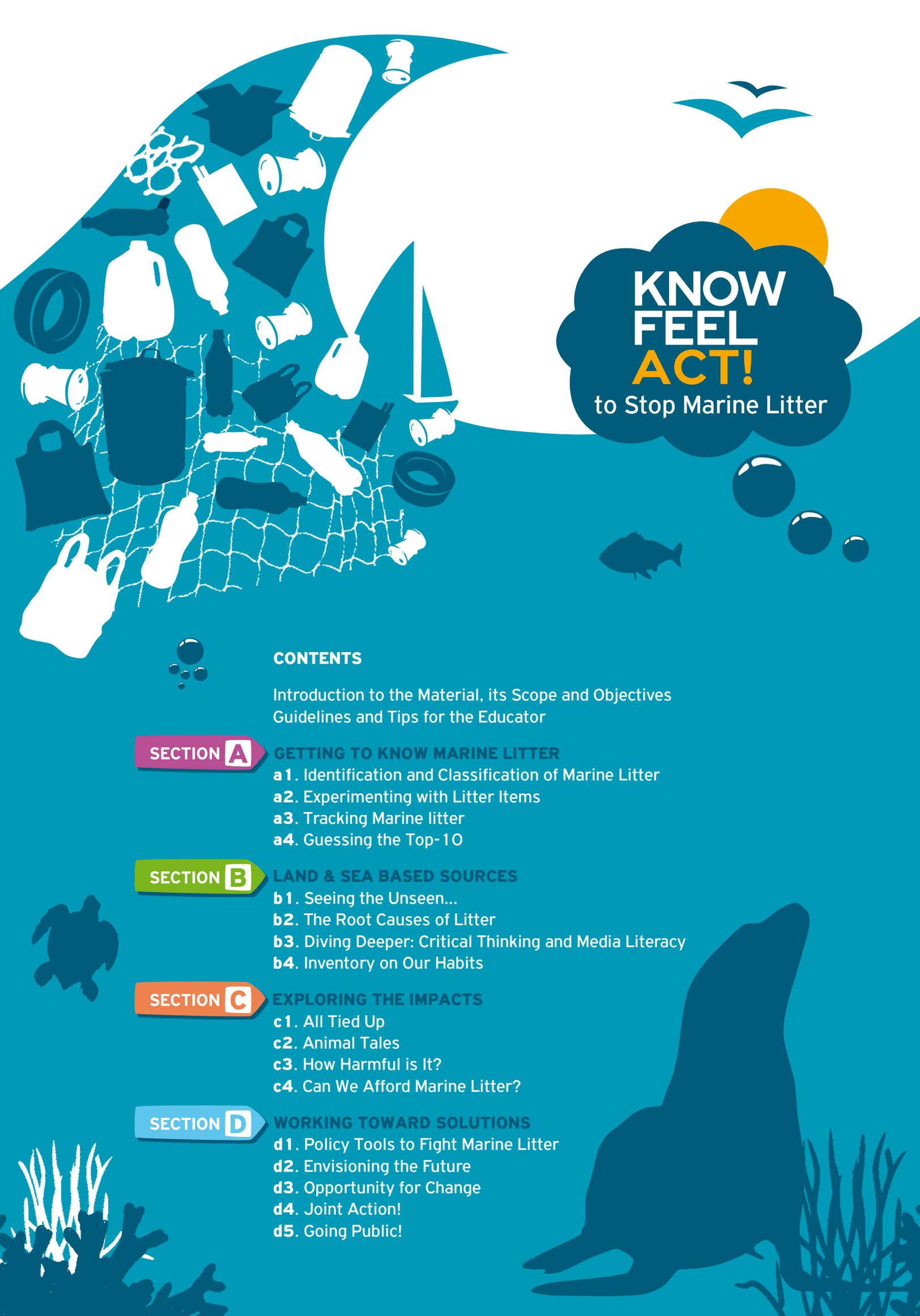




**KNOW
FEEL
ACT!**

to Stop Marine Litter

Lesson Plans and activities for middle level students



KNOW FEEL ACT!

to Stop Marine Litter

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INTRODUCTION, SCOPE & CONTENTS

The Marine Litter Issue

Marine litter or any persistent solid material discarded, disposed of or abandoned in our seas and coasts emerges as an increasing threat to the environment, human health and safety, and our livelihoods.

Fortunately, while it is one of the most challenging problems facing the world's seas, it is also one for which each of us can become part of the solution. That is because all marine litter can be traced back to a single source, people. Indeed, the problem stems from the prevailing production and consumption patterns and from how we deal with our wastes. It is important that we act now to minimise litter, keep it out of our seas and waterways and safeguard the marine environment and wildlife.

Scope and Vision of the Educational Material

As becomes evident by its title, the educational material "Know Feel Act! To Stop Marine Litter" has been prepared to inform, sensitise and enable European teachers and students to take action to tackle the problem of litter in our seas and coasts.

It is a joint product of the MARLISCO partnership and within the project duration (2012-2015) it is expected to be translated and applied in the 15 partner countries. It contains 17 learning activities examining the characteristics, sources, effects and possible ways to tackle the problem, addressing it from an environmental, societal, cultural and economic point of view. It has been designed to primarily serve youth aged 10-15 yrs, but can be used also by educators outside the formal schooling system.

Formal and non-formal educators are invited to use this material as a tool to develop observation, curiosity, imagination, creativity and action skills to young learners, on the topic of marine litter, and not only: in line with the principles of Education for Sustainable Development (ESD), the material views marine litter as a piece of the wider picture of today's environment and sustainability challenges. Bottom line, using as a "vehicle" the tangible issue of marine litter the authors aspire that the material will prove useful in talking about more subtle issues having to do with the prevailing production and consumption models of our modern societies, and ultimately help in shaping the informed, critical thinker, and active citizen of the future.



The material has been prepared in the framework of the MARLISCO FP7 project that is funded by the European Commission. The views and opinions expressed in this material are the sole responsibility of the author and do not necessarily reflect the views of the EC.



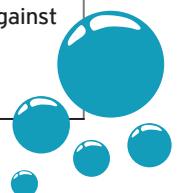
The following table presents an overview of the activities of the material, the educational objectives and the main methodologies applied in each.

TITLE	Educational Objectives	Type of activity (main methodology applied)
Introduction, Scope and Contents	This section presents the scope and contents of the educational material, as well as the partners, sponsors, etc.	
Notes for the Educator	This how-to-use section contains tips and methodological guidelines for the educator, to support him/her in the implementation of the activities	
SECTION A: GETTING TO KNOW MARINE LITTER Learners get to know marine litter, observe it and examine its types and characteristics.		
A1 Identification and Classification of Marine Litter	<ul style="list-style-type: none"> - To practise description and classification skills. - To develop expression and communication skills. - To discuss ways of generating marine litter and attempt to define it. 	TEACHING THROUGH OBJECTS: Learners play games to describe and classify marine litter. They also BRAINSTORM to develop its definition.
A2 Experimenting with Litter Items	<ul style="list-style-type: none"> - To experiment with certain characteristics/properties of marine litter. - To examine how litter's characteristics may affect where it is found in the environment. - To find out the decay time of various types of marine litter. 	Learners carry out simple EXPERIMENTS.
A3 Tracking Marine litter	<ul style="list-style-type: none"> - To find out that marine litter is an issue with no borders, "travelling non-stop" from place to place. - To trace possible end destinations of marine litter, e.g. garbage islands, etc. - To think of possible behaviours that could have prevented marine litter generation. 	Learners engage in MAPPING activities with real and fictional maps to trace the "routes" of litter.
A4 Guessing the Top-10	<ul style="list-style-type: none"> -To make hypotheses, work on data and find out the most commonly found marine litter items. - To practise reading and comparing data and charts. - To reflect on how a shift in our own behaviour can prevent waste generation. 	Through EVOLVING GROUP WORK learners make hypotheses and test them. Part of the activity takes place outdoors.
SECTION B: LAND & SEA BASED SOURCES In this section, learners examine the ways through which marine litter enters the marine environment and investigate the regional variations.		
B1 Seeing the Unseen...	<ul style="list-style-type: none"> - To practise in observing, collecting data, classifying and making charts. - To reflect on how waste generation can be prevented at source. - To recommend actions for remediation and prevention. 	The activity takes place outdoors in the neighbourhood. Learners do MONITORING, DATA ANALYSIS & SYNTHESIS of their results.
B2 The Root Causes of Litter	<ul style="list-style-type: none"> - To discover where marine litter typically comes from and how it finds its way into the marine environment. - To learn how litter that is not properly handled or disposed of on land can become marine litter. - To identify the destination of litter depending on people's habits. 	Learners conduct bibliographic / internet RESEARCH on marine litter.
B3 Diving Deeper: Critical Thinking and Media Literacy	<ul style="list-style-type: none"> - To analyse causes of marine litter in detail based on a real case, preferably local. - To practise analyzing and synthesizing information from written texts. - To develop media literacy. 	Learners carry out a TEXT ANALYSIS of articles published in the media.
B4 Taking Inventory of Our Habits	<ul style="list-style-type: none"> - To conduct a survey to explore people's behaviours related to marine litter (people's habits related to waste management, consumption and sensitivity towards the condition of the coastal/ marine environment). - To explore how waste that is not properly handled or disposed of can become marine litter. - To think of possible anti-consumption habits that could prevent marine litter generation. 	Learners do a SURVEY through questionnaires and/or interviews.





TITLE	Educational Objectives	Type of activity (main methodology applied)
SECTION C: EXPLORING THE IMPACTS Learners explore the effects of marine litter on organisms, ecosystems as well as its socio-economic impacts.		
C1 All Tied Up	<ul style="list-style-type: none"> - To “experience” entanglement by marine litter as experienced by wildlife. - To practice empathy (the capacity to recognise emotions that are being experienced by another being). - To become aware of entanglement threats that marine litter poses on marine life. 	Learners do SIMULATIONS through various kinetic activities.
C2 Animal Tales	<ul style="list-style-type: none"> - To become aware of ingestion and entanglement threats of litter on marine life. - To “experience” how marine species feel like when confronted with marine litter items. 	Through ROLE CARDS representing marine life learners foresee possible threats that litter poses to them.
C3 How Harmful is It?	<ul style="list-style-type: none"> - To be open to the views of others. - To explore the effects of marine litter on animals, habitats, humans, etc. - To understand the role of natural conditions in terms of potential harm caused by litter. - To understand that certain types of marine litter items may have greater effects than others but that all have the potential to be harmful. 	Learners engage in individual and group RANKING & PRIORITISATION activity and MATH calculations to find out the degree of harm of various litter types.
C4 Can we Afford Marine Litter?	<ul style="list-style-type: none"> - To work on a case-study presenting economic impacts of marine litter. - To analyse information and draw conclusions. - To strengthen decision-making skills. 	Learners engage in ISSUE ANALYSIS (text analysis).
SECTION D: WORKING TOWARD SOLUTIONS Learners are informed about steps they can take to prevent marine litter, investigate what individuals and organizations are doing to tackle the issue (at national and international level) and explore ways to educate others about possible solutions.		
D1 Policy Tools to Fight Marine Litter	<ul style="list-style-type: none"> - To understand that marine litter is a global issue and to know about related EU, regional and international efforts (initiatives and policies). 	Learners carry out INTERNET RESEARCH .
D2 Envisioning the Future	<ul style="list-style-type: none"> - To recognise there can be an alternative future for our natural surroundings. - To recognise similarities and differences in the visions of others. - To understand the difference between probable and preferred futures. - To explore the necessary steps in order for a preferred future to become a reality. 	Learners engage in ENVISIONING exercises at individual and group level.
D3 Opportunity for Change	<ul style="list-style-type: none"> - To investigate why often although we know the responsible thing to do, other factors restrain us from doing so. - To identify our personal driving motives and values behind our consumption habits. - To consciously decide and practice a new habit relating to littering behaviour for a given time. 	Learners engage in BARRIER ANALYSIS to identify their underlying values behind habits and try to overcome their own “resistance to change”.
D4 Joint Action!	<ul style="list-style-type: none"> - To join collective efforts for a common cause (clean up). - To design and implement an activity to bring change in the school/ community. - To stimulate creativity while being involved in the activity. 	In this outdoor activity learners practice PARTICIPATION in an organised clean-up activity.
D5 Going Public!	<ul style="list-style-type: none"> - To analyse the factors in developing appealing visual messages for an environmental campaign. - To conceive, design and organise an awareness-raising campaign or event at the level of school, beach, local community. - To encourage awareness and pro-environmental behaviour in others. - To communicate marine litter challenges and possible solutions effectively. - To stimulate creativity. 	Learners apply various CAMPAIGNING TOOLS to set up their own campaign against marine litter.





MARLISCO Raising Awareness across the European Seas

MARLISCO project (MARine Litter in European Seas: Social Awareness and CO-Responsibility) aims to raise public awareness, facilitate dialogue and promote joint responsibility among key actors towards a shared vision for the sustainable management of marine litter across the four European Regional Seas (North-East Atlantic, Baltic, Mediterranean and Black Sea). MARLISCO'S activities are organised by a 20-partner consortium located in 15 coastal countries.

From June 2012 to June 2015, MARLISCO develops a diverse range of actions including a study on the sources and trends of marine litter, a collection of best practices, a public perception survey, a video contest for youth, a web-documentary as well as a series of national debates, workshops, festivals and clean-ups. Additionally, several educational tools are being developed such as an e-game, a travelling exhibition, the current material and more. Find out more about MARLISCO www.marlisco.eu.

Credits

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MIO-ECSDE and MEDIES

The Mediterranean Information Office for Environment, Culture & Sustainable Development (MIO-ECSDE), is one of the largest Federations of NGOs from the Mediterranean. Since its establishment in 1995 MIO-ECSDE acts as a technical and political platform for representation and intervention of Civil Society in the Euro-Mediterranean scene. It is based in Athens, Greece.

Launched in Johannesburg (WSSD, 2002), the Mediterranean Education Initiative for Environment and Sustainability (MEDIES) is MIO-ECSDE's primal education initiative, with the objective to provide capacity building on ESD through publications, trainings and the facilitation of an e-network of educators.

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NOTES FOR THE EDUCATOR

This section provides clarifications, pedagogic guidelines and tips to the educator that wishes to apply some or all of the activities in this material.

Overview

The material “Know Feel Act! To Stop Marine Litter” has been prepared to as a tool to raise awareness and promote responsibility on the issue in European youth and beyond. Based on the principles of Education for Sustainable Development (ESD), it addresses questions from an environmental, societal, cultural and economic point of view and can be used both within and outside formal education systems.

The material has been produced in collaboration with a team of 20 partners, and will be applied in the 15 participating MARLISCO project countries. Given its far-reaching nature, the material cannot meet every partner’s specific educational needs. Practitioners applying it can and should adjust it to best fit in their realities. They are welcome to use parts of it, enrich it, change the order of

activities, add on or simplify worksheets as they see fit. The author’s aspiration is for educators to use the material as a tool to encourage observation, curiosity, imagination, creativity and action skills in their learners. Discussing the very real challenges of marine litter will also help start new conversations on more subtle topics such as current production models in modern, over-consuming societies. Ultimately, it will contribute to developing a more informed, critical and active citizen.

Target Audience

The material is designed for educators and learners of the middle and secondary school level between the ages of 10-15. The material can also be used by non-formal educators including those working in NGOs, aquariums, coastal parks, etc.



lesson plans

for middle level
students



Terminology Clarifications

Is this an educational “material”, a “tool”, a “pack” or something else?

The authors consider that the term “educational material” best applies here. Yet, occasionally, the terms “tool”, “kit”, “pack”, “publication” or “resource” are interchangeably used.

Marine litter vs waste vs trash, etc.

The term “marine litter” is used throughout this material and refers to “any persistent manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment”. Depending on the context, the synonym terms “waste”, “trash”, “rubbish” and “garbage” may also be found in the text. The term “debris” which is favoured by the Americans is not so common here.

Educators and learners vs teachers and students

Since the material is designed to be applied not only in the formal sector (schools) but also in the non-formal sector (out of school education), the terms “educator” and “learner” are preferred over the terms “teacher” and “student” to accurately reflect the wider target audience. Depending on the context, the terms “facilitator”, “instructor”, “trainer”, “target audience”, “players”, can be found as well.

Lesson plans vs activities vs games

The educational material is mainly comprised of lesson plans, each having specific objectives for learners, step by step instructions, etc. However, there are also activities within the material, which have a looser educational approach than lesson plans, and aim to facilitate the premise for a discussion to take place, a game to be played, or exercises to be carried out. Games are also included as quick and simple means to spur the interest of learners.

Objectives

The materials’ objectives for both learners and educators are:

- to know the different types of common marine litter and their characteristics;

- to explain the sources, causes and the impact of marine litter as well as any regional variations;
- to understand the attitudes and behaviours associated with littering so as to best confront them;
- to make informed decisions and be motivated to take action against marine litter;
- to investigate current tools and policies on marine litter issues.

Themes and Structure

The contents of the material are developed in four sections to cover the following themes:

- (A) Introduction on different types and characteristics of marine litter;
- (B) Main sources of land and sea-based marine litter;
- (C) Impact on ecosystems and livelihoods;
- (D) Potential solutions: individuals and groups at local, national and international levels.

These four sections are comprised of several activities to cover the theme in question. Each activity contains some background information on the issue tackled, materials and step by step instructions on how to carry out the activity, as well as a supplementary Worksheet to be filled out by the learners.

The educational material is comprised of the following components:

- an introductory section outlining its scope and content
- 17 lesson plans (or activities) each including the learning objectives, estimated duration, background information step-by-step procedure to complete the activity, practical suggestions and references.
- 17 worksheets for each activity to be completed by the learners
- a how-to-use section with guidelines and suggestions on methodology for educators

Evaluation

The Worksheets in the material comprise the main evaluation tool of the learning process. The authors avoided overloading worksheets with many or complicated questions and kept them within a page or two (one sheet) to facilitate their reproduction. Worksheets are where learners record their observations, ideas, suggestions, etc. and at the same time keep track of their own learning.

The evaluation box

This is a direct mini-evaluation done by the learner. It is found in all activity worksheets and contains the same set of questions. It only takes a couple of minutes for learners to note what they considered to be the most and least interesting aspects of the activity they just completed, as well as the difficulties they encountered. An assessment of the evaluation boxes (e.g. collected from the entire class) can provide valuable information to the educator for the next implementation of the activity.



What is a learner's "insight"?

The last question in the evaluation box invites learners to describe a personal "insight" they had during the activity: a specific, profound realisation about something or someone, including themselves. With this question learners are asked to reflect on eye-opening aspects of the activity and on elements of self-discovery. Examples of learner insights are: "the time it takes for some types of litter to degrade was shocking to me"; "I discovered I come up with better ideas when I am part of a team than when I work alone"; "when I tried to convince my brother to stop littering I realised I am perfectly capable of defending an argument", etc.

Tips and guidelines for specific activities

A1 Identification and Classification of Marine Litter

- Games are a good way to engage students and serve as a lead-in to the definition tasks.
- Litter can be classified by: material (plastic, metal, tetra-pack, etc.), colour, shape, size, recyclable vs. non-recyclable, sources (food consumption, smoking, fishing and water sports, etc.), impact, etc. Learners may also contribute by identifying their own new, diverse classifications.
- Terminology: trash or garbage refers to any type of generated waste. If waste is improperly disposed of, it can then become litter.
- Sentence starters or writing directions could help the younger or less able students develop the definition required in Task B.
- A 'spider-net' or 'issue web' is a simple concept map learners generate. As brainstorming takes place all ideas are noted without intervention and a series of 'satellite words' branch out around the central word, interconnected in a meaningful way. Brevity and using single words is the key to creating a good issue web.
- Task B can also be delivered with a 'vocabulary sheet': the phrase Marine Litter is placed in the centre of a sheet and four boxes are placed in each corner. Learners draw it in one, write words they associate with it in another, write the definition in the third and use it in a sentence in the fourth.
- Depending on the time available, the discussion about family activities that generate marine litter and how this can be prevented could be extended.
- Keeping a collection of different examples of marine litter in a box in a classroom will come in handy in many circumstances, as several activities in this pack call for the use of actual litter items.
- For safety reasons educators provide litter items after having thoroughly rinsed/washed them. Potentially harmful objects such as broken glass or metal must be avoided. Alternatively educators may ask

students to bring waste from home by sending the following note to parents. This is also a good way to involve families in school life and projects.

Dear Family,

Tomorrow we will be learning about recycling in class and we need some examples of waste. We need any type of packaging or containers that you normally discard. Assist your child with opening, emptying, rinsing and drying the containers. Please send them to school with him/her tomorrow.

Thank you for your assistance.

Sincerely

A2 Experimenting with Litter Items

- The most buoyant types of litter are made from plastic and some types of rubber. Paper and wood float at first but tend to sink once they become saturated. Objects made from glass, metal and some types of rubber will sink unless air is trapped inside. Cloth items also tend to sink.
- Paper as well as some types of rubber, plastic and cloth can be carried by the wind. Of course, during periods of high winds almost any kind of trash (including heavier items) can also be blown into the sea.
- For Experiment C: Avoid sterile tap water and use sea or pond water instead. Important signs of degradation are changes in an item's shape, colour and size, as well as the loss of its ability to withstand being pulled apart (this should be evaluated at the end of the experiment). For this experiment a minimum of 8 weeks is required, but the longer the experiment lasts the more obvious the degradation will be.
- Educators who cannot integrate Experiment C in their schedule could do the experiment themselves some months in advance and capture the degradation process by taking photos and/or videos every week. In class they can show these photos and/or videos and what is left of the items.

A3 Tracking Marine Litter

- How to draw a large map: Find an e-map of the area you wish to outline. Using an overhead projector, project the image onto paper or poster board taped to a smooth wall surface. Centre the image and try to cover as much of the paper surface as possible. Ask learners to copy over the outline, making sure to include landmarks and elements relevant to marine litter (e.g. river deltas, coastal zones, ports, landfills, industrial pollution hotspots, etc.).
- If understanding the concept of ocean currents proves difficult for younger students, you could remind them of the animated movie Finding Nemo where they are depicted as high-speed seaways transporting animals, food and waste.

- Based on the true story of the lost rubber ducks the US EPA developed “Ducks on the go / Where did they go?” for grades K 3-5. It is a learning module with a storybook and 3 classroom activities.

A4 Guessing the Top 10

- Learners may be better stimulated to generate ideas about what items could be in the Top 10 list, after visiting an unattended beach where they can see for themselves the types of litter found there. Alternatively they could visit the supermarket and take note of items that potentially may end up as marine litter. A shorter list, e.g. a Top 5 list, can be compiled by younger students.
- To engage mature students and adults you could start a “take3cleanbeach” instagram account. The “take3cleanbeach” initiative encourages people to make a difference by taking 3 litter items every time they leave a beach, waterway, park, or any location.
- If learners do not have Internet access, you should print data from the suggested internet sources in the form of a handout.
- Compare the different data lists and try to extract different conclusions. For example, comparing current lists (B) to past ones (C) will encourage class discussion on how modern consumer societies have evolved.
- When drawing conclusions, focus on qualitative assessments based on comparing the different lists and take important developments into consideration such as legislation, economic factors, etc. rather than focusing on “absolute numbers”. Also focus on types of litter that could have been generated by the learners themselves e.g. food and beverage packaging and how these could have been prevented.

B1 Seeing the Unseen

- Keep the following factors in mind when selecting a site to investigate: distance from school, safety, accessibility, available time, class size, etc.
- Safety precautions: In this activity learners do not pick up litter - they only record and take photos of what they observe. Ensure they disinfect their hands after the exercise.
- The Data Collection Form used in the worksheet is from the International Coastal Cleanup (ICC) of the Ocean Conservancy. Using this form or any other existing protocol builds organisational skills and allows for the collected data to be used in international databases. Overly detailed and lengthy forms should be avoided as their complexity may cause confusion, anxiety and frustration.
- For more detailed research use the OSPAR Marine Litter Monitoring Survey Form instead of the ICC Form. Another option is the ODEMA form.

B2 The Root Causes of Marine Litter

Begin or end this activity by playing the “Who is more BLUE” game (give examples of green/blue behaviours (= good for the environment and the sea) vs less green/blue behaviours (= bad for the environment and the sea). Compare and discuss answers.

B3 Diving Deeper: Critical Thinking and Media Literacy

- It is advisable to analyse case studies relevant to the learners’ realities: A good source of real scenarios can be found in the environmental sections of local media. The MARLISCO “Best Practices” section in www.marlisco.eu is another option.
- To avoid bias, expose learners to as many differing viewpoints as possible by using articles from diverse sources on the same topic. In the case of the sperm whale, for example, it will be interesting to see how the topic is covered by the Spanish press.
- Typical stakeholders linked with marine litter issues include beach goers, governmental and municipal authorities, local professionals, residents, etc. In the case of the Spanish sperm whale both local and more distant stakeholders appear to play an important role.
- Another way to make learners, especially older ones, engage in text analysis is to let them take on the role of the teacher. Without providing them the Worksheet, divide them in groups of five or six in and ask them to develop a list of questions for analysing the article - that will be included in the Worksheet. The different approach taken by each group is analysed at class level.
- Extension for older learners: Discuss pluralism and objectivity in the media. Learners reflect on the prominence of environmental topics in the media; their public appeal, potential impact and media slant - are they considered ‘soft’, ‘biased’, ‘political’ or ‘conflicting’, etc.?

B4 Taking Inventory of Our Habits

- This activity may be limited to discussion and commentary on the findings presented here or it may extend to developing an important survey which would be of value to the learners themselves but also of wider interest given the results it will generate, if properly carried out.
- Extension: Based on their survey findings, learners may organise an awareness-raising activity targeted to their peers and/or their local community.



C1 All Tied Up

- As the proposed activity requires physical contact, knowing what is permitted and/or socially acceptable in your country. In some countries health and safety regulations are stricter than in others; carrying out the activity may not be possible everywhere. Begin by explaining to learners what they will be doing. An analogy such as the fly and the spider web can help: the web is invisible to flies and the harder they try to escape, the more entrapped they become.
- Pictures and videos depicting entanglement can be disturbing for children. As an alternative, younger learners can be provided with stuffed animals to explore this distressing situation and then elicit their impressions.
- To introduce the threat of entanglement and ingestion in a more palatable way have the learners play a game of tag. An open space is required and at least ~20 players separated in two groups: the wildlife team (each player is a different species, e.g. seal, starfish, albatross, etc.) and the litter team (each player is a different litter item, e.g. plastic bag, net, tyre, paper cup, etc.). The open space represents the sea and when the educator gives the signal the wildlife team runs for its “nest” trying not to get caught by the litter team members. Every time an animal is “caught” by litter they have to explain how the specific animal is threatened by the specific litter item. Repeat the game by changing the teams. Ideally, use stickers, hats, or other distinctive paraphernalia for each team.
- Extension activity: Interviews can be conducted using different approaches: from a structured interview with a predetermined set of questions to an unstructured open, free-flowing discussion. In any case, questions or discussion themes must be prepared beforehand. Interviewing is a recommended learning method for approaching “experts” on a theme.

C2 Animal Tales

- With younger learners you may wish to complete TASK C only. Provide learners with prepared flash cards to elicit initial thoughts and first impressions. Example texts for the cards:

SEA LION: I like to play in the water and I am curious about new things. I like to investigate objects floating on the ocean’s surface. My nose is perfect for poking into things ...

FISH: I swim into holes and hover near objects that provide shelter from bigger fish. If a lot of smaller fish are gathered together, I may swim closer to try and eat them ...

SEA TURTLE: I am a turtle that lives in the sea. One of my favourite treats are jellyfish that float near the water’s surface...you can see right through them! I often confuse floating plastic bags with jellyfish ...

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- The texts of the flash cards that are developed by the learners should be brief (approx. 150 words) but with scientifically sound facts. Another option is to ask learners to write little poems on the cards.
- Older students should be thorough in their research and analyse in their essay all those characteristics of the animal that make it susceptible to threats of entanglement, ingestion, pollution in general, etc.
- End the activity by emphasising that any animal living in the sea or along the coast can be affected by marine litter.
- Extension activity: Visit an aquarium or nature reserve. Contact them in advance and request a guided tour focusing on the problems that marine litter poses for endangered and threatened marine species.

C3 How Harmful Is It?

- Before setting off to complete the table, make sure learners interpret the scaling of the terms “rarely harmful”, “harmful” and “extremely harmful” in the same way, through giving them an example.
- Surely, the learners’ outcome does not reflect objective data, but their opinions. Still, these basic ratings help them to explore diverse ways litter can harm marine and coastal communities. Remember, the fundamental point is that although certain types of litter may have greater effects than others, all marine litter items have the potential to cause harm to these different communities.
- The activity can be carried out also by applying progressively expanding group work. Initially learners form pairs each examining one horizontal cluster of the worksheet (i.e. either Animals, or Humans, etc.). Then the pairs working on the same cluster come together making larger groups. They compare results and calculate their cluster averages. The cluster averages are noted on board and results are discussed in class.





- Start the activity by explaining the different levels of governance: local, regional (sub-national), national, regional (e.g. EU, UN level) and global.
- End the activity with a general overview of the international policy tool that was studied. You may wish to ask questions to stimulate class discussion such as: Based on your readings, do you believe the problem of marine litter would be worse without this policy tool or not? Do you think the tool is being effectively enforced? Does it reach its potential?
- A possible follow up activity could be for learners to hold a public hearing on the issue, create an awareness-raising poster to be placed in shop/school windows, or a flyer for distribution, etc.

C4 Can We Afford Marine Litter?

- At least 72 case studies from across Europe which are considered as “best practices” in combating marine litter can be found on the MARLISCO website (www.marlisco.eu). Learners are invited to select one and analyse it.
- For each potentially damaging effect of marine litter, learners should set a reasonable “cost” following the rationale of the Shetland Islands. Afterwards, they should also identify appropriate and workable solutions.
- As a follow up learners can make a poster illustrating the main consequences and related costs of human activities on marine litter for the case of the Shetland Islands.

D1 Policy Tools to Fight Marine Litter

- Exploring to what extent a policy tool is applied in a country or region is not always an easy task. There are few laws that are specific to marine litter. Usually it is tackled within a broader law regarding e.g. solid waste management or the protection of the marine environment. Because marine litter is a relatively new highlight in the international and national agendas, there are few strategies, action plans and monitoring schemes in place. The role of civil society in raising awareness, organising consultations, monitoring policy implementation has been crucial. The biggest problem is weak law enforcement.
- For some learners, especially younger ones, finding and comprehending legal texts is rather difficult. Consider doing this research yourself and preparing simpler, shorter texts making it feasible for learners to analyse them.
- This activity offers the opportunity to talk about the difference between signing and ratifying international conventions. Most people are not aware of the administrative and legal requirements of conventions. Learners will be better equipped to organise themselves and be effective in exerting pressure on legislators to ratify conventions and enforce the provisions they have signed.

D2 Envisioning the Future

- This activity should be carried out when the pressure of time and daily schedules are not an issue to allow learners to engage in a meaningful way.
- Envisioning exercises help people imagine their possible (“business as usual” model) as opposed to their preferred (“ideal”) futures and discover beliefs and assumptions that drive their visions. The process enables them to practice personal reflection (by asking themselves ‘Why do I believe this? What has influenced me?’), to prioritise (by expressing their vision using 3 words), and to strengthen negotiation and communication skills. Most importantly envisioning leads to a sense of direction and serves as a strong motivator for people to modify choices and behaviours.
- It is likely learners will have diverse interpretations and visions of what constitutes a “sustainable coast”, for example. One learner may envisage an isolated beach with minimal human presence while another, a busy marina with lots of people, boats and economic activity. Learners should be encouraged to reflect on the core values and assumptions underlying their views. They should also think about differences and similarities amongst their visions.

D3 Opportunity for Change

This activity is based on discussions that may touch upon personal values and character traits. For this reason, the approach should be rational and “truth-seeking” rather than exploring personal psychologies. Maintain an environment of trust within the group so that learners feel secure in expressing themselves and do not feel judged. Also avoid indoctrination.



Tips on Making Habits – Breaking Habits

- Acting without thinking - known as “automaticity” - is a driving force behind what forms habits. These automatic actions can take up as much as half our waking hours! In fact, the more automatic the action, the less we are able to acknowledge and respond to it. As a result, we barely notice these automatic actions, such as drinking coffee from the same mug, washing hands before lunch, locking the door when we enter home, keeping a glass of water next to our bed at night, etc.
- These automatic actions or habits take place in a certain context: we tend to do the same things in the same circumstances. For example, we buy a muffin from a particular coffee shop on the way to work; we eat a snack during a specific school-break; we go jogging every Saturday morning. The coffee shop, the school break or our free Saturday mornings unconsciously remind us of long standing patterns of behaviour, which we then enact, in exactly the same way as before. “Context” also refers to people: Whether we realise it or not, those around us influence our behaviour, sometimes for better, sometimes for worse. For example in a family environment where members carry their trash with them till they can properly dispose of them in a natural, almost automated manner, it is highly unlikely that any one family member will not do so.
- The saying “old habits die hard” means that the older the habit, the more difficult it is to change. Even if someone consciously decides to break an old habit for a new one, it takes strong will, commitment and deliberate, repeated practice for him/her to ultimately exhibit some kind of behaviour automatically as a new habit.
- Periods of life transitions e.g. moving house, changing school, having a new member in the family, provide good opportunities for change because in these periods our habits are interrupted anyways.

D4 Joint Action

- After the clean up, encourage learners to “adopt” the water-site as a class. This involves regular site visits, keeping it clean and informing the local community on the site’s value, the impact of marine litter and how to best keep the site clean.
- Possible Extension Activity: Based on the closing discussion, learners become pro-active to bring about change in their school (for example, improve separation for recycling, reduce the amount of waste ending-up in the bins, etc.). They should think of ways to motivate and engage the entire school community in their effort.

D5 Going Public!

- Awareness-raising campaigns provide a range of opportunities to take school activities outside the classroom. By “transmitting” messages to families and the local community, learners develop stronger communication and cognitive skills and can put their knowledge, ideas and creativity into practice. Actually, such activities unveil skills and talents that are not often used in the classroom. Furthermore, these types of outreach activities also encourage students to work as part of a team and to reinforce a sense of personal stake, responsibility and self-efficacy.
- Tips for Task A: Some aspects that may result from the learners’ analysis of visual messages are: simplicity in design; having a single straightforward message; a humorous approach or a combination of humour and tragedy; a dose of irony; using a really shocking image; appealing to health & safety risks for people; use of contradiction; a clever slogan; the absence of texts, etc.
- Tips for Task B:
 - If learners decide to design a campaign around a visual tool (e.g. a poster) they should be encouraged to consider the above aspects (simplicity, humour, etc.). Alert them about copyright issues if they use photos they do not take themselves (sourced from the internet or elsewhere).
 - Learners must be specific in identifying the target group: the more clearly they can describe it, the more likely they are to design a campaign around their needs, and more likely to bring change with the campaign.
 - Learners must be specific in the campaign objectives: It is better to start with a target that would be achievable for the learners (e.g. minimisation of school waste). After they achieve this they could work enthusiastically towards more challenging targets (e.g. minimisation of neighbourhood waste).
 - In case learners may decide to organise a competition a good way to involve local media and authorities is to invite them to be on the judging committee or take part in the award ceremony.
 - The documentation of the campaign must be accurate and valid. It should deliver the message using simple, factual knowledge without exaggeration or embellishment. Learners can refer to success stories in tackling Marine Litter from other regions or countries without being afraid to mention failures.





Bibliography

- Baker R., "Getting started with Global Citizenship: A guide for new teachers" Global Citizenship Guides, OXFAM, UK, 2008
- Butterworth A., Clegg I. & Bass C., "Untangled: Marine debris: a global picture of the impact on animal welfare and of animal-focused solutions", WSPA, 2012
- CLEAN UP GREECE, HELMEPA & MIO-ECSDE "Public Awareness for the Management of Marine Litter in the Mediterranean", CLEAN UP GREECE, HELMEPA & MIO-ECSDE, Athens, 2007
- C-MORE "Science Kits on Marine Debris", Center for Microbial Oceanography: Research and Education (C-MORE), ongoing project
- Cowan A.M., "Marine Debris: A Legacy of Litter: what effect is the accumulation of marine debris having on the world's marine ecosystems?" National Geographic Education, 2010
- European Commission DG Environment "Feasibility study of introducing instruments to prevent littering", Final Report, Risk & Policy Analysts Limited, 2013
- European Commission DG Environment flyer "Marine Litter: Time To Clean Up Our Act", European Union, 2010
- Harper J. "All the way to the ocean", USA, 2006
- Hatheway B. & Henderson S., "Ducks in the Flow; Where did they go?", Eastern Michigan University & University Corporation for Atmospheric Research, 2008
- Kershaw P., Hartley B., Garnacho E., Thompson R., "Review of the current state of understanding of the distribution, quantities and types of marine litter", MARLISCO project, 2013
- Mouat J., Lopez Lozano R., Bateson H. "Economic Impacts of Marine Litter" KIMO, 2010
- NOAA, Sheavly Consultants, Virginia, "Understanding Marine Debris: Games and Activities for Kids of All Ages" National Oceanic and Atmospheric Administration, USA
- NOAA, "Turning the tide on trash" A Learning Guide on Marine Debris, National Oceanic and Atmospheric Administration, 2007
- Scoullou M., Papadopoulou D., Alamei A. & Malotidi V., "Waste in our life - Learner's book", educational material, MIO-ECSDE, Athens, 2007
- Teuten El. et al., "Transport and release of chemicals from plastics to the environment and to wildlife", Phil Trans R Soc B, 364: 2027-2045, 2009
- Thompson R., Swan S.H., Moore C.J., Vom Saal F.S., "Our plastic age" Phil Trans R Soc B, 364 (1526): 1973-1976, 2009
- UNEP "What can we do about marine litter," Brochure, UNEP-Regional Seas Programme
- UNESCO "Education for Sustainable Development in Action", Learning & Training Tools No 4, UNESCO Education Sector, 2012





IDENTIFICATION AND CLASSIFICATION OF MARINE LITTER

In this activity learners familiarise themselves with marine litter by playing classification and description games. They brainstorm ideas on the concept of “litter” and discover that all objects disposed of improperly, may end up as marine litter.

SUBJECTS

Language, Arts, Mathematics, Science, Social Studies

LEARNERS' AGE

10-15 yrs

DURATION

60 minutes (30 minutes for each Task)

OBJECTIVES

- To practise descriptive and classification skills.
- To develop expression and communication skills.
- To discuss ways marine litter is created and then define it.

INTERNET SOURCES

www.oceanconservancy.org/ICC

SECTION **A**

GETTING TO KNOW
MARINE LITTER



KNOW FEEL ACT!

to Stop Marine Litter



Did you know that the first generation of plastics produced in the 1950s are still with us today?

Marine litter can be defined as any persistent, manufactured or processed solid material that is discarded, disposed of or abandoned in the marine and/or coastal environment. It is waste produced by human activity either on land or at sea that somehow finds its way into the marine environment.

- Common materials that make up marine litter include plastics, rubber, paper, metal, wood, glass, cloth, etc. and can be found floating on the sea surface, drifting in the water, washed up on beaches or lying on the seabed.
- Litter that is buoyant and/or easily blown away is more likely to end up in the sea. Not all litter is buoyant and some will sink out of sight.
- Marine litter may be visible to the human eye (macrolitter), hardly visible or even invisible (microlitter).
- The rate at which certain litter items degrade indicates how long they remain intact or “age” in the marine environment.
- One way to classify marine litter is by the type of activity that generated it in the first place. For example, fishing, shipping, illegal dumping, smoking, etc.
- Litter items may differ in their potential impact on the environment and wildlife; some litter items are much more harmful than others.

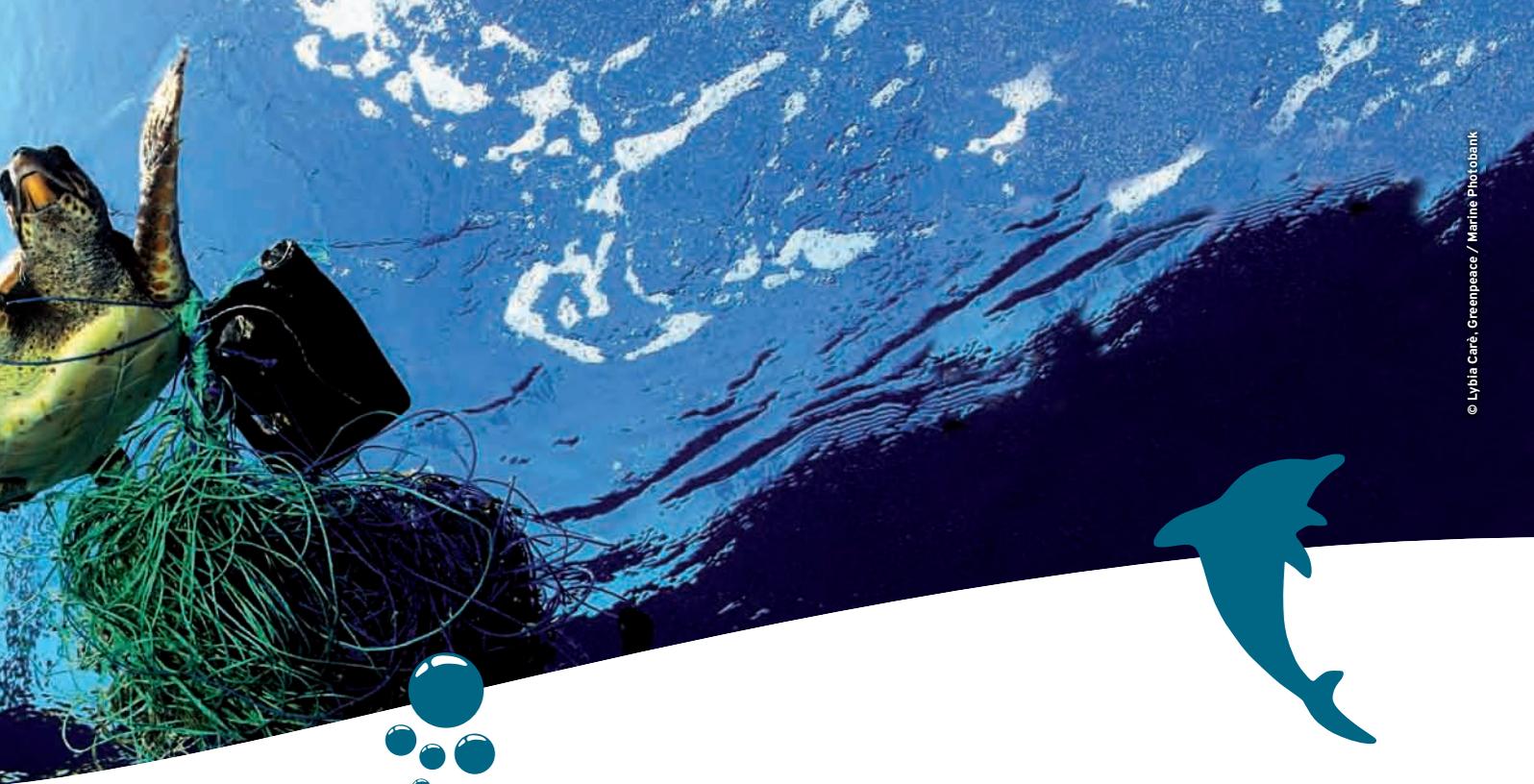
The Era of Plastics

The 20th and 21st century have been characterised as the plastics’ centuries. Plastics have revolutionised our lives: just think about how many different plastic items we use daily: clothes, toys, personal computers, kitchenware, tools and many others!

Despite the benefits, plastics can have severe negative impacts once they become waste and especially if they enter the marine environment. Plastics consistently make up 60 to 80% of all marine litter items found in European Seas. Their design and durability results in a slow degradation in the environment. This means they can travel vast distances with ocean currents, waves, tides, winds and rivers and accumulate over time. Plastic items gradually fragment into increasingly smaller pieces, or microplastics, which are unintentionally ingested by marine organisms every time they open their mouth.

Microplastics can also enter the sea directly mostly through cleaning and personal care products (abrasives), washed clothes (polyester microfibers) or in the form of resin pellets (or “mermaid’s tears” as they are known) found in the raw material of the plastics industry.



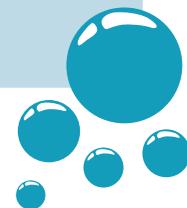


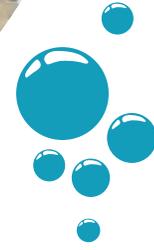
Marine litter games

Game	Skill	Description
Guess it	...description	From a collection of litter items learners secretly choose one and then describe it using only a certain number of words, e.g. 30-40. They then read out their description and the others try to guess the object.
20 Questions	...description	Learners think of 20 questions on a common litter item, for example, a beverage can. This activity demonstrates how much information can be drawn even from any trivial object depending on how we think about it.
“yes - no”	...description	Learners sit in pairs back to back. One holds an object and the other tries to guess what it is by asking only 10 “yes-no” questions (the number of questions depends on what the object is). After the game students draw conclusions on the importance of classification and sequence of questions.
The Litter Museum	...classification	Learners (individually or in groups of 4), are asked to classify a wide range of objects in as many ways as possible as if they were to exhibit them in a Museum. For each classification, learners explain the criteria they used and then the class documents the diverse criteria all the learners used.
My game		



**Can you think of a new game using these litter items?
Describe how to play it!**





Materials and Equipment

Various clean and safe litter items: beverage cans, bottles, candy wrappers, balloons, plastic and paper cups, plastic forks, straws, shopping bags, fishing line and fishing net, rubber bands, paper scraps, etc.

Instructions step by step

TASK A: Marine litter games

The educator empties a large bag full of litter items in the middle of a circle and gives learners time to familiarise themselves with the objects. Depending on age and experience, learners play one or more of the games presented in the Table of the previous page.

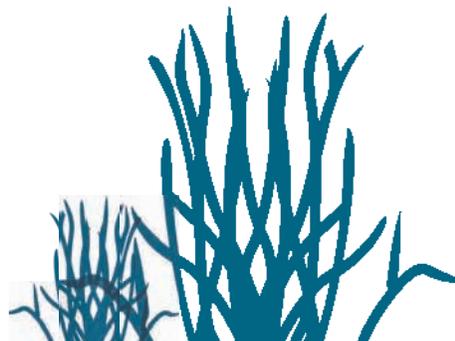
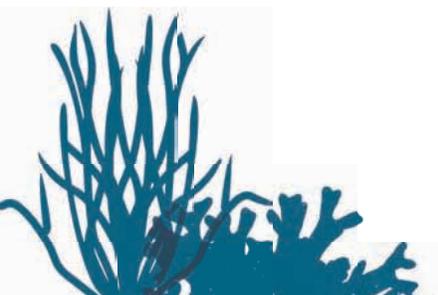
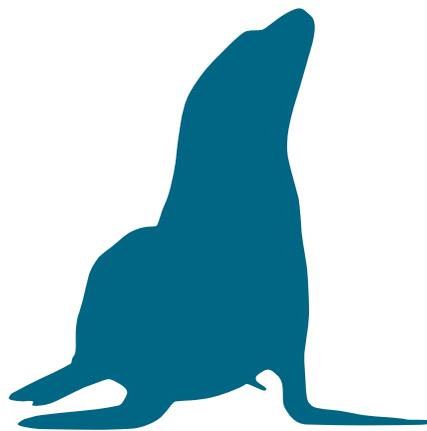
After playing, each learner suggests one new game and the class tries them out.

TASK B: Looking for a definition

Let's brainstorm the question: What is "litter"? Learners list key-words and synonyms (words with similar meaning) for the word "litter". Alternatively, they create a spider-net (concept map) on the blackboard.

What about the definition of "marine litter"? How is it different from litter? How might the waste find its way into a stream or the sea?

In the end learners discuss how their family's daily activities generate marine litter and what they could have done differently to prevent its generation.





EXPERIMENTING WITH LITTER ITEMS

In this activity, learners experiment with litter items and test some of their characteristics and effects on the environment. Learners investigate the degradation time of various materials and the role of weather conditions on the degradation process.

SUBJECTS

Science, Mathematics

LEARNERS' AGE

12-15 yrs

DURATION

Experiments A and B: 45 minutes

Experiment C: 8 weeks

OBJECTIVES

- To test properties of various marine litter materials.
- To examine how the characteristics of a litter item affect its fate in the environment.
- To match the properties of marine litter (e.g. expected lifetime) with their potential impact.
- To practise in making hypothesis, observing, collecting, analysing and presenting data.

INTERNET SOURCES

MOTE Marine Laboratory: Advancing the Science of the Sea: www.mote.org

SECTION A

GETTING TO KNOW MARINE LITTER



KNOW FEEL ACT!

to Stop Marine Litter



Buoyant objects float in water. These objects are more likely to become marine litter than those that sink because they can easily be carried by water and wind. They can also be washed into the sea through heavy rainfall, rivers, streams and sewage, as well as storm water outlets and be swept even further by the wind, waves, tides and currents. As a result, floating litter can travel long distances, far from their original point of entry causing problems over a vast area.

Items **easily blown** by the wind very often find their way into the marine environment either by being blown directly into the sea or indirectly by a river or a stream. These objects can become marine litter even after having been originally disposed of in a proper manner. For example, a napkin that is thrown in a rubbish bin without a lid at the beach may be easily blown out of the bin.

There is a general correlation between an object's buoyancy and ability to be blown around. Lightweight objects tend to float as well as be easily carried by the wind. However, some lighter objects will sink once saturated with water or encrusted with living organisms that attach themselves to hard surfaces such as micro-organisms and larger creatures including barnacles. This is a process known as fouling.

Degradation refers to the process during which an object breaks down into smaller particles (or molecules) through any means, such as the action of wind and water (erosion or weathering), the action of the sun (especially UV radiation), and the action of heat. For example some plastics decompose when exposed to sunlight (*photodegradation*).

During the **biodegradation** process, molecules break down through the action of bacteria, fungi, and other living microorganisms. Biodegradation takes place either in aerobic or anaerobic conditions and produces smaller molecules, some of which (such as carbon dioxide and methane) escape into the atmosphere, while other compounds (such as nutrients) are taken up by other organisms in the environment.

In general, higher temperatures, UV radiation and humidity accelerate biodegradation. Plastics, glass, synthetic rubber, synthetic fabrics, and metal are typically resistant to biodegradation. Natural rubber and cloth can biodegrade but it takes a relatively long time. Paper biodegrades easily unless it is coated with plastic or another non-degradable material.

What is the typical lifespan of a litter item once it enters the sea?

(Source: MARLISCO EXHIBITION, 2013)

Item	Approximate degradation time
Newspaper	6 weeks
Apple core	2 months
Cotton gloves	1-5 months
Wool gloves	1 year
Plywood	1-3 years
Painted wood	13 years
Tin can	50 years
Plastic bottle	100s of years
Aluminium can	80-200 years
Glass bottle and jars	undetermined



These are only estimated times because the lifespan of plastic especially depends on where an item ends up. For example, is it on a sunny Mediterranean shore or at the bottom of the dark, cold North Sea?



EXPERIMENT A: Blown by the wind

Materials and Equipment

A fan and various litter items including plastic, paper and metal objects.

Instructions step by step

1. Set up the fan at one end of a table.
2. Place various litter items in front of the fan one at a time. Observe if it is blown away.
3. Reflect on the following questions:
 - Which items are easily blown around and which are not?
 - Is there a tendency for all items of the same material (plastic, paper, metal, etc.) to be blown around in a similar way?

EXPERIMENT B: Floating or sinking?

Materials and Equipment

A bucket filled with water. Various litter items including plastic, paper and metal objects.

Instructions step by step

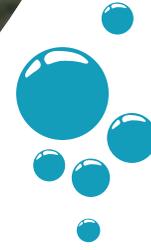
1. Fill a bucket with water.
2. Place each litter item on the surface, one at a time and wait a few minutes.
3. Reflect on the following questions:
 - Which items float and which sink?
 - What happens to buoyant items when they enter the water?
 - What happens to items that do not float when they enter the water?
 - Is there a tendency for all items of the same material to float or sink?

Extension Activity

To test the impact of wind on floating items: place the fan in front of a large, shallow container filled with water and floating litter items.

To test the impact of rain on litter items: place items on a slightly slanted surface (e.g. the slide in the school yard) and sprinkle them one at a time using a water spray can.





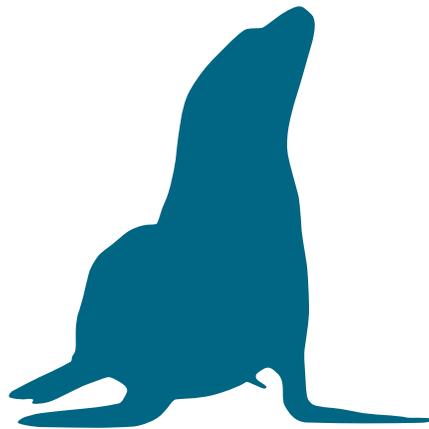
EXPERIMENT C: Decomposing in nature

Materials and Equipment

A large bucket (preferably with a lid)
A box (paper or plastic, preferably with a lid)
Various litter items (2 of each kind)
A camera
Gloves

Instructions step by step

1. Fill two thirds of the bucket with sea-water (or pond water).
2. Place 1 litter item from each kind in the bucket (ideally next to each other, so that it can be seen from above without moving it). Cover the bucket with a lid.
3. Place the second set of litter items in the empty box. These will be used for comparison.
4. Keep both sets outdoors in a protected, roofed area where there is no risk of them getting wet or knocked over by wind, students or animals.
5. Observe the decomposition process on a weekly basis for a period of two months or longer. Record your observations on the worksheet. Take photos to monitor the changes as accurately as possible.
6. At the end of the experiment, using gloves, empty the containers on a large table. Compare each pair of items (shape, color, odor, durability, etc.), and record any differences.





TRACKING MARINE LITTER

In this activity, learners use diagrams, local and global maps in order to illustrate the point that marine litter items continue “travelling” from place to place, creating a problem of global dimensions, with no borders.

SUBJECTS

Geography, Arts, Social Studies

LEARNERS' AGE

10-15 yrs or younger

DURATION

60 minutes

OBJECTIVES

- To track possible routes of marine litter both land and sea-based.
- To track possible destinations of marine litter (e.g. garbage islands, etc.).
- To understand that marine litter is a global issue, beyond borders and that it “travels” continuously.

INTERNET SOURCES

Lost at Sea / The trail of Moby Duck: www.independent.co.uk/environment/nature/lost-at-sea-on-the-trail-of-mobyduck-2226788.html

Friendly Floatees: http://en.wikipedia.org/wiki/Friendly_Floatees

The Amazing Journey of Plastic Bags: www.youtube.com/watch?v=JVO5LBLTNRM

Ducks on the go / Where did they go? [www.epa.gov/owow/oceans/debris/toolkit/files/DucksInTheFlow_sm\[11_merged\]508.pdf](http://www.epa.gov/owow/oceans/debris/toolkit/files/DucksInTheFlow_sm[11_merged]508.pdf)

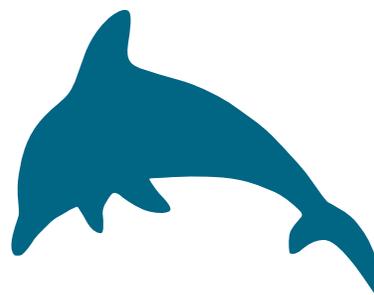
SECTION **A**

GETTING TO KNOW
MARINE LITTER



**KNOW
FEEL
ACT!**

to Stop Marine Litter



Various land and sea-based activities can result in litter entering marine environments either directly into the sea and on coasts or indirectly through rivers, sewage outlets, storm water outflows, currents, wind or even tides. Marine litter can originate from one or more sources. It can come from point or diffuse sources.

While marine litter can accumulate near its source, it can also travel substantial distances ending up far away from its original entry point. It is important to recognise that marine litter's source, drift and effect is influenced by a range of factors including rainfall, river transport, water currents, wind and geomorphology, and by its resilience and persistence.

Marine litter can be found throughout the entire marine environment; from coastal areas to mid-oceans and from the sea surface to the seabed. Local, national and international surveys are conducted frequently to assess quantity, composition and, wherever possible, sources of marine litter found along shorelines. However, long-term, wide scale surveys on marine litter in surface water, on the seabed or circulating in the water column are rarely conducted. Obviously, it is more difficult to monitor litter accumulated on the seabed and in the water column than it is on beaches.

The Journey of 29,000 Rubber Ducks

In 1992, a shipping container with 29,000 plastic bath toys was lost in the middle of the Pacific Ocean on its way from Hong Kong to the United States. At the time, no one could have guessed that those same toys would still be floating in the world's oceans 20 years later.

Since the accident, the yellow ducks have bobbed halfway around the world. Some have washed up on the shores of Hawaii, Alaska, South America, Australia and the Pacific Northwest; others have been found frozen in the Arctic ice. Still others have somehow made their way as far as Scotland and Newfoundland in the Atlantic.

Surface and deep currents in the oceans

Surface ocean currents are mostly caused by the wind as it moves over the water. They travel over long distances, and their circular pattern is further aided by the Coriolis force (the apparent deflection of movement due to the rotation of the earth around itself). In the northern hemisphere, they move clockwise and in the southern they spin counterclockwise. Deep ocean currents are found in depths below 400 meters. They are larger and slower than surface currents and mainly created by density differences in the water.



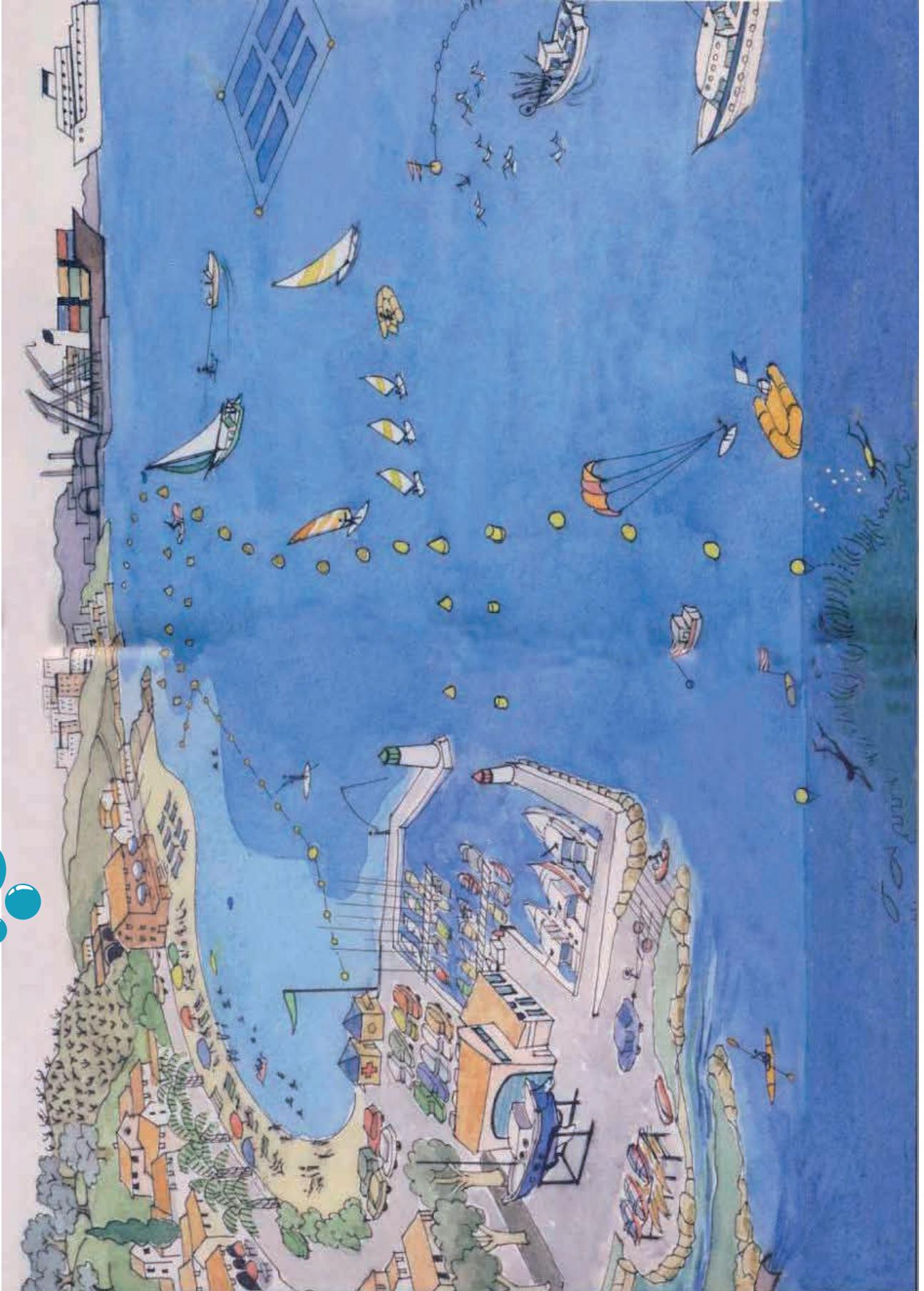


Diagram of a fictional coastal town

© "Cap sur la Gestion du littoral"/ Réseau mer en Provence-Alpes-Côte d'Azur





Material and Equipment

A world map and/or a globe

Instructions step by step

Start a class discussion on how the very nature of a litter item can reveal its source. For example, what is the most probable source of objects like fishing nets, sun-block dispensers, cotton bud sticks, fertiliser containers, etc.?

TASK A

Learners look at the diagram on the previous page depicting a fictional coastal town. They identify how many different entry points there are for litter to enter the marine environment (pollution hotspots) and distinguish between land and sea based sources. How far could some of these sources be from the coast itself?

TASK B

Learners print or draw a picture of a coast that is close to where they live. They must make sure it is large enough to include any nearby stream or river inputs/outputs, etc. and try to identify possible “pollution hotspots” in their area.

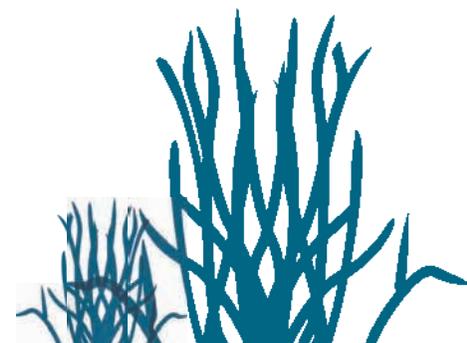
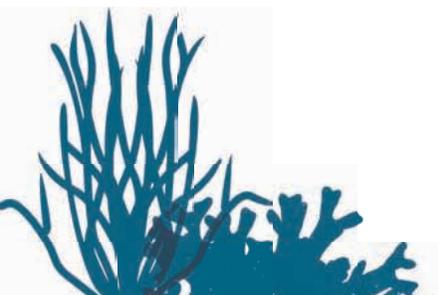
TASK C

The story about the lost rubber ducks is read aloud. Using a globe or a world map, learners show all the places where the lost rubber ducks have been found over a period of 20 years. What can be assumed about their journey?

Close the activity by discussing how all these litter items could have been prevented from being generated in the first place.

Extension Activity

Learners watch the film (3:59 minutes) “The Amazing Journey of Plastic Bags” narrated by Jeremy Irons (www.youtube.com/watch?v=JVO5LBLTNRM). They then compose a poem or song or a comic strip about the travels of a piece of litter - a plastic bag, a rubber duck or another “protagonist”. The point of origin, journey, and where the item ends up should all be included in the lyrics / story.





GUESSING THE TOP 10

In this activity, learners work in groups to guess litter types most commonly found on beaches. They compare their assumptions to published data from national or international research or to real data recorded through their own field research. They reflect on specific consumption habits that generate marine litter and think about how changes in these behaviours can prevent its generation.

SUBJECTS

Mathematics, Science, Social Studies

LEARNERS' AGE

12-15 yrs

DURATION

Group guessing activity: 60 minutes
Coastal cleanup and data recording: 1 day
Comparison and conclusion: 60 minutes

OBJECTIVES

- To set a hypothesis and then test it.
- To practise reading and comparing data and charts.
- To reflect on how shifts in behaviour can prevent waste generation.

INTERNET SOURCES

International Coastal Cleanup: www.oceanconservancy.org/our-work/international-coastal-cleanup

Take 3 Clean Beach Initiative: www.take3.org.au

Ducks on the go / Where did they go?

[www.epa.gov/owow/oceans/debris/toolkit/files/DucksInTheFlow_sm\[11\]_merged508.pdf](http://www.epa.gov/owow/oceans/debris/toolkit/files/DucksInTheFlow_sm[11]_merged508.pdf)

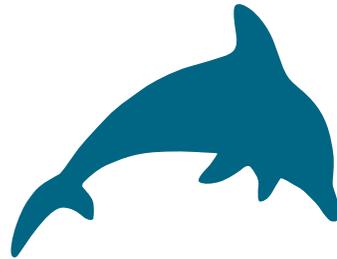
SECTION **A**

GETTING TO KNOW
MARINE LITTER



**KNOW
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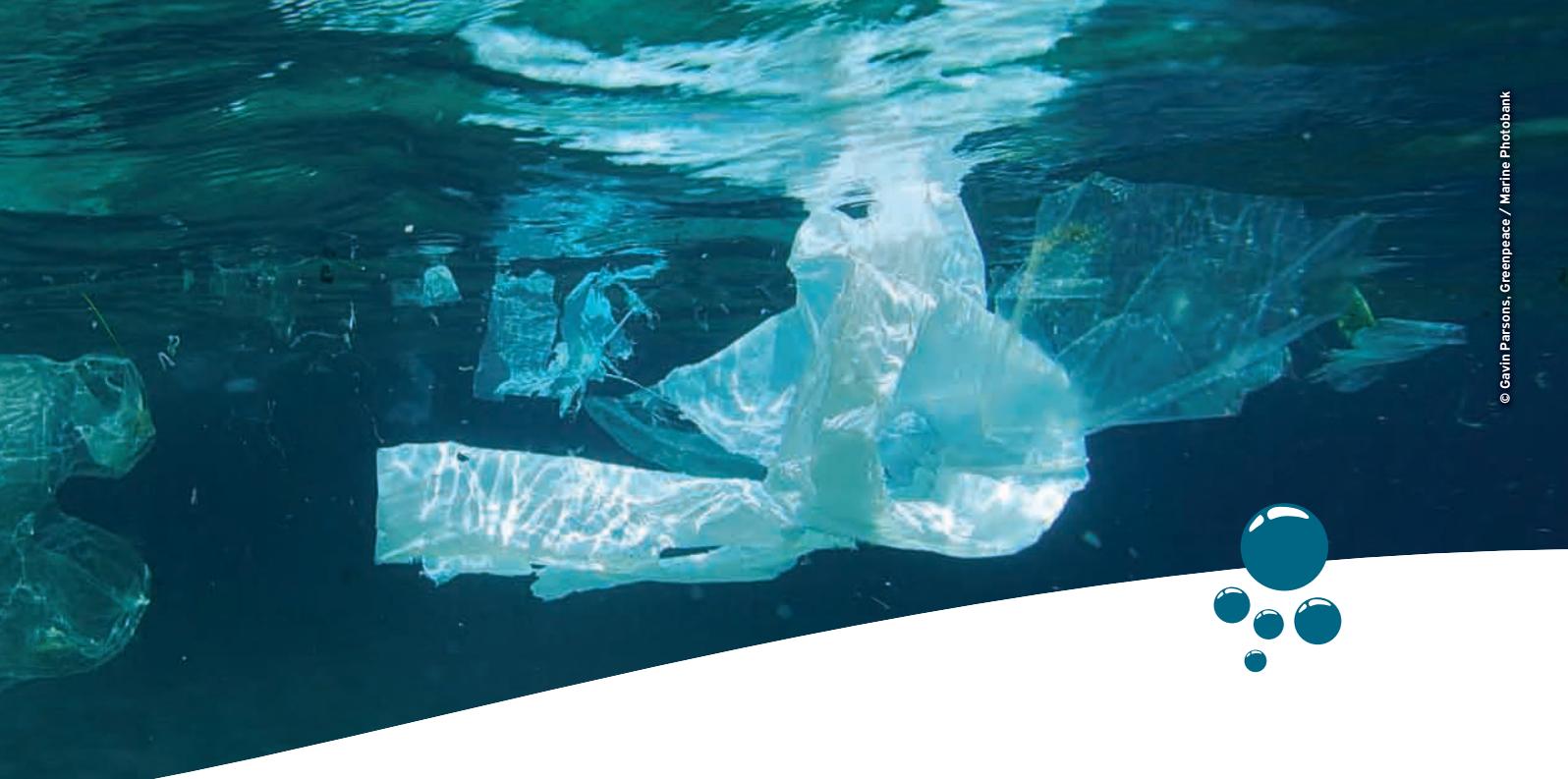
Marine litter is usually recorded by number of items and less frequently by 'weight' or 'volume'. Counting individual items and grouping according to type of material, use, and source is considered as more helpful information when implementing measures at all levels (linking an item to its source and subsequent action) to best deal with marine litter.

Every year, the number of data collection projects such as clean ups and monitoring programmes increase. They are implemented globally either by volunteer groups or appropriate agencies to develop new insight on the amount, trend and distribution of marine litter. These efforts eventually lead

to publishing results and figures that may vary considerably depending on location and duration of the clean up, prevailing weather conditions, methodology, time period between two consecutive clean ups, environmental area (beach, water column, seafloor, etc.), aggregation and statistical management of results, etc.

Results are published annually by various organizations such as the Ocean Conservancy International Coastal Cleanup and provide an overview of what is littering our oceans. These results are important in guiding our efforts towards preventing specific items from reaching the marine environment in the first place.





Every year, the International Coastal Cleanup coordinates a global cleanup and monitoring campaign. Annual global data reports are published at www.oceanconservancy.org. Here are two diagrams of the top 10 lists of litter items recorded on beaches worldwide during the International Coastal Clean Up of 2012 (left) and 2013 (right). Learners can compare these top 10 lists to those from 10-20 years earlier and discuss the differences.

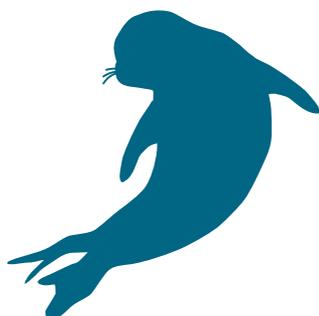
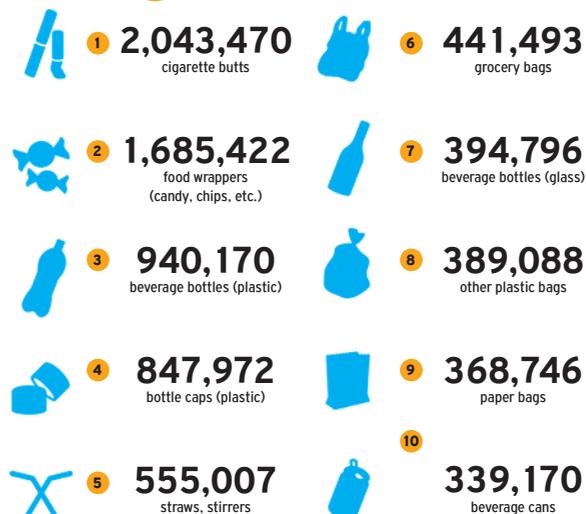
2012

TOP 10 ITEMS FOUND



2013

TOP 10 ITEMS COLLECTED





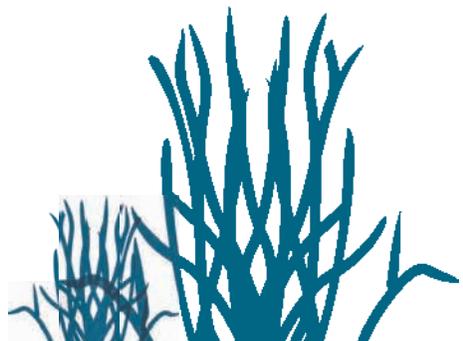
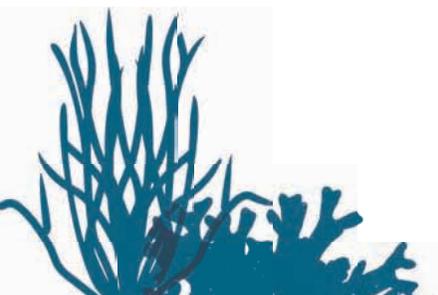
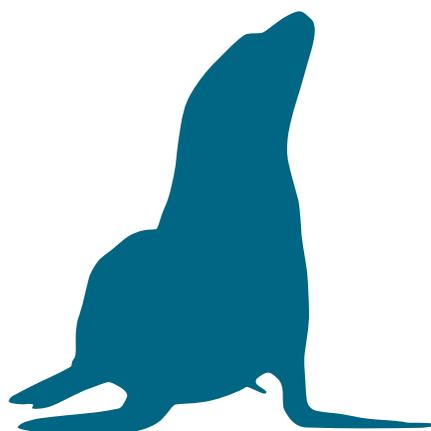
Material and Equipment

Notebooks, gloves and bags for the clean up

Instructions step by step

1. Each learner guesses the top 3 litter items they think is most commonly found on a beach they know (in number of items). The learner then notes them in descending order.
2. In groups of 4, they discuss their guesses. Were there any items that the groups did not guess?
3. In groups, learners compose a list of the Top 10 litter items overall, in descending order (List A).
4. It is time to test their hypothesis. They browse through the given links and complete List B. After comparing this list with their list, how do they differ? Were there items that they did not think of?
5. In case of repeated clean ups, learners can compare their data with that of previous years (List C) and track the differences. Alternatively they can compare findings with published data from the literature.
6. Learners visit a beach with their peers and do a coastal clean-up, recording the litter items they find. They list the most commonly found items (List D). How does this list differ from the previous two?
7. Learners discuss how the items in the Top 10 list could have been prevented from becoming marine litter. What can they personally do to generate less waste?

Before visiting the beach check the safety precautions list in activity D4.





SEEING THE UNSEEN

In this activity, learners observe, record and classify litter found in their immediate surroundings. They reflect on how this litter found its way there, how it can make its way to the marine environment and how to prevent this from happening.

SUBJECTS

Mathematics, Science, Social Studies

LEARNERS' AGE

10-15 yrs

DURATION

Pre-visit: 60 minutes. Field work: 1-2 hours. Post-visit: 60 minutes

OBJECTIVES

- To practise observation, data collection, classification and chart-making.
- To reflect on how waste generation can be prevented at source.
- To propose actions, solutions and prevention.

INTERNET SOURCES

International Coastal Cleanup:

www.oceanconservancy.org/our-work/international-coastal-cleanup/

OSPAR Marine Litter Monitoring Survey Form:

www.ospar.org/documents/dbase/decrecs/agreements/10-O2e_beachlitter%20guideline_english%20only.pdf

ODEMA Aquatic Environment Wastes Observatory www.resodema.org

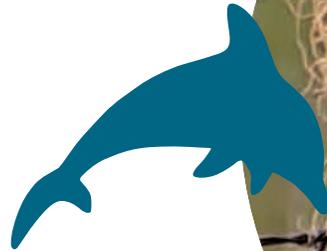
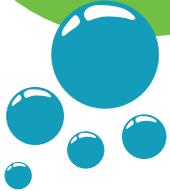
SECTION B

LAND & SEA
BASED SOURCES



**KNOW
FEEL
ACT!**

to Stop Marine Litter

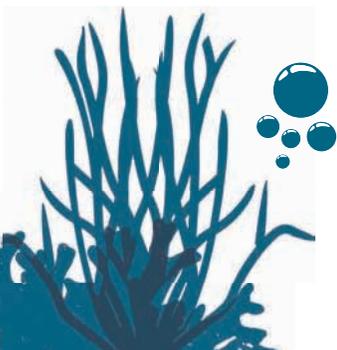
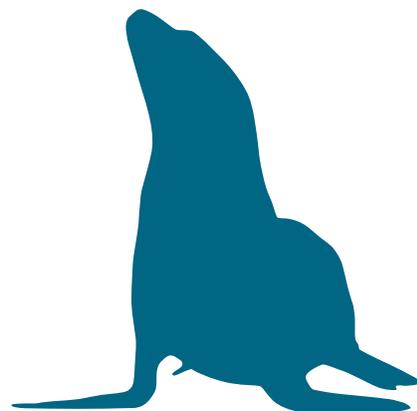


Any waste material improperly disposed of, as well as any material improperly transported or stored has the potential to become marine litter. Marine litter comes mainly **from land-based practices**, such as:

- Inappropriate waste disposal at home, work, on the street, etc.
- Poor waste management at all stages: collection, transportation, treatment and final disposal.
- Untreated municipal sewage, released due to either lack of treatment plants or heavy storms.

- Poorly managed industrial waste which may contain scrap from the production process, packaging or raw material, plastic resin pellets, as well as untreated wastewater, etc.
- Tourism and recreational activities that fill beaches with cigarette butts, plastic bags, food packaging, beverage cans, cartons, toys, etc. Many beach goers leave behind much more than their footprints in the sand...

Litter from land-based sources finds its way to the sea via rivers, drains, sewage outlets, storm water outflows or when blown by winds or even swept with the tide.





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Sea-based activities can also be significant sources:

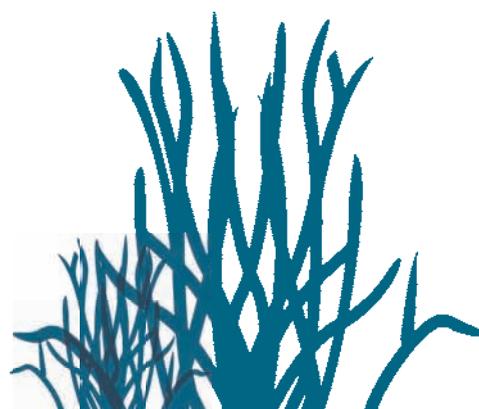
- Commercial fishing that disposes of fishing-related waste (fishing gear, nets, etc.), etc.
- Merchant and leisure shipping (large cargo ships, cruise liners, ferries, etc.) that disposes of sewage, lost cargo, etc.
- Recreational shipping (small boats used for fishing, yachting and water sports) that dispose litter items such as bottles and tins, sewage, fishing and sports gear, etc.
- Offshore oil and gas platforms that dispose of drilling equipment, pipes, storage drums, packaging items, etc.
- Aquaculture that dispose of net cages, construction materials, feed sacks, etc.

What is more, litter produced on board vessels often ends up in the sea. Poor management facilities on ships, in ports and marinas worsen the problem.

Marine litter is composed of a wide range and variety of materials, the majority of items falling into the broader categories of glass, metal, paper and plastic. National and international reports (e.g. UNEP Regional Seas, OSPAR) and scientific research consistently show that **plastic** items represent the most abundant type of marine litter within Europe and globally, typically consisting of approximately 75% of all items found.



Generally, the root causes of marine litter are connected to prevailing production and consumption patterns. The more we consume the more waste we produce. Failure to enforce legislation is also a significant factor but our indifference when it comes to the impact of our consumption and disposal choices plays a very important role!





Materials and Equipment

Map of local surroundings
Tape measure and rope for the field research

Instructions step by step

Start a class discussion about how we may not “see” litter around us, as we may have become accustomed to this sight. This activity enhances observation skills by honing in on this “unseen” litter, which, if not dealt with, can easily end up in the sea.

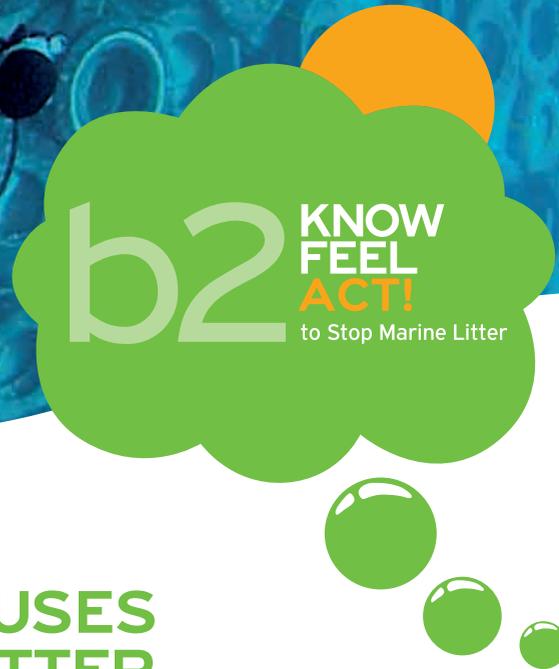
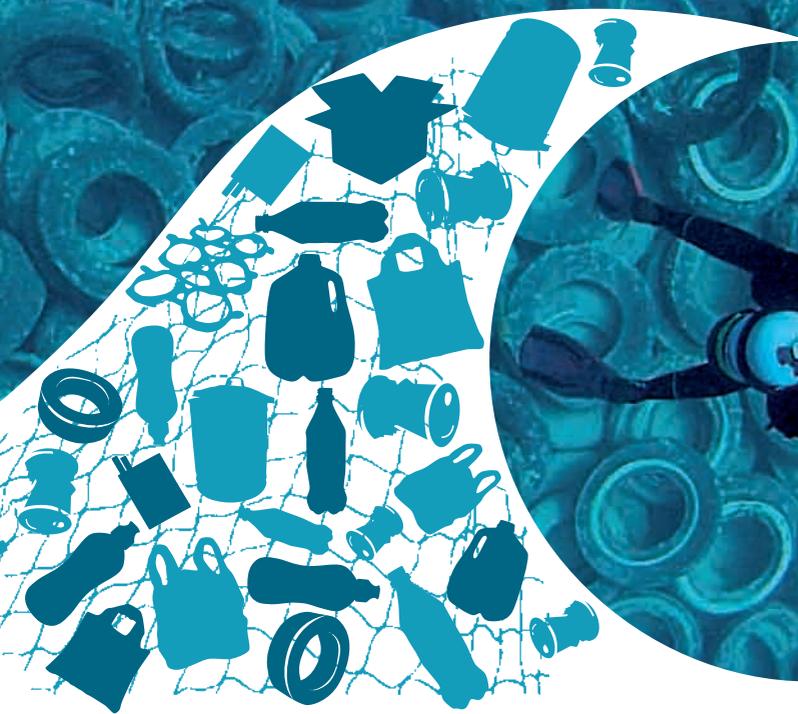
1. A nearby site, such as a beach, river bank or even an urban site is selected for investigation. A map is used to set the boundaries of the investigation site and divide it into sections.
2. Before going outdoors, learners study the Worksheet and make sure they understand the categories and how to record properly.
3. On the site, learners work in pairs to “scan” it:
 - a: For an urban / rural environment: each pair investigates a specific length of parallel roads that lead to a river bank (e.g. 100 m) or an entire city block.
 - b: For beaches or river banks: a rope and tape measure is used to make a grid on the site, e.g. 100 m long by 30 m wide. Pairs then form a line on one end and work along the grid, moving in parallel.

Before starting recording, learners should decide on the minimum dimensions of the items they will record, e.g. approx. 1 cm.

4. The pairs record the litter they encounter: one partner observes, identifies and calls out the litter types; the other tallies them on the Worksheet. They ask for help in case they cannot identify certain items.
5. Back in class, learners total the number of litter items found and present the data in the form of tables and graphs (bars or pie-charts). They can compare this data with that published by the International Coastal Cleanup.
6. Interesting results may be drawn by grouping data into different clusters, such plastic items; food related wastes; single use items; items originating from beach use, etc.
7. Learners discuss the recording method: Here, like in most surveys, calculations are based on *numbers* of items. How different would the data look if estimations were based on *weight*?
8. Learners reflect on the following questions:

What types of items are the most common? What is their source?
Did you find items you and your family use every day?
How could these litter items make their way to the sea?
Where could these litter items be next month / five years from now?
Can beach clean-ups solve marine litter problems? Why? Why not?
Are there any steps we can take to prevent waste generation in the first place?
9. Learners share their results with their school or community in the form of a poster, oral presentation, press release or web announcement.





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 FEEL ACT!

to Stop Marine Litter

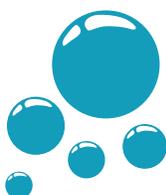


Marine litter is attributed mainly to land-based practices related to poor management, irresponsible behaviours, etc. Sea-based activities such as fishing, shipping and aquaculture also generate litter. Understanding “root” causes of marine litter and the pathway of entry from land or sea is important 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?





DIVING DEEPER: CRITICAL THINKING & MEDIA LITERACY

Like most environmental issues, the question of marine litter is quite complex with diverse root causes and no single solution. In this activity, learners work on a case related to marine litter. They analyse the causes, and think about the actors involved in terms of their responsibilities, values and benefits including possible ways of addressing the problem.

SUBJECTS

Environmental Studies, Language, Global Economy

LEARNERS' AGE

12-15 yrs

DURATION

90 minutes

OBJECTIVES

- To analyse causes of marine litter in detail based on a real case, preferably local.
- To practice analyzing and synthesizing information from written texts.
- To develop media literacy.

INTERNET SOURCES

www.marlisco.eu/best-practices.en.html <http://e360.yale.edu/>, www.theguardian.com/environment,
www.bbc.co.uk/news/science_and_environment/ <http://marinedebris.info/>

SECTION B

LAND & SEA
BASED SOURCES



**KNOW
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to Stop Marine Litter



Spanish sperm whale death linked to plastic used in supply chain for UK supermarket

Sperm whale on Spanish southern coast swallows 17 kilos of plastic waste dumped by greenhouses supplying produce to UK supermarkets.

Adapted from an article in The Guardian, 08/03/2013

A dead sperm whale washed up on Spain's southern coast swallowed 17 kilos of plastic waste dumped into the sea by farmers tending greenhouses where tomatoes and other vegetables for British supermarkets are produced.

Scientists were astonished to discover the 4.5 tonne whale had swallowed 59 different pieces of plastic – most of it thick transparent sheeting used to build greenhouses in southern Almeria and Granada. A clothes hanger, an ice-cream tub and bits of mattress were also found.

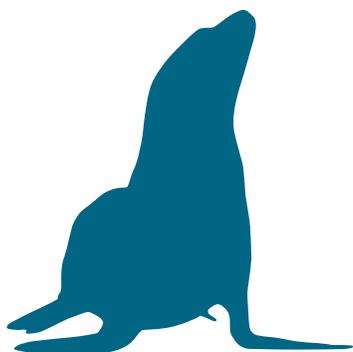
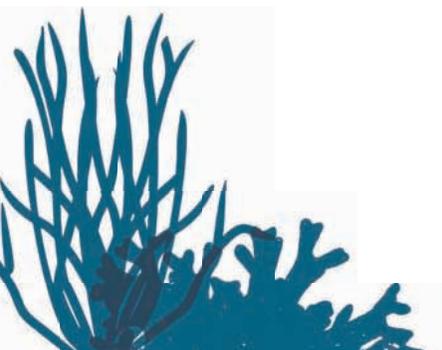
According to researchers from the Doñana National Park research centre in Andalusia, the animal was killed because the plastic eventually blocked its stomach.

At first, researchers found it hard to believe that the 10-metre animal had swallowed such a vast amount of plastic which they found protruding through a tear in its abdomen.

In total, the whale's stomach contained 24 pieces of transparent plastic, plastic bags, nine metres of rope, two stretches of hosepipe, two small flower pots and a plastic spray canister.

All the items found are typical of the closely packed Almeria greenhouses that cover about 40,000 hectares – and are clearly visible in satellite photographs taken from space.

Desert-like Almeria has transformed itself into Europe's winter market garden thanks to the plastic greenhouses where plants are grown in beds of perlite stones and drip-fed chemical fertilisers. Local farmers report that large UK supermarket chains are amongst valued customers.





Estimates of how much plastic waste is generated vary from 45,000 tonnes to more than 88,000 tonnes.

Much of the waste is treated in special centres but environmentalists say local riverbeds are often awash with plastic. Given that the greenhouses have been built right up to the high-tide line, some waste also ends up in the sea.

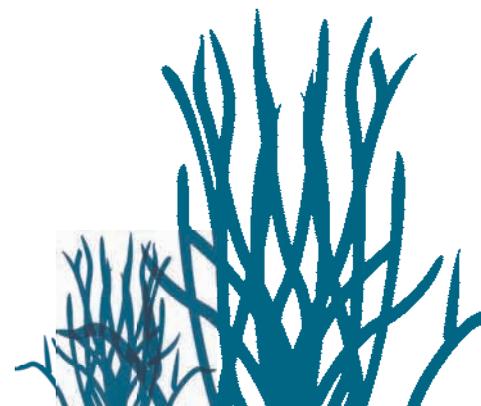
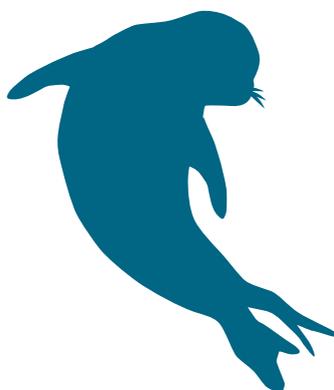
“Degraded plastics which are no longer recyclable is a persistent problem,” reports lead researcher Renaud de Stephanis and his team in the Marine Pollution Bulletin.

Only about 1,000 sperm whales – the world’s largest toothed whales – are thought to live in the Mediterranean. They live up to 60 years and are often killed after becoming entangled in nets or hit by ships.

Yet another man-made danger has now been detected. De Stephanis warns that “These animals feed in waters near areas that have been completely flooded by the greenhouse industry, making them vulnerable to its waste products if adequate treatment of the industry’s debris is not in place”.

Source: www.theguardian.com/world/2013/mar/08/spain-sperm-whale-death-swallowed-plastic

Read another article on the same topic from another source:
www.sciencedirect.com/science/article/pii/S0025326X13000489





Material and Equipment

Notebooks and pens

Instructions step by step

The learners read all texts / articles of the case study independently. Then in groups of four, they discuss the following questions and keep notes on the worksheet:

- What is the key issue at stake? What is the problem?
- Identify the main actors/ stakeholders involved in this situation. What are their views? What is their behaviour? What are the consequences of their actions? What about their interests and values? Underline the exact phrases in the text that support these values.
- Based on your readings and discussions, what are the main causes of the issue? Are they physical, social, cultural, economic? Are the causes the same for other regions around the world?
- How is the specific issue connected to other issues? Is it a local incident? To what extent does it have a global dimension?
- What are the consequences of the issue? For example, how are the ecosystem, tourism, fishing, aesthetics and quality of life affected?
- How does the issue described affect local inhabitants? To what extent does it affect the entire country? Does it have any effect on people elsewhere around the world?
- How could the problem be solved? Are the solutions the same for other people around the world? What can you do as an individual and as a class to address the problem?
- Does the author adequately present all sides of the issue? Can you distinguish between the facts and author's views? Discuss how these differ. What are the author's values? Do you detect any prejudice or bias? If yes, underline the relevant phrases in the text.
- Does the article's title reflect the content? If not, suggest an alternative title.





TAKING INVENTORY OF OUR HABITS

In this activity, learners read the findings of published surveys on the general public's opinions on various issues relating to marine litter. They then prepare and conduct their own survey of local residents from their school area so as to identify perceptions, attitudes and behaviours related to marine litter.

SUBJECTS

Environmental Studies, Maths, Language

LEARNERS' AGE

14-15 yrs

DURATION

Research, questionnaire preparation, data collection & synthesis: approximately 1 month

OBJECTIVES

- To disassociate concepts of factual knowledge, perception, opinion, attitude and behaviour from one another.
 - To prepare a questionnaire on a specific marine litter theme of the learners' interest.
 - To conduct a survey using the principles of the scientific method.
 - To analyse the survey's data and draw conclusions.
- To think of alternative consumption habits that could help prevent marine litter.

INTERNET SOURCES

MARLISCO survey: [www.psy.plymouth.ac.uk/MARLISCO/\(S\(xff4ckietgbqp1cd5xb0jx5a\)\)/brief.aspx?Lang=EN](http://www.psy.plymouth.ac.uk/MARLISCO/(S(xff4ckietgbqp1cd5xb0jx5a))/brief.aspx?Lang=EN)

EVS survey: www.eui.eu/Research/Library/ResearchGuides/Economics/Statistics/DataPortal/EVS.aspx

SECTION B

LAND & SEA
BASED SOURCES



**KNOW
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to Stop Marine Litter



A UK based survey

A survey carried out in 2008 in the UK revealed:

- 37% of respondents believe that a lack of bins justifies littering
- 91% consider increasing the number of bins as the most effective way to reduce litter
- 42% of smokers and 16% of non-smokers consider cigarette related litter as acceptable.

The European Values Study

The European Values Study (EVS) is a cross-national survey repeated every nine years since 1981. It focuses on how European citizens think about life, family, work, religion, politics and society. Two questions of the 2008 EVS survey addressed the issue of littering:

(A) Can throwing litter in public places be justified? On average, 69% of respondents felt that littering in public places is not justified. With over 80% of the respondents agreeing that it is 'Never Justified', Malta, Croatia, Latvia, Romania and Denmark were the highest performing countries. The lowest, with more than 50% agreeing that it is 'Never Justified', were Belarus, Slovakia, Finland and Sweden.

(B) How many of your fellow citizens throw litter in public places? Across all surveyed countries, 15% of respondents claimed that almost all of their fellow citizens litter in public places. The highest percentage figured for Hungary (77%). Other countries with lower but significantly negative social norms were Turkey, Northern Ireland, Greece, Finland and Belarus (28% to 23%). The highest performing countries were Denmark, Belgium, Latvia and the Netherlands (4%), France (6%), and Austria (9%). According to the EVS survey, older people compared to younger ones and women compared to men, are less likely to consider littering as acceptable. This finding is in line with results from other relevant surveys.

The Keep Britain Tidy survey

"Keep Britain Tidy" is a sophisticated analysis that looked at distinct groups of people who litter. Based on their responses, attitude and behaviour, they were categorized in the following groups:

- The **"Well-behaved"** comprised 43% of the littering population. They left behind no more than apple cores, small pieces of paper, and quite often did not regard this as a problem. This group's members were more likely to be female, non-smokers, aged 25 and below;
- The **"Justifiers"** were the next largest group comprising 25% of the total littering population. They justified their behaviour based on the lack of bins or the claim "everyone else is doing it". Justifiers considered people who litter as lazy and they would be embarrassed if someone caught them littering and would subsequently pick up the item. The Justifiers were mostly men, smokers and aged 34 and under;
- The **"Life is too short"** group were aware that littering was wrong but had more important things to worry about.
- Related to this group was the **"Am I bothered?"** group who were either completely unaware of the consequences of littering or simply did not care. No one would feel guilty if someone caught them littering and they would not offer to pick up the item. In some cases, they would become quite verbal and even aggressive. They would, however, consider it rude if someone dropped litter in front of them. This group was more likely to be comprised of young male smokers;





- Members of the **“Guilty”** group comprised 10% of the total littering population. They understood throwing litter was wrong and felt guilty when doing so. But if it were inconvenient to carry or keep their litter until they found a bin, they would continue to litter. Members of this group will litter when nobody is watching, in the car or during public gatherings. They would feel guilty if caught littering and immediately offer to pick up the item. They regard people who litter as lazy and inconsiderate. They are primarily female, non-smokers and aged 25 and under;
- The **“Blamers”** constituted 9% of the littering population. They blamed their behaviour on the local council for inadequate bin provision. They also blamed fast food operators, teenagers and manufacturers for over packaging. Members of this group would be embarrassed if someone caught them littering and would pick up the item while making excuses for their behaviour. They thought people who littered were lazy, but justified their actions when bins were either full or lacking. This was a predominantly young, male, smoking population.

MARLISCO survey on European attitudes and perceptions on marine litter

The results of MARLISCO’s baseline survey indicate that the majority of Europeans notice litter on most or every visit to the coast. Respondents were concerned about marine litter, perceiving it to be an important problem and considered coasts as

being highly valuable. More specifically, respondents believed that the quantity of marine litter is on the rise and that it poses a present threat that will cause lasting damage. They also believed that it is a problem facing us all - not just coastal communities or other countries.

Litter was considered to be found everywhere in the marine environment, particularly near urban areas and on beaches but least likely in polar seas. Respondents believed that litter entered the marine environment predominantly through direct releases into the sea and less likely through landfill and sewage pathways. On average, respondents estimated that the plastic proportion of marine litter is around 46%, which is a serious underestimation as it is actually 75% according to research findings.

Respondents held the government, industry, commercial users and the general public as highly responsible yet less competent and even less motivated to take action on reducing marine litter. In comparison, least responsible were independent scientists and environmental groups who were perceived as the most competent and motivated. Educators were the only group who were perceived as equally responsible, competent and motivated.

Respondents reported that they considered themselves as being likely to take several actions to reduce marine litter but with little intention to ask others to pick up litter if they saw them littering.





Materials and Equipment

Notebooks and pens

Instructions step by step

In class, learners discuss the possibility of developing their own survey questionnaire. What aspect of marine litter would they like to investigate? Learners may wish to explore the following concepts:

- People's *factual knowledge*: This refers to information that is scientifically based and cannot be altered (e.g. aluminium sinks in water).
- Peoples' *behaviours and habits* (self-reported): This could refer to the frequencies of how certain actions are carried out (e.g. I recycle: i) never, ii) occasionally, iii) in most cases, iv) always).
- People's *perceptions*: This could refer to their conviction or certainty of phenomena (e.g. I consider/ believe/ think that a glass object will last longer than a plastic one in the sea).
- People's *opinions* and point of view on a certain issue (e.g. I consider recycling futile).
- People's *attitudes* in favour or against certain actions (e.g. I am in favour of recycling).

Before drafting their questionnaire, learners research and consult similar surveys. Non-Governmental Organisations (NGOs), universities, etc. commonly publish or make such research accessible.

Learners decide which type of questions to use: open-ended or closed; Multiple-choice; etc.

Working in groups, they create a questionnaire to investigate people's behaviours and opinions. The target group may include parents, friends, neighbours, related professionals, beach goers, etc.

Responses may be collected online or via interviews. Learners make sure to collect a sufficient number of completed questionnaires. They could complete the questionnaire themselves as well!

Learners analyse their results with their educator's help. They draw conclusions about the "marine litter profile" of residents in their area.





ALL TIED UP

In this activity, learners “experience” what marine animals may feel when entangled in litter items. The activity can serve as a stimulus for further exploration on ingestion and entanglement and the threats they pose to marine life.

SUBJECTS

Environmental Studies, Language, Arts

LEARNERS' AGE

10-12 yrs or younger

DURATION

15 minutes

OBJECTIVES

- To “experience” entanglement caused by marine litter.
- To practise empathy or the capacity to identify with emotions experienced by another being.
- To be aware of the threats that entanglement by marine litter poses to marine life.

INTERNET SOURCES

www.unep.org/regionalseas/marinelitter/about/effects/default.asp

SECTION C

EXPLORING
THE IMPACTS





Just like humans, animals need a healthy and safe environment in which to live. Waste that ends up as marine litter can harm animals living in or near the sea in many ways: litter objects can entangle, maim and even cause drowning. In other cases, animals mistake litter objects for food which cause choking and/or starvation. In fact, entanglement and ingestion are the primary threats marine litter poses to marine wildlife.

Entanglement results when an animal becomes encircled or ensnared by a litter item. This happens because marine animals are often attracted to them as part of their normal behaviour or out of curiosity (for example, playing with litter items or using them as shelter).

Entanglement can cause wounds leading to infection or loss of limbs, strangulation, choking, or suffocation. It can impair an animal's ability to swim, find food, escape from predators and eventually cause drowning.

Fishing nets that have been accidentally lost or deliberately discarded may continue to catch fish for very long periods of time as they drift in the sea or along the bottom. This is otherwise known as "ghost fishing". Their "catch" attracts other fish, mammals and sea birds looking for food and they too, are often caught or entangled, resulting in a vicious, fatal circle.

Ingestion occurs when an animal swallows marine litter. It can happen accidentally or inadvertently (e.g. filter feeding organisms). But in general, animals ingest litter because it looks like food. For example, turtles eat plastic bags mistaking them for jellyfish; birds feed on or feed their young with plastic pellets mistaking them for fish eggs or crabs.

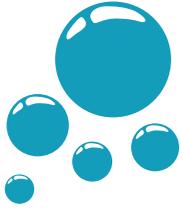
Ingestion can lead to choking, malnutrition or starvation if the ingested items fill the animal's stomach. Sharp objects such as metal, glass or plastic can injure the digestive tract and cause infection and pain. Ingested items may also block the animal's air passage eventually causing death by suffocation. The stomachs of birds of prey and other carnivorous animals have been found with large concentrations of plastics, rope, nets and all kinds of waste that have come from human activities.

Marine organisms can also be exposed to toxic chemicals released from litter items. These chemicals can directly enter organisms that have ingested plastics or indirectly if they have eaten other organisms that have ingested plastics themselves. Even though the adverse effects of these chemicals on organisms are well established, there is still considerable uncertainty on their role in the transfer of chemicals to wildlife or the food chain.

A lesser known fact is that some species attach themselves or "ride" on litter items, invading waters they would normally never reach. As these species establish themselves in a new environment, interaction with native populations can pose threats to the biota and ecosystems. This phenomenon is known as alien species invasion and is one of the most significant threats to global biodiversity.

Marine litter can also harm benthic habitats. Discarded fishing gear causes serious damage to coral reefs as they scrape and break them. As litter items reach the bottom of the sea they cover benthic communities (e.g. a wide piece of plastic, a rug) depriving them of oxygen and thus "smothering" them. Heavy machinery often used to remove litter from coasts can also damage sedimentary habitats.





**KNOW
FEEL
ACT!**

to Stop Marine Litter



A seagull with an aluminum can around its neck
© Nina Kristin Nilsen / Marine Photobank



Lesser Black Backed gull trapped by discarded waste plastic ring
© David Cayless / Marine Photobank



Rope left on shark tail
© Andrew J Burns / Marine Photobank



Entangled starfish
© Peri Paleracio / Marine Photobank



Fish with bottle ring, Mexico
© Martin Porta / Marine Photobank



Ghost fishing in action
© Sijmon de Waal / Marine Photobank





Materials and Equipment

- A couple of thin rubber bands for each learner
- A small bicycle tire, a piece of rope or piece of cloth long enough to be tied around a human body

Instructions step by step

The educator hooks the rubber band over a volunteer learner's little finger, passing it over the back of the hand and hooking it over the other side to the thumb. The educator repeats this using 1 or 2 more rubber bands, entangling a different finger every time. The learner should start to feel the gripping effect of the rubber band on the hand. The learner is asked to try to free his/her hand from the rubber band without using the thumb nor the other hand.

Learners reflect on the following questions:

- How would you feel after struggling like this all morning?
- How would you feel after missing breakfast?
- What would happen if you continued missing meals and using all your strength fighting to break free?



The educator uses a ring-shaped item such as a bicycle tire or a piece of tied rope or cloth, or a belt fixing it around a volunteer's body and arms or alternatively around his/her waist. The learner should try to remove it without using his/her hands -just like an animal with no hands such as a fish would have to do.

In class, discuss the most responsible way to dispose of these and other similar waste items.



These activities simulate entanglement using a rubber band and bicycle tire. They should be performed only by the educator on a volunteer learner taking care not to injure him/her in any way!

Extension activity

Learners arrange to interview a fisherman or a marine scientist to ask about their experiences in terms of wildlife entanglement and other incidents relating to marine litter. In any case, learners prepare their questions in advance.





ANIMAL TALES

In this activity learners simulate reactions of certain marine animals that come into contact with litter items. Learners listen to descriptions of each marine animal's characteristics and then try to identify the type of litter that may harm them.

SUBJECTS

Environmental Studies, Language, Arts

LEARNERS' AGE

10-15 yrs

DURATION

90 minutes

OBJECTIVES

- To be aware of the threats marine litter poses to marine life including ingestion, entanglement and alien species invasion.
- To understand why certain characteristics of marine animals can make them either more or less susceptible to the dangers of marine litter.
- To "experience" what a marine animal experiences when it comes into contact with marine litter items.
 - To encourage expressing emotion and ideas.

INTERNET SOURCES

Marine Species under Threat - National Geographic photo gallery:
<http://ocean.nationalgeographic.com/ocean/photos/marine-species-under-threat/>
Global Symposium: Entanglement in marine debris:
www.wspa-international.org/wspaswork/oceans/marinedebris/symposium/

SECTION C

EXPLORING
THE IMPACTS





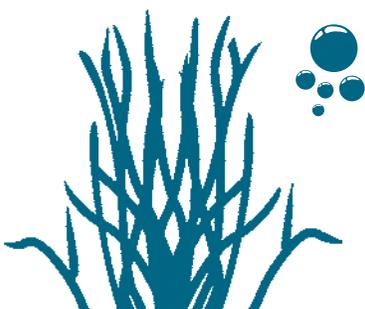
Animals may be attracted to litter items out of curiosity or while looking for food or shelter. Although entanglement and entrapment may not kill a marine animal, it can torment and cause serious pain, for example, when a litter item penetrates the animal's flesh and the animal continues to grow and develop around it. Often animals mistake litter items for food and eat them – this is known as ingestion, which can cause them to choke and/or starve. Ingestion can happen accidentally but also because litter sometimes resembles their food. When the stomach of animals fills with waste that cannot be digested, their digestive tract gets blocked, they feel full, stop eating and eventually die of starvation.

A recent literature review conducted in 2012, reports on the impact marine debris had on 663 species of organisms. Well over half the reviewed publications documented a 40% increase in incidents of entanglement and marine debris ingestion since the last most substantive review (of 1997), which reported on 247 species. The recent review also reveals that all known sea turtles species, about half of all marine mammals species and one-fifth of all seabirds species, have been affected by entanglement or ingestion of marine litter. Approximately 15% of these species are on the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN).

Sea turtles and litter: Sea turtles may become entangled in different types of litter including fishing lines, nets and rope. Ingestion, however, is an even greater problem as these species are indiscriminate feeders. Sea turtles swallow plastic bags because they look like jellyfish, one of their favourite snacks. Cases of turtles swallowing balloons, tar balls and other debris that has become encrusted with algae and other marine forms have also been reported. Ingesting litter can block a sea turtle's digestive tract leading to starvation and a painful death.

Marine mammals and litter: Large, ocean-dwelling mammals are threatened by both entanglement and ingestion. Research over the last two decades reveals hundreds of cases where cetaceans, including species of whales and dolphins, have become seriously ill or killed by marine litter. Seals and sea lions are also severely affected given their natural tendency to investigate unusual objects in their environment.

Seabirds and litter: A large number of seabirds die from entanglement or ingestion every year. Since many seabirds feed on fish, they are often attracted to fish caught or entangled in nets and fishing lines. Sadly, when birds prey upon entangled fish, they too can become entangled. Seabirds are amongst the most frequent victims of abandoned nets. As many as 100 birds have been found trapped in a single abandoned net.



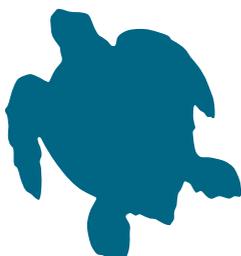


**KNOW
FEEL
ACT!**
to Stop Marine Litter



Ducks, geese, cormorants, terns, plovers, gulls, and even penguins have been found entangled in litter. The ingestion of resin pellets and other small, colourful plastic pieces are also a serious problem for wildlife. Many bird species have been found to ingest these pellets, most likely because they mistake them for fish eggs or other types of food.

Fish, crustaceans and litter: Fish and crustaceans such as lobsters and crabs are frequently caught in lost or discarded fishing nets and fishing lines that continue to ensnare whatever they come across – a phenomenon also known as ghost fishing. Lost traps also continue to attract fish and crustaceans which go into them in search of food or shelter. In addition to killing marine animals, ghost fishing is also dangerous for many aquatic habitats such as coral reefs, sea grass beds and shallow areas of estuaries.



Aquatic marine species invasion: Some species attach themselves or “ride” on litter items and “invade” waters they would normally never reach. Once they establish themselves in a new environment, their interaction with native species may pose a threat to the biota and ecosystems. The Mediterranean Sea is considered a “hotspot” of marine alien species originating from the Red Sea, the Black Sea and the Atlantic Ocean. The bulk of the alien species recorded in the Mediterranean Sea are animals that dwell on the seabed (zoobenthos) and plants (phytobenthos) including fish living in littoral and sub-littoral zones. These invade through the Suez Canal, aquaculture or by being carried by shipping vessels.

Damage to benthic habitats: Litter in the sea damages benthic habitats in many ways - abrasion of coral reefs from fishing gear, disturbance and disruption of colonies, decreased oxygenation in the sediment layer or ‘smothering’ of benthic communities, etc.

Damage to coastal habitats: Heavy machinery often used to remove litter items from beaches can damage shore habitats.





Materials and Equipment

For Task C a set of common marine litter items will be needed including foam or plastic utensils, fishing nets, fishing line or rope, plastic bottle lids, plastic bags, plastic bottle rings (from beneath the lid), a wooden box or crate, cigarette butts, balloons, lighters, paper cups, a ribbon, a metal or plastic pipe, a car tyre, etc.

Instructions step by step

TASK A

An essay on..... (latin name) or (common name)

In pairs, learners select an animal dependent on the marine environment. It could be a seabird, marine mammal, fish, sea turtle, etc. Learners may also chose a benthic organism such as shells, corals, sea grass, etc. They research the animal's eating habits (e.g. favourite snacks), its behaviour (e.g. is it social, curious, a fast swimmer, migratory, etc.), reproduction (when, where, how many eggs/babies does it have each time etc.), preferred habitats (e.g. likes the open sea or dwells in deep caves), and its threats (particularly those relating to marine litter).

They document their findings in the form of a brief essay which can be accompanied by photos, videos, etc.

TASK B

Make a role flash card

Based on their research findings, each group creates a short story or "underwater tale" taking on the role of their marine animal and preparing flash cards that describe their behaviours and characteristics - especially those that make them susceptible to marine litter threats such as entanglement, ingestion, etc. Learners tell their story in the first person ("I am...") as if the animal could speak.

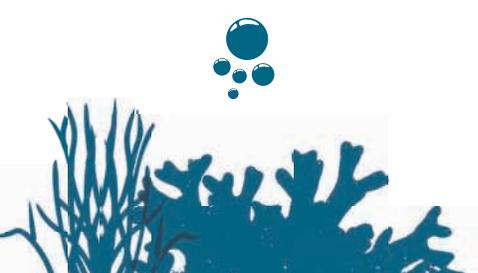
TASK C

The role card game

The educator places the litter items on the floor with learners forming a circle around them. One learner randomly picks and reads a flash card. The other learners:

- guess the animal (optional);
- take turns and pick up a litter item which poses a threat to the animal, and explain how and why the specific animal might be affected by the specific item.

Repeat the procedure for all the animals in the flash cards.





C3

KNOW
FEEL
ACT!

to Stop Marine Litter

HOW HARMFUL IS IT?

In this activity, learners estimate how harmful certain marine litter items are based on their perceptions. Learners express their personal views and work towards reaching a class consensus. They then compare these outcomes with the relevant literature on the impact of marine litter on animals and humans.

SUBJECTS

Environmental Studies, Social Studies, Language, Arts

LEARNERS' AGE

14-15 yrs

DURATION

45 min plus an additional 2 hours for Step 4

OBJECTIVES

- To be open to the views of others.
- To explore the effects of marine litter on animals, habitats, humans, vessels, etc.
- To understand that although certain types of items may have greater effects than others all marine litter items are potentially harmful.

INTERNET SOURCES

A poster that raises awareness on commonly found marine litter and its impact on animals
www.flickr.com/photos/habitatnews/3506702343/

SECTION C

EXPLORING
THE IMPACTS

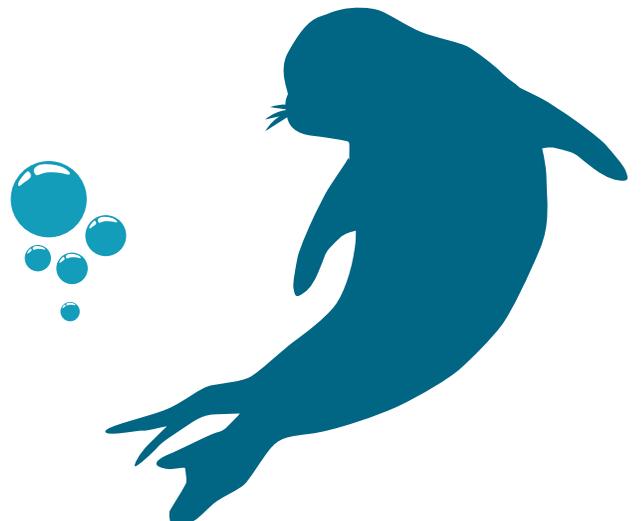
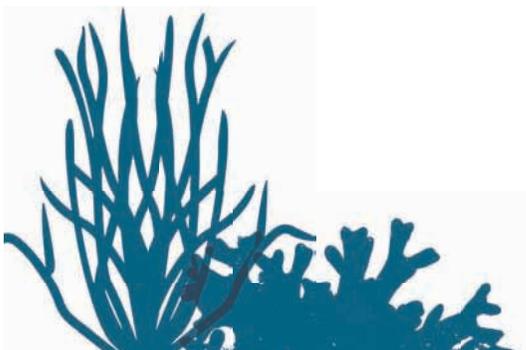




Marine litter can have serious consequences for humans

Litter on the shore or floating on water is certainly an unpleasant sight, significantly reducing the aesthetic beauty of coastal areas. As coasts become unattractive and unsafe for visitors, coastal communities can lose revenue from tourism-related activities. Coastal communities must also face costs relating to clean ups including purchasing beach-cleaning machines, hiring operational staff, etc. The cost increases considerably for communities in remote areas with difficult accessibility or that lack infrastructure such as waste bins, etc.

In addition to the expense associated with replacing it, lost fishing gear and other floating litter can cause costly or irreparable damage to boats: fishing nets can wrap around propellers, plastic sheeting and bags can clog cooling water intakes and lost nets or lines can entangle vessels. Specifically, if marine litter wraps around boat propellers or punctures their bottom the vessel can become disabled endangering the safety of those on board. This is especially serious when power is lost in a storm and the boat cannot return to shore or when steering is hampered. The ghost nets can even affect submarines' navigation and surfacing.



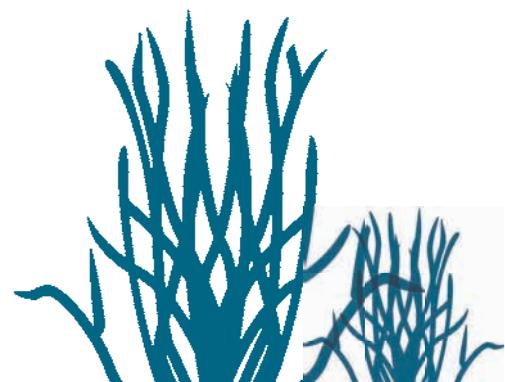


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to Stop Marine Litter

Ghost fishing caused by abandoned or lost fishing nets, eventually traps and kills countless fish that neither reach the market nor release spawn to sustain the next generation. This ongoing loss of marine life impacts on populations of commercial and non-commercial species. *Ghost fishing* can also alter species diversity including their number and relative abundance in a community. Marine ecological communities are similar to terrestrial communities, both complex and fragile. Whenever marine litter impacts on how ecosystems function and compromises the services they provide, people's livelihoods are ultimately affected as well.

Marine litter can also jeopardise human health and safety. Sharp objects, such as glass and rusty metal on beaches or on the seafloor, may cause injury if stepped on. Divers can also become entangled in abandoned fishing nets and lines possibly causing serious injury or even death. Contaminated litter on shores, including medical waste, poses public health hazards through disease transmission.

The actual harm of any litter item depends on its type, condition and location in the ecosystem. For instance, the abundance of certain types of litter such as bottles and cans may make people consider them as the most threatening to wildlife. Broken glass on a beach is indeed dangerous to humans but poses no serious threat on the deep sea floor. In fact, bottles and cans are potentially less harmful to wildlife as opposed to other types of litter such as fishing lines and nets. A single fishing net can continuously maim or kill wildlife, whereas hundreds of soda cans on a beach certainly compromise its beauty but are less harmful to coastal ecosystems.





Materials and Equipment

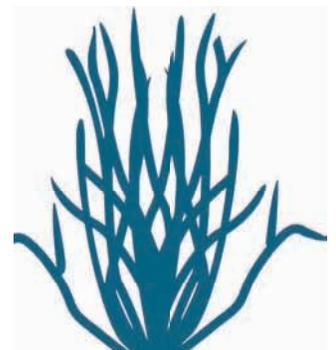
Examples of different types of litter: fishing line, fishing net, paper cup, cigarette butt, plastic bag, lobster trap, resin pellets, broken glass

Instructions step by step

1. Individually, learners complete the worksheet “How Harmful Is It?” They ask their educator for any clarifications if needed.
2. With the educator’s help, the class subtotals for each type of litter are calculated and noted on the board.
3. Learners are invited to consider how individual ratings may differ from the class average. In class, they address the following questions:
According to class results which types of marine litter are most harmful to seals? To dolphins? To sea turtles? To seagulls?
Which type(s) of litter appear to be the most harmful to animals in general?
Which type(s) types of litter appear to be the least harmful?
Are there any types of litter that few learners listed yet are still very harmful? Which ones?
What about the impact on people, vessels and habitats?
How can differences in natural conditions influence the potential harm caused by litter?
4. Learners try to find scientific articles, official reports, etc. on the impact marine litter has on animals and humans. They compare the data with the results they found in class.
How similar or different are they?
Is there any information that struck you?
Was there something that you weren’t aware of?

Extension activity

- Learners choose a litter item they consider to be a threat to marine life. They create an “anti-ad” poster – they think of a clever slogan, ways to illustrate its potential threats and discourage people from consuming or disposing of it inappropriately. They may find ideas for inspiration in activity D5.
- Learners focus on a type of marine litter and design a “Most Wanted” poster. They can include an illustration of the litter item (photo or sketch) and a list of its “crimes” (effects). They might also post a “reward” for the person that finds this type of litter and disposes of it properly.





CAN WE AFFORD MARINE LITTER?

In this activity, learners work on a given case study presenting the economic implications of marine litter and analyse these implications taking into account a list of related parameters.

SUBJECTS

Environmental Studies, Language, Political Economy

LEARNERS' AGE

14-15 yrs

DURATION

2 hours

OBJECTIVES

- To work on a case-study presenting economic impacts of marine litter.
- To analyse information around a conflicting / multidimensional issue and draw conclusions.
- To strengthen decision-making skills.

SECTION **C**

EXPLORING
THE IMPACTS





The marine environment represents significant economic value throughout the world as it sustains a diverse range of activities to surrounding communities including fishing, commercial shipping and tourism. Without question, marine litter has far-reaching economic implications that may both reduce economic benefits derived from marine and coastal activities and/or increase the associated costs. In practice, the extensive range of impacts of marine litter makes measuring the entire economic cost extremely complex. Primarily, it is easier to assess direct economic impacts such as increased cleaning costs than it is to consider the economic implications of ecosystem degradation or reduced quality of life.



CASE STUDY: **The economic impact of marine litter in the Shetland Islands, UK**

The Shetland Islands, located midway between the UK mainland and Norway, is a group of over 100 islands with a population of approximately 22,000 people living across 15 inhabited islands. With more than 2,700km of coastline, the Shetland Islands are very dependent on marine resources which are critical to the inhabitants' livelihoods. On average, marine litter costs the Shetland economy approximately €1 million every year based on the increased costs and losses affecting key industries relying on the marine environment.

Since fishing is one of Shetland's main industries, it carries the highest burden in terms of costs and losses as a result of marine litter. Lost earnings due to time spent removing marine litter from nets constitutes a relatively high proportion of these costs. This is of particular concern given the ongoing European restrictions on the number of days vessels are permitted to spend at sea.

Marine litter also presents widespread issues for Shetland's crofters mostly in terms of litter removal costs but also as regards harm to livestock and damage to property and equipment. Since many crofters in Shetland operate on a small scale, marine litter places additional strain on their time and their profit margins.





**KNOW
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ACT!**

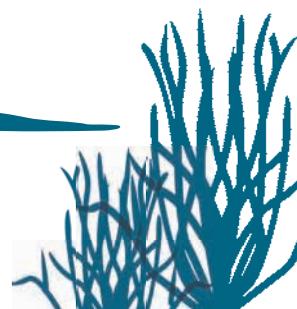
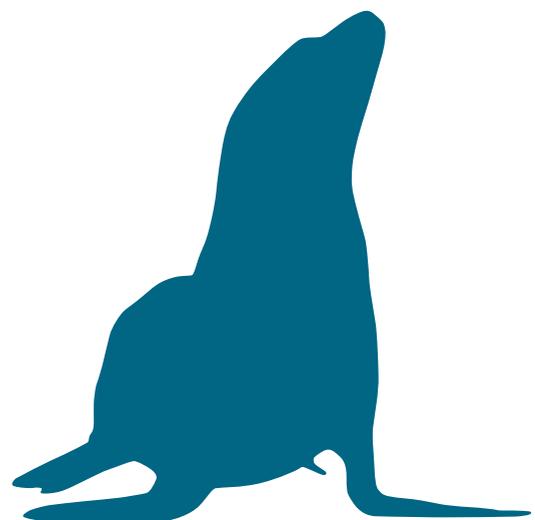
to Stop Marine Litter



The aquaculture industry experienced relatively low costs accounting for just 1.2% of the total cost of marine litter in Shetland. Similarly, the rescue services sector also experienced relatively low costs as the coastguard attended to only one vessel with a spoiled propeller during 2008. The local Power Station reported very few problems related to marine litter and incurred zero costs as a result. Unfortunately, it has been impossible to conduct a meaningful cost analysis on the financial impact of marine litter on either the tourism industry or marinas within Shetland.

****A crofter is the person who occupies and works a small landholding known as a croft (average size is around 5 hectares). Most crofts cannot support a family or give full-time employment, and most crofters have other occupations to provide the main part of their income (e.g. small-scale tourism).*

Shetland's active response to marine litter comes in the form of an annual event, *Da Voar Redd Up* (or "spring cleaning" in Shetland dialect) where volunteers remove litter from beaches and roadsides that have accumulated during the year. As the largest community clean up event in Scotland, Redd Up has been responsible for the removal of well over 1.000 tonnes of litter and has received numerous awards including the UN Dubai International Award for Best Practice to Improve the Living Environment. During the 2009 Redd Up volunteers spent over 8.250 hours removing a total of 65 tonnes of marine litter from around Shetland. The cost of running the event that year is estimated at € 55.000 based on the value of volunteers' time and a small donation from a private company to cover operational costs. This figure is likely underestimated for the total cost of the Redd Up as it does not include a contribution from the Shetland Amenity Trust, which organises the event, nor the disposal cost of the litter collected, which is covered by the Shetland Islands Council.





Materials and Equipment

Notebooks and pens

Instructions step by step

1. In groups of four, learners read the case study on the economic impacts of marine litter in the Shetland Islands in the UK.
2. Learners assume they are working for the local government of the Shetland Islands. The issue of marine litter and particularly the economical impacts is currently on the government's agenda for discussion and possible action in the coming months. They have been asked by their 'supervisor' to brief him/her on the topic.
3. They read through the "Issue Analysis Questions" and discuss any concepts they do not understand.
4. Learners select half of the questions from the "Issue Analysis Questions" list they consider as most important regarding the impact and cost of marine litter. In groups they discuss their replies to these questions and prepare a one-page brief with their arguments. Their 'supervisor' will rely on these briefs in order to prepare for the municipality meeting.

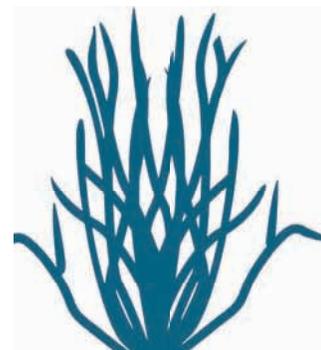
Are there any popular questions that were selected by most of the groups?

5. The educator collects the completed assignments and informs the class on the questions learners considered to be the most important regarding the issue of marine litter.
6. A class discussion is held on why learners identified the specific questions as being the most important and on the arguments they have developed.



Extension

Role playing the municipality meeting: A debate is held in class where the learners present and defend the positions of the community member they represent.





POLICY TOOLS TO FIGHT MARINE LITTER

In this activity, learners are introduced to international efforts focused on fighting marine litter and pollution in general. They conduct research on major policy tools for the protection of the Regional Seas of Europe and study basic information including the aims of conventions and strategies, involved countries, targeted ecosystems, milestones and activities.

SUBJECTS

Social Studies, Language, Environmental Studies

LEARNERS' AGE

14-15 yrs

DURATION

90 minutes

OBJECTIVES

- To be aware of EU and regional policies and initiatives related to tackling marine litter.
- To understand marine litter is an issue of transnational concern.

INTERNET SOURCES

Marine Strategy Framework Directive (MSFD): <http://ec.europa.eu/environment/water/marine>
Barcelona Convention: www.unepmap.org Bucharest Convention: www.blacksea-commission.org
Helsinki Convention: www.helcom.fi OSPAR Convention: www.ospar.org
MARPOL Convention: www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-%28MARPOL%29.aspx
Basel Convention: www.basel.int
UNCLOS Convention: www.un.org/depts/los/convention_agreements/convention_overview_convention.htm

SECTION **D**

WORKING TOWARD
SOLUTIONS



Suitable laws are critical tools that can be used to tackle the issue of marine litter. Given the problem's global nature, international regulations are essential. The legal frameworks in force which address sea and land-based sources of marine litter are many and detailed. Yet they are complex and overlapping, covering global, regional, national and local levels. Despite the plethora of policy tools, enforcement remains a challenge...

At the EU level

The EU Marine Strategy Framework Directive (MSFD)
This Directive, adopted in 2008, is a key legal instrument providing a platform for Europe-wide action to tackle marine litter. It aims to protect the marine environment more effectively across Europe and achieve good environmental status of its marine waters by 2020. Member States are called upon to develop their own marine policy strategy in relation to eleven "descriptors" (one for marine litter). The strategy must contain (a) a detailed assessment on the state of the environment, (b) a definition of "good environmental status" and, (c) clear environmental targets and monitoring programmes. In 2012, Member States assessed their marine environment, identified the main pressures, and set targets and monitoring indicators. By 2015, they must develop a set of measures. To reach the 2020 target, a coherent, coordinated approach along with the involvement of neighbouring countries will be necessary. Within MSFD a technical Working Group on marine litter was formed in 2010 whose role is to support Member States in dealing with it. This Group has carried out a marine litter status review, considering its sources, trends and impacts.

In addition to the MSFD, there are several relevant EU policy tools that pertain to marine litter such as the directives on waste, packaging, landfills, port reception facilities, water, bathing water, etc.

At the European Regional Seas level

The Barcelona Convention (Mediterranean Sea)

The Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, known as The Barcelona Convention has been adopted by 22 Mediterranean countries. The Convention was initially adopted in 1976 and amended in 1995. Over time, its initial scope widened to include planning and integrated management of the coastal region in line with the principles of Sustainable Development. The Barcelona Convention generated seven protocols that address specific environmental protection issues in the Mediterranean. The Protocol on Land Based Sources and Activities addresses the importance of dealing with the problem of marine litter, while other protocols have direct and indirect references. In 2012, a Strategic Framework for Marine Litter Management was developed followed by a legally binding Regional Action Plan on Marine Litter, adopted by the Contracting Parties in 2013.

The Bucharest Convention (Black Sea)

The Convention on the Protection of the Black Sea against pollution was signed in Bucharest in 1992 and adopted in 1994 with six Contracting Parties. The Bucharest Convention aims to fight pollution from land-based sources and maritime transport, achieve sustainable management of marine life resources and pursue sustainable development. The Convention includes three Protocols on pollution from land-based sources, dumping waste and accidents from oil spills. Since the issue is neither widely-accepted nor well known in the Black Sea region, there are still no specific legal instruments on marine litter management. The recent, not yet enforced, "Protocol on the Protection of the Marine Environment of the Black Sea from Land-Based Sources and Activities" is of great importance as marine litter is listed as hazardous material.

The Helsinki Convention (Baltic Sea)

In 1974, a single convention signed by all riparian countries addressed all sources of pollution around the Baltic Sea. The Helsinki Convention for the Protection of the Marine Environment of the Baltic Sea Area entered into force in 1980. In light of political changes that were taking place in Europe at the time, an updated version was signed in 1992 by all Baltic Sea states and the European Community, and was adopted in 2000. The Convention aims to reduce pollution released through rivers, estuaries, outfalls and pipelines, dumping and shipping operations as well as through airborne pollutants. The Contracting Parties have adopted several recommendations for the protection of the marine environment, directly and indirectly relevant to marine litter. Until recently, marine litter was not considered a major problem in the Baltic due to the lack of comparable studies and reliable data but it has since become a question of growing concern, steadily gaining momentum.





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The OSPAR Convention (North-East Atlantic)

The OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic, was adopted in 1992 and entered into force in 1998. It merged and updated the Oslo Convention (1972) on dumping waste at sea and the Paris Convention (1974) on land-based sources of marine pollution. The OSPAR Convention aims at combating pollution from land-based sources, dumping, incineration and offshore sources as well as with assessing marine environment quality. OSPAR and its predecessors have a long history of addressing marine litter issues. Marine litter constitutes a key part of the Convention's monitoring and assessment programme and supports direct reduction measures through the initiative "Fishing for Litter".

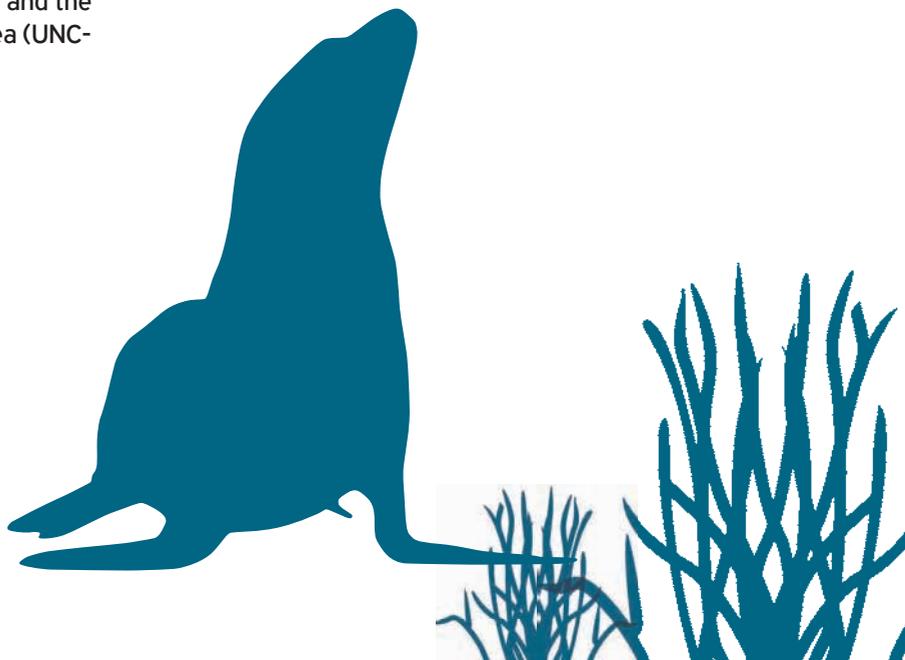
At the Global level

Numerous international conventions deal with marine litter, directly or indirectly. The International Convention for the Prevention of Pollution from Ships (MARPOL), Annex V in particular, deals specifically with preventing garbage pollution from fishing vessels, pleasure craft and commercial shipping. The London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter deals with managing all marine pollution sources. Other related conventions are The Basel Convention on the Trans-boundary Movements of Hazardous Wastes and their Disposal and the United Nations Convention on the Law of the Sea (UNCLOS) aiming at marine resource management.

How anti-smoking laws resulted in the increase of cigarette butts in the streets

The recent bans on indoor smoking in many countries have 'moved' smokers outside. Smoking in the street, in parks, in cars without ashtrays and entrances without ash receptacles has led to increased littering of butts which eventually reach the seas through storm drains and run-off. In other words, there is a gap between the degree of enforcement of laws (anti-smoking vs anti-littering) to the detriment of the environment. Apart from rectifying this, public awareness and education along with prevention strategies such as promoting portable ashtrays and installing ash receptacles at transition points, can help curb this trend.

In any case, not smoking at all is the best solution for the health of people and the environment!





Materials and Equipment

Notebooks and pens

Instructions step by step

The educator explains the different levels of governance: local, national and international.

The learners read the information presented in the text boxes and then research and identify which policy tools (strategies, Conventions, etc.) their country has signed and adopted.

In groups, learners analyse these broad policy tools and find information on the following:

- What are the general aims of the Convention/strategy? Does the Convention relate to monitoring, enforcement or both?
- What countries are involved in the Convention?
- What ecosystems are targeted: coastal, marine, benthic?
- What are the measurable targets? By when must they be reached?
- What mechanisms are in place at the regional level to monitor its implementation?

Learners focus on their country's relevant legislation, frameworks and action plans that comply with the above policy tool. They then address the following questions:

- Is there an action plan in place?
- Which authority is responsible for its implementation?
- What major activities or measures does the action plan foresee?
- Have any results been documented?

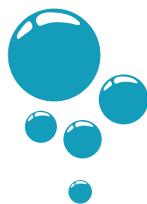
Learners raise the issue with their local and national authorities by writing a letter or conducting an interview with e.g. a mayor, a parliamentarian, etc. The following questions may be used in such an interview:

- Are you aware of the policy tools and measures in place on the issue of marine litter?
- Are you able to implement them?
- If yes, when and how? / If not, why not?
- What factors must be considered for better enforcement?
- Who should be better informed?



Extension activity

Learners carry out a small-scale survey to see whether specific target groups are aware of the Conventions the country has signed. Such target audience could include for example, beach shop owners, fishermen, port administrators, merchant ship and cruise ship staff, etc. If this audience is poorly informed, learners think of an activity they could undertake to raise awareness.





ENVISIONING THE FUTURE

In this activity learners focus on a nearby natural site -a coast, wetland, etc.- that is important to them and envision how they would like this site to be in the future. They do not only reflect on the “envisioned” (desired, ideal) future of the site, but also on their role in shaping it. With this activity learners are encouraged to take ownership and responsibility for their behaviours and actions.

SUBJECTS

Environmental Studies, Language, Arts

LEARNERS' AGE

10-15 yrs (appropriate also for younger and older)

DURATION

60 minutes

OBJECTIVES

- To identify their personal vision for an ideal future of a coast or other site.
 - To recognise similarities and differences in the visions of others.
 - To understand the difference between probable and preferred futures.
- To explore the necessary steps in order for a preferred future to become a reality.



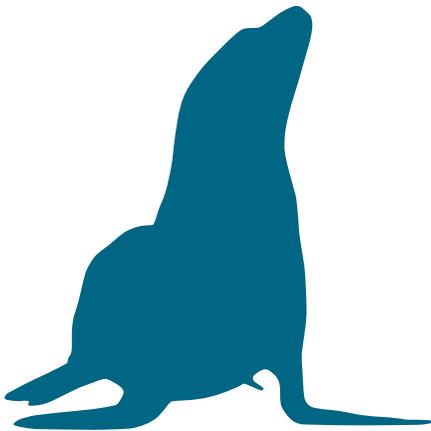


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The dooming media

All too often, we may feel disempowered by disturbing images or doomsday projections about the future. Stories about natural disasters, species extinction, human and animal suffering dominate the media. While these issues all call for urgent action, simply being informed about their existence may not instigate action or bring about change. Contrary, the media's dooming approach sometimes leads to a sense of apathy, powerlessness, guilt and pessimism which can discourage and even hinder action. In our educational practices it is important to not just focus on solving a problematic situation. It is important to strengthen and empower people so that they become agents of change, capable of creating a positive future.





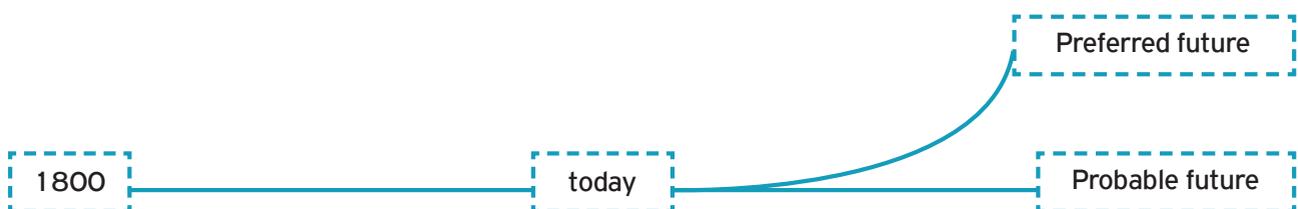
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Envisioning exercise

Envisioning exercises help us imagine our possible (“business as usual” model) as opposed to our preferred (“ideal”) futures and discover beliefs and assumptions that drive our visions. Here is an example of an envisioning exercise.

Learners draw the evolution of a common, familiar site by integrating three milestones:

- Its status in 1800
- Its status today
- Its preferable vs. its probable future: Learners explain how these two might differ and how to move from a likely future to a preferred one.





Materials and Equipment

Blindfold for each learner
Coloured crayons
Notebooks and pens

Instructions step by step

STEP 1: Individually

On their own, each learner thinks of a natural site they are familiar with – it can be a nearby beach, wetland, riverbank or even neighbourhood park but it should be a place that is important to people’s lives.

Learners find a quiet space indoors or preferably outdoors. They each put on a blindfold and quietly let their thoughts and worries of the day drift away. Their task is to imagine ... what would the sustainable future be for this specific site?

Each learner then draws their vision on the back of the Worksheet taking time to reflect on what has influenced their drawing. On their own, they think of 3 words associated with their envisaged future site.

Then they note any actions they currently undertake or can take in the future to arrive at their envisioned future.

STEP 2: In pairs

Learners form pairs and present their drawing and vision to their partner. They discuss how their visions are similar and how they are different. They then try to guess the 3 words their partner used to describe his/her vision. They also discuss the actions they currently undertake or can take in the future as individuals to arrive at their envisioned future.

STEP 3: In class

In a class discussion, learners exchange and communicate their visions with peers. They share their drawings with each other and see if there is a common, shared vision for all the sites they have identified. If so, what are the common, key elements? Are there any challenges in achieving the vision? How can they be overcome? As a group, learners discuss the challenges, opportunities and necessary steps to achieve the desired future. What realistic changes must take place before the “shared vision” can become a reality?





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OPPORTUNITY FOR CHANGE

In this activity, learners reflect on what may keep them from acting in a more environmentally responsible manner. They identify their reasons and personal motives and think about the best way to overcome these barriers. Afterwards, they commit to a “greener” routine for a set period of time and monitor their new habits.

SUBJECTS

Environmental Studies, Social Studies, Language, Arts

LEARNERS' AGE

14-15 yrs

DURATION

1 month

OBJECTIVES

- To think about why we may not always “do the right thing” and identify what keeps us from doing so
 - To identify what drives our habits of consumption and waste
- To consider if we are, ourselves, “resistant to change” and how we can overcome it.

SECTION D

WORKING TOWARD
SOLUTIONS

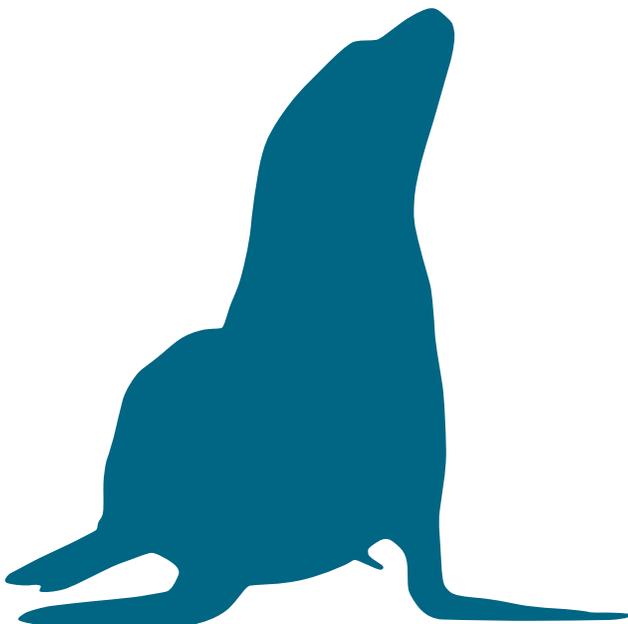




For better or for worse, human action plays a significant role on global ecology. Many of the environmental issues we face today are a direct result of human behaviours and routines. A number of solutions to these challenges will be found by changing human behaviours. In this context, many researchers have investigated the factors that influence our environmental attitudes and behaviours, and how these could be shifted towards a greener lifestyle that is more conscious, more responsible and more sustainable.

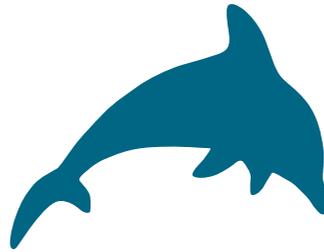


Responsible individuals lead to responsible societies. A sustainable community is in large part the result of each of its members: when members of a community use resources wisely - by recycling, for example - the community moves towards sustainability. When community members pollute less, the community becomes both healthier and more sustainable. Therefore, to promote a healthier, more sustainable future, it is essential to know how to encourage individuals to adopt corresponding lifestyles. Laws and regulations are just one tool. Education can also encourage the needed behavioural changes.





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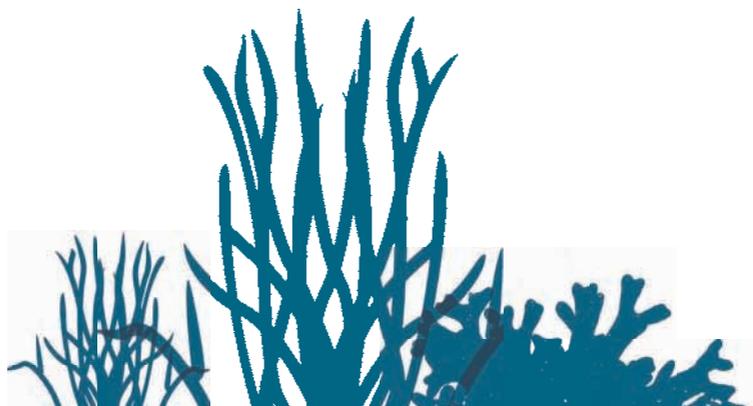


Reducing, reusing and recycling habits

Reducing, reusing and recycling are learned behaviours. The only way to make them a habit is to practice them daily at school, at home, at work, while travelling. Perhaps the household routine is the most difficult to change especially since adults are accustomed to doing things in a certain way. As young learners become used to reducing, reusing and recycling in school, they are able to take these behaviours home and encourage their families to adopt them as well.

The concept of “akrasia”

Why we sometimes are unable to do the right thing even if we know what is right, has been a central concept of philosophy since antiquity. The great Greek philosophers and particularly Aristotle examined the concept of “akrasia” derived from the Greek: “a” meaning ‘without’ and “kratos” meaning ‘power or strength’ or “the state of mind in which someone acts against their better judgement through weakness of will”. Simply put, Aristotle recognised that even though we may have the moral knowledge of the ‘right thing to do’ we may not necessarily do it. He understood that for every human action, apart from beliefs, principles and logic, feelings and passions play a decisive role in how we behave.





Materials and Equipment

A notebook or diary and a pencil

Instructions step by step



Learners think of a behaviour or habit that is connected to dealing with marine litter that they would like to exhibit but currently do not. Some examples: bringing lunch from home in a reusable container, drinking water in refillable containers, carrying their litter with them, picking up others' litter every time they go swimming, etc.

Learners need to identify their personal barriers: What stops them from exhibiting this behaviour? They list the factors that keep them from repeating the desired behaviour. For example, lack of time, convenience, the reaction of peers, etc.

Following, learners consider ways to overcome these barriers. They make a list of what they would need to change to shift towards the “greener” behaviour. For example, carrying lunch in a reusable container would require e.g. cooking more, or devoting sometime in the morning to prepare it, etc.

EXAMPLES OF MONTHLY CHALLENGES:

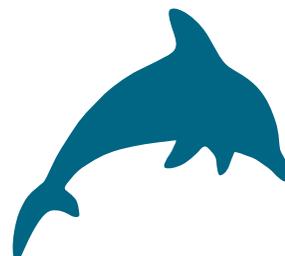
- For one month I will not purchase any bottled water!
- All of next month I will carry my lunch in nothing but reusable containers!

They are free to decide whether they share these insights in class.

Learners consider making a decision to overcome these barriers and then consciously practice the “greener” behaviour over a certain period time – a month, for example. They commit themselves to the new behaviour and reflect on their emotional response to it by keeping a diary.

Younger learners may decide to monitor their progress in practicing a new ‘green’ habit by keeping a monthly calendar on the classroom wall with all their names included. They record their daily green behaviour by getting a stamp or sticker, or by drawing a green happy face on the days they are successful. The calendar also functions as a snapshot of the daily progress of the class as a whole.

At the end of the month, learners decide whether their new habit will become part of their routine or if they will fall back to their previous less green lifestyle. Whatever they decide, self-observation of their behaviours and actions over a month may give them deeper insight into how they behave and why.





JOINT ACTION

In this activity learners organise a clean up project in their local area in collaboration with the municipal or state agency responsible for the site. Learners will 'adopt' this site and seek to inform the local community on the impact of marine litter and how to keep the site clean.

SUBJECTS

Environmental Studies, Maths, Language, Arts

LEARNERS' AGE

12-15 yrs

DURATION

1 week

OBJECTIVES

- To participate in a clean up (a beach, river, wetland, etc.).
- To work collaboratively for a common cause.
- To stimulate creativity.

INTERNET SOURCES

International Coastal Cleanup (ICC): www.oceanconservancy.org/our-work/international-coastal-cleanup

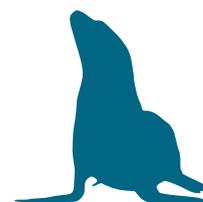
Clean Up the World Campaign: www.cleanuptheworld.org/en/

Clean Up the Mediterranean: www.facebook.com/pages/Clean-Up-The-Med/288531951267566?ref=hl

European Clean-Up Day: www.lets-clean-up-europe.eu

SECTION **D**

WORKING TOWARD
SOLUTIONS





Regional, national and local authorities, industry groups and civil society organisations are stepping up their efforts in combating marine litter. Individual initiative, however, is fundamental to tackling the issue. Citizens of all ages can contribute to reducing marine litter – proper waste disposal, cutting down on waste production, participating in local marine litter projects or joining forces with NGOs are all good ways to help.

There are direct connections between individual behaviours and environmental impacts. For example, a candy wrapper that is tossed in the street can easily be washed into a storm sewer and carried out to the sea. Since prevention is the simplest, most effective way to reduce marine litter, as individuals we can begin by examining our own behaviours and actions including thinking about how much waste we generate and where it all ends up. To reduce the probability of waste becoming marine litter, we must ensure that we dispose of all our waste properly. When outdoors, especially at the beach or on a boat, we should take care that no litter is blown away or left behind. Practicing

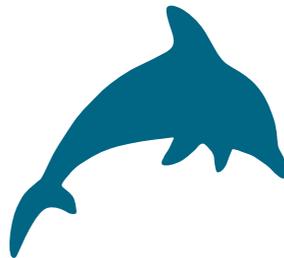
waste prevention techniques, such as reusing plastic bags and containers and recycling, is also very effective. In addition, when making purchases we should select products with minimum packaging, buy in bulk rather than in small packs and prefer products made from recycled material.

Our effectiveness can increase considerably if we work in groups, as concerned citizens, towards the common goal of tackling marine litter in our communities or region. For instance, a group of individuals, well-informed on the effects of marine litter on a nearby beach, in turn can better inform the community-at-large and organise regular clean ups. Such “adopt-a-beach” projects can be a very effective way to educate local communities on marine litter impact and prevention. Furthermore, environmental organisations are always keen on recruiting volunteers to help organise and staff their projects. By volunteering with local or international organisations that organise clean ups, we can all have the opportunity to contribute to protecting the environment and to gain direct experience in dealing with marine litter issues.





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CHECKLIST: BEFORE THE CLEAN UP ACTIVITY

Clothing

- Waterproof windbreaker or jacket (depending on weather)
- Sturdy or protective shoes
- Long pants

Items to bring

- Water (or juice without sugar)
- Sunscreen
- Hat
- Worksheets and pens (for recording and documenting)
- A first aid kit

On the site, ensure there are enough

- Gloves (gardening gloves, dishwashing gloves or disposable latex gloves as a worst-case scenario)
- Large garbage bags

What is a point of a clean up?

What is the point of a clean up when litter will only come back with the next tide? This is a question many people ask - frustrated and disheartened - when they compare the amount of waste removed after each clean up to the amount that appears on the beach over the next few days.

It is important to remember that clean up activities have many positive outcomes: organising a clean up is also about raising awareness and taking action as much as it is an effort to clean the environment. Children of all ages are usually quite active participants

in clean ups. Perhaps one of the most positive messages they receive is seeing adults (parents, friends and others) cleaning up litter; they truly start to understand that everyone has a part to play in caring for our environment. Finally, seeing the recurring amount of waste such as plastic bottles or cigarette butts collect over and over again, may result in becoming more mindful in our daily lives and hopefully, encouraging others to do the same.

Adapted from: <http://journeytotheplasticocean.wordpress.com/>





Materials and Equipment

- Large-scale map of the clean up area
- All items on the checklist
- A bucket for sharp items
- Scissors (to cut fishing line)
- A camera

Instructions step by step

As a class, learners discuss nearby familiar to them “water-sites” (coasts, lakesides, river banks, streams, etc.). They then reflect on the following questions:

- *What do you enjoy doing at these sites and what do others usually do there?*
- *Have you ever thought about animals that live in or around the body of water?*
- *Are these sites littered? Why? What kind of problems can this create for this particular site?*
- *Have you ever been informed of a clean up activity that took place near you? Have you ever participated in such an activity?*

Learners initiate a clean up for a selected site either as a class or as a school activity. They should consider the following:

- *Engage the entire school community and perhaps neighbouring schools as well.*
- *Contact the appropriate agency responsible for the site prior to the clean up. A park or beach manager may provide clean up supplies and arrange for garbage collection after the clean up.*
- *Seek to collaborate with local active NGOs experienced in conducting clean ups.*
- *Approach a local radio, TV station or news blog to promote the event and attract participants.*
- *Ask the art educator to help with a sculpture and artefacts with marine litter to exhibit at school.*

A thorough clean up requires a joint effort, good organisation and a lot of hands. Here are some tips to help increase participation.

Before setting off to the site, learners consult the checklist items to bring and communicate it to all participants. If the clean up is combined with litter monitoring, they should use the Worksheet B1.

On the site, learners form small groups and “scan” the entire area. Group members are assigned different tasks: collecting litter, holding the bag, recording data, piling bags together, etc. When they finish, they ensure the filled bags are collected and disposed of properly.

Back in the classroom, learners analyse their data and draw conclusions. They consider how people’s behaviours and actions contributed to the generation of the litter they collected and think of how it could have been prevented in the first place. For example, what could have been different? recycling, proper disposal, reduced product use, etc.





GOING PUBLIC!

In this activity, learners analyse visual messages of environmental campaigns and gain insights into how visual means are constructed to influence behaviour and decision making. Furthermore, they design and organise their own awareness-raising campaign or event in their municipality, school or local beach, etc.

SUBJECTS

Environmental Studies, Language, Arts

LEARNERS' AGE

10-15 yrs

DURATION

1 month

OBJECTIVES

- To analyse the key-elements of appealing, strong visual messages.
- To increase awareness and inspire pro-environmental behaviour in others.
- To communicate marine litter challenges and possible solutions effectively.
- To conceive, design and organise an awareness-raising campaign or event at the level of school, beach or local community.
 - To stimulate creativity.

INTERNET SOURCES

Memorable environmental campaigns in my country:



Visual messages are omnipresent in our daily life. They are constantly attempting to persuade us to buy, learn, and act. Some are more successful than others in influencing our behaviour and choices. What is the secret power of these messages? How do they succeed in changing our behaviour? In this activity we analyse

visual messages of environmental campaigns. This exercise can be helpful for anyone who wants to understand how our behaviour is influenced consciously and unconsciously by advertising, social campaigns, and government messages. Discuss what makes the following visual messages appealing.

“The most dangerous species in the Mediterranean”

The plastic demijohn
Origin: city streets, beaches and gullies.
Behaviour: can be ingested by animals, causing serious poisoning.
Average lifespan: 400-600 years.

The battery
Origin: city streets, gullies and boats.
Behaviour: the liquids they discharge are highly poisonous.
Average lifespan: thousands of years.

The condom
Origin: toilets and city streets.
Behaviour: they can be ingested by other animals and cause digestive problems.
Average lifespan: 30 years.

The plastic bottle
Origin: beaches, city streets and boats.
Behaviour: causes serious damage to marine flora and fauna.
Average lifespan: 300 to 500 years.

The carton
Origin: beaches and city streets.
Behaviour: has an abrasive effect on organisms growing on the sea bed.
Average lifespan: 25-50 years.

The paper bag
Origin: Beaches and boats.
Behaviour: has a serious effect on the digestion of certain sea creatures.
Average lifespan: 4 weeks.

The tin can:
Origin: city streets and beaches.
Behaviour: causes cuts and lesions to marine fauna and swimmers.
Average lifespan: 200-500 years.

The cigarette stub
Origin: toilets, beaches, gullies and city streets.
Behaviour: impedes the digestion of certain animals.
Average lifespan: 10 years.

The plastic ring
Origin: beaches and city streets.
Behaviour: traps marine organisms causing serious injuries or death.
Average lifespan: 450 years.

Diesel and engine oil
Origin: boats.
Behaviour: its toxicity destroys the marine habitat wherever it reaches.
Average lifespan: depends on the amount discharged.

The bottle cap
Origin: city streets beaches and boats.
Behaviour: causes digestive problems to marine fauna.
Average lifespan: 300 years.

The plastic bag
Origin: city streets, beaches and boats.
Behaviour: as it resembles jelly fish, it is eaten by other animals and poisons them.
Average lifespan: 35-60 years.

Pieces of plastic
Origin: factories and city streets.
Behaviour: can be eaten by other animals and poisons them.
Average lifespan: hundreds of years depending on the quantity.

The glass bottle
Origin: city streets, beaches and boats.
Behaviour: causes cuts and serious injuries to swimmers and marine fauna.
Average lifespan: thousands of years.

The aluminium foil lid
Origin: beaches and boats.
Behaviour: has an abrasive effect on organisms growing on the seabed.
Average lifespan: 10 years.

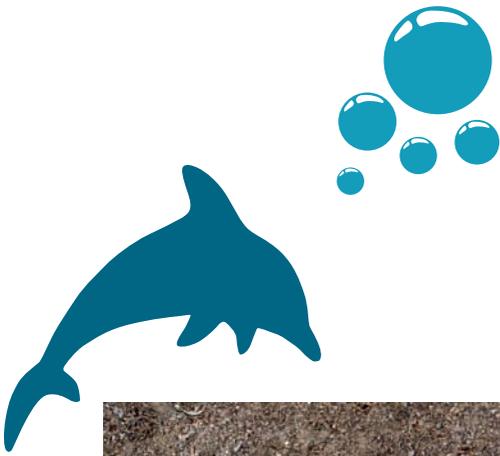
The food wrapper
Origin: beaches and city streets.
Behaviour: causes serious damage to marine flora and fauna.
Average lifespan: 20-30 years.

Aluminium foil
Origin: beaches, streets and gullies
Behaviour: can envelop certain organisms and prevent them from feeding.
Average lifespan: 5 years.

The sanitary pad
Origin: beaches, toilets and boats.
Behaviour: impedes the proper digestion of animals that ingest them.
Average lifespan: 25 years.

Around the world, 8 million tonnes of waste reach the sea every day. All this refuse is generated by human activity. This non-recyclable rubbish is thrown into the toilet, onto the streets into gullies, onto the sand and into the sea, turning it into a tangible destroyer of marine life. But you can stop this from happening.

Uncontrolled waste is a treat to the seas.



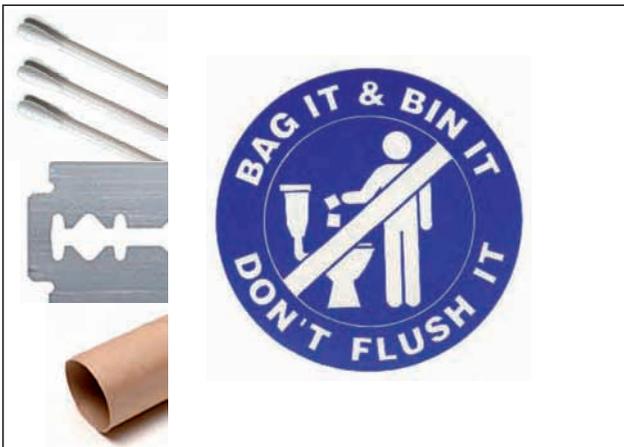
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“If you don't pick it up they will”
Endangered Wildlife Trust Campaign © Jared Osmond



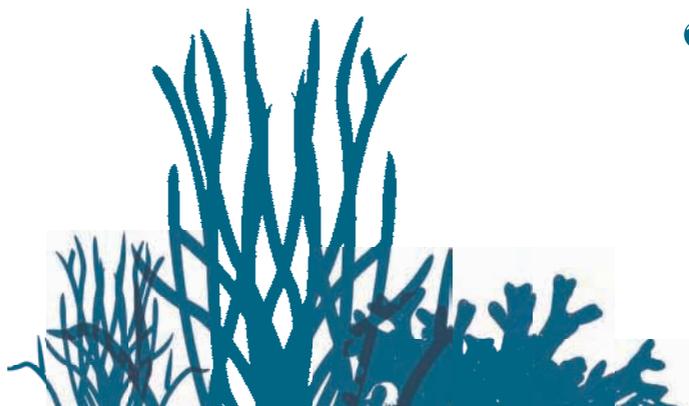
“Stop the Invasion”
2013 Campaign / Surfrider Foundation Europe



“Bag It & Bin It”
UK based campaign that encourages people not
to flush any items down the toilet



“This is litter too”
Campaign against cigarette butts litter /
Keep America Beautiful





Instructions step by step

TASK A

Learners begin by discussing their impressions of the visual messages used in the presented outreach campaigns. They note what they regard as “success factors” and try to incorporate them in their own campaign to the extent possible.

TASK B

If learners detect a low level of awareness among peers, family or the community, they may decide to create an awareness-raising campaign. Before starting, the following questions can help them to organise their work:

- Specify the goal of the campaign: Is it to present findings, to suggest ideas for action or to protest against activities that threaten the environment?
- Who is targeted? Is it your peers, other schools, your neighbourhood or the wider community? Why would the campaign’s main message be of interest or relevance to them?
- How do we approach our audience? Depending on your target group, the communication tools will vary. For a specific, immediate audience such as peers, appropriate approaches could be creating an info-board, performing a play, organising an exhibition or a presentation at school. For a campaign that aims to reach the wider community, it may be necessary to engage local authorities, NGOs, media, etc. Campaigning via social media is another popular option.
- Who is responsible for what? An awareness-raising campaign is quite a demanding endeavour. Working in small focused groups on different aspects of the campaign can increase efficiency. For example, some of the work different groups can take on are:
 - Public relations: this group contacts media, authorities, etc. Remember some media organisations may offer free space for public service issues.
 - Documentation: this group collects material to support the campaign such as scientific research findings, visual material, existing laws and legislation, etc. This material is used to prepare a press release, brochure or other informational material for the campaign. This group may also propose ideas for the campaign’s slogan. However finding the proper slogan requires brainstorming with the whole class.
 - Layout and Design: This group designs materials to be used in the campaign - posters, brochures, artwork, sketches, multimedia applications, logos, etc. that are attractive, effective and directly linked to the campaign’s slogan. Using reused and recycled materials is a priority.
 - Financial: This group prepares a campaign budget including costs for printing, promotional material, distribution, etc. Also they look into possible sources of funding either by approaching the municipality or local enterprises for support.
- How can you build on the campaign’s publicity? Often, campaigns start or end with an open, public event such as an exhibition, a festival, a performance, etc. To increase the event’s publicity you may invite a local celebrity.





IDENTIFICATION AND CLASSIFICATION OF MARINE LITTER

TASK A: GAMES

Guess it: One paragraph on:

.....
.....
.....
.....
.....
.....

20 Questions on:

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

Yes or No questions:

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

The Litter Museum

What different ways did you think of to classify/sort the litter items?

Criterion 1: By	Criterion 4: By
Criterion 2: By	Criterion 5: By
Criterion 3: By	Add any other classification criteria you thought of

TASK B: Looking for a definition

Litter can be defined as:

.....
.....
.....
.....

Synonyms for litter:

.....
.....
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Marine litter can be defined as:

.....
.....
.....
.....

Write a sentence using the term Marine Litter:

.....
.....
.....
.....

The 1' Evaluation Box

The most interesting part of the activity:

The least interesting part of the activity:

Something that I found difficult during the activity:

An insight I had during the activity:



a2 KNOW
FEEL
ACT!
to Stop Marine Litter

WORKSHEET

**EXPERIMENTING
WITH LITTER ITEMS**

Experiments A & B

	Item	Material	Blown around by the wind? (A)	Floats or sinks? (B)	Drifts around on the water? (B Extension activity)	Moved by sprinkled water? (B Extension activity)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Experiment C

	Item	Week 1 (description)	Week 2 (description)	Week 3 (description)	Week 4 (description)	Week 5 (description)	Week 6 (description)	Week 7 (description)	Week 8 (description)
1	(in water)								
	(in a box)								
2									
3									
4									
5									

The 1' Evaluation Box

The most interesting part of the activity:

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Something that I found difficult during the activity:

An insight I had during the activity:



a3

**KNOW
FEEL
ACT!**
to Stop Marine Litter

WORKSHEET

TRACKING MARINE LITTER

TASK A

Look at the diagram of the fictional coastal town. List potential sources of marine litter (hotspots).
Do some of these hotspots also exist in your area? Are there other potential marine litter sources?

- Hotspot:

TASK B

Draw on the back side the outline of a coast that is close to where you live
and identify possible sources of marine litter (hotspots).
In a few lines present the thinking behind your choices.

.....

.....

.....

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.....

The 1' Evaluation Box

- The most interesting part of the activity:
- The least interesting part of the activity:
- Something that I found difficult during the activity:
- An insight I had during the activity:

Diagram of a coastal area that is close to where I live





GUESSING THE TOP 10

Guess the top 3 litter items most commonly found on a beach (in number of items):

1..... 2..... 3.....

LIST A Top 10 list of your guesses (based on group work)	LIST B Top 10 list from sources (national, international, etc.) Source:	LIST C (optional) Top 10 list from past years Year: Source:	LIST D Top 10 list from your clean up Beach: Date:
1.	1.	1.	1. (No.)
2.	2.	2.	2.
3.	3.	3.	3.
4.	4.	4.	4.
5.	5.	5.	5.
6.	6.	6.	6.
7.	7.	7.	7.
8.	8.	8.	8.
9.	9.	9.	9.
10.	10.	10.	10.

What are the similarities in the lists? How do they differ? Explain.

The 1' Evaluation Box

The most interesting part of the activity:

The least interesting part of the activity:

Something that I found difficult during the activity:

An insight I had during the activity:

SECTION B

LAND & SEA BASED SOURCES



b1 KNOW FEEL ACT!
to Stop Marine Litter

WORKSHEET
Based on Ocean Conservancy
Data Form

SEEING THE UNSEEN

Ocean and waterway litter ranks as one of the most serious pollution problems on our planet, threatening human health, wildlife, communities and economies around the world. Marine litter is entirely preventable, and data volunteers collect are part of the solution. The International Coastal Cleanup (ICC) is the world's largest volunteer effort on behalf of ocean and waterway health.

HERE IS HOW ICC WORKS



1 CLEAN UP TRASH & COLLECT DATA



2 ORGANISE & ANALYSE DATA



3 PUBLISH RESULTS



4 REDUCE OUR IMPACT

SITE INFORMATION:

Date:
Cleanup Site Name:
State or Province:
Country:

NUMBER OF VOLUNTEERS WORKING ON THIS CARD:

Youth & adults:
Children (under 12):

TYPE OF CLEANUP:

Land Underwater Watercraft

CLEANUP SUMMARY (circle units)

Number of trash bags filled: Weight of litter collected: lbs/kgs Distance cleaned: miles/km

The 1' Evaluation Box

The most interesting part of the activity:
The least interesting part of the activity:
Something that I found difficult during the activity:
An insight I had during the activity:

Data Form of Litter Collected

Citizen scientist: Pick up and record all items you find below. No matter how small the items, the data you collect are important for scientists who monitor marine litter.

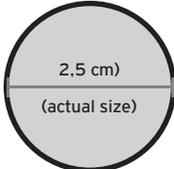
EXAMPLE: Plastic Bags: = 8	TOTAL # ↓	Please DO NOT use words or check marks. Only numbers are useful data.
--	--------------	--

MOST LIKELY TO FIND ITEMS:		TOTAL #
Cigarette Butts:	=	=
Food Wrappers (candy, chips, etc.):	=	=
Take Out/Away Containers (Plastic):	=	=
Take Out/Away Containers (Foam):	=	=
Bottle Caps (Plastic):	=	=
Bottle Caps (Metal):	=	=
Lids (Plastic) :	=	=
Straws/Stirrers:	=	=
Forks, Knives, Spoons:	=	=
Beverage Bottles (Plastic):	=	=
Beverage Bottles (Glass):	=	=
Beverage Cans:	=	=
Grocery Bags (Plastic):	=	=
Other Plastic Bags:	=	=
Paper Bags:	=	=
Cups & Plates (Paper):	=	=
Cups & Plates (Plastic):	=	=
Cups & Plates (Foam):	=	=

FISHING GEAR:	TOTAL #	PACKAGING MATERIALS:	TOTAL #
Fishing Buoys, Pots & Traps:	=	6-Pack Holders:	=
Fishing Net & Pieces:	=	Other Plastic/Foam Packaging:	=
Fishing Line (1 yard/meter = 1 piece):	=	Other Plastic Bottles (oil, bleach, etc.):	=
Rope (1 yard/meter = 1 piece):	=	Strapping Bands:	=
	=	Tobacco Packaging/Wrap:	=

OTHER TRASH:	TOTAL #	PERSONAL HYGIENE:	TOTAL #
Appliances (refrigerators, washers, etc.):	=	Condoms:	=
Balloons:	=	Diapers:	=
Cigar Tips:	=	Syringes:	=
Cigarette Lighters:	=	Tampons/Tampon Applicators:	=
Construction Materials:	=		=
Fireworks:	=		=
Tires:	=		=

TINY TRASH LESS THAN 2.5CM:	TOTAL #
Foam Pieces:	=
Glass Pieces:	=
Plastic Pieces:	=



DEAD/INJURED ANIMAL	STATUS	ENTANGLED	TYPE OF ENTANGLEMENT ITEM
	Dead or injured	Yes or No	

ITEMS OF LOCAL CONCERN:
1. _____ 2. _____ 3. _____

MOST UNUSUAL ITEM COLLECTED:
<input style="width: 100%; border: none; border-bottom: 1px solid black;" type="text"/>

Please return this form to your country or area coordinator. If you are unable to do so, email it to cleanup@oceanconservancy.org





WORKSHEET

**DIVING DEEPER:
CRITICAL THINKING
& MEDIA LITERACY**

1. What is the key issue at stake? What is the problem?

.....
.....
.....

2. Who are the main actors / involved in this situation?

What is their behaviour and interests as regards the beach in question?

What are their interests and values?

.....
.....
.....

3. Can the specific case be linked to other local or global issues at stake?

.....
.....
.....

4. Based on your analysis and group discussions what do you believe are the main causes of the marine litter issue?

.....
.....
.....

5. What are the consequences?

.....
.....
.....

6. How do you think the problem can be solved?

.....
.....
.....

7. What can you do as an individual and as a class to address the problem?

.....
.....
.....

8. Distinguish the facts from the views of the author. How do they differ?

.....
.....
.....

9. Suggest an alternative title for the article.

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The 1' Evaluation Box

The most interesting part of the activity:

The least interesting part of the activity:

Something that I found difficult during the activity:

An insight I had during the activity:



SECTION B

LAND & SEA BASED SOURCES

b4

**KNOW
FEEL
ACT!**
to Stop Marine Litter

**SAMPLE
SURVEY
QUESTIONNAIRE**

TAKING INVENTORY OF OUR HABITS

1a. How often do you visit your nearest coast or riverbank?

never	annually	monthly	weekly	daily
-------	----------	---------	--------	-------

1b. When you visit the coast, how often do you notice litter?

never	rarely	sometimes	usually	always
-------	--------	-----------	---------	--------

2. A nice day at the beach has come to an end. You pack your things but you do not see any trash bin around. What do you do?

- Leave your litter on the beach; it was not so clean anyway.
- Leave your litter in a closed bag.
- Carry your litter with you until you find a bin where you can dispose it.
- Collect other litter that you find as well. Put it in your bag and take it with you.

3. In your opinion, how important are the following factors in contributing to the presence of litter on the coast and in the sea?

1: not at all 2: not very 3: somewhat 4: extremely

People's behaviour when disposing litter. For example, they leave litter on the beach, discard litter in the toilet, etc.	1	2	3	4
Lack of bins in public areas.	1	2	3	4
Single-use/throw-away nature of many products used today.	1	2	3	4
Extensive use of plastic material in everyday products and packaging.	1	2	3	4
Behaviour of coastal industries (e.g. fishermen, restaurateurs, tourist centres).	1	2	3	4
Lack of enforcement of waste disposal management.	1	2	3	4
Losses during product or waste transportation.	1	2	3	4

4. To what extent do you agree with the following?

1: not at all 2: not very 3: somewhat 4: extremely

The oceans are so large, it is unlikely that marine litter will cause lasting damage.	1	2	3	4
Marine litter is only a problem for coastal communities.	1	2	3	4
I am very concerned about the impact of marine litter.	1	2	3	4

5. How willing are you to:

1: not at all 2: not very 3: somewhat 4: extremely

Opt for re-usable, rather than single use “disposable”, non-biodegradable products (i.e. cups, utensils, plates, food containers, etc.).	1	2	3	4
Ask people to pick up their litter if you see them littering.	1	2	3	4
Pick up litter that you see at risk of entering the sea.	1	2	3	4

How can you make a survey questionnaire? Here are some tips for formulating questions.

- Avoid lengthy questionnaires. No more than 1-2 pages.
- Open-ended questions allow for a wide range of replies but these replies may be difficult to categorise. Closed questions, matched with a list of possible replies from which to choose, are easier to use when drawing conclusions. Ensure the list includes the most likely replies and that you haven't omitted an important option.
- Questions should have clear wording. Instructions should be stated simply.
- Keep questions as short as possible using no more than 20 words.
- Avoid words with abstract or general meanings, e.g. “*What kind of products do you consume most?*”
- People taking surveys tend to give “politically correct” answers rather than give their true opinions. Keeping the survey anonymous helps people to express themselves honestly.
- If you decide to survey people's habits and behaviours, remember you can only record their “self-reported” behaviour. This may not necessarily be the respondents' actual behaviour which can only be monitored by observation.
- Avoid questions that may make respondents feel uncomfortable or embarrassed.
- Avoid “leading” questions. For example, “*Do you agree that XXX has to be done ...*”
- Before conducting a large scale survey, give the questionnaire a trial run with peers or family members. Use their feedback to improve your questionnaire in terms of size, phrasing, etc.

c1

**KNOW
FEEL
ACT!**
to Stop Marine Litter

WORKSHEET

ALL TIED UP

Write down your feelings / reactions as you experienced being entangled by the rubber band and the bicycle tire (or while you observed your fellow learner who was entangled).

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The 1' Evaluation Box

The most interesting part of the activity:

The least interesting part of the activity:

Something that I found difficult during the activity:

An insight I had during the activity:

TASK B: Make a role flash card

Here is an example of a role card for a seabird.

In your groups and based on your research, develop a role card on the animal you chose.

(ANIMAL.....) I am

.....

(EXAMPLE: SEABIRD) I look for food in the piles of seaweed that are washed up on the beach by the waves and tides. I don't like to dive for food, but prefer to wait and prey on fish that gather due to the ocean currents. If I can, I will eat food that has already been caught in nets (why bother hunting?). I also like to eat fish eggs, which are round and clear. I like to make my nest in ... in order to ... etc.

TASK C: The role card game

Play the role card game and identify the threats posed on the animals by the litter items.

Animal	It is threatened by:	due to:
Seabird	Floating Litter	its habit to prey on fish that swim close to the surface
	Surface nets carried by trawlers	its habit to feed on fish already caught in nets
	Small litter items that are round and clear	the resemblance of this litter to fish eggs

The 1' Evaluation Box

The most interesting part of the activity:

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Something that I found difficult during the activity:

An insight I had during the activity:



C3 **KNOW
FEEL
ACT!**
to Stop Marine Litter

WORKSHEET

HOW HARMFUL IS IT?

Name: _____

Using a scale from 1 to 3, rate how harmful each type of marine litter is once it comes into contact with animals, humans, vessels and habitats (1= never or rarely harmful, 2= sometimes harmful, 3= extremely harmful)

Animals	Fishing line	Fishing net	Paper cup	Cigarette butt	Plastic bag	Lobster trap	Resin pellets	Broken glass
Crab or Lobster								
Fish								
Sea turtle								
Seagull								
Seal								
Subtotal								
Humans	Fishing line	Fishing net	Paper cup	Cigarette butt	Plastic bag	Lobster trap	Resin pellets	Broken glass
Beachgoer								
Boater								
Diver								
Fisherman								
Inhabitant								
Subtotal								

Vessels	Fishing line	Fishing net	Paper cup	Cigarette butt	Plastic bag	Lobster trap	Resin pellets	Broken glass
Motor boat								
Canoe								
Personal watercraft								
Sailboat								
Subtotal								
Natural habitats	Fishing line	Fishing Net	Paper cup	Cigarette butt	Plastic bag	Lobster trap	Resin pellets	Broken glass
Beach								
Coral reef								
Posidonia seagrass								
Marsh								
Subtotal								
	Fishing line	Fishing net	Paper cup	Cigarette butt	Plastic bag	Lobster trap	Resin pellets	Broken glass
My total ratings								
The class average								

The 1' Evaluation Box

The most interesting part of the activity:

The least interesting part of the activity:

Something that I found difficult during the activity:

An insight I had during the activity:





C4 KNOW
FEEL
ACT!
to Stop Marine Litter

WORKSHEET

CAN WE AFFORD MARINE LITTER?

Select half the questions from the following list that you consider the most important in relation to the issue you are examining. Discuss them in groups and then prepare a one-page brief for your 'supervisor' explaining your choices and arguments.

1. What are the main - past and present –causes of the issue? Physical, social, cultural, economic, etc.?
2. What is the geographical scale, the spatial distribution and the longevity of the issue?
3. What are the major risks and consequences to the natural environment?
4. What are the major risks and consequences to humans (socio-economic)?
5. Are there any groups of people that bear more responsibility than others for the problem? Who are they?
How do they choose to address the problem?
6. What are the main solutions currently implemented or proposed? Are there any solutions not yet considered?
7. What are the obstacles to these solutions?
8. What major values (economic, political, ecological, aesthetic, etc.) are involved in or infringe upon these solutions?
9. What groups of people bear the cost of these solutions?
10. Is there a need or way for costs to be “shared” by the groups identified in questions 5 and 9?
11. What is the political status of the problem? Of the solutions?
12. How is this issue connected to other issues?
13. What change can you make or have you made in your daily life to make the issue less of a problem?
14. Beyond changes in your daily life what is the next step you could take to address the issue?

Adapted from UNESCO Learning & Training Tools No 4 (2012)

d1

**KNOW
FEEL
ACT!**
to Stop Marine Litter

WORKSHEET

POLICY TOOLS TO FIGHT MARINE LITTER

International Policy Tool or Convention:

Is it legally binding? Yes / No Year of enforcement:

What are the policy tool's general aims?

.....
.....

What are the Convention' contracting parties?

.....
.....

Which ecosystems does it address - coastal, marine, benthic?

.....
.....

What are the measurable targets and by when should they be reached?

.....
.....

What mechanisms are in place to monitor its implementation?

.....
.....

In your country, does an action plan exist? Which authority is responsible for its implementation?

.....
.....

What measures does the action plan foresee? Are there any documented results?

.....
.....

Based on your readings, do you think this tool combats marine litter issues?

.....
.....

Based on your readings, do you think this tool meets its goal for effective enforcement?

.....
.....

The 1' Evaluation Box

The most interesting part of the activity:

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An insight I had during the activity:



d2 **KNOW
FEEL
ACT!**
to Stop Marine Litter

WORKSHEET

ENVISIONING THE FUTURE

STEP 1: Individually

Three words I associate with the future of the site as I envision it:

.....

An action I already undertake as an individual that may lead to my envisaged future:

.....

An action I can undertake from now on that may lead to my envisaged future:

.....

STEP 2: In pairs

What are the similarities and differences between my vision and my partner's?

.....

.....

.....

STEP 3: In class

Based on your discussions, could there be a common, shared vision at the class level? If so, briefly describe it.

What are its common, key elements? What are the challenges that must be faced to achieve it? How can they be overcome?

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The 1' Evaluation Box

The most interesting part of the activity:

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Something that I found difficult during the activity:

An insight I had during the activity:



The 1' Evaluation Box

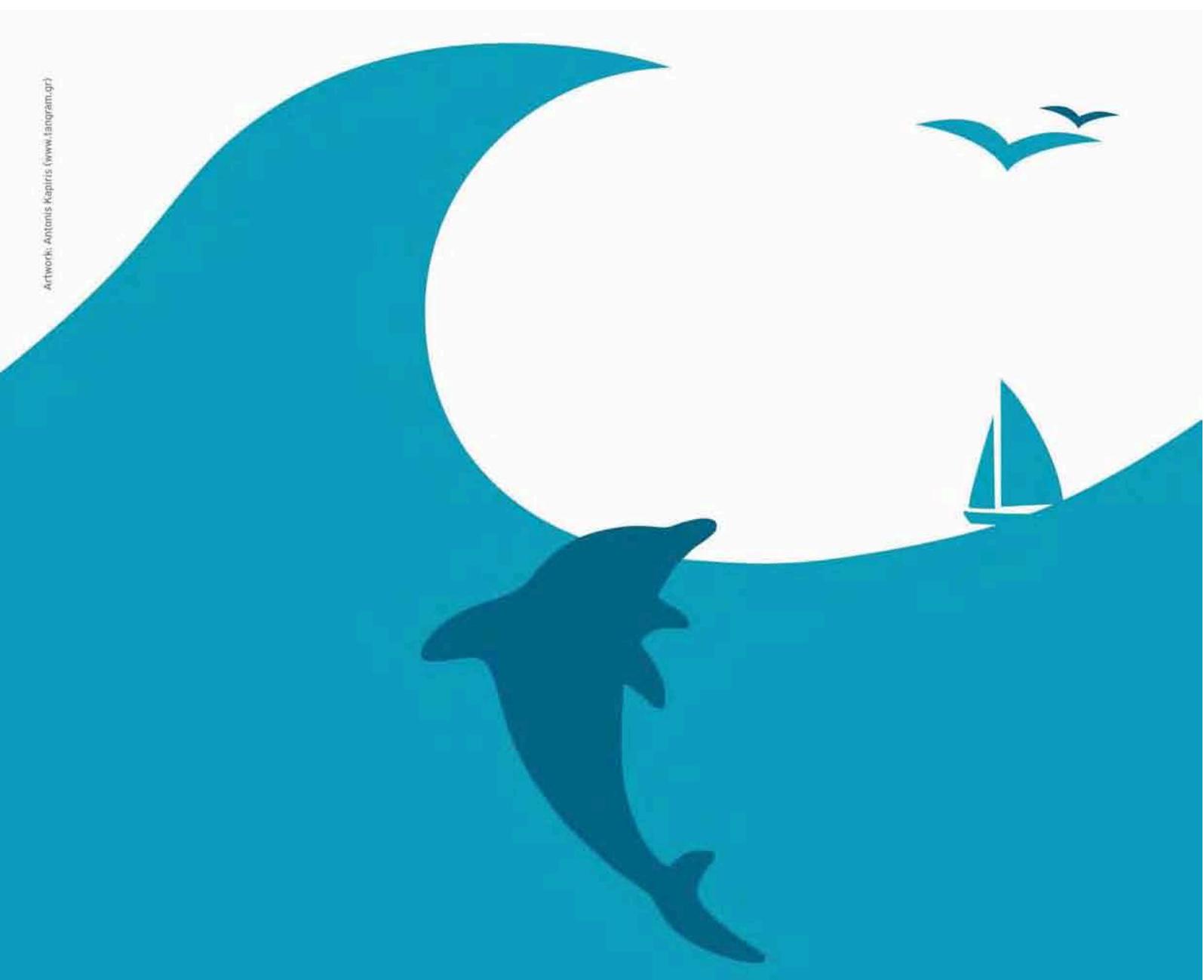
The most interesting part of the activity:

The least interesting part of the activity:

Something that I found difficult during the activity:

An insight I had during the activity:





MARine Litter In Europe Seas: Social Awareness and CO-Responsibility
www.marlisco.eu



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