocean stakeholders, allow for assessment, and encourage hands-on experience.

4. METHODOLOGIES FOR IMPLEMENTING BLUE LITERACY IN THE CLASSROOM

When SHORE was submitted as an application to Horizon HORIZON-MISS-2022-OCEAN-01 (Actions for the implementation of the Mission Restore our ocean and waters by 2030), it was done so with the intention of promoting and strengthening of blue literacy in the project's five targeted region - represented by seven country hubs in Austria, Estonia, Hungary, Italy, Poland, Romania, and Turkey. As a Horizon-funded initiative, SHORE was tasked with highly ambitious objectives - the integration of blue literacy into national education systems - an undertaking that has presented significant structural and institutional challenges within the project's limited timeframe — and has emerged as one of the key challenges in aligning SHORE's outcomes with the original proposal. To clarify, a *curriculum* refers to the officially sanctioned, state-level framework that dictates what students are taught in primary- and secondary-school classrooms. This encompasses not just content, but also includes pedagogical approaches, assessment standards, and institutional structures; across European education systems, the development and revision of curriculum frameworks is a complex and protracted process, typically unfolding over several years. Amending or introducing new elements into a national curriculum is an intensive, multi-year process involving complex political negotiations, stakeholder consultations, pilot testing, and alignment with national education goals and legislation.

In this context, the ambition of embedding "blue curricula" — educational content focused on sustainability of Earth's aquatic ecosystems, sustainable marine practices, and blue economy topics — into formal national curricula within the 36-month lifespan of an EU-funded project is structurally unfeasible. Most EU countries undergo a prolonged curriculum reform cycle. Even preliminary curriculum shifts typically require approval from multiple ministries, input from national education councils, teacher retraining strategies, and systemic policy support. In short, expecting a three-year project — regardless of funding or intent — to deliver lasting curricular reform at the national levels of the seven country hubs ignores the political, temporal, and institutional realities of how education systems operate. The project may raise awareness or inspire pilot materials, but meaningful integration into official national curricula lies far beyond the scope, timeline, and influence of SHORE as a Horizon CSA project. Therefore, 'raising awareness' became SHORE's operational focus in terms of influencing the inclusion of blue literacy in primary- and secondary-school classrooms that have taken the form of 'teaching routes'. To support the teaching routes developed by the Country Hubs, the SHORE WP2 Team has curated a repository of external resources uploaded to the community platform, designed to enrich and contextualize classroom engagement with blue literacy themes. This approach reflects the project's pragmatic shift from attempting to embed blue literacy directly into formal curricula — an undertaking unfeasible within a 36-month project timeframe — to instead prioritizing the raising of awareness among students and educators and provide material in the form of modular teaching routes that would enable teachers to create lessons plans that would be effective in promoting blue literacy in classroom instruction.

4.1 Blue Education – Teaching and Learning

SHORE teaching and learning material, structured by age group and cognitive levels, offer adaptable frameworks aligned with the project's five thematic areas and related sub-sections, encouraging educators to develop their own lesson plans suited to their national and local contexts.

Figure 4: SHORE Thematic Topics/Subtopics

Teaching Routes were developed as a coordinated effort under Work Package WP2 to demonstrate how SHORE's country hubs are not only inspiring educators but also equipping them with practical, adaptable tools for the classroom in an effort to be better tailored to the specific needs of the school community in the focused regions while also promoting the EU Mission Ocean goals.

4.2 blue literacy Roadmap

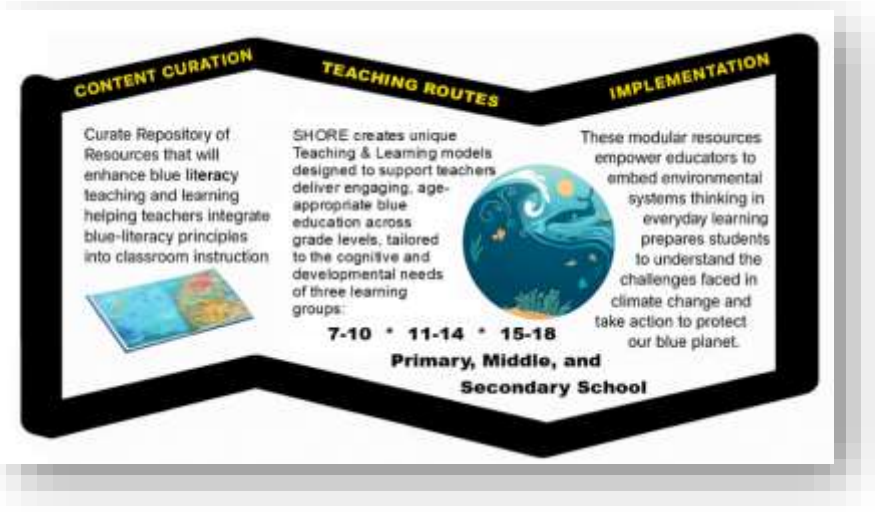


Figure 5: SHORE blue literacy Roadmap

SHORE's blue literacy Roadmap is a three-phased approach to Task 2.3 - Deliver international teaching routes, teacher resources, and training activities, improved for each region.

PHASE 1 - CONTENT CURATION: The WP2 Team curated resources that will enhance blue literacy teaching and learning; this process helps teachers integrate blue literacy principles into classroom instruction in both primary and secondary-education classrooms, as well as in non-formal learning environments following the open-schooling methodology. These resources emphasize the interconnectedness of aquatic ecosystems and their impact on broader Earth systems. During SHORE's first year, consortium partners curated a range of resources that will raise awareness of the project's five focus areas that can be used as a structured educational experience for teachers. Phase 1 involved curating resources from open-source material to create a repository that is currently housed on the SHORE Community Platform. Performance KPIs are evaluated

based on the number of users who have accessed the materials, as reported in WP4, bringing Phase 1 to its completion.

PHASE 2 - TEACHING ROUTES: Helping students understand the reciprocal relationship between themselves and Earth's water bodies, through integrated educational resources and programming, is essential to the success of SHORE. The seven country hubs collaborated to develop unique teaching and learning models designed to support educators in delivering engaging, age-appropriate blue education across primary and secondary levels. Rooted in SHORE's interdisciplinary approach, the teaching routes are structured around five thematic topics and tailored to the cognitive and developmental stages of three age groups: 7–10, 11–14, and 15–18.

Rather than prescribing fixed lesson plans, the teaching guides offer recommended actions that teachers can use to design their own context-specific lessons. They serve as practical frameworks that promote flexible implementation while aligning with curriculum standards. By combining centralized guidance with decentralized adaptation, this task has enabled the creation of multilingual, culturally responsive training modules that foster innovative, inquiry-driven, and project-based learning in classrooms across Europe. SHORE's teaching route plans were created in English, and have been made available in the consortium languages of German, Estonian, Hungarian, Italian, Polish, Romanian, and Turkish using the European Commission's e-translation. These modular resources empower educators to embed environmental systems thinking into everyday learning—preparing students to understand the challenges faced in climate change and take action to protect our blue planet.

PHASE 3 - IMPLEMENTATION: Now that the teaching routes have been formatted using a common template to ensure clarity and consistency, they have been uploaded to the Community Platform. This central repository will allow registered users, not only teachers and educators but also NGOs and others sponsoring out-of-school learning, to easily access and download the materials. To further support integration of blue literacy into classroom teaching, a Teacher's Guide was developed by COO Yildiz Technical University, also uploaded to the

community platform, that offers guidance on how to adapt the content to different educational levels and contexts. Many of the teaching routes include supplementary resources such as background information, multimedia content, and suggested classroom activities aimed at enriching the learning experience. By providing these adaptable materials through the community platform, SHORE empowers teachers to confidently incorporate blue literacy concepts into their everyday teaching practice.

4.3 Open-Schooling Methodologies

To drive meaningful change and protect our planet, educators and schools play a vital role in engaging young people. SHORE aims to involve students, teachers, and schools in advancing the EU Mission Ocean: “Restore Our Ocean and Waters by 2030” by strengthening blue literacy through collaborative activities and educational projects. The goals of SHORE’s cooperation with schools include:

- Raising awareness among students and teachers about marine and freshwater challenges and their relevance to the EU Mission Ocean.
- Deepening knowledge of blue education, environmental issues, and skills linked to the Blue Economy.
- Promoting the integration of blue literacy topics into both formal and non-formal learning environments.
- Empowering students to take action and advocate for sustainable practices related to marine and freshwater ecosystems.
- Providing teachers with access to SHORE resources that support curriculum enhanced by blue literacy and school-wide engagement.

These efforts are designed to help students build a deeper understanding of aquatic environments while encouraging curiosity, creativity, and a sense of connection to Earth’s water systems. To maximize impact, it is essential to adopt modern, innovative teaching methods that support both teacher preparation and student engagement. The use of technology, digital tools, and active pedagogical approaches such as project-based learning and inquiry-based methods is highly recommended. However, a key barrier

remains: in many countries, there is a lack of formalized teacher training and continuing professional development (CPD) opportunities focused on integrating blue literacy into classroom teaching. Without structured support at the national levels, many educators are left without the guidance, resources, or confidence needed to effectively deliver ocean and water-related content. Addressing this gap through targeted training, resource development, and cross-sector collaboration is critical to embedding blue literacy into mainstream education.

Open-schooling methodologies assure that blue literacy education extends beyond the classroom. Schools serve as crucial links between academic learning and real-world challenges, and their success depends on collaboration with a wide range of partners—including environmental organizations, community groups, government agencies, and industry professionals. The open-schooling approach fosters this collaboration, enabling the co-creation of practical, community-based solutions that make learning more relevant and impactful. In the context of blue literacy, this collective effort is essential. Schools cannot achieve these goals alone; it requires the involvement of all sectors of society. Through open schooling, communities and schools can co-design educational experiences that not only raise awareness but inspire action.

Embedding sustainability in education helps students understand the importance of protecting natural resources, reducing waste, and conserving ecosystems. Teaching these principles equips the next generation to become committed, informed citizens ready to safeguard the health of our planet's waters. Open schooling, therefore, plays a key role in supporting the EU Mission Ocean by engaging a wide network of stakeholders—such as scientists, Blue Economy professionals, local authorities, and policymakers—in hands-on, collaborative learning experiences that shape a more sustainable future.

Open schooling involves making schools active hubs of learning where students work on real-world problems with the support and involvement of the wider community, to support:

1. **Community Engagement and Awareness** by encouraging collaboration between schools and community members, including local environmental organizations,

government agencies, and businesses. SHORE is dedicated to mobilizing actors in local communities to co-design, co-develop and co-implement projects that can contribute to expand and broaden blue literacy for young people. By involving students and their communities in projects related to restoring our ocean and waters, awareness and understanding of the issues are significantly heightened. This increased awareness can drive local actions to reduce pollution, restore habitats and promote sustainable practices, all of which are crucial for achieving the mission's goals.

2. Hands-On Learning and Citizen Science by enabling students to participate in hands-on learning activities proposed in their school project, such as water quality monitoring, habitat restoration, species identification, etc., that involve gathering data, conducting experiments, and contributing to citizen-science projects. By engaging in these activities, students contribute to the collection of valuable data that can inform larger scientific studies and restoration efforts, directly aiding the Mission's objectives of citizen engagement. School projects submitted to SHORE's open calls are intended to be co-designed, developed and implemented, thus open-schooling methodologies support student-led initiatives that foster a sense of ownership and responsibility for their learning and the environment.

3. Interdisciplinary Education Approaches that integrate disciplinary subjects like biology, geography, chemistry, and social studies to explore complex environmental issues and ocean science. This approach helps students understand the multifaceted nature of ocean restoration, linking ecological health with economic, social, and cultural factors. Such a comprehensive understanding is vital for creating sustainable solutions that align with the mission's objectives. The SHORE Teaching Routes Framework for our five focus areas (*sea-based activities, biodiversity, hazardous substances, climate change, sustainable resource use*) integrates concepts, skills, and activities from multiple subjects and disciplines into a single, cohesive learning experience. This approach helps students make connections between different areas of knowledge and apply what they learn in one subject to another, fostering a deeper and more comprehensive understanding of the topic. The framework also aligns with the European Framework for Lifelong Learning Key Competences to ensure that the educational content not only

covers the subject matter but also develops essential skills and abilities that students need for personal development, active citizenship, social inclusion, and employment.

Each country hub has developed its own approach to training teachers and engaging schools through culturally- and linguistically-appropriate workshops, webinars, and other activities such as specialized events on blue literacy; these are held in conjunction with workpackage WP3 and reported therein. Teacher Training also is aimed at helping teachers utilize material archived on the community platform in their classrooms, as outlined in the country hub progress reports below. This includes outreach to schools and recruitment of teachers who can participate in SHORE activities, as well as guidance on developing blue school projects eligible for implementation with SHORE funding awarded during the project's three open calls, orchestrated by work package WP6.

4. **Problem-Solving and Innovation** that enable students to identify water-related challenges of the body of water in close proximity, whether the sea or river, and begin to think of what solutions are required to address the challenges faced. These challenges are complex and interconnected, necessitating multidisciplinary approaches and global cooperation. Some of the most pressing issues have been identified as challenges facing the project's five focus areas around which the open calls are organized and teaching/learning models used by teachers to create their unique lesson plans.

The creative problem-solving fostered by open schooling can lead to new, scalable solutions that contribute to restoring waters across the EU. Contextual Learning fostered by SHORES Teaching Routes can inspire broader societal changes that align with the Mission's goals.

5. **Sustainability/Blue Education,** when embedded into the classroom teaching and learning, can help students understand the importance of conserving natural resources, reducing waste, protecting ecosystems and taking ownership for the health and well-being of Earth's water bodies.

4.4 SHORE Blue Education Support

Supporting educators in providing a contextual understanding of the influence Earth's water bodies have on humans, and vice versa, can involve a variety of engaging activities that help students explore the complex relationships between aquatic environments and human society. Country Hubs are tasked with providing guidance for participation in the various activities carried out by SHORE under the aegis of Horizon sponsorship to promote the EU Mission Ocean, "Restore Our Ocean and Waters by 2030", aimed at nurturing a new generation of Agents of Change by integrating blue literacy into everyday education.

5. TEACHING ROUTES

To ensure the usability of SHORE materials in real classrooms, country hubs have been tasked with revising the structure and format of existing educational resources. This process includes simplifying complex materials, organizing content more clearly by age group and curriculum relevance, and incorporating feedback from educators on classroom applicability.

- **GUIDANCE** - schools within the vicinity of the seven CHs hosted by selected partners will receive guidance on crafting blue school projects, applying to open calls for funding and joining the NEBS.

- **COLLABORATIO**N – Designed as an open-source virtual learning environment and education management system created to maximize the impact of learning, the SHORE Community Platform serves as a host for Education and Awareness, Project Monitoring, Gamification, and a Virtual Learning Environment. The CHs will also facilitate engagement between schools to collaborate on projects and within the NEBS to participate in e-Twinning as well as the Mission Ocean & Waters Helix, an international open innovation community of experts from academia, education and training in the blue economy, water and marine ecosystems and related fields,

launched with a specific focus on driving impact, leveraging resources and facilitating knowledge dissemination.

- **ACCESSING RESOURCES** – WP3 reports on each of the seven SHORE country hubs having devised a series of events that consist of webinars, “meet & greet” and other structured activities such as hackathons and summer institutes that support teachers in their goals of implementing blue literacy in the classroom.

- **REPOSITORY OF RESOURCES** – Our vision is to continue to curate myriad publications, videos, infographics, etc. as resources that will help teachers foster an understanding of the roles Earth’s water bodies play in regulating climate via the planet’s ecosystem throughout the project’s lifespan. This will help teachers convey the urgency of addressing the challenges while promoting ocean literacy and encouraging positive environmental stewardship in their native tongue.

- **TEACHING ROUTES** A total of 154 adaptable teaching routes are accessible via the SHORE community platform – 22 original teaching routes were developed in English and then translated into the seven languages of the consortium around five thematic topics, each highlighting a selected sub-topic to provide a starting point rather than serving as a fixed curriculum. These routes offer a creative framework aligned with blue literacy goals, allowing teachers to tailor activities to their students’ local environments, cultural contexts, and learning needs by combining storytelling, hands-on exploration, and inquiry-based learning; the routes are aimed at empowering educators to spark curiosity, deepen ecological understanding, and foster environmental responsibility in students through place-based, student-centered learning by making reference to a set of criteria determined to be pedagogically valuable.

SHORE Thematic Topics	Grade Level	Teaching Route Title	CH Contribution
5.1 Sea-Based Activities	Primary School	Underwater noise pollution	Italy
5.1 Sea-Based Activities	Middle School	▪ Aquaculture and Food Responsibility ▪ Consumption, Water & Global Responsibility ▪ Electricity Hydropower ▪ Water Tourism ▪ Water Transport Routes ▪ Watersport and Water Justice	Austria
5.1 Sea-Based Activities	Secondary School	A balanced aquatic ecosystem	Estonia
5.2 Biodiversity	Primary School	Nature's Neighborhoods	Estonia
5.2 Biodiversity	Middle School	Biodiversity Secrets of the Living Planet.	Poland
5.2 Biodiversity	Secondary School	Bird Migration - 2030 Biodiversity Strategy	Italy
5.3 Hazardous Substances	Primary School	Threats and pressures on marine and aquatic ecosystems,	Italy
5.3 Hazardous Substances	Middle School	▪Protecting Drinking Water ▪Plastics/Chemicals ▪Eco-Friendly Alternatives	Hungary
5.3 Hazardous Substances	Secondary School	From Can to Land	Estonia
5.4 Climate Change	Primary School	Scientific Thinking & Inquiry Skills	Turkey
5.4 Climate Change	Middle School	Shifting Sands	Estonia
5.4 Climate Change	Secondary School	How whales contribute to carbon sequestration	Italy
5.5 Sustainable Resources	Primary School	Sustainable use of water resources	Italy
5.5 Sustainable Resources	Middle School	Sustainable use of water resources	Romania
5.5 Sustainable Resources	Secondary School	Blue Economy - Multi Uses	Estonia

Table 5: List of Teaching Routes Uploaded to Community Platform

The SHORE Teaching Routes, designed in alignment with a 14-element template, serve as a pedagogically grounded guide for educators—not as fixed lesson plans, but as recommended frameworks to support the design of their own context-specific, blue literacy-based lessons. Built around a modular and adaptable structure, each teaching route provides clear, value-based criteria that help teachers define learning goals, identify relevant environmental content, select age-appropriate skills, and integrate interdisciplinary subjects across cognitive levels.

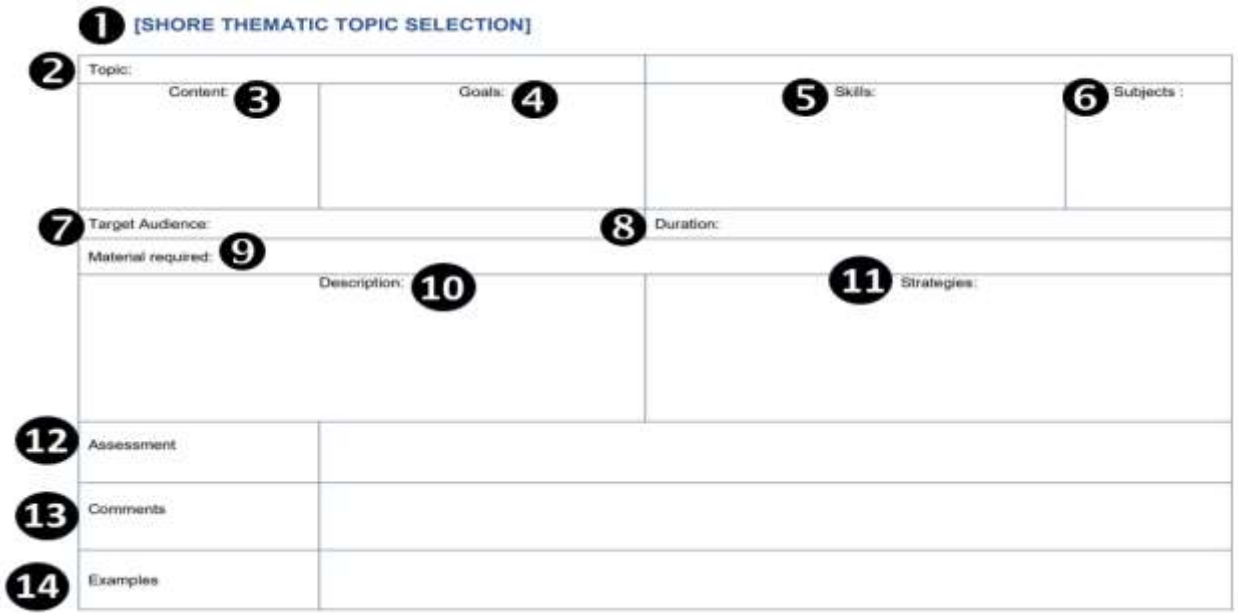


Figure 6: SHORE Teaching Route Template

1-2 Topic: Selection of one of the five SHORE Thematic Topics (5.1 Sea-Based Activities, 5.2 Biodiversity 5.3 Hazardous Substances, 5.4 Climate Change, 5.5 Sustainable Use of Resources). These topics expose students to critical and tangible environmental issues affecting marine and freshwater ecosystems. By focusing on real-world problems, the teaching routes make abstract ecological concerns relevant to students' lives and encourage curiosity about the interconnectedness of ecosystems. These actions directly support the goal of building foundational knowledge for informed environmental stewardship.

3 Content: Outlines the core environmental issues or scientific concepts the teaching route addresses that align with broader EU policy frameworks, particularly the 2030 Biodiversity Strategy, which gives students insight into how local actions connect to regional and global objectives. It reinforces the importance of biodiversity and frames students not only as learners but as future participants in sustainability. It also gives structure so that students can focus attention on specific, interlinked climate-change related themes.

4 Goals: this section articulates what the lesson aims to achieve in terms of student understanding and awareness. Helps educators align the lesson with national standards and the broader sustainability-, blue-, and green-education goals.

5 Skills: Skills development is integral to raising awareness because it empowers students to investigate, question, and communicate environmental issues critically and collaboratively. Emphasizing these competencies ensures the lesson goes beyond rote memorization to foster deeper engagement and sustained interest in environmental topics.

6 Subjects: By connecting SHORE's thematic topics across multiple disciplines, the teaching routes encourage a holistic understanding of environmental challenges. They also allow teachers from various subject areas to incorporate blue literacy themes, broadening exposure and reinforcing interdisciplinary relevance.

7 Target Audience: Each thematic topic has three teaching routes designed for different age groups - 7-10 year olds in primary school, 11-14 year olds in middle school, and 15-18 year olds in secondary school.

8 Duration: Teaching routes vary from 30 minutes to 13 weeks, and are tagged accordingly in the SHORE community platform where the teaching routes are housed.

9 Material Required: Suggests low-cost materials that can be used to execute the teaching route in the classroom.

10 Description: aims to increase awareness of marine diversity and inform students about the 2030 Biodiversity Strategy through group-based research and presentations. This learner-centered approach emphasizes discovery and peer learning. By researching and presenting biodiversity targets in their local and national contexts, students gain ownership over the learning process and connect abstract policy goals to concrete realities in their environments.

11 Strategy: Students are prompted to conduct research and explore real initiatives to deepen their understanding of the EU Mission Ocean in order to engage them with real-world initiatives. Strengthens the connection between classroom learning and actual environmental efforts, and builds relevance and urgency, prompting students to see themselves as active contributors rather than passive observers.

12 Assessment: Based on student feedback and group work outputs, the template provides a flexible, formative approach to assessment that values participation and critical engagement over standard testing. It encourages reflection and dialogue, key components in developing environmental awareness and attitudes.

13 Comments: Notes the importance of teacher guidance in accessing and contextualizing information, acknowledging the teacher's role highlights that awareness is co-constructed. Teachers act as facilitators, helping students navigate complex topics and ensuring the materials are meaningfully understood.

14 Examples: Localize abstract concepts. Discussing species familiar to students or visible problems such as plastic pollution helps personalize environmental issues, which is crucial for fostering empathy and motivation to act.

Rather than offering one-size-fits-all content, the teaching routes are meant to inspire and empower educators to co-create meaningful and engaging learning experiences based on their students' needs, local environments, and national curriculum standards. The template includes dedicated sections for strategies, required materials, assessment suggestions, and localized real-world examples—making it a practical and flexible tool for integrating ocean and water literacy into primary and secondary education. All SHORE Teaching Routes align with the EU's sustainability agenda, particularly the EU Mission Ocean and the 2030 Biodiversity Strategy, and are structured to raise awareness about urgent environmental challenges through inquiry-based and student-centered methodologies. They are made available in English, with translations into the consortium languages supported by the EU eTranslation tool, enabling broader access and

integration across the SHORE project. In this way, the SHORE Teaching Routes foster cross-cultural, interdisciplinary learning while promoting educational consistency and creativity. They provide a replicable yet adaptable model for advancing blue literacy and helping students see themselves as active contributors to a sustainable future.

While these efforts do not constitute formal curriculum reform, they do represent an important groundwork for long-term impact. By showcasing how blue literacy can be meaningfully addressed through flexible, educator-led initiatives, SHORE activities serve as best-practice examples for policymakers seeking to initiate or influence education reform at the national levels of education policy. The teaching routes created by the Country Hubs are complemented by a repository of resources available from external sources to reflect the project's pragmatic pivot from attempting to embed blue literacy directly into classroom instruction to, instead, focusing on raising awareness among students and educators. Providing these materials is paramount to support the overarching goal of providing examples of best practice for policymakers seeking to initiate or influence education reform at the national level.

Upon registering as a user on the platform, teachers can navigate to the resources repository and teaching routes, and select the material that has been classified by age groups:

Figure 7: Teaching Resources Available on the SHORE Community Platform

Once the age group is selected, the registered user can choose between Resources and Materials that have been categorized into the five thematic foci (Biodiversity, Climate Change, Hazardous Substances, Sea-based Activity, Sustainable Use of Resources) or

Experiments. Once the theme is selected, a list of available courses will appear for which enrollment is required. After enrollment is completed, the teacher can select the course. These have been categorized by language, appropriateness for age groups and teacher training material.

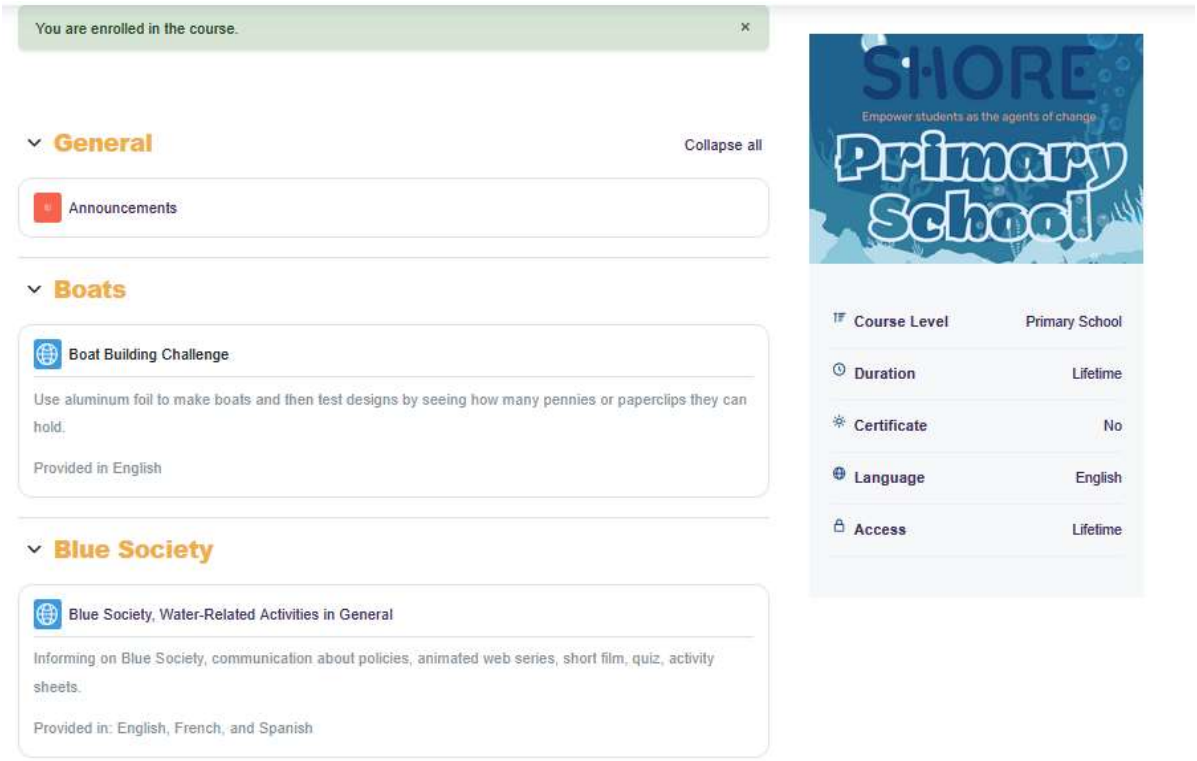


Figure 8: Accessing the SHORE Teaching Resources

5.1 Teacher Manuals

SHORE COO Yildiz Technical University, representing the Turkey Country Hub, produced two teachers guides on blue literacy in the classroom:

(1) The Teacher's Guide for Primary-School classrooms explore the oceans and offers insights on nurturing Agents of Change at an early age

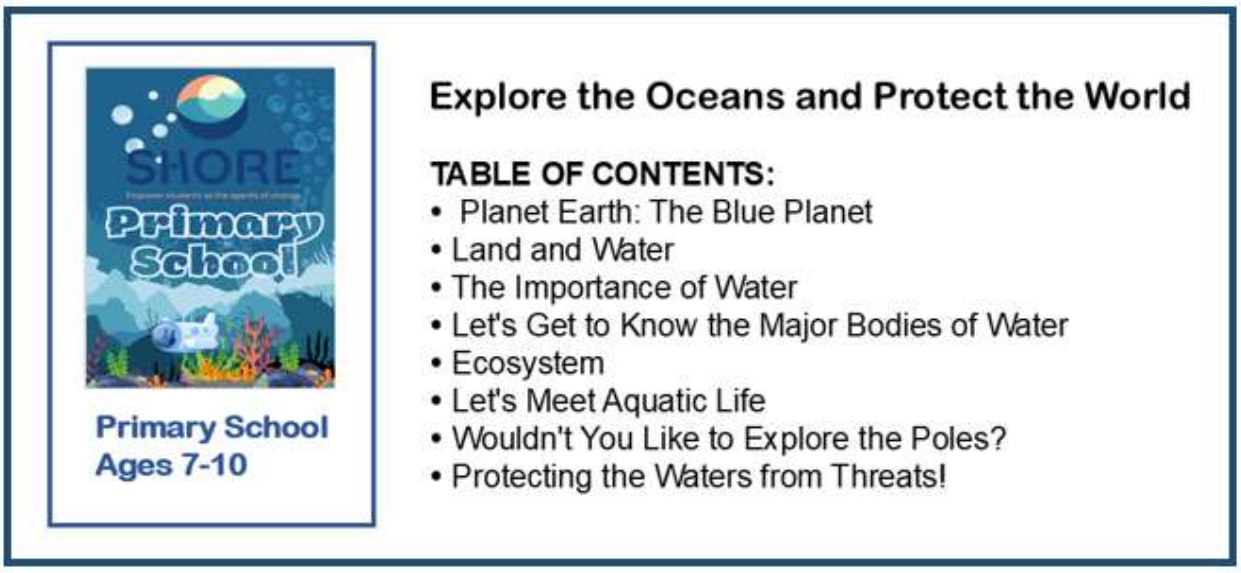


Figure 9: SHORE – Primary School Teacher's Guide

(1) The Teacher's Guide for Secondary-School Classrooms explores the oceans and offers insights on nurturing Agents of Change at an early age

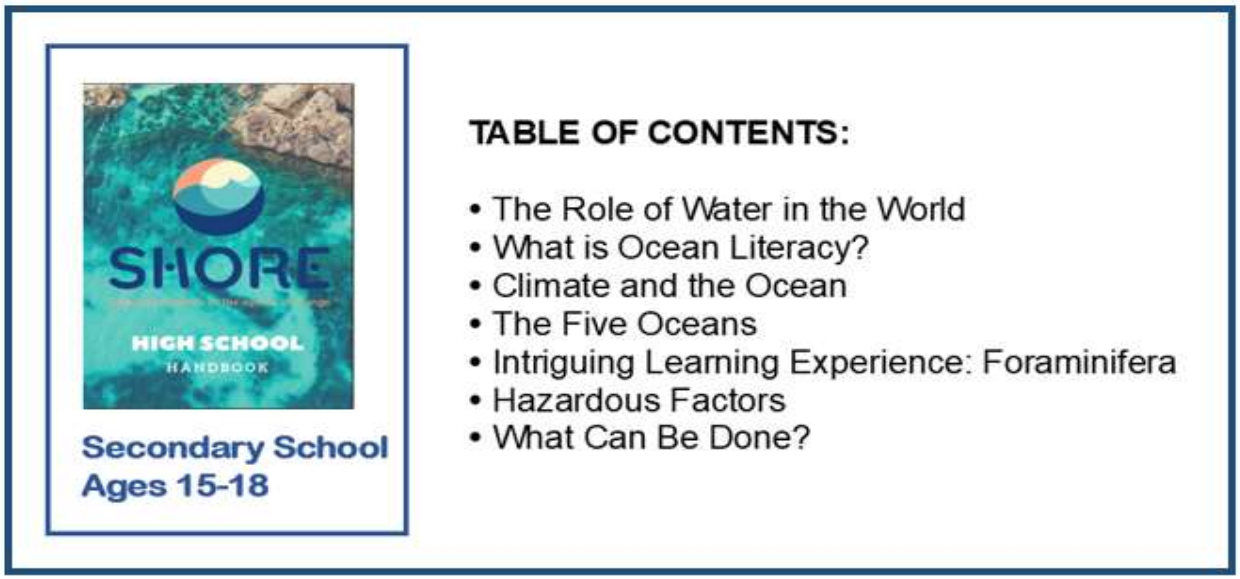


Figure 10: SHORE – Secondary School Teacher's Guide

5.2 SHORE's blue literacy Teaching & Learning Model

SHORE's teaching and learning model offers an adaptable, inclusive framework designed to empower educators and students with tools that are both locally grounded and globally

relevant to promote blue literacy inside and outside formal education classrooms. Central to this model are teaching routes developed for teacher training, each uniquely tailored to accommodate adaptation of local customs, cultures, and languages, while addressing global environmental challenges. These are supported by a series of short, engaging videos that tackle three pressing issues: plastic pollution, water scarcity, and food waste:

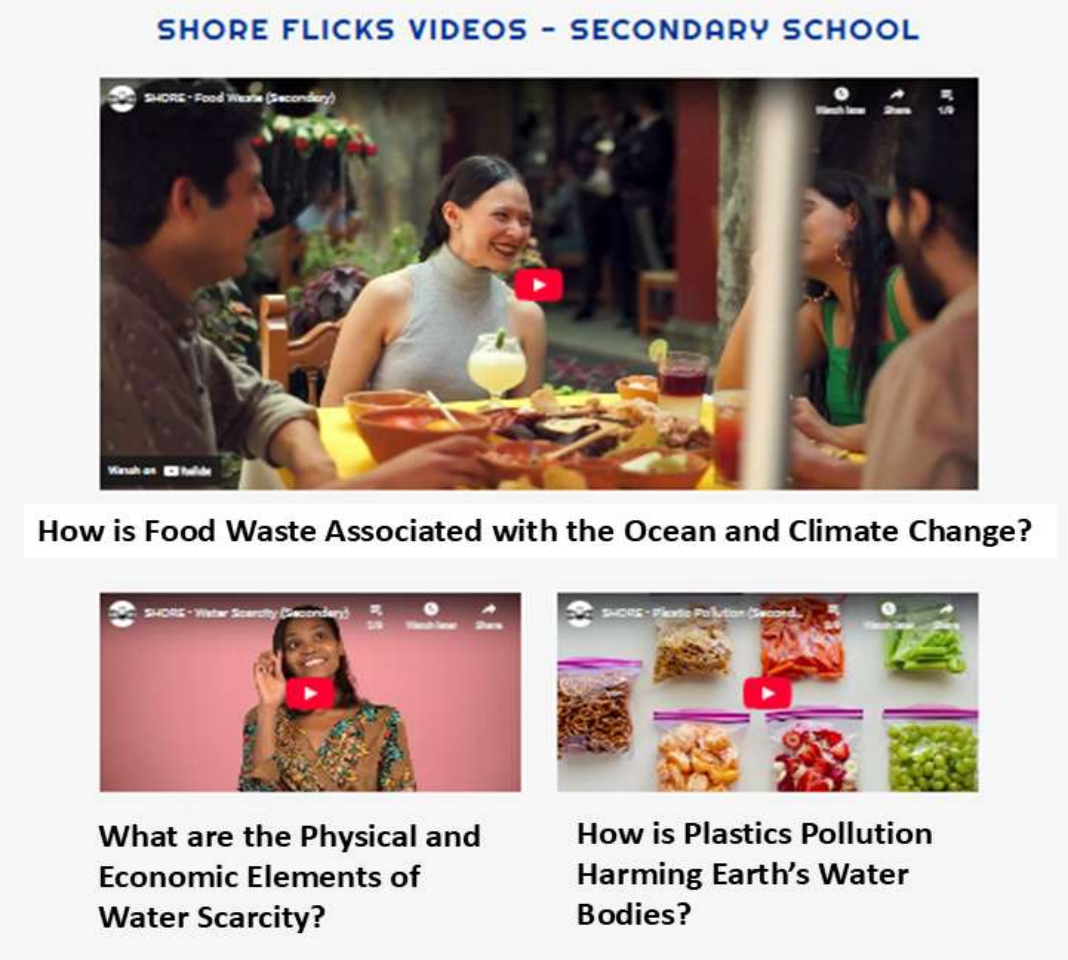


Figure 11: SHORE FLICKS – Secondary School Audiences

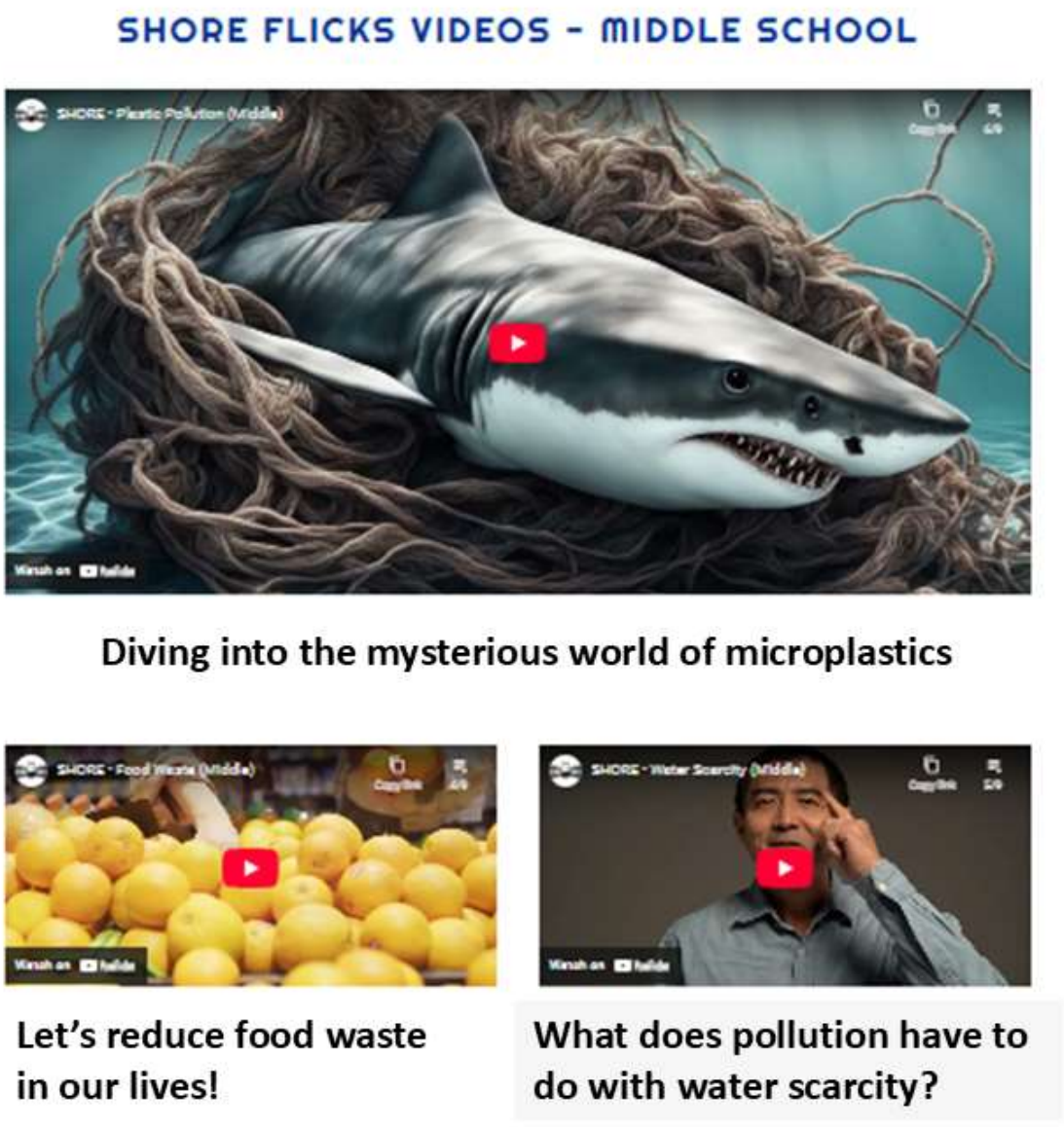


Figure 12: SHORE FLICKS – Middle School Audiences

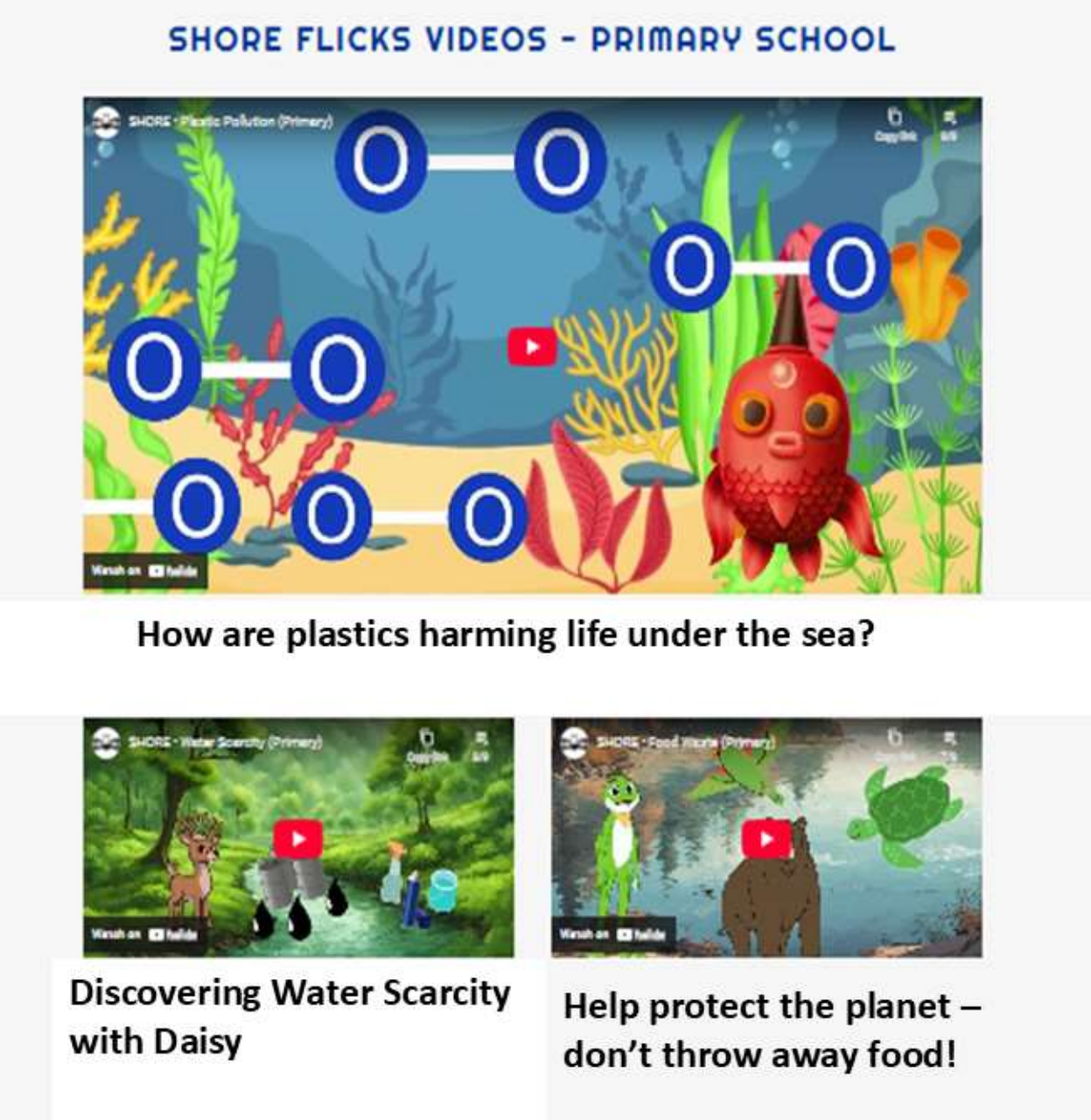


Figure 13: SHORE FLICKS – Primary School Audiences

The Estonian Country Hub Baltic Living Lab also produced an interactive digital lesson, "The Seven Ocean Principles", available in English and Estonian: Introduction to Ocean Literacy and the EU Mission Ocean. Evaluation of usage is performed via the Typeform mechanism that serves as a feedback loop from the teachers who use the lesson

Figure 14: SHORE Digital Interactive Lesson Plan: "Seven Ocean Principles"

Additional material is being prepared by SHORE partners, such as the publications from the Budapest University of Technology and Economics, representing the Hungary Country Hub. Their publication for primary school children, which will also cover a range of topics, can be included in the various lesson plans. In addition to the "stories" for children, there will also be excellent illustrations that can be translated into the national languages of SHORE's country hubs from English, so that they can be used in a wide range of ways. All materials are made available as open-source content through SHORE's community platform, ensuring equitable access and encouraging adaptation, reuse, and peer exchange.

Crucially, the model promotes interdisciplinary learning—breaking down the traditional silos of subject-specific instruction to reveal the deep interconnectedness of Earth's systems. By integrating science, civics, geography, sustainability, and economics, SHORE helps learners understand the vital role of the hydrosphere in regulating the climate and sustaining life. In doing so, it actively combats "ocean blindness"—the widespread lack of awareness about the critical influence Earth's water bodies have on global systems and how human behaviors are accelerating their degradation. This holistic approach also fosters the development of 21st-century skills, including critical thinking, collaboration, effective communication, and creative problem-solving. Blue school projects funded via SHORE's three open calls promote citizen science, hands-on inquiry, and real-world learning experiences, where students gain both the competence and confidence to engage in meaningful environmental action. Simultaneously, the model enhances the continuing professional development (CPD) of educators by providing flexible pedagogical tools and facilitating peer learning and cross-border collaboration across the SHORE network.

Ultimately, SHORE's teaching and learning model is aimed at nurturing a new generation of Agents of Change—young leaders equipped with the knowledge, skills, and mindset needed to restore and protect the health and well-being of Earth's water bodies, while fostering a more sustainable and resilient future.

5.3 Implementation Narratives from the Country Hubs

Each of the seven SHORE country hubs has taken a unique approach for the delivery of the teaching resources and training activities improved for each region:

AUSTRIA

Pilot Activities / Case Examples, Implemented Sample Activities from Schools - KUW maintains a sustainable and long-term collaboration with a wide network of schools interested in science education. Within the SHORE project, this network has been significantly expanded across Austria, particularly involving schools with a focus on blue

education. Additionally, numerous contacts have been established with schools located along the Rhine River. Given that Austria is a landlocked country, many teachers tend to focus on local water bodies and perspectives. As a result, KUW has consistently emphasized a global perspective, complementing local materials provided by various stakeholders with international best practice projects and resources.

During the development of school projects - especially in the context of the open call - KUW placed strong emphasis on building upon the experience gained from previous successful initiatives, as well as integrating SHORE activities into ongoing school programs. The added value of SHORE for participating schools has remained central. By connecting already existing school projects with SHORE, KUW has highlighted the additional opportunities available and clearly communicates the benefits for schools when applying for SHORE funding. For example, one school that previously participated in the DOCK4Change climate education project of KUW applied for funding in Open Call #3. This school, already active through its climate club, aims to use the support to further develop their existing projects. Meanwhile, another school involved with the Vienna Children's University took SHORE as the long-awaited catalyst for initiating their first water-related project.

Student Participation (Workshops, Field Studies, etc.) - Within the framework of the SHORE project, KUW developed a variety of tailored activities designed to actively involve both students and teachers. These activities were carefully adapted to suit the age groups and specific needs of the participants.

- Water quizzes with scientists from the University of Vienna: For primary school children, the objective was to create a connection between their school-based knowledge and real-world applications by highlighting both national and international examples. This approach aimed to spark their curiosity, enhance their water literacy and empower them to become Ambassadors of Change. During SHORE, two interactive quizzes were conducted with primary school students in cooperation with scientists from the Faculty of Earth Sciences, Geography and Astronomy at the University of Vienna. The first quiz focused on “Corals, Reefs and More,” exploring the fascinating underwater landscape and

marine biodiversity. The second quiz evolved around life in and along the Danube River, which is part of the students' immediate environment and school curriculum. This alignment between SHORE's objectives and the national curriculum was further enriched by a special guest from our project partner Mare Nostrum who joined online to answer the last question about the Danube basin. For several Romanian-speaking students, this part of the quiz was an especially engaging highlight. In total, both quizzes reached over 200 students and multiple teachers expressed interest in integrating the quiz questions into their regular teaching.

- European Geoscience Union (EGU) Conference: Upper secondary students were offered a unique opportunity to participate in the EGU Conferences held in Vienna in 2024 and 2025. KUW established a collaboration with the EGU Educational Committee, marking the first time that school students and civic society members were invited to attend. Phil Smith, Coordinator of the Teacher Scientist Network and member of the EGU Educational Committee, approached KUW to identify schools interested in participating at the conference. The 2024 programme included 58 students attending the first session and listened to the key findings of the IPCC and afterwards the inputs of Valérie Masson-Delmotte, Laboratoire des Sciences du Climat et de l'Environnement, IPSL, France, and Joeri Rogelj, Centre for Environmental Policy, Imperial College, London, Great Britain, about the issues of climate literacy. After the Q&A session, the students explored the poster presentation to gain insights into diverse geoscience fields and interact with researchers. Additionally, KUW hosted a workshop led by Alessandra Savini's team from the University of Milano at KUW's facilities. The first part covered ocean literacy, corals, marine sediments and research methods. Students were then split into two groups: one explored coral reefs in tropical and subtropical zones and their threats, while the other focused on polar environments and Arctic sediments. Groups swapped topics afterwards. Interactive tools such as videos, 3D models via QR codes, and VR headsets allowed students to experience immersive learning environments. Following positive feedback from the EGU Board, the collaboration continued in 2025 with more than 25 students attending the conference. Highlights included the NASA "Ask me anything" session and the

panel discussion on “Habitability in Our Solar System” and guided tours through poster sessions, providing students with a comprehensive insight into geoscience research and its real-world applications. Overall, more than 100 upper secondary students and 10 teachers engaged in EGU-related activities through SHORE. KUW also emphasized ocean literacy for teachers through various initiatives:

- Study Visit Lappeenranta: During the European Children’s University Network Open Space event in Vienna, KUW presented SHORE and attracted interest from representatives of the Junior University of Lappeenranta, Finland. As a result, a study visit was arranged and this delegation included city officials, university staff and development teachers involved in creating water-related curriculum units. The study visit aimed to exchange experiences regarding SHORE and water education units, discuss future-oriented and open schooling-based ocean literacy. As part of the study visit, the delegation exchanged their thoughts, views and inspiring projects with teachers and shared feedback and ideas for further projects.
- Bildungsgrätzl Initiative: KUW actively participates in this Vienna municipal initiative promoting collaboration between schools and non-formal education providers to foster education in the districts. During the annual exchange meeting, KUW advocated for water literacy as a crucial skill for younger generations. In an open session with teachers, experiences and challenges related to water topics and SHORE were discussed. KUW shared ideas and resources to support educators in initiating water-related educational projects with their students.

Outcomes and Feedback - The feedback from both students and teachers across all age groups has been highly positive, with a multiple request to continue the collaboration beyond the SHORE project’s official timeframe. Many partnerships initiated within SHORE is set to be sustained and further developed. For instance, the primary school that participated in the science quizzes has already submitted new topic requests along with their schedule for the upcoming academic year. This ongoing engagement demonstrates how the various SHORE activities have not only deepened existing collaborations but also fostered new school partnerships.

A notable milestone was the participation of school students at the EGU Conference in

2024 - the first time that school students attended the conference. Following highly positive evaluations by the EGU Board and involved scientists, the collaboration was extended into 2025, with plans underway to broaden and deepen the partnership with the EGU in the coming years.

Localization and Adaptation - As the Country Hub of the Danube Area, it was important for KUW to emphasize the interconnectedness between the Danube River and other local water bodies with the global perspective of water, highlighting that all waters are connected and that every activity has an impact. This approach was reflected, for example, in the water quizzes tailored to the local environment of the Danube, aligning SHORE's objectives with the national curriculum and making the global challenges tangible for students. By linking local realities to international contexts, KUW successfully fostered a deeper understanding of water issues among schools and teachers alike.

Country-Level Adjustments to Materials - The development of the Baseline Report within WP2 has played a pivotal role in understanding the Austrian context and serves as a foundation for guiding targeted actions. During semi-structured interviews conducted as part of the report, several teachers highlighted the need for ready-to-use teaching materials in German that address global water issues. This feedback supports the effective promotion and uptake of educational resources in schools.

Reflecting this need, WP2 adopted a strategic shift: instead of developing entirely new training materials, the team is reviewing and annotating existing resources related to blue education. This process ensures that all available tools are thoroughly assessed for their relevance and practical application scenarios. These scenarios provide concrete examples and guidance to schools on how to meaningfully integrate blue education into classroom teaching. This strategic focus allows the Austrian Country Hub to address a clear gap identified by teachers. Moreover, the Teacher Routes developed as part of Deliverable D2.7 provide ready-to-use materials tailored to the national circumstances in Austria while maintaining global connections. These materials incorporate diverse didactical approaches that enable future-oriented water literacy education.

Language and Cultural Tailoring - The translation of all Teacher Routes significantly enhances the likelihood of their adoption in the classroom. However, feedback from

teachers collected during the Baseline Report indicates that it is equally important to familiarize educators with national and international best practice models, relevant literature, and supplementary teaching materials. This approach provides teachers with a variety of options for didactic implementation.

Water-related topics are rarely covered in the Austrian teacher training programs and Austrian schoolbooks offer limited references to the global context of water. Consequently, many teachers - especially at the under secondary level, where numerous lateral entrants teach outside their original subject area - feel uncertain about how to effectively incorporate water related topics into their lessons.

Local Stakeholder Collaboration - During SHORE, KUW leveraged its sustainable and long-term cooperation with local stakeholders and expanded collaboration with numerous well-known and respected organizations active in the field of water literacy in Vienna.

- Via Donau: Via Donau, the Austrian Waterway Administration, is responsible for collecting, preparing and disseminating expert knowledge on Danube navigation. Their Education and Learning Department is keen to exchange knowledge and collaborate with educational institutions. Accordingly, Via Donau and KUW have discussed strategies to connect SHORE and its educational materials with those of Via Donau, organize joint events that address topics of interest to teachers and students and utilize both networks for the distribution of educational resources.
- University of Applied Sciences Steyr: Following discussions with Via Donau, the University of Applied Sciences Steyr in Upper Austria approached KUW to explore potential collaboration. They operate the Transport School Lab, offering schools interactive workshops focusing on various transport modes, especially inland waterways. A topic that remains largely underrepresented in Austria. KUW's commitment to promoting less known but important subjects aligns well with this initiative. The first joint event, a teacher training focused on logistics in inland waterways, is planned for autumn 2025, aiming to strengthen ties between schools, research and non-formal education providers.
- Guides for Future: Collaboration with Guides for Future was established to familiarize teachers with the local water-related characteristics of Vienna. These

contribute to environmental and climate protection through their creative and interactive tours around the city, highlighting urban developments. In an initial guided tour along the Danube Canal, participating teachers were introduced to the canal's ecosystem and biodiversity by the Guides for Future team.

- University of Natural Resources and Life Sciences (BOKU): Since 2023, BOKU operates the River Lab on the Danube in Vienna, offering a unique platform for river and water research. It provides students with practical opportunities to understand river processes more deeply. In line with SHORE's open schooling approach, KUW initiated contact with BOKU's River Lab and is currently organizing a joint school excursion for autumn, followed by a discussion session.
- "Rettet das Korallenriff – ein Spiel für Detektivinnen": KUW participated as a consortium partner in the development of "Rettet das Korallenriff – ein Spiel für Detektiv*innen," an interactive educational game created by Angelina Ivkic, a scientist at the Faculty of Earth Sciences, Geography and Astronomy at the University of Vienna. Other consortium partners included the University of Vienna, the Natural History Museum Vienna and Austria's Agency for Education and Internationalisation. The game aims to educate students and their families about the fascinating coral reef ecosystem. KUW actively disseminated the game within its network and aligned its objectives closely with those of SHORE.

Qualitative Feedback and Key Observations from Teachers - Teachers appreciated the activities, materials and best practice models for their future-oriented and cross-curricular approaches, as well as for effectively linking local and global perspectives. They also valued the selection of topics, many of which are rarely covered in Austrian schoolbooks. After each session, KUW actively collected feedback to continuously improve the activities. The majority of responses were highly positive, often serving as a foundation for establishing deeper, ongoing collaborations with the schools.

Suggested Improvements - During the project, several challenges became apparent that provide valuable lessons for future activities. Firstly, the concept of "Ocean Literacy" remains unfamiliar to many teachers and stakeholders. To overcome this issue, short videos, infographics, or glossaries could be developed to foster a deeper understanding.

Secondly, many teachers and school leaders are unfamiliar with the process of applying for grants. While they recognise the value and opportunities SHORE offers, the application process is seen as an unfamiliar and additional workload alongside their regular teaching responsibilities, which leads to hesitation in submitting proposals.

Another challenge lies in the currently limited cooperation between Austrian and international schools. Through SHORE, KUW has taken important first steps to strengthen the NEBS in Austria and actively promote cross-border exchange between schools. While establishing such collaborations requires time and sustained effort, the foundations laid during the project can be effectively built upon and expanded in future initiatives.

The bottom-up approach of KUW, involving direct communication with school leaders and leveraging existing networks, has proven effective and should be expanded. Additionally, promoting SHORE through newsletters and local stakeholder events increases engagement and awareness. Finally, KUW plans to deepen its collaboration with regional institutions and integrate more localized content, while maintaining the global perspective of water literacy, to ensure relevance and resonance with diverse school communities.

Summary of Evaluations - Overall, the evaluations were highly positive. Key findings include:

- The effectiveness of cross-curricular approaches that integrate both local and global water literacy perspectives, fostering a holistic understanding among students.
- The curated repository of materials and best practice models serves as a valuable pool of ideas and inspiration for teachers, facilitating the adaptation of content to diverse classroom needs.
- The availability of ready-to-use teaching materials tailored to different age groups, which supports seamless integration into existing curricula.
- A broad variety of interactive activities - such as science quizzes and visits to the European Geoscience Union (EGU) conference - that provide enriching experiences rarely found in regular classroom settings, thus increasing student engagement and motivation.

These results underscore the positive reception of SHORE's innovative approach and highlight opportunities for further expansion and refinement.

Monitoring & Impact Assessment, Learning Indicators, Rubrics, or Surveys - Although no formal quantitative instruments such as rubrics or surveys were systematically implemented during the project, qualitative feedback gathered from teachers and students served as an important indicator of learning progress. Observations during workshops and interactive activities provided valuable insights into the development of water literacy and engagement levels. These informal indicators helped to assess the relevance and effectiveness of the materials and activities.

Teacher and Student Satisfaction - Teacher and student satisfaction was primarily assessed through direct feedback collected after each activity and session. Overall, both groups expressed high levels of enthusiasm and appreciation for the interactive and practical approach. Teachers highlighted the value of ready-to-use materials and cross-curricular content, while students particularly enjoyed hands-on experiences like quizzes and conference visits. This positive response strongly encouraged the continuation and expansion of SHORE activities beyond the project timeline.

Evaluation of Classroom Impact - Although no formal classroom impact evaluation was conducted, ongoing communication with participating schools revealed promising indications of SHORE's influence on teaching practices and student awareness. Teachers reported incorporating SHORE materials into their lessons and expressed interest in further integrating water literacy topics into their teaching. The sustained engagement from schools, such as requests for new quiz topics and increased participation in follow-up activities, suggests a meaningful and lasting impact on classroom learning.

ESTONIA

Pilot Activities / Case Examples, Implemented Sample Activities from Schools - SHORE Partner Global Skills Network established the Baltic Living Lab (http://BalticLivingLab) as a social enterprise dedicated to fostering cross-sector collaboration among the eight EU countries bordering the Baltic Sea. Its primary mission is to promote sustainable development

and innovation within the region by uniting diverse stakeholders—including policymakers, researchers, industry professionals, and citizens—in co-creating solutions to environmental and socio-economic challenges. It operates as a "living lab," serving as a real-life testing and experimentation environment that encourages open innovation, and it has extended beyond Estonia to outreach to all eight EU countries bordering the Baltic Sea. In this way, we can promote SHORE to those countries that are not included in programming, and encourage more participation in the Network of European Blue Schools from the region, which is currently sorely under- represented.

The Baltic Living Lab emphasizes open-schooling methodologies between schools and the Multiple-Helix Model, aiming its future endeavors towards integrating efforts from academia, industry, government, and civil society to address complex issues such as climate change, marine ecosystem health, and the sustainable development of the Blue Economy. As a living lab, its programming will actively support initiatives like the EU Mission "Restore our Ocean and Waters by 2030", functioning as a regional hub for knowledge dissemination, citizen science, and educational outreach. Through its affiliation with programs such as the Horizon sister projects and others like the lighthouses and citizen science, the Baltic Living Lab is positioned to optimize synergies that facilitate the development of innovative solutions aimed at preserving the Baltic Sea's ecological balance while promoting economic resilience and community engagement:

- While having hosted activities and events, including webinars and in-person meetings in the afternoon hours after school adjourns, and translated all SHORE material to Estonian, participation remains low - educators often register but do not attend.
- From two open calls to date, only one application was received in the first round, and six in the second, none of which were selected. They are currently mentoring 10-12 applications for SHORE's OC#3 final call, providing direct support to improve their alignment with eligibility and quality criteria. Unfortunately, with the exception of Poland, none of the other Baltic region countries have country hubs that could provide guidance on the current and final application process with a deadline of 30 June. Therefore, the Baltic Living Lab will serve as a contact point

for SHORE resources and for promoting membership in the Network of European Blue Schools as well.

One of the major challenges to advancing blue literacy within Estonia's formal education system is the absence of formalized teacher training programs or Ministry-sanctioned continuing professional development in ocean and water literacy. In the face of this institutional gap, the Baltic Living Lab has adopted a unique, ground-up approach to teacher training**,** working collaboratively with local experts and education stakeholders to support educators directly—outside the constraints of national policy cycles.

Estonia's national curriculum is internationally recognized for its innovation and digital infrastructure, yet it remains highly prescriptive and centrally governed. Curriculum revisions occur in long, cyclical intervals—often every five to ten years—and are coordinated through complex, multi-stakeholder processes. These conditions make it virtually impossible to formally integrate new content, such as blue literacy or the promote Blue Economy goals, into the formal education system. Despite repeated efforts, SHORE has been unable to secure endorsement or dissemination support from Estonia's Ministry of Education and Research. Because SHORE is not a formal educational institution, there is no institutional gateway or process sanctioned by the Ministry of Education for submitting new content for inclusion in the national curriculum. As a result, blue literacy content, even when evidence-based and aligned with EU sustainability goals, retains little prospect of system-wide uptake without long-term, ministry-led reform. Even where high-quality blue literacy resources exist, another formidable barrier is the lack of teacher preparedness. Most generalist educators in Estonia—especially at the primary and lower secondary levels—have not received training in interdisciplinary topics such as ocean literacy, systems thinking, or the socio-economic dimensions of the Blue Economy. While many teachers are open to innovation, the lack of formal training, recognition, or assessment frameworks makes it difficult for them to justify using non-mandated materials in a system that is tightly aligned with standardized exams. This challenge is exacerbated by chronic issues within Estonia's teaching profession. In early 2024, a nationwide teachers' strike underscored the broader structural problems—teachers are underpaid, overworked, and lacking adequate institutional support. In this environment,

introducing additional, non-compulsory content without compensation, training, or curricular time allocation is an unrealistic expectation. Blue literacy may be valued, but it is rarely prioritized.

Thus, the Baltic Living Lab has responded to these barriers with localized, collaborative Teacher Training, shifted its strategy from trying to embed SHORE content directly into the national curriculum, to empowering teachers through flexible, locally relevant training. Working with Estonian education experts, environmental organizations, and grassroots networks, the Baltic Living Lab designed teaching routes as recommendations and inspiration, not prescriptive lesson plans. These routes are adaptable to Estonia's existing curriculum structure and are aligned with national competencies in science, civic education, and 21st-century skills.

Language and Cultural Tailoring - Recognizing language as another barrier to adoption, all SHORE resources were translated into Estonian, curated by an earth sciences professional native to Estonia, and contextualized to include local examples and priorities—particularly relevant for the Baltic Sea region. This has allowed teachers to access materials in their native language, increasing the likelihood of integration into their teaching practice, even informally. We also aligned SHORE's materials with the UNESCO Eco-Schools network, which is already active in Estonia and supported by the Tartu Environment Education Centre (TEEC). By linking SHORE's thematic topics—such as biodiversity, climate change, and the sustainable use of aquatic resources—with Estonia's environmental education framework, schools can integrate SHORE content into existing sustainability efforts, including whole-school engagement and applications for the Green Flag award.

While SHORE cannot reform national policy within the scope of a 36-month project, the Baltic Living Lab has created a viable model for grassroots impact. It demonstrates that in the absence of formal structures, progress is still possible by focusing on teacher empowerment, local partnerships, and flexible, well-aligned materials. This approach not only supports Estonia's goals for environmental education but also strengthens the bridge between formal and non-formal learning, enabling schools to connect required curriculum

content with real-world sustainability challenges. In doing so, the Baltic Living Lab offers a compelling example of how external initiatives like SHORE can achieve meaningful, if incremental, progress—even in highly regulated educational environments. By grounding teacher training in local needs and practical realities, and by embedding SHORE's blue literacy content within broader sustainability frameworks, the Baltic Living Lab helps educators take ownership of new content—and supports the long-term vision of integrating blue education into classrooms across the region. We have taken advantage of opportunities to collaborate with diverse stakeholders in Estonia that deliver teacher training activities in the context of national and EU projects (hence ad hoc nature). We have partnered with community-based nature centers such as Tartu Loodusmaja (https://www.tartuloodusmaja.ee/) and (https://www.pernova.ee/loodusmaja/) Pernova Loodusmaja - great collaborators to design and co-deliver teacher training activities. The nature centres have their own teacher training plans and it will be beneficial to join forces with them, as well as scout for the educators who can use SHORE material in their classrooms through their network. The limitation is that not all schools are in their network and it would not be possible to reach less-active schools through their channels. But it has been a good start for SHORE to promote blue literacy amongst active teachers in formal education. Furthermore, we have begun to engage experts from the Tartu University Estonian Marine Institute and the Blue Economy Department from Pärnu College and Saaremaa, aimed at building long-standing relationships that ensure high quality content delivery.

Local Stakeholder Collaboration – This is a critical element for the success of our hackathon activity, engaging local stakeholders in a variety of support positions: as sponsors that are able to contribute prizes, as members of the judging panels, as mentors during the event to serve as scientific resources, and for liaison. Likewise, our entre into the schools would not be possible if not for our collaboration with local stakeholders such as NGOs, universities, and research centers. The Estonian Hub aims to deliver eight teacher training pilots during the SHORE project duration that explore diverse formats in the context of Estonian education landscape that require extensive collaboration with

external audiences such as representatives of the Civil Society, actors from the Blue Economy, Researchers and Scientists from local universities, and others:

- Spring 2024: Experience sharing from Estonian Kohila School about writing blue literacy based projects and methodology for citizen science-based projects for observing local river biodiversity.
- Summer 2024: production of self-paced online learning module on Seven Ocean Principles. https://bonolab.com/7oceanprinciples/
- Autumn 2024: Estonian experts led training session with a focus on hands-on problem-based learning methodologies in the context of blue literacy. In collaboration with the Estonian Marine Institute, Tartu Loodusmaja and an NGO Huvi Outdoor.
- Autumn 2024 DigiEduHack challenge on virtual escape rooms with the context of blue literacy. Educators are invited to form a team or bring their students (grades 7-9). In collaboration with Tartu Loodusmaja, Pernova Loodusmaja, Estonian Marine Institute, Pärnu College, Tallinn University, Huvi Outdoor, Tallink Ferries, and others
- Spring 2025: Experience sharing from a Swedish school the Baltic Living Lab was mentoring as an awardee of SHORE funding with a focus on blue literacy methodology that combines biodiversity observation in the local sea ecosystem and connecting with the subject through art. Experience sharing from Estonian Loksa School about writing a blue literacy project with a focus on water properties measuring toolkits with citizen science methodology.
- School cycle beginning in September, 2025: with the publication of teaching routes on the SHORE Edu platform, we have developed an outreach campaign to Estonian schools to encourage them to sign up as users to shoreedu.com and access the materials available in the content repository that is positioned to complement the teaching routes. We will be setting up an evaluation feedback loop to send out during the course of the school cycle.
- Summer 2025: Practical teacher training activity with a focus on problem-based learning methodologies combined with easy to purchase water quality measuring

toolkits. The Baltic Living Lab will be sponsoring a teacher training event in conjunction with the UNESCO annual conference, to which we will invite educators from all eight countries around the Baltic Sea to attend. The event will be held at the University of Tartu - Tartu Ülikool in June. A second teacher training event will take place in October in conjunction with the Estonian Biology Teachers annual conference.

- Autumn 2025: Online two-session webinars combined with the self-based online learning module on UNESCO's Seven Ocean Literacy Principles and selected examples from the SHORE education platform. The peer-to-peer learning focused webinar series supports the educators to co-create lesson plans for their planned classroom teaching activities.

Utilizing existing educational initiatives for engagement - we are finding a variety of EU initiatives as well as the various EU outreach mechanisms such as EPALE, SALTO, and the Erasmus+ results platform a great way to attract attention from the local educators and school administrators for informal teacher training formats.

Monitoring & Impact Assessment, Learning Indicators, Rubrics, or Surveys - Although no formal quantitative instruments such as rubrics or surveys were systematically implemented during the project, qualitative feedback gathered from teachers and students served as an important indicator of learning progress. For example, with DigiEduHack (https://digieduhack.com/), European Commission DEAP flagship activity. These events attract educators who are interested in the digital education innovation and design engagement with blue literacy context. When student teams complete tasks during the event, they demonstrate acquired skills. The Baltic Living Lab is actively exploring making use of this platform for both engagement of Estonian teachers as well as teachers from throughout the Baltic Region; the DigiEduHack program will run until 2027, and we have scheduled events to be sponsored in 2025, 2026, and 2027.

Student Participation (Workshops, Field Studies, etc.) - In 2024, Global Skills Network hosted two hackathons aligned with the EU Digital Education Action Plan 2021-2027:

- Two iterations of the Baltic Region Hackathon (Estonia DigiEduHack) were held online in conjunction with the global DigiEduHack and in situ at the

Pernova Nature House in Parnu, Estonia. The Nordic Hackathon 2024 took place from September 27 to 29, 2024, in Odense, Denmark, as part of the Blue Bio Techpreneurs (BBT) initiative. This three-day event brought together 43 participants from 20 universities across 14 European countries, including students, recent graduates, and industry experts. The hackathon focused on addressing real-world challenges in blue biotechnology, such as sustainable aquaculture, marine biotechnology, and ecosystem-friendly food production. The event was hosted at the University of Southern Denmark (SDU) and the Svanninge research station, the event featured a SHORE challenge around sustainability in the Baltic Sea, where hackathon participants worked in multidisciplinary teams, guided by expert mentors, to develop innovative solutions.

- We are moving full speed ahead in preparing for the 2025 DigiEduHack challenge, "***Hack the Blue: Digital Stories for a Water-Wise World"*** https://digieduhack.com/challenges/hack-the-blue-digital-stories-for-a-water-wise-world. This online event invites teachers to convene a group of students to join a global creative hackathon to co-develop digital stories about oceans, rivers, and water systems. The aim is to combat "ocean blindness" by using AI and authoring tools to reveal the hidden value of aquatic life and ecosystems. Open to all educators, storytellers, designers, artists, and curious minds. Teams submit concepts or prototypes. Winners receive development support from partners. Our oceans, seas, and inland waterways are vital to life on Earth—but much of their value remains invisible. This online hackathon invites changemakers to address ocean blindness through the power of digital storytelling. Whether it's about coral reefs, river histories, climate impacts, or underwater cultural heritage, we want to see fresh formats and perspectives. Participants will explore and use AI tools, open data, and digital education platforms to create concepts or rapid prototypes. They don't need to be a coder—we welcome educators, artists, writers, students, scientists, and designers in the spirit of SHORE's open-schooling methodologies strategies. The best ideas will receive

mentoring and support to further develop their stories into scalable learning experiences that foster ocean literacy for all. Goals/Outcomes:

* Raise awareness about the interconnectedness of oceans, rivers, and human activity.
* Create engaging, educational digital stories that support ocean literacy.
* Spark cross-disciplinary collaboration between storytellers, educators, technologists, and water experts.
* Introduce and promote the use of AI tools and authoring platforms for digital education.
* Generate scalable prototypes or concepts that can be implemented in classrooms, museums, or community outreach.
* Identify and support the most promising solutions with expert guidance and development help post-hackathon.

Participants will walk away with increased skills in digital storytelling, and a deeper understanding of blue economy topics. Winning teams will gain visibility, recognition, and the opportunity to further develop their ideas with our partner network. We had engaged with Plastic Pirates as the Estonian Representatives and have now entered into a long-term agreement via a formal Memorandum of Understanding.

- Building off the webinar, "*Say Hello to your Baltic Neighbors*", co-hosted by SHORE's Baltic Partners Global Skills Network and WSB Akademia, held last year, we are organizing similar events as e-twinning. Because the Baltic Living Lab is featured on the SHORE website as the Estonian Country Hub, we are also receiving inquiries from places other than Estonia. For example, we were contacted by a Lithuanian school looking for an e-twinning partner. Therefore, we created the first event as a joint webinar between our Open Call 1 mentee, Gullmarsgymnasiet in Sweden and Lithuania, which will be followed by virtual exchange between students, between teachers, and between school administrators, to support the creation of dialogue around common environmental challenges facing the countries bordering the Baltic Sea. The webinar will be

preceded by English version of the video uploaded to YouTube (https://www.youtube.com/watch?v=iPRa0vW3m3k) available beforehand on Swedish and Lithuanian voice overs so teachers can prepare their students for the quiz on the five major environmental challenges facing the Baltic Sea held during the webinar. These activities will be followed by creating joint applications to the upcoming Erasmus+ calls for KA1 mobility and KA2 small partnerships.

- Although none of Estonia's applications to SHORE's open calls were selected, teachers used these to create in-classroom instruction that engaged their students in the citizen science and project-based learning contained in submitted projects.

Teacher and Student Satisfaction - Teacher and student satisfaction was primarily assessed through direct feedback collected after each activity and session. Teachers expressed appreciation for the activity initiated in Estonia to involve schools in SHORE activities, providing guidance on applying for the open calls, and helping them join the NEBS. Students showed great enthusiasm for events such as the hackathons and Plastic Pirates activity.

Evaluation of Classroom Impact – Now that the Teaching Routes will be accessible via the SHORE community platform, the Baltic Living Lab will initiate a strong push to encourage teachers to begin using the material in the 2025-2026 school cycle, beginning with the teacher training taking place this summer. This will allow us to perform formal classroom impact evaluation, as well as engage in ongoing communication with schools to promote SHORE's influence on teaching practices and student awareness.

Suggested Improvements – In view of the limited engagement of the Baltic region in either SHORE open calls or as members in the NEBS, we have acted upon our PO's recommendation that we attempt expanded outreach. We have revised our imaging for the Baltic Living Lab to include a focus on all eight EU countries, and sent out information/served as mentors on SHORE's OC#3 to our mailing list that included

contacts in other Baltic countries, and are now preparing a webinar series similar to our “Say Hello” event we hosted with WSB Akademia last year.

HUNGARY

In Hungary, the SHORE initiative has taken a distinctive form rooted in the country’s pedagogical traditions, environmental context, and creative educational culture. Led by the Budapest University of Technology and Economics (BME), the Hungarian Country Hub promotes blue literacy through an approach that combines hands-on experimentation, narrative engagement, and place-based learning. The focus is on reaching learners at an early age—especially those in primary and lower secondary education—by integrating scientific understanding with emotional and imaginative connections to water.

Experiential Science: Piloting DIY Kits and PHYWE Tools Across Age Groups - A central pillar of Hungary’s SHORE implementation is the use of PHYWE Student Sets Environment and Outdoors to teach water-related concepts through inquiry-based science. These kits were not simply recommended—they were tested directly by BME in controlled educational settings to assess their suitability across age groups and learning styles. The most comprehensive test occurred during the Children’s University summer science camp, organized by BME in 2024. Here, students ranging from grade 3 to grade 8 participated in structured experiments using PHYWE equipment. The setting allowed for close observation of how learners of different ages approached experimental tasks, from basic observations to guided data collection. Activities included measuring water hardness and pH, examining turbidity, and conducting visual comparisons between tap water, pond samples, and filtered water. The results were highly encouraging. Not only were the kits safe and effective across age groups, but they also engaged students emotionally and cognitively. Even younger children (ages 8–10) were able to understand and reflect on scientific outcomes when guided appropriately. Teachers and facilitators

reported that students felt empowered by using “real scientific tools” rather than simplified or symbolic substitutes.

Building on this success, the Hungarian Country Hub plans to distribute PHYWE kits to selected schools starting in autumn 2025. The goal is not only to enhance in-class experiments but also to promote field-based inquiry—encouraging schools to collect and test samples from local water bodies. Each kit will be accompanied by Hungarian-language instructions, classroom guides, and digital support materials tailored to the national curriculum. Most importantly, the program will include mentorship and consultation opportunities through BME’s Faculty of Chemical Engineering. Schools can request expert guidance on experiment design, data interpretation, or curriculum integration—ensuring that science is not just taught, but brought to life.

Place-Based Fieldwork: Encouraging Schools to “Find Their Water” - Despite Hungary’s rich hydrographic network—rivers, lakes, streams, irrigation channels—many schools rarely use the outdoors as a teaching environment. Teachers often cite concerns about safety, time constraints, and lack of training when it comes to organizing outdoor educational activities. The SHORE team in Hungary is actively addressing this issue by developing a “Find Your Water” initiative, which emphasizes the value of hyperlocal exploration. Rather than relying on large-scale field trips, schools are encouraged to identify the nearest accessible water body, even if it is a small retention basin or canal, and use it as a springboard for blue literacy education. To support this, the Hungarian Country Hub provides:

- Simple field trip plans adaptable for 45-minute or 90-minute excursions,
- Safety protocols and checklists,
- Experiment flowcharts using PHYWE or low-cost tools (e.g., DIY turbidity meters),
- Printable data sheets and visualization templates for classroom discussion.

Resources are designed to minimize preparation time and risk while maximizing learning outcomes. The approach also aligns with Hungarian cultural values around experiential learning and independence: giving students a direct, sensory relationship to nature.

Early Engagement Through Illustrated Storytelling - Recognizing that scientific thinking begins with imagination, the Hungarian SHORE team developed a unique narrative-based learning path for younger students. The “Oceans of Adventure” (Tengernyi kaland) storybook series introduces aquatic topics through richly illustrated, age-graded stories, each focusing on an environmental challenge relevant to water ecosystems. The series includes four books:

- Penguin Adventure (ages 6–7): A young penguin named Adél faces melting sea ice and must help her community find a new home.
- Toma’s Dream (ages 7–8): A small fish embarks on a dreamlike journey through polluted and healing waters, encountering a wise sturgeon who teaches him resilience.
- The Impossible Journey (ages 8–9): Two orphaned seagulls search for a safe nesting site, navigating altered coastlines and learning about adaptation.
- The Mission of the Glowing Fish (ages 9–10): In a deep-sea setting, a luminescent fish must restore ecological balance to the underwater world.

Each story blends adventure with age-appropriate environmental themes—from climate change and habitat loss to pollution and biodiversity. The books include reflective prompts, drawing tasks, group discussions, and dramatized role-plays. They also feature end sections titled “Did You Know?” that explain scientific concepts in simple, factual language. The goal is not just cognitive understanding but emotional and imaginative engagement. By identifying with fictional characters and facing dilemmas through storytelling, children build personal connections to nature, which research shows is a strong predictor of pro-environmental behavior. Educators receive accompanying teacher’s guides that outline integration into Hungarian language, art, and environmental studies classes. The stories are also used in family settings, creating bridges between formal and informal learning.

Resources, Mentoring and National Outreach - To ensure that SHORE materials are accessible and adaptable, the Hungarian Country Hub has translated and adapted a wide range of SHORE resources into Hungarian, including:

- Teaching routes,

- Experiment guides,
- Worksheets and templates,
- Visual communication materials (infographics, posters),
- Storytelling activities.

All translated content has been published on the national project platform: https://shore.bme.hu. This website allows teachers to search for materials by age, topic, or activity type and provides easy-to-use downloadable formats.

In spring 2025, a nationwide campaign was launched to promote these materials and raise awareness of SHORE's goals. Every public and private school in Hungary received tailored outreach materials, including:

- A printed flyer summarizing blue literacy,
- Instructions for accessing translated materials,
- An invitation to join the SHORE Hungary teacher community.

This campaign had significant impact. Many schools that had never engaged in marine or water education before expressed interest in trying a SHORE module. Rural and low-resourced schools were especially appreciative of the no-cost, locally tailored tools and the opportunity to borrow equipment and request mentoring.

A National Identity Rooted in Water - Although Hungary has no coastline, its relationship with water is profound. The Danube, Tisza, Lake Balaton, and countless tributaries and springs are deeply woven into national history, geography, and daily life. SHORE in Hungary builds on this legacy by helping students see that water is not a distant or foreign concept—but something intimately local and alive. Whether students are measuring pH in a pond behind their school, role-playing glowing fish in a classroom story, or drawing a seagull flying above a plastic-strewn beach, the goal is the same: to awaken curiosity, foster care, and empower learners as future stewards of aquatic environments.

Hungary's contribution to SHORE shows that even without an ocean, a country can be deeply connected to blue literacy—through rivers, through learning, and through the stories we tell about the water that sustains us.

Feedback and Early Results - From the earliest phases of implementation, the Hungarian SHORE team has prioritized real-world testing of all materials and tools. Feedback from teachers and students has been instrumental in shaping and improving the content. Starting in spring 2025, several schools began integrating the newly translated Hungarian-language SHORE resources into their lessons, project days, and extracurricular programs. Teachers reported that the materials were easy to use and adapt within the Hungarian national curriculum. They especially appreciated the visual layout, local relevance, and the fact that students enthusiastically engaged with the illustrated stories and creative tasks. Meanwhile, at the Children's University summer camp, science seminars received highly positive responses. Students were fascinated by the opportunity to work with real instruments; the hands-on nature of the activities gave them a sense of agency and ownership.

These early-stage experiences confirm that SHORE tools and narratives function effectively in real educational environments and are capable of delivering meaningful learning outcomes across a wide age range.

ITALY

Implemented Sample Activities from Schools - The Italian country hub focused on introducing Blue Education pathways through dedicated teacher training routes while promoting SHORE objectives in diverse school contexts, including both coastal and inland cities. Coordinated by the University of Padua, the initiative aimed to build national awareness of ocean literacy by supporting teachers with hands-on, adaptable learning experiences. To achieve this, the Italian hub organized an in-person training day for primary and secondary school teachers. The session introduced participants to the SHORE Project's goals and resources, helping them understand how Blue Education concepts could be translated into their own classrooms. A key feature of the event was the presentation of specially developed teaching modules, created in collaboration with subject-matter experts. These modules were designed to integrate marine and water-related themes such as biodiversity, pollution (including acoustic pollution), and the water cycle into different school subjects, including science, geography, civic education, and

even language arts. Teachers took part in four interactive workshops, each corresponding to one of these themes and specifically designed for easy classroom adaptation. The activities considered different student age groups and school contexts, ensuring flexibility and relevance for both primary and secondary levels. In addition to these practical sessions, teachers received concise scientific insights from the Italian Country Hub team and participated in a non-formal education activity with external experts. This offered valuable opportunities for direct discussion, knowledge exchange, and collaborative planning to adapt SHORE activities to their specific classroom needs.

Student Participation (Workshops, Field Studies, etc.) - Students were actively involved both during theoretical lessons and in practical activities, contributing ideas, questions, and personal reflections. Their enthusiasm was clear in the engaged and curious way they approached the various environmental topics proposed. The opportunity to experience the content first-hand through workshops, guided discussions, and collaborative moments allowed students to develop a deeper and more concrete understanding of the close interconnection between environment, humans, and biodiversity. Rather than simply learning abstract notions, they were able to recognize the impact of human activities on ecosystems, reflect on their own daily habits, and consider possible actions to contribute to positive change. Thanks to the new approaches adopted during the activities—such as collaboratively constructing the dolphin skeleton, listening to sounds related to noise pollution, seeing anti-oxidative extracts from discarded sea urchins, and seeing practical demonstrations of the effects of marine pollution the experience was even more immersive and engaging. Some concepts were passed on through gamification, such as the clam-goose game, using gain of function mutations, and climate change adverse effects to illustrate clam survival. These innovative tools stimulated students' curiosity and attention, made complex concepts easier to grasp, and provided an immediate, tangible link between theory and real-world issues.

Outcomes and Feedback - This active and participatory approach fostered the development of critical thinking and environmental awareness, encouraging a sense of individual and collective responsibility. Students demonstrated their ability to connect

scientific knowledge with broader ethical and social questions, understanding the importance of an integrated and sustainable approach to managing natural resources. Teachers observed that the activities helped shape students into more attentive, informed, and motivated citizens, reinforcing the idea that protecting biodiversity and ecosystems is a shared and essential commitment for the well-being of present and future generations. Most teachers reported that the activities, although short, were many and were difficult to include in their compact teaching time. Some experiments were unable to catch the attention of the whole class.

Localization and Adaptation - All educational activities and materials were designed to be relevant and adaptable to the Italian school context, taking into account curriculum expectations in science, geography, and civic education. During the training event, the Italian Country Hub presented teaching modules developed in collaboration with subject-matter experts, each focusing on specific marine and aquatic themes such as biodiversity, pollution (including noise pollution), and the water cycle. These modules were structured to be easily integrated into different school subjects and to accommodate varying student age groups. Particular attention was given to ensuring that activities could be adapted for different classroom environments, from well-equipped urban schools to those in smaller towns or rural areas. Materials and approaches were created to be flexible and practical, supporting both indoor and outdoor learning when possible. By emphasizing hands-on, interactive methods such as constructing the dolphin skeleton model, exploring the sounds associated with marine noise pollution, and demonstrating the impacts of human activities on water systems the initiative aimed to make complex environmental concepts tangible and locally meaningful for Italian teachers and their students.

Country-Level Adjustments to Materials - Recognizing Italy's geographic diversity—from northern alpine regions to extensive coastlines the Italian hub developed flexible content that could be used nationwide. Materials included freshwater-focused modules for inland schools and marine-themed activities for coastal areas. Teachers received optional guidelines for selecting the most relevant content for their local context.

Language and Cultural Tailoring - All resources were translated and adapted to match Italian educational terminology and classroom practice. Teacher guides included culturally appropriate examples, idiomatic language, and references to local ecosystems to strengthen student engagement. The Italian team also provided online support for teachers needing help with implementation or adaptation to their specific school setting.

Local Stakeholder Collaboration - The Italian hub collaborated with regional education authorities, environmental NGOs, universities, and teacher training centers to promote SHORE resources and encourage the integration of Blue Education pathways in schools. This multi-stakeholder approach ensured that the initiative could reach a wide range of educators, from coastal to inland regions, and address diverse local needs. Both online and in-person meetings and training sessions were organized to support peer learning and facilitate the exchange of ideas, strategies, and experiences among teachers. These moments of discussion and reflection helped educators to adapt SHORE materials to their specific classroom contexts and student age groups, enhancing the overall impact of the program. The collaboration also aimed to strengthen ties between formal education and the broader community of environmental practitioners and researchers. By involving experts in marine science, sustainability, and pedagogy, the initiative provided teachers with access to up-to-date knowledge and innovative teaching methods.

Educator Feedback and Evaluation

Qualitative Feedback and Key Observations - Teachers who attended the training day appreciated the relevance and clarity of the proposed modules, highlighting that the interdisciplinary design made it easier to connect ocean literacy topics with existing subjects such as science, geography, and civic education. They valued the hands-on and immersive approaches—like the dolphin skeleton activity, noise pollution soundscapes, and practical demonstrations of marine pollution—which helped make complex environmental issues more accessible and engaging. Many teachers emphasized that these resources offered them new tools to spark student curiosity and facilitate active learning, even in schools located far from the coast. They also noted that the opportunity

to discuss and reflect in small groups with peers and experts enriched their understanding of how to adapt the activities to their own classroom contexts.

Suggested Improvements - Teachers suggested developing additional guidance to help tailor activities to different age groups and school levels. They also expressed interest in having access to more ready-to-use materials such as printable kits and digital resources to support implementation in a variety of teaching environments. Some participants noted the importance of ensuring sufficient time for planning and coordination with school administrators, suggesting that future training events might include support for integrating these modules into existing curricula in a practical and manageable way.

Summary of Evaluations - Overall, teacher feedback on the training event was highly positive. Participants highlighted several key strengths of the approach and materials presented:

- Clear, well-structured modules that can be adapted to different teaching contexts.
- Interdisciplinary design enabling integration into existing subjects such as science, geography, and civic education.
- Hands-on, immersive activities that help make complex environmental topics tangible and engaging.
- Flexibility to adjust activities for different age groups and classroom resources.

Educators especially appreciated the balance between structured guidance and the freedom to customize the content for their students' needs. Many expressed interest in continuing to use the proposed modules and activities in their own schools, and in collaborating with experts to bring similar workshops directly into their classrooms.

Monitoring & Impact Assessment - Since this pilot activity focused on teacher training rather than direct classroom implementation, formal student assessments were not conducted at this stage. However, feedback gathered from participating educators provided valuable insights into the potential classroom impact of the proposed modules and activities. Teachers reported that the interdisciplinary design, hands-on methods, and clear guidance would support them in introducing complex marine and environmental

topics in an accessible and engaging way. Many expressed confidence that these resources could enhance student awareness of ocean-related issues, strengthen environmental vocabulary, and motivate learners to adopt more sustainable behaviours. Future plans include developing additional support materials such as simple rubrics, student reflection sheets, and detailed activity guides to help teachers systematically track learning outcomes once the modules are implemented in schools. Integrating these tools into ongoing teacher training workshops will ensure a consistent approach to monitoring and continuous improvement.

POLAND

Pilot Activities/Case Examples - Polish Country Hub have implemented samples of Teachers Routes during different activities like:

- Training for teachers on 30th May 2025 in Sopot in hybrid form – 16 teachers attended in person and 14 teachers online - by Izabela Kotyńska - Zielińska and Tymon Zieliński,
- Online meeting with teachers and pedagogy students on 2nd March 2024 with participation of 26 teachers and pedagogy students - by Michał Szyszka,
- Two online training sessions with teachers and staff of Rybnik Municipality by Ewelina Widerska - on 29th May 2025 and 3rd June 2025 - 6 teachers and 2 staff members attended.

Polish Country HUB focused on preparation and organization of 3 webinars called “Let’s talk about the Baltic”. All 3 webinars were organized in English in international groups of students and teachers was finally transformed to teaching materials created under SHORE project that teachers can use during regular classes:

Webinar/teaching materials 1 - Let’s talk about the Baltic part one based on the webinar from 4th December 2024. Material available here:

https://www.youtube.com/watch?v=KS_ypAcgD-o

This webinar focused on the unique features of the Baltic Sea, featuring specialists Professor Tymon Zieliński and Aleksandra Koroza from the Climate and Ocean Education Laboratory at the Institute of Oceanology of the Polish Academy of Sciences in Sopot. The event was hosted by Izabela Kotyńska-Zielińska, founder of @todaywehave and an

Ocean Literacy Educator and Communicator. The discussion covered the characteristics of the Baltic Sea, including its location, low average depth (55 m), unique hydrological conditions, and low salinity (6-7 grams of salt per liter). The speakers emphasized how rivers (approximately 250, including the Vistula) and limited water exchange with the North Sea impact the sea's condition. The effects of climate change, such as water warming, and challenges related to biodiversity were also discussed. The Baltic Sea is characterized by lower biodiversity, with species like cod at risk of extinction due to pollution and unfavorable breeding conditions. The speakers highlighted the importance of protecting marine ecosystems as a means to safeguard resources and improve the quality of life for Baltic coastal communities. A unique webinar and materials where teachers and students can uncover fascinating secrets and surprising facts about one of the most unique seas in the world – the Baltic Sea. Discover what makes the Baltic so exceptional and learn about the ecological challenges that the future holds for this region.
Main goals:

- To understand the Ecological Threats – from toxic algae blooms and dead zones to climate change. Experts discuss the challenges related to environmental protection and resource restoration in the Baltic, as well as how human activities impact this fragile ecosystem.
- To analyze Climate Change Impacts – what are the consequences for the Baltic? Scientists explore the effects of rising temperatures and increasing storm frequency on the local ecosystem, sharing the latest research and forecasts.

Additional Topics to Explore:

- Why is the Baltic so low in salinity? Discover the significance of the rivers flowing into the Baltic, such as the Vistula and Niemen, and why the Baltic is known as a brackish sea.
- The Impact of Plastic and Chemical Pollution – the Baltic is one of the most polluted seas in the world. Experts will explain the current state of pollution and the actions being taken to mitigate its effects.

Webinar/teaching materials 2 - Let's talk about the Baltic part two based on the webinar from 12th March 2025. Material available here:
https://www.youtube.com/watch?v=vH5iBKdI2h0&t=278s

This webinar focused on the unique biodiversity of the Baltic Sea, featuring specialists Dr. Tomasz Kijewski and Aleksandra Koroza from the Climate and Ocean Education Laboratory at the Institute of Oceanology of the Polish Academy of Sciences in Sopot. The event was hosted by Izabela Kotyńska-Zielińska - an Ocean Literacy Educator and Communicator. The discussion covered Baltic biodiversity and the fascinating lives of migratory fish. The webinar provided participants with valuable insights into the conservation of Baltic biodiversity and the importance of sustainable fish consumption, highlighting the crucial role we all play in protecting this unique ecosystem.

Is the Baltic Sea rich in life? During this webinar, students can learn about the fascinating species inhabiting this unique ecosystem — from microscopic plankton to fish commonly found on our plates. Students can explore the vital role of tiny, invisible organisms and how they impact the health of the sea and its larger inhabitants.

In the second part, Students will dive into the incredible journeys of salmon and sea trout, which leave the salty waters of the Baltic to spawn in cold freshwater streams. Discover the challenges they face and the influence of human activities on these remarkable fish. Students and teachers can also work on farmed fish, their health benefits, and environmental risks.

Topics covered:

- *What makes the biodiversity of the Baltic Sea unique compared to other seas?*
- *Are there any endemic species in the Baltic Sea?*
- *Can the loss of a single species disrupt the entire ecosystem?*
- *What conservation efforts are underway to protect Baltic biodiversity?*
- *The incredible journeys of salmon and sea trout – how do they manage it, and why does it matter?*
- *Farmed fish: health benefits, challenges, and risks*

The webinar allows us to teach about fascinating insights into the Baltic Sea ecosystem, learn how students can protect its biodiversity, and discover practical knowledge on sustainable fish consumption.

Webinar/teaching materials 3 - Let's talk about the Baltic part one based on the webinar from 13th May 2025. Material available here:

https://www.youtube.com/watch?v=SOVEps6JgWk

This webinar focused on the unique creatures of the Baltic Sea, featuring specialists Dr. Tomasz Kijewski and Aleksandra Koroza from the Climate and Ocean Education Laboratory at the Institute of Oceanology of the Polish Academy of Sciences in Sopot. The event was hosted by Izabela Kotyńska-Zielińska - an Ocean Literacy Educator and Communicator. Materials focus on invasive species. Often misunderstood and little known, in this webinar, students can learn what they are, how we can protect native species, and how to prevent future invasions. The Baltic Sea and its secrets will be unveiled during this interactive session where students can discover more about these unexpected and intriguing newcomers. Topics covered by materials:

- *What are alien and invasive species?*
- *Where do they come from, and how do they survive in the salty, chilly waters of the Baltic?*
- *Creatures shaking up our blue backyard—from bold gobies to sneaky crustaceans. Why are they here? Are they harmless hitchhikers, or ecosystem wreckers?*
- *Can we protect native species and still manage these surprise visitors?*

Outcomes and Feedback - Activities were well received, generating positive feedback from both students and teachers. During 3 webinars teachers and students from Poland, Greece, Romania, Croatia and Germany participated. Baltic sea related materials were extremely interesting to students from Black Sea and Mediterranean Region. They had the opportunity to compare knowledge from different regions.

Localization and Adaptation - All webinars and materials were in English. Trainings with teachers was conducted in Polish.

Romania

Pilot Activities / Case Examples, Implemented Sample Activities from Schools - The Romanian country hub focused equally on implementing teacher routes for Blue Education and promoting the SHORE project. Mare Nostrum led the initiative, aiming to establish a small national network of schools committed to the SHORE vision and methodology. While Romania has a coastline, only Constanţa County—where Mare Nostrum is based—has direct access to the sea. This geographic limitation emphasized

the need to engage inland schools and educators who are typically distanced from marine topics.

Mare Nostrum developed a series of customized materials inspired by the SHORE philosophy, tailored to various educational levels—from kindergarten to high school. These included both indoor and outdoor challenge worksheets designed for Blue Education and Ocean Literacy. A school timetable, created as a “SHORE souvenir,” was also distributed to participating student groups as a memento of their involvement. A mass-email outreach reached approximately 1,300 educators with whom Mare Nostrum had previously collaborated. As a result, 85 school groups engaged in what were called “Blue Lessons,” involving more than 180 teachers and approximately 4,000 students.
Student Participation (Workshops, Field Studies, etc.) Students participated in interactive "Blue Lessons" using the specially crafted worksheets and materials provided by the Romanian Country Hub (from the Resource Repository created under WP2). The activities combined environmental education with interactive engagement, emphasizing the SHORE approach to Blue Education and Ocean Literacy. Some schools also participated in live demonstration lessons, which served as practical showcases for the broader teacher community.

Teachers and students were also encouraged to take part in the "Make EU Blue Campaign" by making personal pledges symbolizing their commitment to Blue Education. The campaign was supported through an online-streamed session on Facebook and YouTube, guiding teachers on how to translate their commitments into practice.

Outcomes and Feedback - The activities were well received, generating positive feedback from both students and teachers. Teachers, particularly those from inland regions, emphasized that the initiative “brought the sea closer” to their students, creating a newfound awareness of marine issues even in areas far from the coast. Interactive worksheets were highlighted as the most effective and appreciated resources. These tools helped stimulate students’ senses and cognitive engagement, contributing to deeper, longer-lasting connections with the subject matter.

Localization and Adaptation - The educational content was localized for Romanian students and schools. Challenge worksheets were adapted to suit various school environments, ensuring relevance for both indoor and outdoor use. Materials were designed and/or selected to align with existing curricula while introducing new perspectives on ocean literacy and sustainability.

Country-Level Adjustments to Materials - Given Romania's limited coastal access, significant effort was invested in designing a concise and short material that could bridge the experiential gap for students unfamiliar with marine environments. The content was adapted to make the ocean and its issues relatable, even to students in landlocked counties.

Language and Cultural Tailoring - All materials developed or curated by the SHORE Country Hubs and included in the Resource Repository were made accessible to Romanian teachers. Mare Nostrum provided ongoing support and guidance for educators requiring translations or additional clarification on how to adapt and implement the materials effectively. This approach helped ensure both accessibility and relevance, enhancing comprehension and long-term engagement among teachers and students alike.

Local Stakeholder Collaboration - The Mare Nostrum team collaborated with schools across various counties, engaging local educators through email campaigns and online meetings. Events such as the "MeetNTalk: Blue Inspiration" series fostered peer-to-peer learning and knowledge exchange. These two online events connected over 500 teachers, creating a strong sense of community and shared purpose in advancing ocean literacy in Romania.

Educator Feedback and Evaluation, Qualitative Feedback and Key Observations from Teachers - Teachers praised the activities for their relevance, creativity, and ability to engage students on a topic rarely discussed in inland schools. The sentiment from

many was that these lessons allowed their students to experience the sea “without ever leaving the classroom.” Educators also found the cross-disciplinary approach of the materials—integrating science, geography, and sustainability—to be especially valuable. **Suggested Improvements -** Several teachers suggested the inclusion of more sensory-based and multi-modal materials to further engage different types of learners. Others expressed interest in more frequent live demo lessons and expanded access to physical resources (e.g., printed materials or activity kits).

Summary of Evaluations - Overall, teacher evaluations were highly positive. Key strengths identified included:

- Ease of implementation across different school environments.
- High levels of student interest and participation.
- The adaptability of the materials to various age groups.

Educators valued the balance between structured guidance and flexible use, allowing them to tailor lessons to their classroom needs.

Monitoring & Impact Assessment, Learning Indicators, Rubrics, or Surveys - Although formal quantitative assessments were limited, informal feedback and qualitative observations served as the main indicators. Teachers reported increased student engagement, heightened curiosity about marine environments, and greater awareness of ocean-related issues. Future iterations could benefit from implementing rubrics or student reflection sheets to measure learning outcomes more systematically.

Teacher and Student Satisfaction - Both groups expressed high satisfaction with the activities. Teachers appreciated the ready-to-use nature of the resources, while students enjoyed the interactive and exploratory style of the lessons. The “Blue Lessons” were often described as “fun,” “different,” and “memorable” by students.

Evaluation of Classroom Impact - The project had a noticeable impact on classroom dynamics. Teachers reported a shift in students’ attitudes toward environmental responsibility and an increased willingness to engage in discussions about ocean

protection and sustainability. Many teachers indicated they would continue using the materials beyond the pilot phase, integrating them into regular lesson plans they are able to create from the SHORE Teaching Routes.

TURKEY

Pilot Activities / Case Examples, Implemented Sample Activities from Schools - The Turkish Country Hub, coordinated by Yıldız Technical University, has strategically focused on simultaneously promoting SHORE objectives and establishing teacher pathways for implementing Blue Education within formal and non-formal school environments. Leveraging Türkiye's distinctive geographic position—bordered by three seas and containing a vast inland population—the Country Hub aimed to ensure that both coastal and inland schools could equally benefit from SHORE resources and philosophies. To support this effort, a comprehensive suite of contextualized resources and teaching routes was developed, tailored to national curriculum expectations and educational needs across all school levels—from primary to secondary. The Turkish Hub produced simplified, modular, and thematically focused teaching routes supported by teacher guides and visual materials. These were enriched with localized examples such as the Marmara Sea mucilage crisis and regional water scarcity scenarios in Central Anatolia. In addition, a "Blue Education Map of Türkiye" poster set and a "Student Climate Diary" were developed as classroom-ready materials to facilitate engagement and action. An outreach campaign conducted in early 2025 targeted over 900 schools using regional education authority mailing lists, professional networks, and SHORE-affiliated educational communities. As a result, 67 school groups actively engaged in SHORE-themed workshops and lessons in the spring term of 2025, including more than 160 teachers and approximately 3,100 students across 14 provinces.

Student Participation (Workshops, Field Studies, etc.) - Students participated in highly interactive activities built around the revised Turkish versions of SHORE materials. For example, primary students used role-playing activities to explore marine biodiversity in the Aegean Sea, while middle school students participated in a classroom simulation of the water cycle and discussed its links to climate change. In selected high schools,

students carried out citizen science exercises, including a microplastic survey of their local environment, following a guided worksheet from SHORE's resource pool. The Turkish Hub also actively encouraged student and teacher participation in broader awareness campaigns, such as "Make EU Blue" and Türkiye's National Climate Week. Online and in-person events included storytelling competitions, poster design challenges, and school-led environmental pledges—many of which were integrated into school-wide sustainability action plans.

Outcomes and Feedback - The pilot implementation generated highly positive feedback from educators and students alike. Teachers emphasized that SHORE materials provided a much-needed bridge between environmental theory and practice and allowed students to relate ocean topics to their everyday lives—even in inland settings. Particularly appreciated were the visual worksheets, flexible formats, and local relevance of examples. Educators reported a significant increase in classroom discussions around environmental topics and a shift in students' attitudes toward sustainability and civic responsibility. Several teachers noted that the modular structure of the materials allowed them to integrate Blue Education content without requiring full timetable changes—an important factor in Türkiye's centrally controlled curriculum.

Localization and Adaptation - All teaching materials have been translated into Turkish and edited to reflect Türkiye's education terminology and pedagogical structures. Examples and activities have been aligned with national science, geography, and social studies curricula to ensure coherence. Special care has been taken to ensure cultural sensitivity, with examples reflecting Türkiye's unique marine and freshwater ecosystems, climate challenges, and regional water policies.

Country-Level Adjustments to Materials - Given the diversity of Türkiye's educational ecosystem—from urban Istanbul schools to rural Eastern Anatolia—the Turkish Hub adopted a flexible resource design approach. All materials are offered in printed and digital formats, and selected schools in under-resourced areas have been supported with printed kits and visual tools. Teachers in coastal cities received optional case studies and

video content directly related to marine themes, while schools further inland were provided with freshwater and water-cycle oriented modules.

Language and Cultural Tailoring - All revised content, including SHORE Flicks and the "Seven Ocean Principles" digital module, has been adapted linguistically and pedagogically for Turkish teachers. Translation has gone beyond language and incorporated curriculum alignment, idiomatic expression, and education-level readability. In partnership with local environmental educators and education faculty experts, these resources were piloted before publication on the SHORE platform.

Local Stakeholder Collaboration - The Turkish Country Hub collaborated with municipal education offices, teachers' professional development centers (Öğretmen Akademisi), and NGOs such as TEMA Foundation and the Turkish Marine Research Foundation (TÜDAV). Regional teacher training workshops and webinars—such as the "Blue Tools for Classrooms" series—were co-organized with these institutions and reached over 600 educators nationally. In addition, the hub developed a digital repository on the Yıldız Technical University website that links to SHORE resources and Turkish Blue School activities.

Educator Feedback and Evaluation, Qualitative Feedback and Key Observations from Teachers - Teachers frequently praised the relevance and clarity of the materials, particularly those that offered hands-on, place-based, and interdisciplinary learning experiences. Teachers from inland provinces mentioned that the materials "made the sea a real concept" for their students. Educators valued the range of entry points SHORE resources offered, from simple activities to project-based extensions.

Suggested Improvements - Some educators requested more structured timelines and activity guides for certain modules, particularly for younger age groups. Others suggested integrating QR-code-based multimedia support into the print materials and expanding content on freshwater ecosystems, as this was especially relevant to schools far from coastal areas.

Summary of Evaluations - The pilot process revealed the following strengths:

- Clear modular format suitable for time-constrained schedules
- Local relevance and curriculum compliance
- Strong student engagement across age groups
- Flexibility in implementation (single activity or full program)

Teachers expressed a strong willingness to continue using SHORE content and to share it with colleagues during school-based in-service trainings.

Monitoring & Impact Assessment, Learning Indicators, Rubrics, or Surveys - To build on the pilot's success, a structured monitoring plan was developed. Teachers are being encouraged to use simplified student self-assessment tools, classroom observation checklists, and learning outcome rubrics. Results will be collected anonymously and analyzed for inclusion in WP6 evaluations.

Teacher and Student Satisfaction - Feedback surveys from both groups showed over 85% satisfaction rates. Students described the lessons as "interactive," "real," and "fun." Many expressed a desire to continue similar environmental activities beyond the SHORE timeline.

Evaluation of Classroom Impact - Impact assessments indicate improved environmental vocabulary, systems-thinking skills, and heightened awareness of marine and freshwater interconnectivity. Teachers reported that students were more willing to engage in sustainability projects and often extended their learning to discussions at home or in their communities. In addition, feedback loops will be formally embedded into future implementations through the use of classroom observation forms, student reflection sheets, and post-activity teacher evaluation surveys. These tools will allow SHORE to systematically monitor platform usability, content clarity, and lesson effectiveness across different classroom settings. User experience improvements based on feedback will

include simplifying the platform interface and improving content categorization for quicker access.

6. CONCLUSION AND OUTLOOK

Blue Skills: Preparation and Participation Processes (Train & Take Part)

The Next 12 Months

The activities sponsored under SHORE's workpackage WP2, "Blue Skills: Preparation and Participation Processes (Train & Take Part)", go hand-in-hand with the other five workpackages to provide a comprehensive framework to promote blue literacy, orchestrated by SHORE's country hubs, community platform, website, and the Ocean Helix, while efforts will continue to be supported to encourage schools to join the NEBS.

Based on the PO reviews and internal feedback received, particularly on the updated Deliverable 2.2 and Deliverable 2.6, the following improvement actions are recommended for the remaining twelve months of the project's lifespan:

✨ **Feedback collection:** Narratives on the deployment of student/teacher surveys and formal evaluations were contributed by each country hub:

- Austria: Reported limited formal evaluation tools used in the early stages, highlighting the need for more structured feedback mechanisms to improve implementation, reporting that, overall, the evaluations were highly positive.
- Estonia: Reported conducting evaluations during the hackathon events and used feedback to reflect on the effectiveness of their primary student engagement event, DigiEduHack, in skills development that could improve local implementation strategies.
- Hungary: Did not conduct formal student or teacher evaluations during the pilot phase; mentioned challenges in systematically collecting feedback due to resource constraints.
- Italy: Reported using structured feedback tools, such as post-training evaluations and questionnaires to assess participant experiences. These were part of their formal evaluation process following training events and activities with teachers.
- Poland: The narrative emphasized resource development and engagement activities but did not include mention of data collection or feedback tools.

- Romania: Did not explicitly mention the deployment of formal student or teacher surveys. Their narrative focused more on challenges related to institutional cooperation and curriculum alignment, rather than on evaluation or feedback mechanisms.
- Turkey: Mentioned impact assessments that indicated improved environmental vocabulary, systems-thinking skills, and heightened awareness of marine and freshwater interconnectivity. Feedback loops will be formally embedded into future implementations through the use of classroom observation forms, student reflection sheets, and post-activity teacher evaluation surveys. These tools will allow SHORE to systematically monitor platform usability, content clarity, and lesson effectiveness across different classroom settings.

Additional activity will include surveys to awardees of SHORE's open calls measuring before-and-after behavioral changes.

With the roll-out of the SHORE Teaching Routes, each country hub will be able to perform formal classroom impact evaluation, as well as engage in ongoing communication with schools to promote SHORE's influence on teaching practices and raising awareness.

Looking ahead to the final phase of the 36-month project, SHORE will scale up its impact through a suite of strategic activities:

✨ Roll-out of the teaching routes via the SHORE community platform – this will involve WP5 in communications and dissemination efforts to bring attention to the availability of content, both in terms of the repository of resources as well as the availability of teaching routes for download. WP5's role is essential to publicize the rollout through targeted campaigns that will raise awareness about the breadth of resources and drive engagement among both formal and non-formal education networks, including the NEBS and others like EMSEA (European Marien Science Educators Association) and the ATEE (Association of Teacher Education in Europe), as well as opportunities identified by the country hubs to influence national curricula. A strong dissemination plan coordinated by WP5 helps promote the fact that SHORE:

- addressed a dearth of material in languages other than English by producing outputs in a range of languages
- has a special interest in promoting blue literacy to landlocked regions and underrepresented communities
- supports the engage of stakeholders in local school ecosystems and promotes SHORE's educational resources to both formal and non-formal learning communities
- reinforces its visibility as a European-wide blue literacy initiative

The roll-out will also involve monitoring the KPIs for reporting purposes to ensure a centralized, open-access distribution of teaching routes to educators across Europe. WP4 will track *visits*, user engagement, and geographic reach of teaching routes to support evidence-based reporting and aligns with SHORE's performance indicators.[1] The WP1 and WP4 teams will work together to identify trends and gaps in order to refine future outreach strategies that promote sustainability and long-term use, ensuring that community platform resources remain accessible after the project's conclusion. This facilitates SHORE's legacy as an open-source, collaborative platform for blue literacy.

✨ Continued teacher training will be conducted by the country hubs, with emphasis placed on expanding outreach to engage more teachers and involve more schools in SHORE programming, with the assistance of WP5 for focused outreach communications and dissemination mechanisms; related events will be monitored for KPIs by WP3 for reporting purposes. The strategic importance of continued teacher training and outreach by country hubs should not be under-estimated:

- It ensures long-term capacity that equips more teachers with the pedagogical tools and content needed to deliver blue literacy effectively when knowledge transfer takes place that builds "train the trainer" capacity for expertise within schools, where cascade training reduces long-term dependency on external resources.

[1] The platform tracks users' regions based on the option they select when creating an account (one of five predefined regions). While the country and regional information accessed by the user can be viewed, the geographical access to educational pathways cannot be specifically monitored.

- Reinforces SHORE's goal of embedding blue education into regular classroom practices.
- Expands SHORE's reach and impact by broadening the network of engaged educators and schools across all participating regions, especially when successful at enrolling them as members of the Ocean Helix and helping them make their pledge to the Ocean Pact that presents a once-in-a-generation opportunity to coordinate ocean policy, funding, diplomacy, and citizen engagement across sectors. Formally adopted in June, 2025, the European Ocean Pact is a unified, non-legislative framework launched by the European Commission to better protect Europe's seas, restore ocean health, boost the blue economy, and strengthen the well-being of coastal and island communities.
- Helps scale the adoption of SHORE teaching routes, blue school projects, and citizen-science activities.
- Provides equitable training opportunities to teachers in underserved or remote areas.

✨ Country hubs will also continue full implementation of open-schooling methodologies in order to not only meet project goals, but to also deliver lasting educational value, support local adaptation to continue with the co-creation process began with the blue school project applications, and build real-world problem-solving capacities in students that can contribution towards creating the conditions for systemic, generational change. Open-schooling methodologies are central to both the SHORE mission as well as the NEBS objectives, offering multiple long-term benefits that align with both educational innovation and environmental impact goals via real-world problem solving. This makes learning more relevant and impactful, encouraging students to apply their knowledge in meaningful ways, especially around environmental issues that can be improved with behavioral change. Moreover, embedding open-schooling in local education ecosystems helps mainstream blue literacy into formal and non-formal learning. This ensures that even after SHORE ends, its educational legacy continues through locally-owned and community-embedded initiatives and the teaching & learning model created can be scalable and adaptable throughout Europe, empower teachers and building capacity to

help address gaps previously cited in formal curricula. Moreover, it strengthens Community/School and Industry/School Partnerships that fosters collaboration with the multiple helix and increases grassroots ownership of SHORE initiatives, supporting sustainability beyond the project timeline.

✨ In an effort to be attentive of finding opportunities for their regions' blue school projects to gain exposure, Country Hubs will continue to engage their local schools in twinning, and share experiences and expertise with other schools. During these next 12 months, efforts could be directed at strengthening institutional engagement, particularly through policy alignment and curriculum integration strategies if possible. Enhanced dissemination via their own social media and public events will complement WP5's activities aimed at extending SHORE's reach

In short, 2025–2026 marks a period of consolidation, innovation, and legacy-building, positioning SHORE as a cornerstone for blue literacy and blue education across Europe. By continuing to foster a deep understanding of the challenges facing Earth's oceans and rivers, the need for promoting sustainability practices, and the critical importance of conservation, SHORE as a Horizon "sister" project will continue its ripple effect that reaches beyond the classroom. By the conclusion of the project at the end of July, 2026, we aim to have established a robust framework for blue literacy that can be adopted by schools across the geographic areas of interest to Horizon Europe, contributing significantly to the broader mission of restoring our ocean and waters by 2030.


SHORE
Empower students as agents of change