

Mediterranean Marine Science

Vol 23, No 2 (2022)

Special Issue Ocean Literacy



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doi: [10.12681/mms.29712](https://doi.org/10.12681/mms.29712)

To cite this article:

CHEIMONOPOULOU, M., KOULOURI, P., PREVIATI, M., REALDON, G., Mokos, M., & Mogias, A. (2022). Implementation of a new research tool for evaluating Mediterranean Sea Literacy (MSL) of high school students: A pilot study. *Mediterranean Marine Science*, 23(2), 302–309. <https://doi.org/10.12681/mms.29712>

Implementation of a new educational research tool for evaluating Mediterranean Sea Literacy (MSL) of high school students: A pilot study

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Mediterranean Marine Science, Special Issue, 23 (2) 2022

S1: Mediterranean Sea Literacy (MSL) Questionnaire (correct answers are indicated in bold).

Student's Grade:

1. The Aegean Sea is connected

- a. only to the Black Sea
- b. only to the Mediterranean Sea
- c. only to the Atlantic ocean
- d. to all parts of the ocean**
- e. I don't know

2. Which of the following statements are true about the Mediterranean Sea?

- a. It is the largest and deepest semi-enclosed sea on Earth**
- b. It is the largest and shallowest semi-enclosed sea on Earth
- c. It is the smallest and shallowest semi-enclosed sea on Earth
- d. It is the smallest and deepest semi-enclosed sea on Earth
- e. I don't know

3. Water circulation in the Mediterranean Sea is powered by

- a. water exchange through the Gibraltar Straits only
- b. water exchange through the Gibraltar Straits, and freshwater supply from rivers
- c. water exchange through the Gibraltar Straits, freshwater supply from rivers, and heat input from the atmosphere**
- d. nothing of the above affects water circulation
- e. I don't know

4. In the Mediterranean Sea, considering the climate of the region,

- a. evaporation greatly exceeds precipitation and river run-off**
- b. precipitation and river run-off greatly exceed evaporation
- c. the evaporated water is fully replaced by precipitation and rivers run-off
- d. evaporation is not important due to the sea's small size
- e. I don't know

5. Resources in the Mediterranean Sea

- a. are limited due to its small size but they are not further reducing
- b. are plenty and its present management is sufficient
- c. are limited and its management should be realized sustainably**
- d. are plenty, nonetheless, their sustainable management is essential
- e. I don't know

6. **Typical Mediterranean cultivations, as vineyards, flourish in soils that originate from limestone rocks mainly of**
 - a. **marine formation**
 - b. riverine formation
 - c. lacustrine formation
 - d. mountain formation
 - e. I don't know
7. **Which of the following processes led to the formation of the Mediterranean Sea ?**
 - a. **The African and Eurasian lithospheric plate movement**
 - b. The catastrophic volcanic eruption of the island of Santorini about 1600 years B.C.
 - c. The closure of the Gibraltar Strait about 6 million years ago
 - d. The opening of the Suez canal
 - e. I don't know
8. **Which of the following factors contributes most to the shaping of the Mediterranean Sea coasts?**
 - a. **Wave motion (action)**
 - b. Winds
 - c. Tides
 - d. Coastal vegetation
 - e. I don't know
9. **Mediterranean seagrass meadows play a significant role in the carbon cycle and therefore the greenhouse effect as they**
 - a. **can store carbon through photosynthesis**
 - b. favour water acidification
 - c. expose seashores to erosion
 - d. reduce biodiversity
 - e. I don't know
10. **Which of the following features can not be found at the bottom of the Mediterranean Sea?**
 - a. Submarine canyons
 - b. Seamounts
 - c. Abyssal plains
 - d. **Glacial valleys**
 - e. I don't know
11. **Which are the typical features of the Mediterranean climate?**
 - a. Hot and wet summer, mild and dry winter
 - b. Mild and dry summer, cold and wet winter
 - c. Mild and wet summer and winter
 - d. **Hot and dry summer, mild and wet winter**
 - e. I don't know
12. **Which of the following winds is NON-typical of the Mediterranean region?**
 - a. Meltemi
 - b. Sirocco
 - c. **Monsoon**
 - d. Mistral
 - e. I don't know
13. **In your opinion the Mediterranean Sea**
 - a. is warming as the rest of the ocean
 - b. **is warming more than the rest of the ocean**
 - c. is warming less than the rest of the ocean
 - d. is not warming
 - e. I don't know

14. In the Mediterranean region, which of the following produces the largest amount of oxygen?
- phytoplankton**
 - macroalgae
 - Seagrass meadows
 - b and c
 - I don't know
15. Mediterranean climate is mainly the result of the
- high biodiversity of the Mediterranean Sea
 - regional weather conditions
 - winds blowing in the region
 - heat transfer and water circulation of the Mediterranean Sea**
 - I don't know
16. What contributes to the co-existence and survival of both temperate and subtropical organisms in the Mediterranean Sea?
- The complex system of sea currents
 - The high level of biodiversity
 - The wide ranges of climate and hydrological characteristics**
 - The geological diversity
 - I don't know
17. Mediterranean Sea is characterized by
- high biodiversity and high endemism (=presence of species not found elsewhere)**
 - low biodiversity and high endemism
 - high biodiversity and low endemism
 - low biodiversity and low endemism
 - I don't know
18. Which of the following habitats is NOT present in the Mediterranean Sea?
- Vermetid reefs (=intertidal formations of marine gastropods and red calcareous algae)
 - Coralligen (=sublittoral hard bottoms of biogenic origin produced mainly by accumulations of encrusted calcareous algae)
 - Maerl beds (= sublittoral marine benthic beds of calcareous red algae (rhodoliths))
 - Kelp forests (=large brown algae)**
 - I don't know
19. What type of coastal wetlands can not be found in the Mediterranean region?
- Deltas
 - Estuaries
 - Coastal lagoons
 - Mangrove swamps**
 - I don't know
20. Mediterranean ecosystems are defined by certain unique abiotic characteristics: which of the following ones is true?
- The relatively high temperature of the deep-sea waters**
 - The presence of large-scale tides
 - The same salinity across the western and eastern basin
 - The occurrence of hurricanes
 - I don't know

- 21. Productive nursery areas for many species in the Mediterranean Sea, thus contributing to the conservation and maintenance of its biological resources, are**
- deltas
 - estuaries
 - rivers
 - a and b**
 - I don't know
- 22. Non-indigenous species are introduced in the Mediterranean Sea through**
- river floods
 - escapes from aquaculture and aquaria
 - the opening of the Suez Canal
 - b and c**
 - I don't know
- 23. The Mediterranean Sea and its climate affects**
- history and culture of its region
 - health and well-being of its inhabitants
 - lifestyle of its inhabitants
 - all the above**
 - I don't know
- 24. Which one of the following statements is true for the Mediterranean Sea?**
- It provides food, medicines, minerals, and energy resources**
 - It is a minor pathway of maritime transport, trade, and cultural exchanges
 - It leads to unemployment and economical crisis
 - Its coastal population is decreasing
 - I don't know
- 25. Major human impacts on the Mediterranean Sea are due to:**
- marine pollution from land and sea-based sources
 - over-fishing and habitat degradation
 - a and b**
 - The Mediterranean Sea is not affected by human impacts
 - I don't know
- 26. Rising CO₂ levels in the atmosphere, caused by human activities, are responsible for the warming of the surface waters of the Mediterranean Sea as well as its acidification, leading to**
- increase of biodiversity
 - increase of fish stocks (= the amount of fish)
 - increase of harmful algal and jellyfish blooms**
 - increase of tourism
 - I don't know
- 27. Which of the following is the most important threat for Mediterranean coasts?**
- Erosion**
 - Earthquakes
 - Volcanic eruptions
 - Tsunamis
 - I don't know
- 28. Citizen science projects**
- do not affect public knowledge and awareness
 - help researchers to collect scientific data**
 - have a playful but not a scientific value
 - apply only to terrestrial environments
 - I don't know

29. Biodiversity in the Mediterranean Sea

- a. is known as well as that of the mainland in the Mediterranean region
- b. is better known more than that of the mainland in the Mediterranean region
- c. is less known than that of the mainland in the Mediterranean region**
- d. is less known than that of the remaining ocean
- e. I don't know

30. Which of the following is not leading to the protection of the Mediterranean resources?

- a. Extending the size of existing marine protected areas
- b. Extending the degree of protection of marine protected areas
- c. Establishing new marine protected areas
- d. Liberalizing the access of tourists to marine protected areas**
- e. I don't know