b2 KNOW FEEL ACT! to Stop Marine Litter

THE ROOT CAUSES OF MARINE LITTER

In this activity learners study the most commonly found marine litter items according to their origin and types of activities that generate them. They study data, make graphs and discover how our collective trash becomes marine litter.

SUBJECTS

Mathematics, Social Studies, Language, Science

LEARNERS' AGE

14-15 yrs

DURATION

90 minutes

OBJECTIVES

- To learn the origins of marine litter and how it finds its way into the marine environment.
- To understand how marine litter is categorised depending on the activity that generated it.
- To learn how waste not properly treated or disposed of on land can ultimately become marine litter.

INTERNET SOURCES

International Coastal Clean Up: www.oceanconservancy.org

KNOW
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Marine litter is attributed mainly to land-based practices related to poor management, irresponsible behaviours, etc. Sea-based activities such as fishing, shipping and aquaculture also generate litter. Understanding "root" causes of marine litter and the pathway of entry from land or sea is important in order to develop measures to prevent it and reduce it.

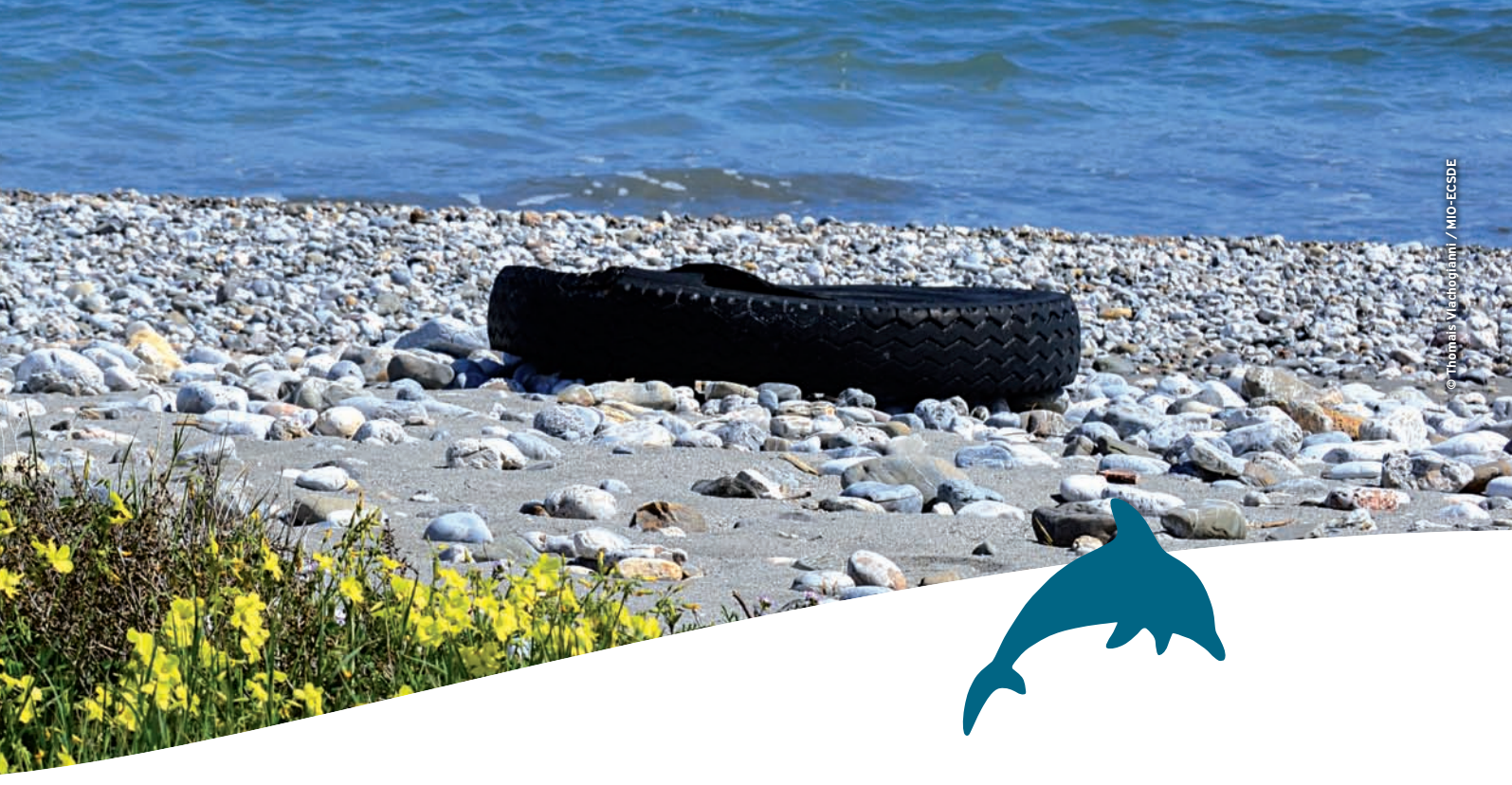
A range of factors influence marine litter's origin, flow and destination. These include: rainfall and runoff, riverine transport, ocean water currents, winds and geomorphology, along with the item's resilience and persistence. Consequently, litter can accumulate near the entry source to the ocean but it can also travel substantial distances and may end up far away from the entry point, both in terms of space and time.

A challenge for the scientists who monitor litter dispersal is the difficulty in pinpointing the origin of many types of litter. A plastic bottle, for example, found on the shore may have been:
- discarded from a vessel at sea;
- carried from inland through a river;
- left by a beachgoer;
- blown by the wind from a bin with no lid, etc.

Sewage related litter items may come from either land or sea-based discharges, while items such as rope and netting are most probably linked to shipping or fishing activities. In general, plastic litter is found in bigger quantities near population centres, including a greater proportion of consumer related plastics, such as bottles and shopping bags. In addition, plastic litter items increase near popular tourist beaches. As marine litter is often removed with beach clean ups, monitoring its real underlying temporal and spatial trends gets difficult.

OSPAR (2007) indicates that marine litter in the **NE Atlantic** can be traced back most often to tourism, fishing related activities and sanitary waste. The number of fishing related items has increased significantly on reference beaches during the period 2001-2006, contrary to litter from any other sources, including tourism, shipping, sanitary and galley waste. Similarly, a UK survey (Beachwatch, 2007) showed that marine litter can be traced most often to recreational beach users (35%) and fishing (14%) while 42% remains non-sourced.

There is little information available regarding marine litter sources in the Baltic region. The majority of marine litter in this region can be attributed to shoreline and recreational activities (HELCOM, 2007; UNEP, 2009). HELCOM (2007) also lists fishing in rivers and intentional dumping as major land-based sources. In terms of sea-based sources, commercial shipping, recreational fishing boats and pleasure craft are considered important but no data is presented (UNEP, 2009).



According to data from the **Mediterranean** ICC (2002-2006), the majority of marine litter has land-based origin. More specifically, marine litter found on Mediterranean beaches originates mostly from urban solid waste and coastal recreational activities and is composed mainly of plastics (bottles, bags, caps/lids, etc.), aluminium (cans, pull tabs) and glass (bottles) (52% - based on item counts). Smoking accounts for 40% of marine litter items (cigarettes, cigarette filters, etc.), which is substantially higher than the global average for the same period (32%). UNEP/MAP (2009) considers coastal tourism and recreational activities, as well as poor solid waste management, as the main causes of litter on shorelines. According to UNEP/MAP the inadvertent release of litter from coastal landfills, littering by beach users and illegal dumping of domestic and industrial waste accounts for 94% of all litter found on shore.

Poor solid waste management is also one of the major environmental problems in the **Black Sea region** and a likely source of marine litter. Although there are only a few studies on the extent and sources of marine litter, illegal dumping at sea has been known to take place in all Black Sea coastal states for many years. For example, on the Black Sea's southern coast, municipal and industrial solid waste, mixed with hospital and hazardous waste, are dumped on either nearby lowlands and river valleys, adjacent to the coast or directly into the sea. In addition, along the Georgian and Turkish coasts, landfills have been located too close to the sea. This has led to their erosion and the subsequent spill of their contents into the sea (UNEP, 2009). Illegal, unreported and unregulated (IUU) fishing in the Black and Azov Seas is also considered an important source of marine litter due to discarded and abandoned nets (UNEP, 2009).

Material and Equipment

Notebooks and pens

Instructions step by step

1. In groups of four, learners find their country's entry in the "The Ocean Trash Index/2012". If their country is not in the Index, they study the data from another neighbouring country belonging to the same regional sea.

   The Ocean Trash Index presents country-by-country data about marine litter collected and tallied by volunteers around the world on one day every fall during the Ocean Conservancy's International Coastal Cleanup. Volunteers have collected data since 1986; the data is used to raise awareness, inform policy and encourage solutions. The Ocean Trash Index provides a single snapshot of what's littering our seas so we can work to prevent specific items from reaching water in the first place.
   Another option is for learners to contact the national agency that acts as a focal point in the International Clean Up and request their country's marine litter data.

2. Learners find out about the categorisation of marine litter and the quantities generated by various human activities in their own country and globally. Any unknown terms of litter types are discussed with the educator. Using the Office Excel or another similar programme, learners make one or more bar graphs to compare the quantities of litter generated by various activities, such as shoreline and recreation activities, fishing related activities, etc. They give titles to their graphs, for example, "Marine litter from shoreline and recreation activities" and properly label the horizontal and vertical axis (for example, X axis = litter types related to shoreline and recreation activities and Y axis = weight or number of items).

3. Once they have completed their bar graphs, learners discuss their results.
   - *Which is the litter category with the lowest and the highest record?*
   - *Were there any surprising numbers on the data sheet?*
   - *Are bar graphs the best format to display the data?*
   - *Which other charting techniques can be used to illustrate the relative quantities of types of litter?*

4. Reviewing all the charts and graphs, learners discuss the most common categories of marine litter. In their opinion, why are they produced? What type of activities produce them?

   Could any of these marine litter items (or categories of items) be prevented or drastically reduced through proper handling and disposal of wastes?