BLUE OCEAN
ERASMUS+ PROJECT

TEACHING MATERIAL

BlueOcean: mainstreaming a Blue Education Area in Europe and the Pacific Ocean Schools
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STEM Skills for Ocean Conservation

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Lesson 1: Vetea Liao: Director of an association: Connecting science, tradition and technology for ocean conservation

Duration: **20’04**

Goals:

- To explain his educational and professional path in marine biology
- To highlight the STEM skills required in his field
- To emphasize the importance of education and knowledge transmission
- To raise awareness about ocean and lagoon protection

Description

The speaker, Vetea Liao, director of the Temana no te Tairoto association and a nature photographer, explains his academic path in marine biology, from specialized studies in France to advanced training on coral reefs in Australia. He highlights the wide range of STEM skills essential to his work: marine biology knowledge, lab techniques, field skills such as diving and boating, and more recently, digital competencies like designing a citizen-science mobile app.
He emphasizes the importance of communication, project management, and collaboration with schools within Marine Educational Areas, where his association helps children understand marine ecosystems from an early age. He insists on the value of combining empirical knowledge from fishermen with scientific research to better understand natural phenomena—such as coral spawning—and to improve data collection through the mobile app.
Finally, he discusses broader environmental challenges in Polynesia, including lagoon protection, human impacts on coral reefs, and international debates about deep-sea resource exploitation. He argues that before exploiting deep-sea ecosystems, humanity must first understand them to avoid irreversible damage.

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Lesson 2: Deep-Sea Conservation: Skills, Collaboration, and the Future of Marine Science with Dr Clémentine Séguigne.

Duration: **13’17**
Goals:

- To present the role and expertise of Dr. Clémentine Séguigne in deep-sea and mesophotic ecosystem conservation.
- To highlight the scientific, technical, and interdisciplinary skills required in ocean conservation work.
- To explain the importance of collaboration among scientists, divers, fishermen, institutions, and communicators.
- To discuss future career needs in marine conservation, including the impact of AI and the value of creativity and citizen science.

Description

The video features an interview with Dr. Clémentine Séguigne, president of an environmental organization dedicated to conserving mesophotic and deep-sea ecosystems. She explains the wide array of skills needed in her work, ranging from biology, ecology, genetics, programming, and data analysis to technical abilities such as professional diving, fishing techniques, and risk management at sea.
Dr. Seguin emphasizes that conservation relies not only on scientists but also on captains, technicians, communicators, and cultural knowledge holders such as local fishermen. She gives examples of collaborative projects involving professionals from various backgrounds to study and protect sharks, including rare species observed only by fishermen.
She also discusses her own atypical path—from engineering to ecology through her passion for diving—and highlights the importance of involving students and the public in “blue careers.”
Dr. Seguin notes that artificial intelligence will significantly transform conservation work, especially in tasks like shark photo-identification. However, she insists that AI will never replace expert judgment and critical thinking. Finally, she explains that creativity plays a key role in designing innovative research projects and engaging the public through artistic collaborations and educational materials.

Lesson 3: Bridging Science and Society: Coral Reef Mediation and Education

Duration: **21’**
Goals:

- To explain the role and responsibilities of a science mediator specializing in coral reefs.
- To highlight the importance of STEM skills (biology, multimedia, data management, problem-solving) in scientific mediation.
- To illustrate how science communication can engage diverse audiences, including children, adults, and non-specialist communities, and incorporate traditional knowledge.
- To emphasize the development of critical thinking and environmental awareness through experiential learning and emotional engagement.

Description

Cécile, a science mediator specializing in coral reefs, explains her multifaceted profession. She works with various organizations and audiences to transmit scientific knowledge, particularly about coral ecosystems. Her work combines biology with multimedia skills, problem-solving, and data management to make science accessible. She emphasizes adapting her communication to different audiences, from children to adults, using emotional, experiential, and intergenerational approaches. She incorporates both traditional knowledge and scientific understanding, fostering critical thinking and environmental awareness. Cécile also describes her educational and professional background, including her literary baccalaureate, university training in documentation, and later marine biology studies in French Polynesia. The video shows how science mediation bridges research, education, and public engagement, making complex ecological phenomena relatable and meaningful.

Lesson 4: Elise Rigot: From Coral Forests to 3D Modeling: Rethinking Oceanic Design

Duration: **16’17**

Goals:

• To present the professional background and research areas of Elise Rigot, a teacher-researcher specializing in the links between art, design, and science.
• To explain how her work connects with STEM skills, especially through 3D modeling, engineering tools, and interdisciplinary collaboration.
• To explore the importance of integrating traditional knowledge, fieldwork, and creative research approaches in ocean-related studies.
• To highlight future STEM-related jobs and challenges linked to ocean protection, such as sensors, environmental data processing, modeling, and AI.

Description

In this interview, Elise Rigot, a teacher-researcher at the University of Toulouse Jean Jaurès, explains her work and academic background. She specializes in the relationship between art, design, and science, particularly in projects related to the ocean. Her research involves developing an "oceanic design" approach and collaborating closely with scientists and engineers.
She describes how her activities connect to STEM skills, especially through the use of 3D modeling and printing, engineering tools, and interdisciplinary work with CNRS laboratories to study biological questions such as coral structures and larvae recruitment. She also highlights the importance of observing the field and working with professionals like marine biologists, naturalists, and sometimes fishermen.
Elise retraces her academic path, from design school to a master's degree focusing on design–science interactions, and later a PhD with the LAAS-CNRS. Her interest in science grew from ethical questions about technology and the desire to understand technical systems from within.
She emphasizes the wide range of skills needed in design: observation, drawing, continuous adaptation to new digital tools, creativity, and the ability to reformulate problems rather than simply responding to specifications.
Elise presents a major project carried out in French Polynesia: *Toa – Walk in the Coral Forest*, a poetic 3D cinematic about the coral life cycle combined with a virtual 3D microscope that allows users to explore coral skeleton fragments. The project mixes scientific accuracy with cultural perspectives to make scientific knowledge more accessible and emotionally engaging.
Finally, she discusses the importance of developing critical thinking and identifies key future STEM-related jobs for ocean protection, such as environmental sensor development, data processing, ecosystem modeling, artificial intelligence for species identification, and the management of complex genetic and environmental databases.