



Course title: Balance of marine ecosystems

Module 1: Let's Build Our Own Ecosystem!

Did you know that...

An ecosystem is made up of all living things (plants, animals) and abiotic (water, soil, air, light) elements of a place and the relationships between them. A coastal ecosystem is one of the most productive marine zones. Because of the shallow water, the sun's radiation can reach the bottom of the sea and help reproduce many living organisms. The ecosystem can be a river, a lake, a sea, but also the small hole in the bottom of the sea.



Language Physics



2 teaching hours



Ecosystem, marine and coastal

Objectives

- Get to know the natural ecosystems and understand in particular the functioning of the coastal marine ecosystem
- To cultivate positive attitudes and behaviors towards the coastal and marine ecosystem

Materials

Computers, materials from nature (sand, stones, shells, pebbles), cardboard boxes, brushes, paints, clays, glue.

Suggested Activities

It is important to understand the value of the living and inanimate beings that are part of them and the relationships between them. In this light, a series of illustrative activities, multifaceted learning objectives (cognitive, emotional, psychomotor), which utilize experiential learning techniques, are proposed.

Dr. 1st: Diving into the "Archipelago" of life ...!



students visit the Archipelagos website (archipelagos.gr) to view and observe photos, obtain information on coastal and marine ecosystems. It is suggested to develop questionnaires, differentiated, content, by group, in order to deepen the characteristics of marine and coastal ecosystems. Indicatively:

1st group: "We the marines":

- ✓ *The student group dramatizes the "assembly", in order to use reasoning to draft and send a resolution to the people on the urgent need for anti-pollution measures. It is proposed to utilize the above teamwork structure in the coastal ecosystem team, with the corresponding name: Write a brief definition of this. What is a marine ecosystem? Where is it and what does it consist of? }*
- ✓ *Choose at least two distinctive pictures of him. }*
- ✓ *Choose an organization that lives in it and "speak" with its voice. How would he present himself? How would he present to you the "place" he lives in? Make a brief first-person recording.*
- ✓ *Members of the marine ecosystem of the region are invited to an extraordinary meeting ... (give it its name), to discuss the dangers they are facing recently due to pollution ... What could they have discussed? Alternatively: }* The student group dramatizes the "assembly", in order to use reasoning to draft and send a resolution to the people on the urgent need for anti-pollution measures.
- ✓ *It is proposed to use the above teamwork structure also in the coastal ecosystem group, with the corresponding name*

: Group 2: "We on land"

Dr. 2nd: Lives are not so easily balanced ... }

We then give the carton which is cut into a rectangular shape (approximately as a box). They are instructed to split it about halfway to grasp the concept of balance: the



separated pieces symbolize the equal value of marine life and the coastal area. We ask students to create their own coastal ecosystem with the materials we have gathered in the classroom. Student groups already established during the previous activity, sea and land, are being exploited. The first group undertakes to paint half a carton in shades that refer to the sea and to make plasticine the life that exists in it and the "non-life". The second group takes over the piece of land. Construction remains in order.

At the end of construction, we ask students to represent frozen life in marine ecosystems. We change positions for students so that one group has significantly more people and we discuss what this means for the balance of an ecosystem and how it is disrupted.

Then, it is suggested to complete a conceptual map group, using similar digital tools (Kidspiration etc)

The key concept is given: Ecosystem

Note: If there is difficulty in conceptual mapping, it is recommended that students prioritize using digital resources available. For users of the Greek language, for example:

<http://photodentro.edu.gr/lor/handle/8521/3423>

Section 2: Food Pyramid or "How the Big Fish Eats the Little Fish"

Did you know that...

If we count the number of organisms in an ecosystem, there are many plants, fewer herbivores and even fewer carnivores. That is, the number of organisms decreases as we move from the lower nutritional level to the higher. In this way, a food pyramid is formed as well as the food chain that represents what each organism eats in its living environment. At sea, food chains almost always start with phytoplankton, but there are many different ones that create a more complex food chain.



Language Physics



2 teaching hours



Food chain, food pyramid

Objectives

- Understand the concepts of food chain, marine ecosystem, biodiversity
- Get to know nude life forms and cultivate a sense of respect for them even if they do not look naked (eg phytoplankton)
-

Materials

Thread, boxes, photos

Dr. 1st: Pyramid of Life

Step 1:

We divide the children into 4 groups and share in each of the aluminum boxes and pictures with a) phytoplankton, b) small fish, c) large fish, and d) human. Each photo must be glued to each box. The phytoplankton boxes should be larger than the small fish, and so on. so that as we go up the food pyramid has a smaller number of boxes. With the whistle of the coordinator the first player runs to the point where the boxes are located. The first box stands out. He puts it a little ahead of the others, and turns around. Continue the next until all the boxes with the phytoplankton are finished. The same process is repeated until an environmental pyramid is created so that the phytoplankton at the first level, the small fish at the second, the big fish at the third and the human at the top.

Step 2:

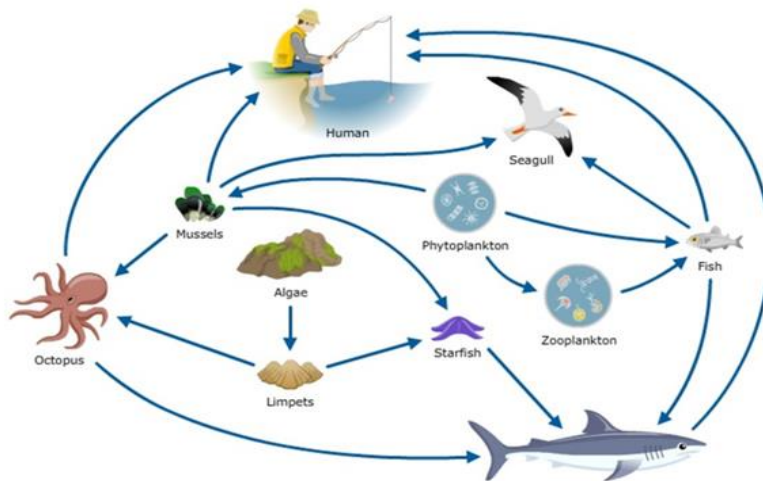
We ask a volunteer student to remove one of the boxes.
 We observe the collapse of the pyramid and we are discussing the value of all organizations in maintaining balance.
 We focus the discussion on the human factor, asking students to name actions that "remove boxes" from the pyramid

Dr. 3rd: Sorry that....

Students are asked to write collectively and with creative writing techniques a text of apology to the members of the marine ecosystem, filling in a common sheet of paper the apology: ... I let my plastic glass take the air ... etc As soon as everyone completes his proposal, he folds the sheet so that it does not appear what he has written and gives it to his next classmate to continue: Sorry that ... Once all the students have passed, the teacher undertakes to read the text..

Dr. 4th:

Students are then asked to stand up, form their own life cycle and, taking into account what has been discussed to maintain the balance of ecosystems, identify a new, "stabilizing" behavior for the pyramid of life that will adopt from tomorrow: From tomorrow I will make sure to



Suggested pictures:

Phytoplankton



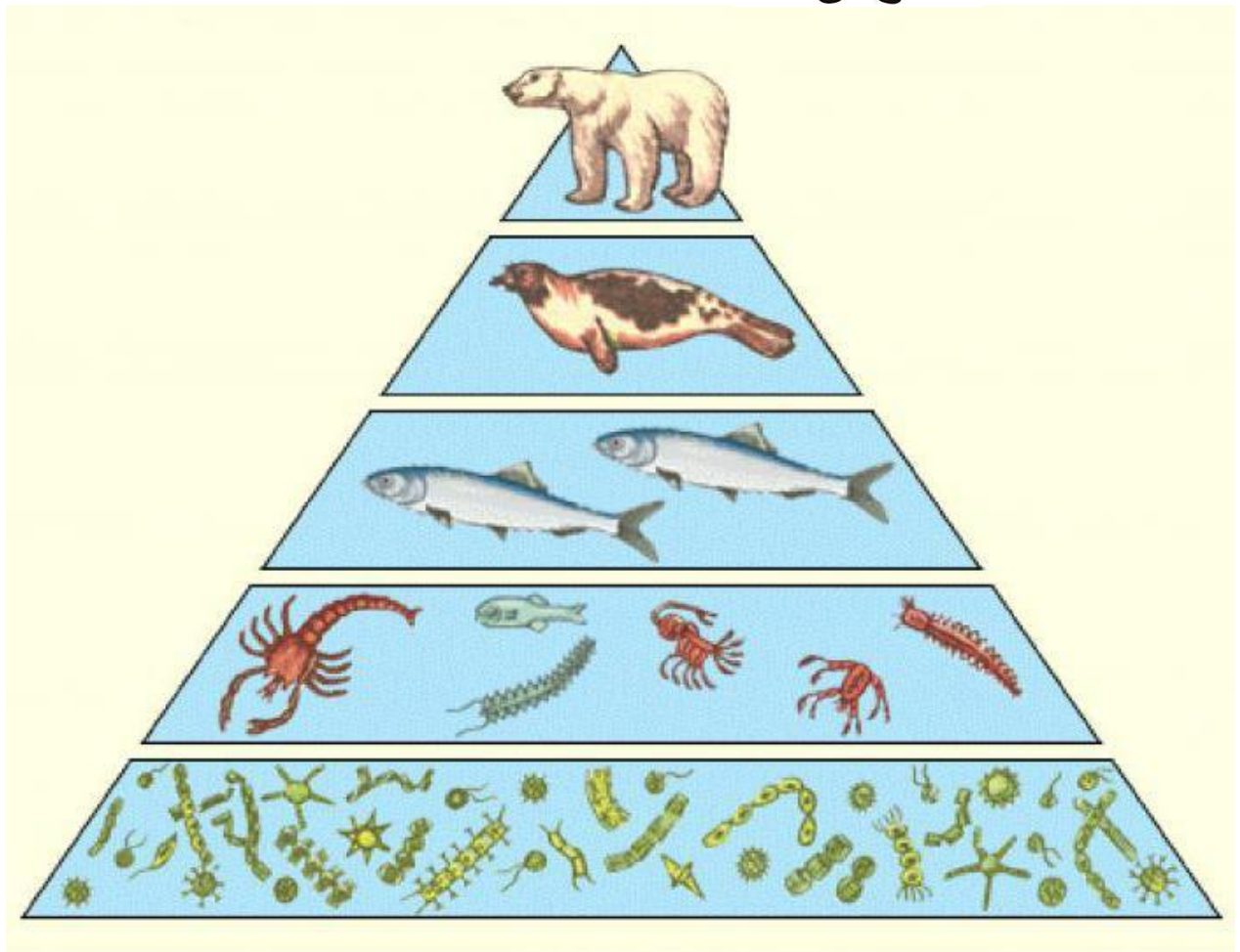
Small fish



Big fish



Human



Unit 3: "What Do Fish Eat? Maybe their belly is in danger? "

Did you know that...

Organizations that share the same area develop diverse and complex relationships with each other. These relationships can be cooperation and at times competition for food, space, water. Every plant or animal organism can feed on many different species of animals, so it belongs to many food chains and it is preferable to talk about food webs between organisms. In the seas of the whole earth, there are over 50 billion micro-organisms that pollute and transport them through the food chain even to humans.



Language, ICT,
Physics



1 teaching hour

Objectives

- Understand the chaining relationships of all elements of the marine ecosystem and realize the factors that cause their balance disorder.
- Understand the need to prevent the destruction of natural ecosystems, focusing on the effective prevention or response to marine pollution / water pollution.
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Materials

Glass transparent, sugar, spoon, Computer, printer

Dr. 1st: Relations and interdependencies at sea

Discussing ...

We discuss with students about food chains, food webs and interdependence relationships. Note the image below.

Dr. 2nd: Plastic lives forever ...



Food grid,
microplastics

Experiment: We show kids an article (<https://el.m.wikipedia.org/wiki>) about microplastics and do the following experiment. In a transparent glass of water pour a spoonful of sugar. Stir and see the sugar disappear. We explain to the children that this is exactly what plastic does. At first it consists of large pieces and we can distinguish it, but then decomposes into several smaller ones, making it invisible to the human eye

Activity: We print labels with marine organisms a) zooplankton, b) small fish c) big fish and d) people and share them with children .. Tail the black ribbons on the zooplankton children who have absorbed the microplastics and give the slogan to chase the small fish. Once all the tails are stolen by the small fish from the zooplankton, the second part of the game starts with the small fish wearing the tails to chase the big ones. As soon as the big fish pick up all the tails from the small fish, the big ones take their place and they become human prey. After humans catch enough or all of the fish, we count the ribbons and find that all this plastic has accumulated on the human, who is at the top of the food pyramid.



Possible extensions



- In each activity, students can use the game and the Sea4all website as an adjunct.
- Take advantage of the opportunities offered by new technologies and build on the computer food pyramids and image relationships that will draw on the Internet.
- Present these tasks throughout their school by posting these tasks in a prominent place.

Keywords

Marine ecosystem, coastal ecosystem, food pyramid, food chain, food web, ecosystem balance.

Bibliography - Links

www.helmepacadets.gr.

Photo of phytoplankton

<http://blueplanetsociety.org/2015/03/the-importance-of-plankton/>

Photo of small fish

<http://www.semanariolocal.cl/archivos/28582>

Photo of big fish

<https://wildoceans.org/projects/bring-back-the-big-fish/>

Photo marine food chain

<http://www.justscience.in/articles/marine-food-web-interactions/2018/03/06>

Photo man

<https://k8schoollessons.com/human-life-cycle/>

www.archipelagow.gr

<https://repository.edull.gr/edull/retrieve/5007/1430.pdf>

ebooks.edu.gr/modules/ebook/show.php/DSDIM-D108/558/3664,15895/



Enhancing critical thinking in schools for marine
pollution using innovative ICT technologies (Sea4All)



Erasmus+

http://4.bp.blogspot.com/_QMD3uDrxxgM/S04hHa0GO5I/AAAAAAAAAGc8/j14dUw17_Z0/s1600-h/food_web_600.jpg

<https://el.play-azlab.com/obrazovanie/84493-zachem-nuzhny-i-chto-otrazhayut-pravila-ekologicheskikh-piramid.html>