Marine Litter: “Searching for the usual suspects ...at my beach”

School: none
Teacher: NUCLIO
No of students participated: Teacher's choice
Subject domain: Biology, Environmental Education, Geography and Earth Science

Contact info

Feel

Students will investigate a predetermined area of their local beach and collect all the litter they can find within the area. After this, students will separate the different types of waste, identify them and analyse what is the predominant type of waste. After deciding what is the main agent of marine waste, students will investigate its origin and try to come up with sollutions to reduce its release in the beach.

1: Brainstorning about source, types and causes of marine litter

Students will investigate about marine pollution, causes and consequences and should answer to questions like:

How does marine pollution affect human health and the quality of marine ecosystems?

Which is the origin of marine litter? How does it end up in the sea?

What kind of waste appears in the sea?

How do microplastics and microbeads appear in the sea and coastal areas?

How long does marine litter last in the sea?

Why have green alternatives to fossil-based plastics made a splash in recent years?

2. Investigation proposal to address such questions

For this activity, students will use a tool for collecting data on marine litter. This tool is designed to generate data on marine litter according to a standardized methodology.

The Marine Litter Monitoring Program on beaches is one of the actions taken to respond to the Marine Strategy Framework Directive and to the commitments made by Portugal under the OSPAR Convention (The North-East Atlantic Environment Strategy).

Students will organize and participate in an awareness campaign about marine litter. They have to collect, register and monitor the litter found on the beach, identify the most frequent residues on the beach, as well as their origins, impacts and reflect about ways to reduce them.

Coastal waste / rubbish assessment campaigns are the primary monitoring tool of the litter loads in the marine environment and have been used worldwide to quantify and classify pollution by marine litter.

Material needed: waste collection bags, gloves, tweezers, sieves and growers.

Methodology:

1-beach cleaning and waste collection

a) Identification of permanent reference points to ensure that the same area will be monitored.

b) The sampling unit is a fixed section of beach covering the whole area between the water's edge and the bottom of the beach (as exemplified in the image above).

The guideline developed by OSPAR establishes two sampling units:

- 100 m: for identification of all marine waste items (collecting the waste in the intertidal zone, that is between tides). Students should ensure the activity is performed during low

tide;

- 1 km: to identify objects in general greater than 50 cm (students should identify, weigh and classify the type of waste collected)

c) Beaches can be monitored four times a year:

• Winter (mid-December- mid-January)

• Spring (April)

• Summer (mid-June-mid-July)

• Autumn (mid-September-mid-October)

Ideally, the chosen beach should be monitored on the same day of each year.

2. Gathering, counting and categorizing

After the beach cleaning, students will gather, count and divide the waste collected into categories, following OSPAR procedures. The results of the collecting data should be represented using graphics and histographies.

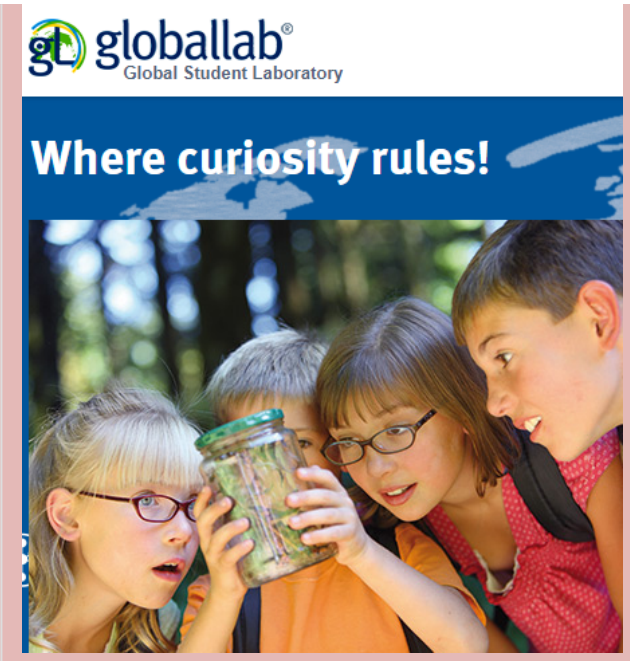
The graphics will be used to deepen the knowledge about the most frequent waste collected and its origin. The marine waste should be evaluated considering the following variables: amount of waste collected in kg; type of waste collected.

The activity should provide objective conclusions about the causes of marine pollution identified in the research.

You can see a more specific guideline document with a list of categories for the marine waste for this research here

You can find the original OSPAR guidelines and ID table here

3. Collaborating with students from other locations: investigating globaly



Globallab is a platform where students can introduce data they have collected, by answering to a form, and then compare it with the same data collected by students all over the world. A specific form was created for this activity, contemplating the OSPAR categorires of marine waste.

The project can be found here: https://globallab.org/en/project/cover/marine_litter_the_usual_suspects_at_my_beach.en.html

In this project, students follow the OSPAR protocol to collect marine waste and separate it into categories to then insert their discoveries related to the main type of waste they have found in the beach. Within the section "findings" students will discover the organized data that includes all the answers from all participating students. Students can then copy the tables, maps, etc. from the findings to insert them in their OSOS project and can also use them to properly analyse their data and retrieve conclusions.

In order to introduce their data, students first need to register on the platform. When doing this, please consider the following:

- Students should use a code name

- Students shouldn't add any picture of themselves in the platform

- If necessary, students can print the protocol and keep it at all times.

- Students shouuld go to the “discussion” area to communicate with the other students about their results

Keeping record

During the process, students should record all the details of their research and make the photographic record and short videos of the activity.

Students should keep a constant record of their work here in their OSOS project, including pictures of the whole process and print screens of their most relevant graphics, maps, etc.

Imagine

Thinking about solutions

After the sampling of the local beach, students are now aware of the main sources of marine waste and beach pollution. Knowing this, students should start to brainstorm and think about how they can target the main source of pollution and what they can do to improve the problem.

Contacting with the community

Students should contact with their families, neighboors, general community members to inquire them about their habits and lifestyle and to learn about what they would be whiling to change in order to protect their marine fauna and flora as well as their own health. The Captaincy, Maritime Police and City Hall should be contacted. Students should articulate the collection of waste collected in the sand with the City Council.

Thinking with Desing Thinking

Design thinking is all about looking into a specific problem in a specific community and coming up with solutions specficaly designed for such problem in such community. This means that students shouldn't just think about possible ways to solve a general problem. Students need to communicate and contact with their community, learn its features and particularities and come up with solutions that will be effective and that target their communitie's needs and willingness to change. There is no use for a solution that no one will want to practice. So, students not only will need to create a considerate olution (or a set of solutions) but they also have to think about a full holistic strategy to raise awareness and convince people that their solution is practical and important.

Create

After coming up with their most creative solutions for their community, students should propose a set of activities (such as debates and exhibitions, etc.), with the objective of consolidating the knowledge acquired and sharing it with their community, training skills like communication, collaboration, problem solving and leadership, among others.

Here, students will decide how they will make a change and leave a legacy to their community.

13: Gamification, consolidation and communicating

Students should think about how they can share their work and new knowledge with their community. Here, they can spread their imagination and come up with their own ideas.

Some suggestions are:

An exhibition with the collected waste

A photo exhibition on beach cleaning

Sculptures with marine litter collected

a mini-video campaign, conference, role play activity, etc.

Click here to see a detailed list of ideas and concrete examples to explore with the students.

Share

After having created all the outcomes to share with the community, students should decide how to share.

The sharing can be done in the form of a fair, an exhibition, a leaflet distribution, etc. One particular way is through a science trail. In a science trail, students prepare different stations, with different activities, and place them in a physical trail where the community members walk and visit their work.

In a science trail, each group of students can decide to present their work in a different way, combining all the proposed activities.

A specific methodology to create science trails can be found in another accelerator, by clicking here. Otherwise, the science trail can be created using the students imagination, following their own ideas.

Leaving a positive impact

Make sure that your students feel like they are actually making a change and fighting for a good cause. Let them know that what they are doing is important. Support them in following their own ideas and allowing them to explore their goals.