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## EDUCATIONAL ACTIVITIES FOR SECONDARY SCHOOL

### WWF - Miramare Marine Protected Area

#### Guided tour of the BioMa

The visit to the Marine Biodiversity Museum “BioMa”, guided by the WWF staff of biologists and naturalists, is a real experience of discovering the marine environment and the rich biodiversity of habitats and species, both animal and plant, that characterize our sea. Walking through museum spaces set up with reef reconstructions, sections of sandy and muddy sediment, dioramas of sea grasslands, with over 150 life-size species, all enriched by immersive videos and acoustic showers to listen to the sounds of the sea, a tunnel of the sea at night with the spectacular phenomenon of bioluminescence, and a special touch tank aquarium with benthic organisms, students will be able to 'immerse themselves', while remaining strictly dry, in the entire variety of environments of the Gulf of Trieste, from the surface of the sea to its depths, among the macro to micro-organisms, animals and plants, that populate them.

Climbing the stairs leading to the first floor, a terrible plastic vortex introduces the theme of human impacts on the marine environment, with a section devoted to the age-old problem of plastic and microplastic waste dispersed in the water column, from the seabed to the surface, and to what each of us can do to reduce our footprint on fragile marine ecosystems.

#### Identifish

This educational activity offers an insight into marine organism classification through a team gameplay (Identifish) that helps to understand how structures, forms, sizes, colours and functions are related to an organism's life environment. The “Home-sweet-home” activity provides a further insight into the evolutionary meaning of structures and features associated to the different organisms.

Indoor or outdoor activity.

#### Lab on the chemical-physical parameters of seawater

During this lab, participants will learn how to study the sea world starting from the basics: with the aid of scientific instruments they will measure the most important seawater parameters, such as salinity, density, dissolved oxygen, and other relevant meteo-marine parameters, such as air temperature, atmospheric pressure and wind speed. All these data, far from cold and impersonal, will offer a new reading key to understand the marine ecosystem and its role in the life of our planet as a whole.

Indoor or outdoor activity.

#### The tidal environment

This activity takes place on the exclusive beach of Miramare MPA, that can only be visited in the presence of a WWF guide, and is focused on one of the most peculiar features of the



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Gulf of Trieste, its tidal excursion. Indeed, here you can find the most dramatic tides of the Adriatic sea, with tidal ranges that can reach one metre. Participants will comb the beach searching for animals and plants, and will identify them using easy-to-read spotting sheets. They will also collect data along a basic transect to understand how the different species have adapted to this transitional environment. Getting an insight into this fragile and precious environment will allow students to appreciate its ecological value and the importance of protecting it.

**NOTE: The activity can be carried out only in certain phases of the tidal cycle and in specific days, and for a maximum of two classes per day. Feasibility must therefore be checked by calling the Educational Activity Office.**

### Sea and garbage

This activity focuses on the environmental impacts of human garbage, reflecting on how the waste we produce is a source of pollution, affects natural cycles and food chains and has other negative effects on the ecosystem. The aim of this activity is to tackle such a relevant issue, reflecting on its causes and analyzing the strategies adopted so far to limit it. Participants will carry out field work in order to collect and classify waste found along the shore; data collected will then be analyzed, also determining the source and the average degradation time of the different types of litter. All these information will be discussed in order to identify local and global actions that should be undertaken for a more environmental friendly waste management.

### Watch out for the micro!

Through a workshop we will tackle the serious problem of marine pollution caused by insidious macro and microplastics, we will discover where they come from, what their chemical and physical characteristics are, and their potential effects on marine ecosystems and human health. In the workshop we will sift sand samples and discover how many and which microplastics are hiding there, we will try to classify them and observe them with lenses, microscopes and observe some of the processes that lead to their production and dispersion in the environment.

### It's all about benthos

Participants will find a benthic sample, specifically collected by the MPA staff for this activity, waiting for them. In this laboratory, students will turn into young researchers involved in the analysis of sea-bottom samples, searching for organisms that live burrowed in the sandy-muddy bottom. The observation of these organisms, first with bare eyes and then with the aid of a microscope, will allow to discover their main characteristics and to understand their lifestyle and ecological role.

**NOTE: the activity is subject to favourable meteo-marine conditions for the offshore collection of a benthic sample.**

### It's all about plankton



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Participants will carry out theoretical and practical activities on plankton samples collected by the MPA staff. They will observe a series of plankton samples, both live and stained, to get acquainted with these animals and plants that are at the base of the food web. Working in groups and using microscopes and spotting sheets, students will collect data on the forms, structures and habits of this diverse group of organisms, and will discuss them with the rest of the class.

**NOTE: the activity is subject to favourable meteo-marine conditions for the offshore collection of a plankton sample.**

### **Biodiversity in a “sock”**

What is a 'mussel sock'? Few people know, yet it is a fundamental part of the mussel farming process, a sustainable 'seafood' farming technique.

And what does biodiversity have to do with it? The submerged rows, where the rests float in a row, are a habitat rich in life, which we will observe thanks to a sample from the mussel farms not far from the protected area: we will discover - thanks to lenses and microscopes - a multitude of different organisms, such as serpentine stars, polychaete worms, ascidians, nudibranches, sea anemones and even sponges, which we will try to determine and classify.

### **Sea watching**

Snorkelling, also known as sea watching, is not only a summer pastime but also an educational activity that can hold many surprises. Equipped with fins, diving mask and snorkel, participants led by a qualified guide will discover the underwater MPA world along a shallow-water trail (1.5 m) winding along the rocks just a few metres offshore.

**NOTE: only in June and September.**