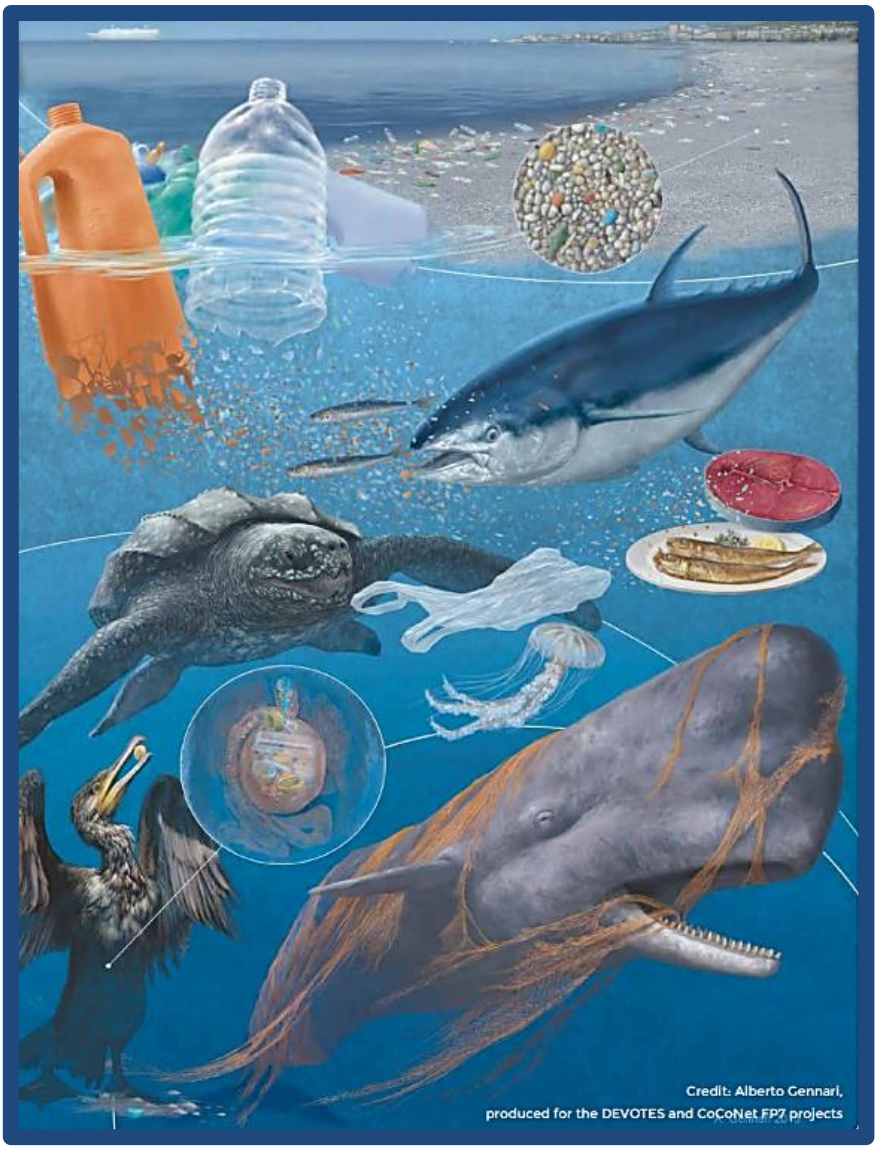
SEA CHANGE

OUR OCEAN | OUR HEALTH



Sea Change Teaching Module: Marine Pollution & Human Health

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1. Background information

The ocean makes planet Earth a habitable place to live and the marine environment is a source of vital human health benefits. Some of the invaluable benefits and services the ocean provides include:

Food: Seafood is a major food staple and protein source.

Transportation: 90% of all EU external trade is transported by sea and European ship owners control almost 40% of the world fleet.

Recreation: The benefits that can be derived from spending time around the Ocean are intangible. Marine tourism is the second most valuable world marine industry after shipping and transport.

Medicine: Biomedical products derived from marine plants and animals provide important medicinal products and health benefits.

Climate regulation: The Ocean plays a key role in climate regulation especially in buffering the effects of increasing levels of greenhouse gases, such as carbon dioxide, in the atmosphere and by moderating rising global temperatures.

Economy: Ocean-related industries provide revenue through fishing, seafood distribution, tourism, recreation and transportation. According to the EU Blue Growth programme, the "blue" economy in Europe represents 5.4 million jobs and generates a gross added value of almost €500 billion a year, with further growth possible.

The ocean is vitally important to Europe. The 28 Member States have between them the largest maritime territory in the world (approximately 3.9 million km2) and all of us depend on the ocean and its resources. Despite the importance of Europe's sea areas, their sustainable development and protection faces threats from natural and human pressures. By better understanding the relationships between us and the ocean, we will be better able to protect these precious resources.

a. Sea Change project

The Sea Change project aims to establish a fundamental "Sea Change" in the way European citizens view their relationship with the sea, by empowering them, as Ocean Literate citizens, to take direct and sustainable action towards a healthy ocean, healthy communities and ultimately a healthy planet.

Most European citizens are not aware of the full extent of the medical, economic, social, political and environmental importance of the ocean to Europe and indeed to the rest of the

world. Many of us are not aware of how our day-to-day actions can have a cumulative effect on the health of the ocean – a necessary resource that must be protected for all life on the planet Earth to exist.

Sea Change creates deeper understanding of how the health of European citizens depends on the health of our ocean, and how the health of our ocean depends on the actions of our citizens.

For more information on the project, ways in which you can get involved and resources please visit http://www.seachangeproject.eu/http://www.seachangeproject.eu/

B. Ocean Literacy

Ocean literacy is an understanding of the ocean's influence on you – and your influence on the ocean.

An ocean-literate person:

- **Understands** the importance of the ocean to humankind
- Can **communicate** about the ocean in a meaningful way
- Is able to make informed and responsible **decisions** regarding the ocean and its resources

The Seven Principles of Ocean Literacy

1. The Earth has one big ocean with many features
2. The ocean and life in the ocean shape the features of Earth
3. The ocean is a major influence on weather and climate
4. The ocean made Earth habitable
5. The ocean supports a great diversity of life and ecosystems
6. The ocean and humans are inextricably interconnected
7. The ocean is largely unexplored

C. Ocean & Human Health

Humans have altered and will continue to alter their environment, while remaining dependent upon marine ecosystems as resources of food, water and materials. Human populations are both moving to, and growing in coastal areas globally. Consequently, there is an increased reliance on, and use of, these coastal resources, ranging from fishing and aquaculture activities to desalination for drinking water and recreational use of beaches and coastal areas.

Increasing our knowledge of the connections between human health and the ocean has many public health applications, ultimately allowing us to:

- Improve our understanding of the potential public health benefits from marine and coastal ecosystems
- Reduce the burden of human disease linked with marine environmental causes
- Anticipate new threats to public health before they become serious

What do we mean by 'Ocean & Human Health'?

There is increasing recognition that the health of the ocean is inextricably linked to human health and wellbeing in a number of ways. In other words, the marine environment impacts human health. These impacts are a complex mixture of negative influences (e.g. from extreme weather events such as cyclones to water-borne illnesses and pollution) and beneficial factors (e.g. from natural products including seafood to marine renewable energy and wellbeing from interactions with coastal environments).

Humans also impact the ocean in a number of ways. Through our activities, including pollution and overfishing, as well as global climate change, we are directly and indirectly affecting the health of the ocean. This in turn has significant implications for human health, particularly if future potential medicines from the seas, as well as important sources of protein in seafood, are lost due to contamination as a result of human activity and the effects of climate change.

Considering these factors together, the study of human health and the ocean is the study of all the ways in which the ocean influences our health and wellbeing, and in turn, how we influence the health of the ocean.

2. Marine Pollution and human health

Background Information

Many of our waste products end up in the sea. This includes visible litter as well as invisible waste such as chemicals from personal care products and pharmaceuticals that we flush down our toilets and drains. Once in the sea, these pollutants can move through the ocean, endangering marine life through entanglement, ingestion and intoxication.

When we visit coastal areas, engage in activities in the sea and eat seafood, we too can be exposed to marine pollution that harms our health. We can all help to reduce marine pollution by changing our consumption patterns and reducing, reusing and recycling our waste.

Sources of Marine Litter

The sea is the final resting place for much of our litter. Common items of marine littler include cigarette butts, crisp/sweet packets, cotton bud sticks, bags and bottles.

Man-made items of debris are found in marine habitats throughout the world, from the poles to the equator, from shorelines and estuaries to remote areas of the high seas, and from the sea surface to the ocean floor.

Approximately 80% of marine litter comes from land-bases sources (e.g. though drains, sewage outfalls, industrial outfalls, direct littering) while 20% comes from marine-based activities such as illegal dumping and shipping for transport, tourism and fishing.

Plastics are estimated to represent between 60 and 80% of the total marine debris. Manufactured in abundance since the mid-20th century, most of the plastics that have been produced are still present in the environment.

The cumulative amount of plastic produced since the mid-20th century is of the order of 5 billion tons, enough to wrap the Earth in a layer of plastic wrap. The amount projected by 2050, on current trends, is about 40 billion tons, which is enough to wrap 6 layers of plastic wrap around the planet.

Source: Sea Change Factsheet "Human Health and the Ocean": http://www.seachangeproject.eu/images/SEACHANGE/Media_Centre/HumanHealthOcean_Factsheet_set.pdf

Marine Pollution – the connection to human health

Human health can be directly influenced by marine litter in the form of physical damage, e.g. injury from debris such as broken glass, medical waste or entanglement in floating or submerged debris.

Indirect health effects can be caused by chemicals, toxins or other harmful particles such as viruses or bacteria in the water. For example, medical waste (syringes, bandages, etc.) and sewage pose a public health hazard through transmission of infectious diseases.

People's livelihoods are affected by marine pollution. For example, littered beaches or polluted water does not attract tourists. Fewer tourists mean less income for coastal communities.

Plastic particles have been found in a wide variety of species including some that we eat such as bivalves (e.g. mussels), crustaceans (e.g. crabs) and fish. The risk of chemicals adhered to plastics transferring through the food web from marine organisms to humans has not yet been conclusively established and represents an important knowledge gap.

Marine Litter – a danger to marine life

Observed effects in wildlife attributed to microcontaminant exposure (a diverse class of chemicals including pharmaceuticals, pesticides and industrial chemicals) include reproductive abnormalities and behavioural effects.

All sea turtles species, 45% of all species of marine mammals, and 21% of all species of the sea birds have been affected by ingestion of or entanglement in marine debris, with plastic items being the most frequently documented.

Plastics can absorb toxins from surrounding seawater, such as pesticides and those in the class of chemicals known as Persistent Organic Pollutants (POPs). They can also release harmful constituents such as Bisphenol A (known to mimic the hormone estrogen), as they degrade. Bisphenol A is industrially used in numerous sectors and one of the most well-known effects of it is the appearance of infertility.

Because of their small size, microplastics (plastic fragments ≤ 5mm) can be ingested by a wide range of organisms. This can cause physical damage from abrasions, blockages or accumulation of toxins in organisms that can rise alarmingly in concentration along the food chain.

Your role as responsible citizens: small actions make a big difference

The best way we can help is to minimize new littler entering the marine environment.

- **Refuse:** avoid the use of any disposable plastic such as plates, cups, cutlery, bags and excessive packaging. Say no to balloon releases.
- **Rethink**: never put away garbage in the toilet (e.g. cotton swabs) or in the floor (e.g. cigarette buts). Use and refill your own water bottle.
- **Reduce**: choose products with less packaging. Better still, choose shops where you can refill your own container.
- **Reuse**: use reusable coffee mugs, water bottles and shopping bags.
- **Recycle**: separate items that can be recycled (e.g. plastic, paper, cardboard).

3. Teacher's Notes

Marine litter is a global problem affecting the ocean from the surface to the deepest point and the coastal areas. Their presence has direct consequences on the health of the ocean and its biodiversity, as well as on the economy, human health and safety. It is defined as any persistent, manufactured or processed solid material discarded, disposed or abandoned in the marine and coastal environment. Marine litter originates from different marine and terrestrial activities, and includes items brought into the sea through natural forces like river flows or

wind, as well as other drainage and sewage systems. The debris consist of different materials with distinct degradation rates. Most of the items found along the coastal line and in the ocean are made from plastic or other synthetic materials, making it a challenge to eliminate them, even more difficult in the light of the ever-growing levels of plastic production and the resistant nature of the material. However, plastics degrade over time into smaller particles due to UV exposure as well as currents and waves at sea. This secondary microplastics should be distinguished from primary microplastics, like the pellets used as raw material in the industry, the microspheres contained in hygiene products and the fibers from clothing. To help improve the marine environment we can make small changes in our daily life.

The activities proposed in this pack focus on:

1. Microplastics
2. Fibers from clothing
3. Beach cleaning & art

The aim is to help students understand the links between marine pollution and ocean and human health. The activities can be adapted to teaching pupils aged 6-14, and cover Ocean Literacy Essential Principle 6: The ocean and humans are inextricably interconnected.

Keywords: ocean literacy, marine pollution, marine litter, microplastics, toxins, contaminants, clothing fibers,

Learning Outcomes

- Recognise that the ocean is important and a source of vital health benefits
- Recognise that humans have changed the marine environment, sometimes harmfully
- Understand the importance of changing our daily life consumption options
- Understand the importance of reducing the production and consumption of plastics
- Develop the creative ability of students

The activities will give the possibility of working inside – classroom or laboratory - or outside – by the sea or the river (depending on the location of the school).

4. Resources and activities

Activity 1: What's hidden in our sand?

Backgroud information

The ocean is polluted by marine litter due to multiple activities carried out in coastal areas every day. Plastic constitute between 60-80% of the marine litter and is currently considered one of the top five marine pollution problems along with petroleum hydrocarbons, ballast water, eutrophication and others, posing a major threat to marine organisms such as fish, birds, turtles, mammals and zooplankton, mainly due to the risk of ingestion. Plastic may be carried by surface currents to sites far from their source, which has detrimental effects on ocean species and coastal ecosystems (US-EPA, 2002). About 400 marine species from around the world have been found "stuck" to tons of plastic like plastic bags and fishing nets scattered across the ocean. Microplastics are small plastic particles (≤5mm) that vary in composition (synthetic polymer), shape and colour. They are manufactured (primary microplastics) to fulfill certain functions, such as industrial abrasives, exfoliant micro-beads in personal care products or cosmetics, and pre-production plastic beads or pellets. They can also result from degradation or fragmentation of larger plastic particles (secondary microplastics) through mechanical, UV and microbial action. Microplastics also have the capacity to adsorb and concentrate contaminants, namely Persistent Organic Pollutants (POPs). Because they are often mistaken by food and ingested by zooplanctonic organisms, they represent a route of entry of persistent organic pollutants (POPs) into marine food chains, potentially impacting organisms at higher trophic levels.

Target Audience

Curricular Areas: Natural Sciences and Biology

Age group: 10-18

Aim

To discover microplastics, their origin and effects in the marine environment and raise awareness on the need to reduce the production and consumption of plastics.

Material

- 5L water bottle
- 1.5L bottle
- 0.5L bottle
- Funnel
- 1kg of kitchen salt
- Beach sand (1.5L bottle)
- Filtration glassware (i.e. Büchner flask, filtration glass, clamping device...)
- Vacuum pump with hose
- Two ~1.2µm membrane filters (1 per half 0.5L bottle)
- Stereomicroscope
- Petri Dishes
- Tweezers

Procedure

PREPARATION:

- Collect sand from the high tide line, on the shallow side, up to about 5-10cm depth to a 1.5L bottle; discard large debris, or plastics, found into adequate recycling bins (Fig. 1a).
- In the lab, prepare an ultra-concentrated saline solution in the 5L bottle: add 1kg of commercial NaCl (kitchen salt) to 3L of tap water (Fig. 1b, 1c); if there is no material for measuring 3L of water, a 1.5L bottle filled twice can be used);
- Shake well and let stand (Fig. 1d).
- Move the sand collected in the 1.5L bottle to the 5L bottle (Fig. 1e);
- Close the jug and shake vigorously 5 times for about 30 seconds each time;
- Allow the mixture to stand for about 15 minutes (Fig. 1f);
- Move the water with the particles in suspension into the 0.5L bottle;
- Prepare the filtration system (vacuum pump + filtration glassware) and place the membrane filter in place (Fig. 1g, 1h);
- Decant 250mL of the salted solution in 0.5L bottle into the filtration cup and connect the vacuum pump;
- At the end of the filtration, transfer the membrane filter to a Petri dish with the tweezers and observe with the stereomicroscope (repeat decantation and filtration steps using the water remaining in the 0.5L bottle);

- Proceed with the observation of microplastics. If desired, microplastics can also be separated into a Petri dish to simplify their counting.

Figures showing microplastics commonly found in beach sand are available in works of Possato *et al.* (2011) and Lechner *et al.* (2014).

Suggestion: students may be asked to collect and bring to the class sands from beaches under differing levels of human pressure and compare them.

EXPERIMENTAL SEQUENCE:

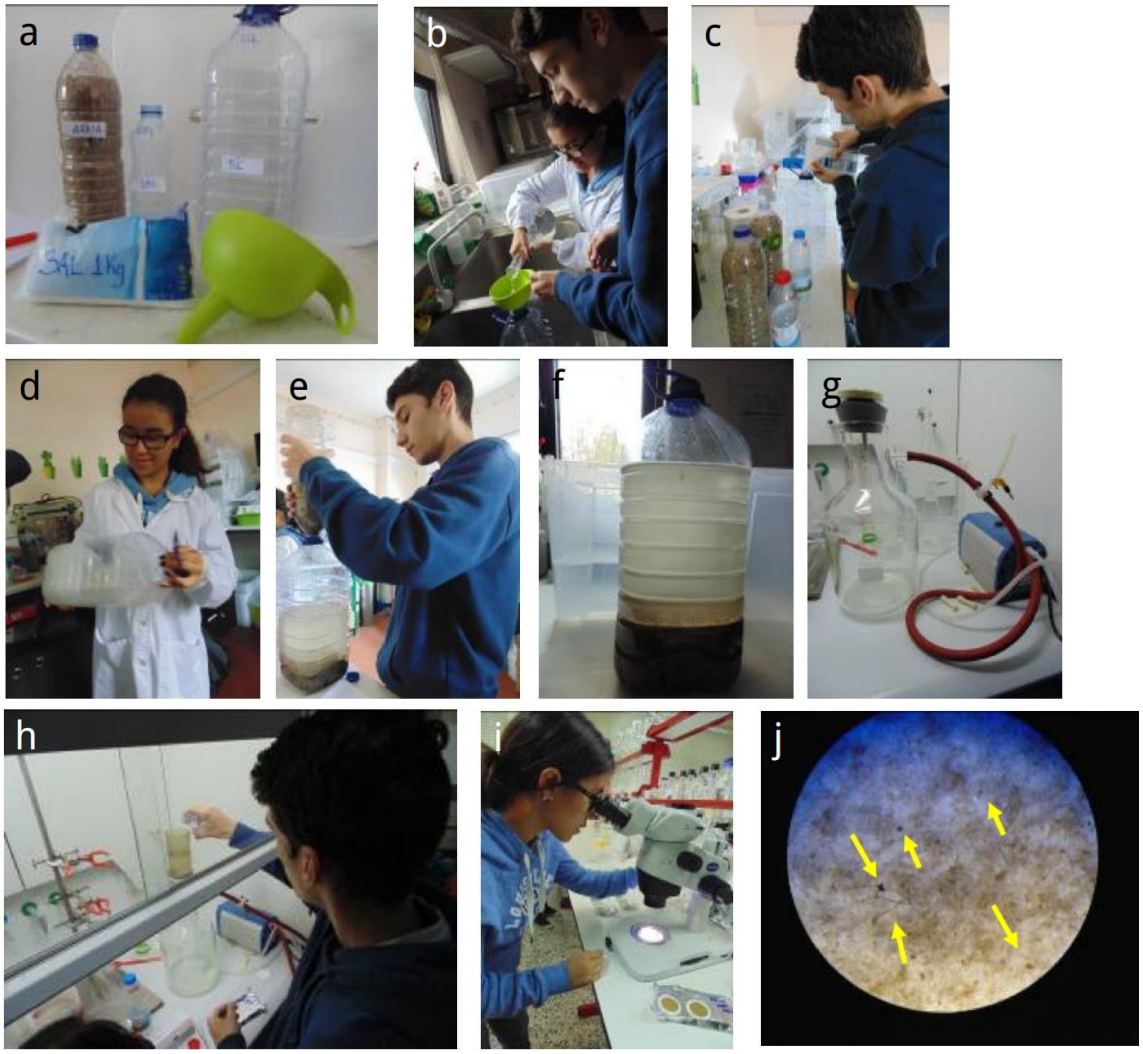

Figure 1
Steps in the experimental procedure for recovering and observation of microplastics from collected sand.

Experiment log

1. Indicate the hypothesis to be tested in this experiment.
2. What is the purpose of the NaCl used in the experiment?
3. Where were the microplastics retained when the sample was filtered?
4. Was the analysed sample contaminated with microplastics? If yes, what kind of microplastics did you find (shape, colour, etc.)?
5. Suggest three measures we should take in our daily life to avoid contamination of waters with microplastics?

ACTIVITY 2: WHAT'S HIDDEN IN OUR LAUNDRY WATER?

Background information

Multiple daily human activities carried on inland and in coastal zones directly and indirectly affect the marine ecosystem. According to the United Nations, about 80% of all litter at sea comes from land, with the plastic waste as the most representative fraction (60-95%). Besides the 8 million tons of plastic thrown into the ocean every year, more and more personal hygiene products have microplastics (a facial cleanser can have about 330 thousand of microplastics) and many pieces of clothing have polyester fibers in their composition. It has been estimated that about 1,900 plastic microfibers are released from a single synthetic cloth every time it is washed in a laundry machine. Due to its small size, microfibers are not retained in the washing machine filter and end up in the marine environment. It has also been estimated that there are about 4 billion plastic microfibers per km^2 of ocean floor.

Target audience

Curricular Area: Natural Sciences

Age group: 12-18

Aim

The purpose of this activity is to raise awareness to the problem of microplastics, in particular polyester fibers, and the consequences they have to the marine environment. This activity aims to raise awareness of the need to reduce the production and consumption of plastics, as well as

to warn about the need to change our daily activities that negatively affect the marine environment.

Material

- 1,5L bottle
- Large bucket
- Funnel
- 100% polyester clothing
- Filtration glassware (i.e. Büchner flask, filtration glass, clamping device...
- Vacuum pump with hose
- Six ~1.2µm membrane filters
- Stereomicroscop
- Petri dishes
- Tweezers
- Dissection needle
- Lighter
- Light microscope

Procedure

1. To perform this experiment it will be necessary to collect the water from the first wash of a washing machine.
2. Make sure the water outlet hose of the washing machine is in a visible and safe place (for example, inside a bucket);
3. Select 100% polyester clothes (confirm on the label of each piece of clothing). Give preference to clothes with vibrant colors to facilitate the observation of microfibers with the Stereomicroscop;
4. Wash the polyester clothes in the washing machine using the “economical” washing program. Do not use any type of detergent or soap;
5. Pay attention to the water outlet of the washing machine and, using a funnel, connect the hose to the mouth of the plastic bottle (do this in a bucket). After collecting 1.5L of water, the hose can be returned to the usual location. The water left in the bucket can be reused flushing the toilet;
6. Do not store water collected for many days (try to do the laundry the day before the experiment);

7. Before starting the filtration, close the bottle and shake it vigorously 3 times for about 5 seconds (repeat the process when necessary, the microfibers can stick to the wall of the plastic bottle);
8. Prepare the filtration system (vacuum pump + filtration glassware + clamping device) and fit the filter (for a more economical, and easy to find, option you can use round-cut coffee paper filters that fit the filter cup);
9. Turn on the vacuum pump and gradually pour the water from the bottle. Change filters whenever you feel you need;
10. At the end of each filtration, transfer the filter to a Petri dish with the tweezers and observe with the stereomicroscope;
11. The microfibers present in the filter may also be separated into categories (colors, sizes, texture) in order to facilitate their counting and logging.
12. Try to distinguish synthetic from cotton microfibers with the help of the light microscope. Polyester fibers are smooth tubes, usually translucent in their interior, with very well defined walls. Cotton fibers are flat, usually twisted, their interior may contain pigmentation and the walls have many imperfections and folds (Fig. 2).
13. To confirm you are observing a synthetic microfiber you may also do the “hot needle test”, with the help of the stereomicroscope and of an adult to manipulate the lighter or another heat source. Heat the tip of a dissection needle with a lighter (or other heat source) and place the hot needle near the fiber under analysis. If the fiber quickly curls or melts on the needle, showing the behaviour of a burning plastic, it can be considered to be a plastic rather than a cotton microfiber.

Suggestion: The same procedure can also be carried out with 100% cotton clothing thus allowing making comparisons between microfibers of natural fabrics and synthetic fabrics.

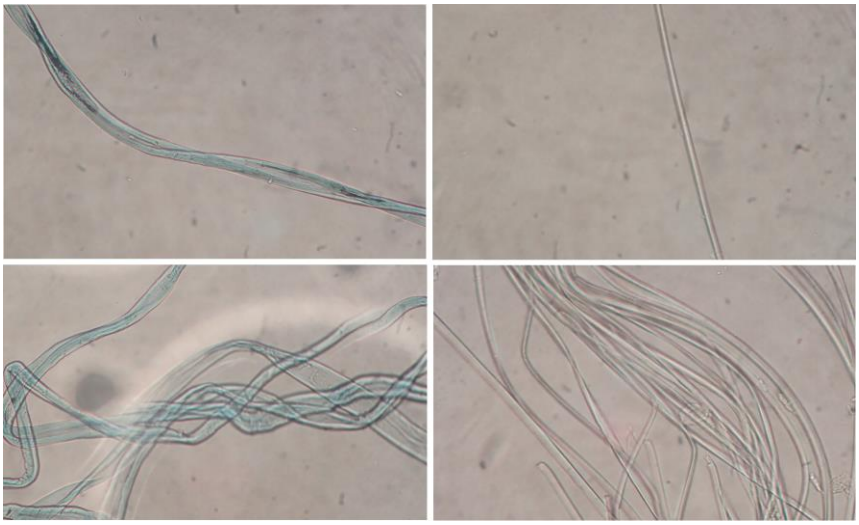

Figure 2
Cotton (left) and polyester (right) microfibers observed under the light microscope.

Experiment log

1. Indicate the hypothesis to be tested in this experiment.
2. What are microplastics?
3. Name three sources of the microplastics found in the environment.
4. Where were the microfibers retained during the filtration of the sample?
5. Is the analyzed sample contaminated with microfibers? If so, how many fibers were found in 1.5L of water.
6. Write down in the table the number of microfibers counted per color and material (polyester or cotton) in the water sample. Write the table caption.

Table 1

	Number of Microfibers	
	Polyester	**Cotton**
Color 1:		
Color 2:		
Color 3:		
Color 4:		
Color 5:		
Color 6:		
Color 7:		
Color 8:		
Total (in %)		

7. In the axes system below draw graphs for the number of polyester microfibers of each color counted in the water sample (Figure 1) and for the total relative frequency (in %) of polyester and cotton microfibers found (Figure 2). Write the captions for the X and Y axes and the graphs you have drawn.
8. What is the difference between a polyester and a cotton microfiber?
9. What type of clothing releases more fibers per liter of water?

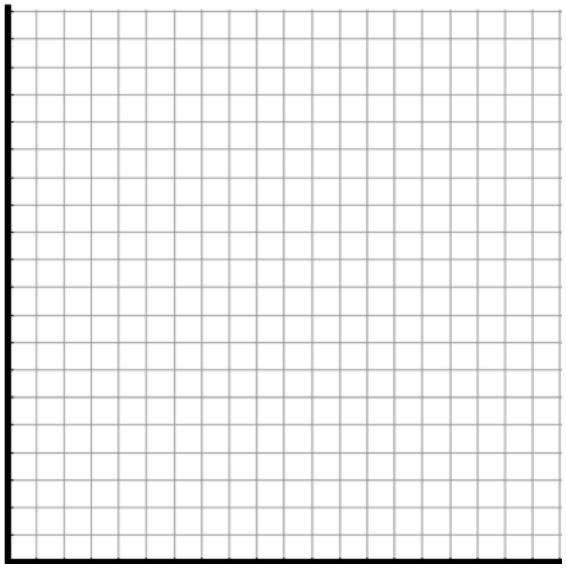

Figure 3

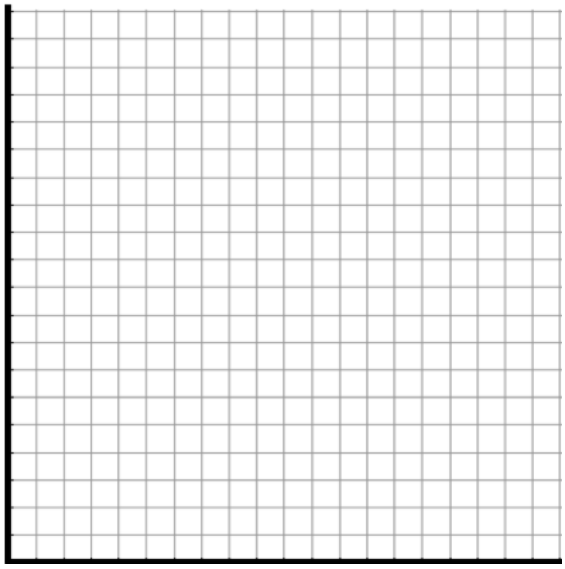

Figure 4

10. Choose five classmates and write down on the table the material with which each one's T-shirt is made of (example: polyester, cotton, nylon ...). Write down the table caption.

Table 2

Class Colleague	T-shirt Material
Colleague 1	
Colleague 2	
Colleague 3	
Colleague 4	
Colleague 5	

11. What conclusions can you draw from Table 2 regarding the use of plastic in our clothing?
12. Right now, are you wearing any clothes or have any school supplies that do not contain plastic? If yes, indicate which.
13. What measures would you propose to be taken to prevent water contamination with polyester microfibers?
14. What can you do to reduce the use of plastic in your daily life? Give two examples.

ACTIVITY 3: BEACH CLEANING

Background information

The oceans and their ecosystems contain a substantial part of our planet's biodiversity, assuming a strategic importance to Europe, both economically and socially. These waters provide different goods and services, including fishing and other extraction activities and the production of food for human consumption, use of marine organisms for biotechnology and medicine production, recreation and tourism, among many others. However, every year, thousands of tons of litter and contaminants are throw in the ocean. This is an example of a global threat that does not have a single solution that fits all, but requires an integrated approach and joint efforts between the general public and public and private institutions. Marine litter consists of a great diversity of materials, especially plastic, which is reduced in smaller pieces by the action of the sun and waves, forming the microplastics, thus making the situation more and more serious. Even if we stopped producing garbage today, the problems associated with marine litter would remain for many years.

The litter we see on the beaches is only a small percentage of all the litter that is in the marine ecosystem, because much of it is floating on the surface, or free on the water column, or deposited on the seabed. The development and implementation of this activity can cover the knowledge about the widespread decline of marine ecosystems as well as the degradation of the coastal environment. Being aware to this situation requires a behaviour change of all of us, and the improvement of the exercise of citizenship, forming more concerned and conscious adults.

Target audience

This activity has as target audience the whole school community, institutions and population in general.

Aim

With this activity, we want to improve the knowledge of the environmental situation of the European coast and to make the school community, institutions and the general public aware of the negative impacts of human activity on the coast.

Material

- Authorization of the authority responsible for the beach.
- Authorization of those responsible for the students (in case of participants under 18)
- Gloves (safety/hygiene)
- Worksheet and pencil for notes
- Durable plastic bags
- Camera
- First Aid Kit
- Water, jacket and cap
- In case of a picnic by the sea: water, juice, snack, towel and alcohol in gel
- Extract of red cabbage (to prepare as indicated in the activity "Acid or Alkaline?")
- PH Colorimetric Scale
- Sodium bicarbonate
- Vinegar
- Distilled water
- Shells of marine animals
- 2 small plastic bottles, one 30 cL and other 50 cL
- Straw or other flexible tube
- Plasticine
- Glasses
- Straw

Procedure

STAGE 1 | BEFORE THE VISIT TO THE BEACH

- Before the visit take a look at the beach where the litter will be collected, observe the amount of garbage (take some photos) and analyse if there is easy access for the participants. Define the space that will be prospected.
- See the possibility of carrying out the activity during the low tide time (especially if the beach have rocks).
- In advance request permission to the local authority responsible for the beach. Inform the local authority about the purpose of the activity, the location, the time and the number of students that will participate.
- The caretakers must sign an authorization to allow the students to go to the beach. Advise students to take water, warm clothes, appropriate shoes, cap, sunscreen, etc.
- Make a logistic list to know how to properly store, transport, and dispose the litter collected. Depending on the route the group will take, smaller, sturdy plastic bags can make it easier to transport the litter collected.
- If you want to hold a big event and need more volunteers, publicize the activity with posters, news on the social networks of the school, between the parents and class directors. Involve the entire school community. In case of gathering large numbers of people, ask the beach authority in advance to make containers available or to help transport the collected garbage.
- Create small rules for carrying out the activity, such as: divide the class into groups of 5 people, share and take turns (who will write down, hold bags, do accounting, etc.), indicate the path to be taken, the limits that must be respected, the time and the meeting point.
- Print the attached registration form (one per group) to facilitate the identification and accounting of the collected items.

STAGE 2 | DURING THE BEACH CLEANING

- Before you start the beach cleaning, explain to students the safety procedures (use gloves, carefully pick up objects, do not climb rocks, or get into holes to remove litter). Remember to have the first aid kit with you.
- Do not forget to remark the importance of doing this activity, motivate the students and capture the moment!
- Talk about the rules of the activity, divide the class into groups and distribute one registration form for each group.

- The groups should walk close to the responsible teacher or student. Each item found must be identified, counted and registered on the registration form before going into the plastic bag. Interesting items should be stored in a different plastic bag to be used in the art works at school.
- All collected litter should be separated properly (glass/plastic/metal/paper) and deposited in the nearest recycling bin. If possible try to weight the different debris. If students selected some marine litter items, this material should be stored at school for future activities.
- If the teacher has time available, the class can take snacks for a community picnic by the sea. Be careful not to leave any rubbish in the place. If some student touched any debris without gloves he should not eat before washing the hands.
- At the end of the activity teacher should gather all the groups and report the experience lived during the beach cleaning, seeking for solutions for the problem founded.

STAGE 3 | AFTER THE BEACH CLEANING

- Some suggestions for continuing this activity at school are:
    - Propose the construction of posters or sculptures with the litter selected by the students during the beach cleaning (always with gloves), or in alternative using plastic waste collected in the school bar or canteen.
    - Demonstrate, using graphs and statistics, the amount and type of litter found in the beach. Please send a resume of your results (date, location, number of participants, distance of beach cleaned, total number of collected items, number of collected item by items, total weight if measured) to the email: xxxxxxxxxx
    - If possible please also submit the data collected from your beach cleaning in the International Coastal Cleanup website (https://oceanconservancy.org/trash-free-seas/international-coastal-cleanup/start-a-cleanup/).
    - Share photos on social media networks and/or make a photo/art exhibition through the corridors, living areas or library of the school or in local community spaces.
    - Work in an interdisciplinary way, bringing the subjects of mathematics, history, geography, physics, chemistry, arts and biology to later activities related to this activity.
    - Below you find the registration form to be completed by students during the visit to the beach.

Registration Form

DATE		**BEACH AND COUNTY**
START TIME	**END TIME**	**TEAM**
SCHOOL		
TEACHER		
GROUP		

Register how many objects of each item where found:	**ITEM**	**QUANTITY**	**ITEM**	**QUANTITY**
	FISHING BUOYS		STRAWS	
	CERAMICS		PAPER	
	ROPES		IRON PIECES	
	COTTON SWABS		PLASTIC PIECES	
	POLYSTYRENE		CIGARETTE BUTTS	
	PACKAGING | FOOD		FISHING NETS	
	PACKAGING |SWEETS		PLASTIC BAGS	

	PLASTIC BOTTLE		BOTTLE COVERS	
	LIGHTER		TISSUES	
	ALUMINUM CANS		GLASS	

ARTWORK EXAMPLES

4. Additional Resources on Marine Litter from Sea Change

Infographics

Plastic in the marine environment - http://www.seachangeproject.eu/campaign/ocean-literacy-resources/plastics-in-the-marine-environment-infographic

Make a Sea Change in the kitchen with these easy steps - http://www.seachangeproject.eu/images/SEACHANGE/Infographics/SC_kitchen_V8.jpg

Make a Sea Change in the bathroom with these easy steps - http://www.seachangeproject.eu/images/SEACHANGE/Infographics/SC_bathroom_V7.jpg

Make a Sea Change in the office with these easy steps - http://www.seachangeproject.eu/images/SEACHANGE/Infographics/SC_office_V4.jpg

Make a Sea Change in the supermarket with these easy steps - http://www.seachangeproject.eu/images/SEACHANGE/Infographics/SC_supermarket-_V7.jpg

Make a Sea Change on the commute with these easy steps - http://www.seachangeproject.eu/images/SEACHANGE/Infographics/SC_-commute_V5.jpg

Make a Sea Change eating on the go with these easy steps - http://www.seachangeproject.eu/images/SEACHANGE/Infographics/SC_eating_V3.jpg

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6. CREDITS

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