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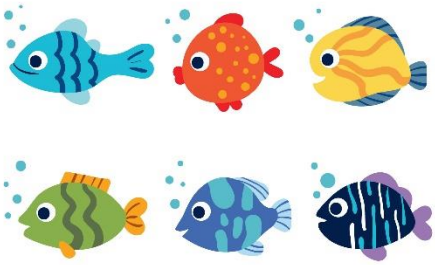
Sustainable fishing and marine environment



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Theme: **Sustainable food production**

Total duration: 20-30 hours

School subjects (proposal): Biology, Chemistry, Physics, Language, Philosophy, English, Computer Science, Civic education

Equipment/Materials: Video-projector, Cameras, voice recorder, mobile phones, drawing sheets, Organism identification keys, magnifying lenses, jars for preserving organisms, Optical Microscopes, Stereoscopes, PC

Digital tools: edtech.gr, scribble-maps, Filmora.wondershare, youtube.com, search engines, word/video editing and quizzing applications, collaborative documents

Brief description

In this unit we will try to approach the concept of sustainable fishing, the importance of seafood in a balanced and healthy diet, and the criteria based on which students should select the seafood they consume.

We will deal with the history of fishing, traditional and modern fishing methods, the risks arising from overfishing, sustainable practices and the interventions that need to be made to protect biodiversity and the quality of the marine environment.

The topic addressed here is linked to the general theme as we want our students to know the multiple health benefits of consuming seafood and on the other hand to contribute with their choices to the protection and conservation of species that are currently threatened with extinction (tuna, salmon, cod, swordfish, sole, shark owl, etc.).

The questions that will concern us are whether there are enough fish in the world's seas today to meet the demands that are growing as the world's population continues to grow rapidly.

The fishing industry is currently at a very critical crossroads.

On the one hand, fish stocks are under enormous pressure as 93% of the world's fish stocks are fully exploited or overfished.

On the other hand, we continue to increase the quantities of catches without considering that the populations of most species are at a critical population size. The fishing industry is permeated by illegal and unsustainable practices. Illegal and unregulated fishing is becoming an issue with serious social, economic and environmental impacts.

At the same time, the global market trades in fish caught using illegal and unsustainable methods. In many cases illegally caught quantities are mixed with legally caught fish.

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Educational Objectives

Students will learn about:

- ✓ types of fishing
- ✓ reasons why fish are reduced
- ✓ sustainable fishing
- ✓ the role of fish in the diet of prehistoric humans
- ✓ gastronomy and fish

Students will be able to:

- ✓ recognize the important role of fish in our diet
- ✓ realize how complex the problem of fish reduction is
- ✓ connect gastronomy with fish
- ✓ link sustainable fishing to the major environmental problems of our time
- ✓ select which fish to buy as a consumer

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Steps of the Learning Unit

Orientation

Duration: 180 minutes (two activities)
School subjects involved (suggestion): Biology, Chemistry, Physics, English, Civic Education, Philosophy.
Where the activity takes place: Laboratory of Natural Sciences – Fishing port

The first activity can take place in the school's Natural Sciences Laboratory.
Start by showing a video on YouTube like the following available in English (subtitles available):
https://www.youtube.com/watch?v=og8N-EslUPQ&t=18s - David Attenborough Explains What We Need to Do to Stop Over-Fishing (3:14 minutes)
https://www.youtube.com/watch?v=oCZr4j24dsg - No more fish — empty net syndrome in Greece - DW Documentary (25:55 minutes)
https://www.youtube.com/watch?v=oaW2rqJjXvs - This is the most over-fished sea in the world (5:49)

Method: *After watching the video, students will work in groups to identify on cardboard the topics that attracted their interest and would like to know about more.*

Equipment/Materials: Cardboard, markers, pencils

After mapping on the cardboard the key points that attracted the students' interest, a brainstorming will follow from the students that will help us find the best ways to stimulate the students' interest.
It is important to be able to develop a real channel of communication and to do so we need to identify the individual issues that students are most interested in, the knowledge they have about these issues, the existing misconceptions.

Through brainstorming, we want to connect the topic with their daily life, as well as the area in which they live.

The second activity will take place in a nearby fishing port *in order to get to know the main types of mid-distance fishing vessels (trawlers, purse seines, coastal fishing vessels, etc.).*
The activity can take place in any fishing port.

Method (how students should work): *The students work in groups.*
Equipment/Materials: Cameras, voice recorder, mobile phones, drawing sheets

DESCRIPTION:

At the port, pupils observe the vessels operating in the two fishing types. In the conceptualisation step that will follow, we will clarify the differences between coastal and mid-distance fishing.

At the port we can observe the differences between the vessels in terms of their dimensions, the nets and fishing gear they use, the distance from the coast and the depth at which they can fish.

Apart from observing the fishing boats and discussing with the fishermen, we can also pass by the fish market where we will observe the seafood available.

Students record with their cameras or mobile phones the events of this visit in videos or photos (fishing boats, fishermen, lifestyle on boats, fish, port).

Some students can capture on paper snapshots of the events at the port.

Conceptualisation

Duration: 120 minutes
School subjects involved (suggestion): Biology, Chemistry, Physics, English, Civic Education, Philosophy
Where the activity takes place: *Laboratory of Natural Sciences*
Method (how students should work): *Students work as a class*
Equipment/Materials: Video projector

DESCRIPTION:

Following the Orientation step we start to formulate some basic questions, which will guide the activities later in the investigation step.

The key question we are asked to explore is what is meant by the term 'sustainable fishing'. It is not at all an easy question. In many cases it is easier to determine what is not sustainable fishing than what is sustainable fishing.

Firstly, we need to define sustainable fishing.

According to the criteria established by GREENPEACE, sustainable fishing is defined as fishing whose practices can continue indefinitely so that each species maintains its population at healthy levels and without adversely affecting other species in the ecosystem.

The GREENPEACE criteria for sustainable fishing, which are based on the FAO CODE OF CONDUCT FOR RESPONSIBLE FISHING, are as follows:

- "States and users of living aquatic resources should conserve aquatic ecosystems. The right to fish carries with it the obligation to do so in a responsible manner so as to ensure effective conservation and management of the living aquatic resources."

- "Fisheries management should promote the maintenance of the quality, diversity and availability of fishery resources in sufficient quantities for present and future generations in the context of food security, poverty alleviation and sustainable development. Management measures should not only ensure the conservation of target species but also of species belonging to the same ecosystem or associated with or dependent upon the target species."

The main reasons for the drastic reduction of fish stocks are:

- Overfishing
- Destruction of marine habitats
- The increasing use of destructive and illegal fishing practices
- Invasive species that displace native species.
- Climate change

The **key characteristics of sustainable fisheries are:**

- Sustainable fisheries are managed from an ecosystem perspective, following the Code of Conduct of the World Food Organization, based on scientific knowledge and data and setting clear objectives in management planning. It is important to have solid monitoring procedures in place.
- Sustainable fishing contributes to the protection of vulnerable species and habitats. The role of protecting and controlling areas where fish breed is particularly important.
- Sustainable fishing maintains populations of species at healthy levels.
- Sustainable fishing uses selective fishing methods.
- Sustainable fishing does not cause irreversible damage to the ecosystem.
- Sustainable fishing minimises energy consumption, the use of chemicals and the generation of waste in all its activities.
- Sustainable fishing operates in a socially and economically just and responsible way.
- Sustainable fishing can provide full traceability for all catches, from the point of catch to the fish market and uses all interconnected traceability methods (such as GPS, internet) for all large fishing vessels, as part of a reliable control system.

This is followed by discussions with the students in order for them to choose the specific topics on which they will want to focus during the investigation.

Students work in groups to propose a hypothesis or questions that will then be finalized by the entire class.

Possible questions we can explore are:

- *Are there enough fish in our seas today?*
- *Where are all the fish we see in the fish market caught?*
- *How are all these fish caught?*
- *In what seasons should different species of fish be fished?*
- *What fish do fishermen catch today and how do they catch them?*
- *Is the future of fisheries sustainable and, if not, what should we do to make it more sustainable?*
- *By what criteria should we choose each time the fish we buy?*

If we focus, for example, on the species of the European flying squid (as an ingredient in our selected recipe), we can find the differences between the flying squid and squid and then investigate what are the sustainable methods by which flying squid are caught.

The hypothesis or questions formulated and finalized will guide the investigation that follows.

Investigation

Duration: Depends on the activities that will take place and the depth of the selected activities.
School subjects involved (suggestion): Biology, Chemistry, History, Philosophy, English, Language, Economy, Civic Education, IT.

We start with a presentation on the topic where we will present coastal and mid-distance fishing, types of vessels, fishing methods, species of fish currently threatened and the major problems facing the marine and coastal environment today (overfishing, unsustainable fishing practices, pollution, tourist exploitation of the coast, population growth of coastal areas, climate change, acidification of seawater, reduction of biodiversity, etc.).

Where the activity takes place: *Laboratory of Natural Sciences, Laboratory of Informatics, fishing port, research centre (e.g. Marine Research Centre).*
Method (how students should work): *Students work in groups*

DESCRIPTION:

Activity 1

Image 1: Trawls and purse seines in the fishing port of Rafina

School subjects involved (suggestion): Biology, Chemistry, Political Economy

1) Programming

Where the activity takes place: Laboratory of Natural Sciences

Duration: 60 minutes

Equipment: Video projector

DESCRIPTION:

We will start our activity with the viewing of the video we showed to the students at the beginning of the learning unit.

This will be followed by a short research by the students on marine fishing with motorboats, based on the data provided by the Statistical Service of each country.

The Statistical Service of each country provides detailed data on the number of vessels operating in each category (coastal fishing, mid-distance fishing) and the amount of fish caught by these vessels.

These data are published annually for all countries of the European Union.

2) Execution

Where the activity takes place: Fishing port

Duration: 180 minutes
Equipment: Cameras, voice recorder, mobile phones, painting blocks

DESCRIPTION: Visit to a large fishing vessel in the port.

We will visit two types of fishing boats at the port, a mid-distance fishing vessel (e.g. trawl) and a small-scale coastal fishing vessel. The fishermen will guide the students on their boats and talk to them about the fishing practices and fishing gear used by each fishery (the trawl for mid-distance fishing and the smaller vessel for coastal fishing).

Coastal fishing vessels make up the vast majority, accounting for more than 90% of all fishing vessels in Mediterranean countries.

Fishing vessels are facing major economic problems, which we will try to investigate in order to see whether fishing is currently sustainable and what actions should be taken towards making fishing sustainable.

Indicative questions we will address to the fishermen are:

- *Are there enough fish in our seas today?*
- *Where are all the fish we see in the fish market caught?*
- *How are all these fish caught?*
- *In what seasons should different species of fish be fished?*

- *What fish do fishermen catch today and how do they catch them?*
- *Is the future of fisheries sustainable and, if not, what should we do to make it more sustainable?*
- *By what criteria should we choose each time the fish we buy?*

One element that we will try to investigate is that of the rivalry that exists between mid-distance and coastal fishing vessels. In a discreet manner and without causing tensions with our questions, we will try to investigate the impacts of trawls on the marine ecosystem.

It is a very delicate matter as we will address both mid-distance fishermen, who have a large trawl, and coastal fishermen with a vessel less than 12 meters in length. It is important to listen to all sides, both mid-distance and coastal fishermen, in order to be able to draw conclusions about sustainable fishing and how the seafood we will use in our selected recipe is caught.

For example, in the fishing port of Rafina in Greece a fisherman with a large trawl told us that with only one go (the nets they threw and lifted) they caught seven tons of flying squid. The number seems unreal, but it is true. Do we consider such a fishing method sustainable or should we turn to a fisherman with a small boat that will catch only a few kilograms of squid each time? This topic will be explored with the students.

At the port we can observe the differences between the vessels in terms of their dimensions, the nets and fishing gear they use, the distance from the coast and the depth at which they can fish.

Apart from observing the boats and the discussion with the fishermen we can visit the fish market where we will observe the seafood available. The students can be divided into groups and each group may visit a different shop in the fish market. The shop owners or workers may answer students' questions and teach them how to distinguish different types of fish.

It is very important for students to be able to understand the criteria by which we buy fish. What to look out for in fish and seafood in order to distinguish the fresh ones. Students learn to observe the colour, scales, and the eyes of fish.

An important activity may be to go fishing with our students on a professional fishing boat. It is extremely important for students to experience fishing in real conditions. For fishermen, fishing tourism provides an additional and necessary income, as the incomes of coastal fishermen are constantly decreasing. Students record with their cameras or mobile phones the events of this visit in videos or photos (vessels, fishermen, life on boats, fish, port). Other students can draw on paper some snapshots of the events at the port.

Immediately after the boats and the fish market we can head to a seafood restaurant. Here the owners of the restaurant may introduce the students to traditional seafood.

Image 2: "MARIA", the last shore seine of Rafina

Activity 2

A second activity may take place in a research centre with research activity in the field of fisheries and the marine environment (e.g. a marine research centre).

School subjects involved (suggestion): Biology, Chemistry, Political Economy

Where the activity takes place: Research Centre

Duration: 180 minutes
Equipment: Cameras, voice recorder, mobile phones, drawing sheets

Description: The activity is divided into two sessions.

In the **first session** students can attend the educational programme of the research center (if offered).

The educational programme should include an analysis of fishing activity in the country:

- Stocks, fleet of vessels and fishing areas, through short statistical tables depending on the level of education.
- Recording of the main fishing problems (overfishing, lack of fishing data, etc.).
- Reference to the new directions of fishing in the country: Deep-water fishing, artificial reefs, protected areas, as well as coordinated efforts to conserve fish populations, through management measures for the sustainability of fisheries.
- Finally, reference is made to the current problem of the entry of exotic species ('lesepsian migrants') and their possible effects on existing populations.

In the **second part** of the activity students will have the opportunity to ask questions to an expert at the center.

Indicatively, these questions may be:

- *Are there enough fish in our seas today?*
- *Where and how do we fish the fish we eat?*
- *In what seasons should different species of fish be fished?*
- *What fish do fishermen catch today and how do they catch them?*
- *Is the future of fisheries sustainable and, if not, what should we do to make it more sustainable?*
- *By what criteria should we choose each time the fish we buy?*

3) Analysis/Results

Where the activity takes place: Laboratory of Natural Sciences

Duration: 120 minutes

Equipment: Video projector

DESCRIPTION: Based on what we have seen and heard at the port and the research centre, we will try to reach conclusions about the category of fishing vessels (mid-distance or coastal) and the fishing gear (trawl/purse seine or net/longliner) we will select for the fish or seafood species included in the selected recipe. We will also determine the right season for their fishing.

We will also search for information in applications or sources on the internet.

By making responsible decisions about the seafood we consume, we too can contribute to the protection of life in our seas, for present and future generations. It is important to avoid consuming seafood whose populations are significantly reduced due to overfishing. But there are other factors that can determine our choice, such as how a species has been caught and what impact its fishing has on the ecosystem.

More than 65% of fish stocks in the Mediterranean are fished beyond safe biological limits. The overexploitation of our seas poses a serious risk, both to marine ecosystems and the rare species already living in them (marine mammals, turtles, etc.), as well as to the future of coastal fishing as an important social and economic activity.

Activity 3

Image 3: Copepods of the genus Cyclops from the wetland of Artemis Spata.

This activity can take place on a beach within walking distance from the school.

School subjects involved (suggestion): Biology, Chemistry, Political Economy

1) Programming

Where the activity takes place: Coastal ecosystem

Duration: 3 teaching hours
Equipment: Organism identification keys, magnifying lenses, jars for the preservation of some organisms

DESCRIPTION: Students will visit a coastal ecosystem and record the plant and animal organisms they will identify.

2) Execution

Where the activity takes place: A coastal ecosystem.

Image 4: A crab from the beach of Marikes in Rafina

Image 5: Phaeophyta (brown algae) from the beach of Marikes in Rafina

DESCRIPTION: Students divided into groups look for organisms and record them in categories, based on the help of an expert (e.g. research center researcher) and organism identification keys.
Students collect seawater samples, which will be studied at the school's Natural Sciences Laboratory. We try to observe organisms of both zooplankton and phytoplankton. For phytoplankton we will collect material that exists on stones and other organisms. These organisms are the most obvious.
In addition, we observe algae (red algae, brown algae, chloroalgae in the optical microscopes at the school's laboratory.
For zooplankton it will be necessary to collect samples with a special net for zooplankton.
It is important to try to observe the samples immediately after collecting them so that the organisms are alive.

Image 6: Prunocerotes of the genus Daphnia from the wetland of Artemis Spata.

3) Analysis/Results

Where the activity takes place: Laboratory of Natural Sciences

Duration: 90 minutes

Equipment: Optical Microscopes, Stereoscopes

DESCRIPTION: We observe organisms of zooplankton and phytoplankton that cannot be observed with the naked eye.

In zooplankton the main group of micro-zooplankton are the oppipods.

In photoplankton we try to locate diatoms and dinoflagellates.

Activity 4

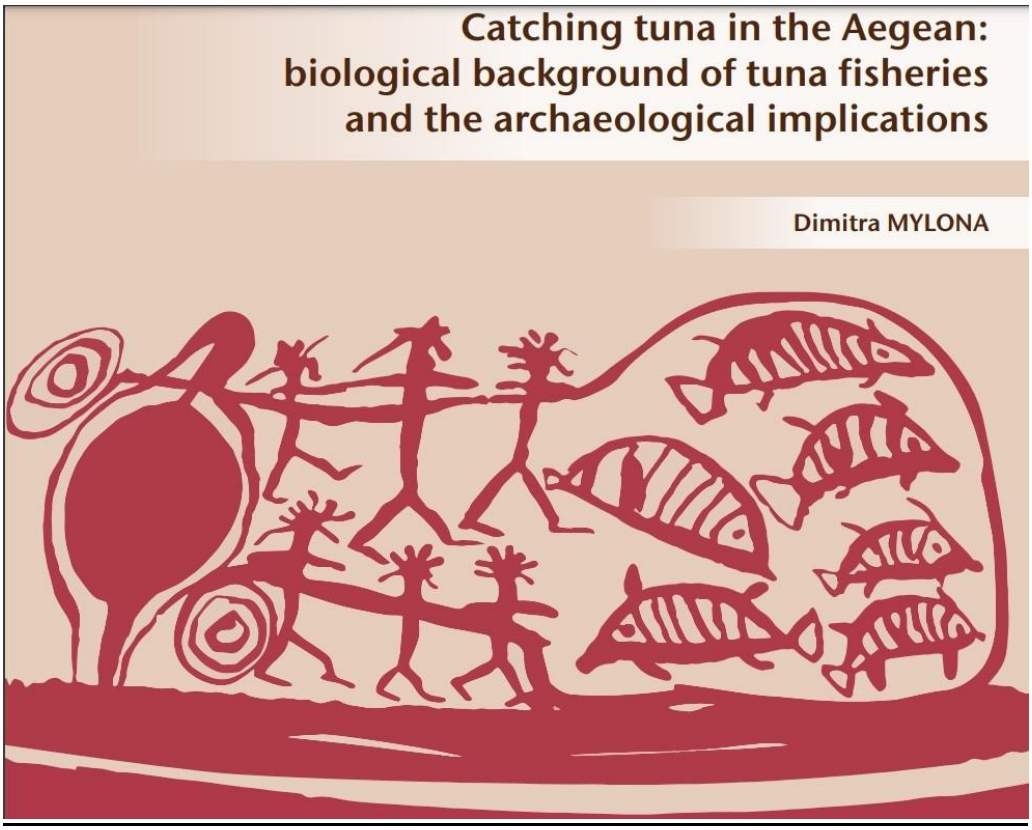

Image 7: Catching tuna in the Prehistoric Aegean: The biological background of tuna fishing and its effects on archaeology (scientific work by Demetra Mylona).

A fourth activity may try to combine the subject of History with fisheries and species currently threatened with extinction, climate change and the economy of a prehistoric society.

The activity can focus on caves that exist in many European countries. For example, in Spain there are the famous caves of Altamira, where unique rock paintings with animal representations and hunting scenes have survived. In Greece a similar cave is the Franchthi cave of Argolida.

School subjects involved (suggestion): History, Biology, Political Economy

1) Programming

Where the activity takes place: Laboratory of Natural Sciences

Duration: 2 teaching hours

Equipment: Video projector

DESCRIPTION: We try to connect the fishing of a specific species (e.g. tuna) that took place in prehistory 10,000 years ago and even earlier through the history lesson.

2) Execution

Where the activity takes place: Laboratory of Natural Sciences

DESCRIPTION: Example of the implementation of the activity in Greece.

In Argolida there is the **Franchthi** Cave, which has been inhabited since 40,000 years ago.
From incisions in Franchthi Cave, we know the diet of the inhabitants of the cave in a period of time that reaches 50,000 years.

During the Upper Paleolithic Age (40,000 to 9,000 years ago) the residents of the cave based their diet on hunting. They hunted species such as a wild ass species (Asian species-extinct today), a wild ox species (extinct today), deer and other species.

The sea level 20,000 years ago was 120 meters below the current sea level.
The coastline is currently seven kilometers away from where the sea is today. Today the sea is only a short distance from the cave.

During the Paleolithic Era in front of the cave there was an extensive Mediterranean steppe with shrubs and grasslands. For this reason, hunting was plentiful. The climate was colder and drier than it is today.

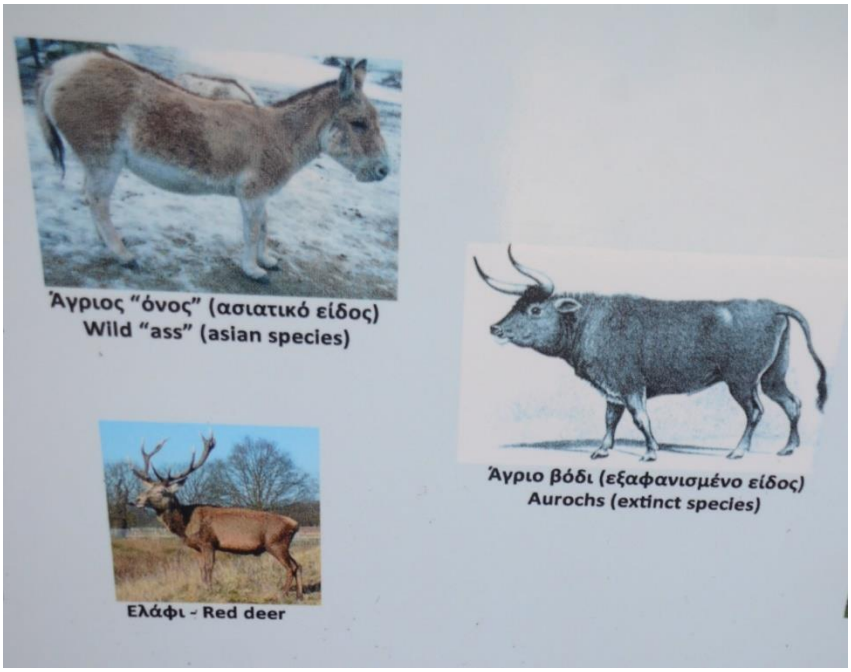

Image 8: Species of animals hunted by the inhabitants of the cave during the Paleolithic Age

During the Mesolithic period the vegetation changes, the climate becomes milder and wetter.
The coastal plain is beginning to shrink significantly.
Since the end of the Paleolithic Era, many of the species hunted by humans have become extinct or significantly reduced (wild ass, wild ox).
Forest species such as deer and wild boars are abundant.
Residents living in Franchthi Cave base their diet on fish.
It is truly admirable that these people managed to catch tuna.

Tunas are migratory fish, which at a certain time of the year pass through a cape located near the Franchthi cave of Argolida.
The inhabitants of the Prehistoric Cave know the ethology of tuna and have elementary boats to hunt for tunas.

Tuna vertebrae and several other remnants of prehistoric human's diet have been found in Franchthi Cave.

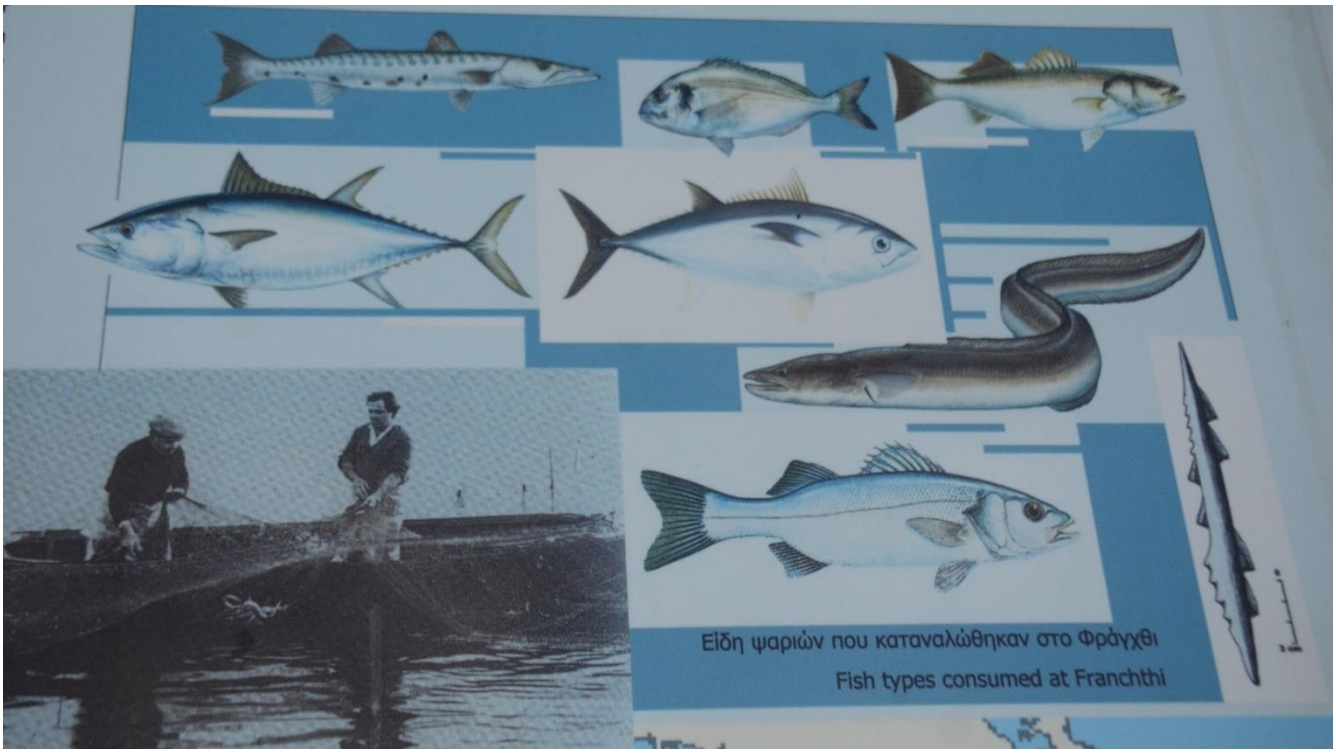

Image 5: Species of fish consumed in Franchthi

An important element concerning Franchthi is the finding of obsidian in the cave. Obsidian is a volcanic material that comes mainly from the island of Milos. How the obsidian was transported from Milos to Franchthi in Argolida is still a mystery today.
The boats available to the inhabitants of the cave of the Mesolithic era were very small, papyrella-like, and the journey from Milos to Argolida was certainly dangerous.

It is possible that obsidian was transported from island to island at certain times of the year (summer), where the sea currents were exploited.
Probably obsidian was transported coast to coast (from island to island) to Sounion and from there was transported by land road to Franchthi.

During the Neolithic period (from 7000 to 3000 BC) the climate becomes warmer and the inhabitants of the cave turn to agriculture and animal husbandry.
Climate change allows for the cultivation of land and the rearing of animals.
It completely changes the way of life of the inhabitants.

Image 10: Tuna vertebrae from the Franchthi cave of Argolida

Today tuna is a species threatened with extinction due to overfishing.

This may be followed by a presentation focusing on the following topics. It is desirable to invite a qualified archaeologist who will give more information on tuna fishing in Prehistory.

- Tuna fishing in the Mesolithic period
- The Ethology of Tuna
- The eating habits of the inhabitants
- Changes in the region due to climate change (sea level rise)

- The causes that threaten tuna with extinction today
- The fish farming of tuna that took place since ancient times ("Thynion")

Image 11: The Franchthi Cave of Argolida

Image 12: Tuna in the fish market of Rafina

Analysis/Results
Where the activity takes place: Laboratory of Natural Sciences

Duration: 45 minutes (1teaching hour)

Equipment: Video projector

DESCRIPTION: Students discuss what they saw in the presentation. There is a connection with today. New questions are being asked. Students actively participate by offering answers to the new questions that arise during the discussion.

Students can draw the animals that lived during the Paleolithic Age in the cave.

Students can write short texts describing the lives of these people during the different eras.

All this can be done spontaneously and starting from what they heard to unfold the diverse talents of the students.

Creative expression for the prehistoric way of life.

We ask students to imagine what they see through an imaginative window to the Paleolithic, Mesolithic and Neolithic Ages.

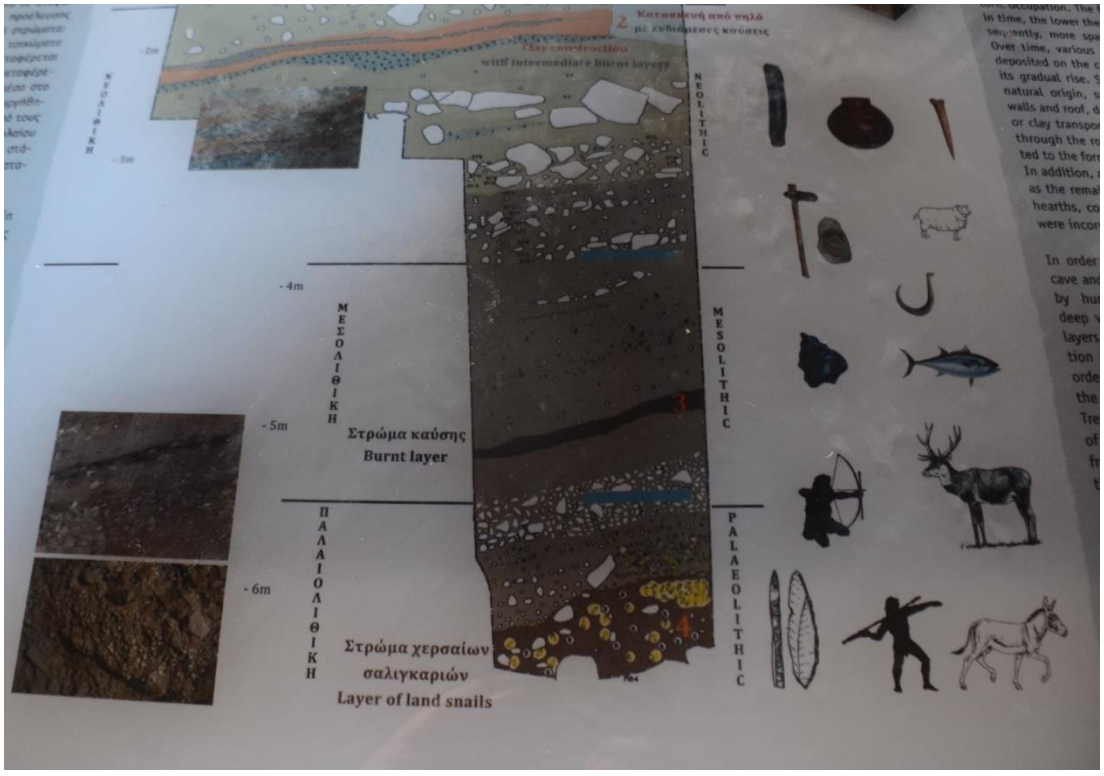

Image 13: Stratigraphy in Franchthi Cave of Argolida. The dietary habits of its inhabitants in the Paleolithic, Mesolithic and Neolithic eras.

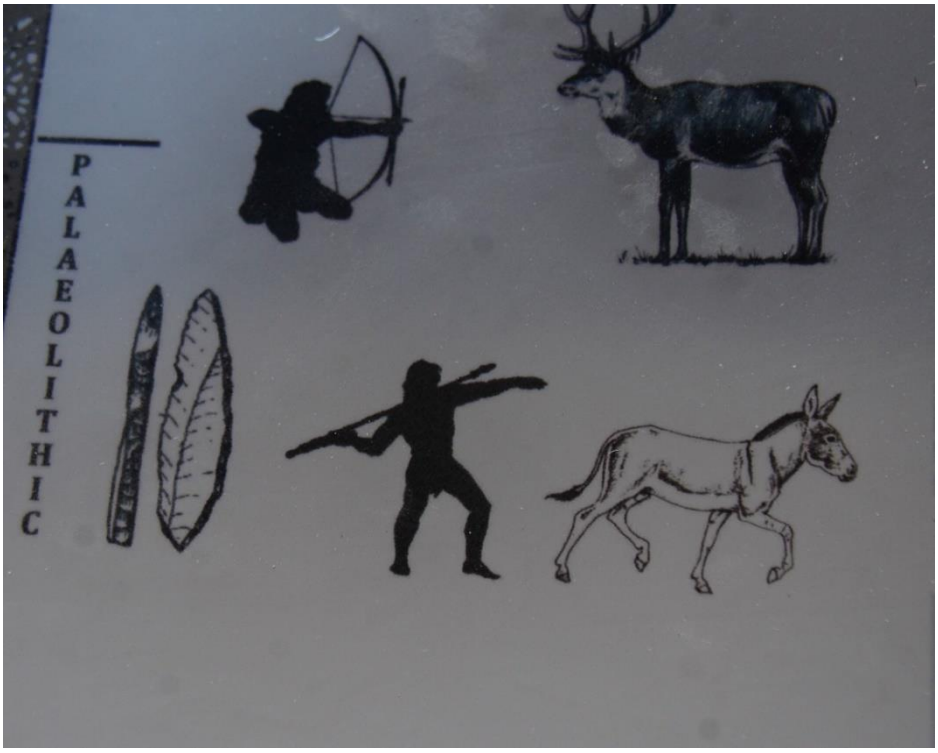

Image 14: The dietary habits of the inhabitants of Franchthi cave in Argolida during the Paleolithic era.

Image 15: The dietary habits of the inhabitants of Franchthi cave of Argolida during the Mesolithic era.

Activity 5

1) Programming

Where the activity takes place: Computer Room

Duration: 1 teaching hour (45 minutes)
Equipment: Video projector

DESCRIPTION: Students are concerned about the following questions:

- When and how do you think the primal instinct of self-preservation began to be treated differently by humans? When did man see his diet as a need not only for survival but also for well-being? Are you familiar with the term “gastronomy”?
- Students divided into groups search on the internet for the meaning of the term "gastronomy" as well as its etymology.
- They then look for Archestratos, the so-called "father of gastronomy" and his work Edypathia or Gastronomos.

3) Execution

Where the activity takes place: Laboratory of Informatics
Duration: 90 minutes (2 teaching hours)
Equipment: Computers and Video Projector
Digital tools/applications: edtech.gr/scribble-maps/ and Filmora.wondershare

DESCRIPTION: The students, divided into groups, search for the main destinations of Archestratos in the Mediterranean and create a digital map with his travels.
They are looking online for information on the basic cooking rules he has compiled and are preparing a relevant video.
They study the cooking recipes of Archestratos and choose their favorite one.

4) Analysis/Results

Where the activity takes place: Laboratory of Natural Sciences

Duration: 90 minutes (2teaching hours)

Equipment: Electric oven, pots and raw materials

DESCRIPTION: During the first teaching hour, students perform their selected recipe of Archestratos according to his guidance under the supervision and guidance of the responsible teacher.

The next hour they call their classmates and taste the delicacy together. This is followed by self-evaluation and discussion with their classmates about the whole process as well as the benefits they gained from it.

Activity 6

1) Programming

Where the activity takes place: Classroom

Duration: 45 minutes

Equipment: Computer, video projector

DESCRIPTION: The aim of this activity is for students to identify the historic evolution of the local diet and its connection with sustainability. Starting from the eating habits of the past in terms of fish and seafood, and reaching to the present day, students are invited to discover not only the local cuisine of the past and the present, but also to understand its configuration as a result of the way in which the available resources are used. They are also invited to understand the history of local fisheries as a key factor in shaping these food resources.

After showing excerpts of films highlighting local cuisines (e.g. "Ratatui", other films on the local cuisine), the teacher asks students about the differences of each local cuisine by focusing their attention on explaining the differences. Students are then invited to seek more systematically and over time the specific characteristics of the local diet and the related economy.

Students are divided into groups of four, and the teacher assigns specific roles to each member of the group: one member will be entrusted with the task of browsing the internet, another with the collection of the requested data, a third with the composition and the fourth with the presentation of the findings of the survey. Half of the groups formed will be called "Nutrition Historians" and the other half "Historians of local fishing".

2) Execution

Where the activity takes place: Laboratory of Informatics, outdoors

Duration: 180 minutes

Equipment: Computer (internet connection), audio recorders

Digital tools/applications: the youtube.com platform, internet search engines, word editor, collaborative documents.

DESCRIPTION:

a) The "Nutrition Historians" are invited to carry out the following activities:

1. To search on the internet and record in a word processing program the foods and recipes that the residents of the area consumed in the past.

2. To repeat this search for new populations that settled later in the area in some historical period (e.g. refugee movement, movement due to population exchange, etc.). Seek continuities and discontinuities and try to justify them.

3. To search on the internet and record the agricultural, livestock and fishery products produced by the regions of origin of the new populations. Look for connections to the local cuisine.

4. Repeat this search for the same populations after they settled in the area.

5. The first four research questions can be explored through live interviews with descendants of the new populations or through already recorded interviews (documentary material).

b) The "Historians of local fishing" are invited to carry out the following activities:

1. Search the internet and record in a word processing program the fisheries, techniques and means used by local residents in the past.

2. To repeat this search for new populations that settled later in the area in some historical period (e.g. refugee movement, movement due to population exchange, etc.). Seek continuities and discontinuities and try to justify them.

3. To search on the internet and record the fisheries, techniques and means used in the regions of origin of the new populations. Seek connections with local practices.

4. Repeat this search for the same populations after they settled in the area.

5. The first four research questions can be explored through live interviews with refugee descendants or through recordings of pre-recorded interviews.

3) Analysis/Results

Where the activity takes place: Laboratory of Informatics

Duration: 135 minutes

Equipment: projector, PC (with internet connection),

Digital tools/applications: video editor, presentation program, collaborative documents and quiz maker.

DESCRIPTION: The two groups gather their material and create:

1. A presentation where their overall research results are recorded and presented.

2. A 5-minute video summarizing the main conclusions of their research.

3. A quiz with questions related to their research.

They present their work to the class.

Activity 7

1) Programming

Where the activity takes place: School computer lab.

Duration: 90 minutes.

Equipment: Computers with internet connection.

Digital tools/applications: Browser, search engine.

DESCRIPTION: Students are divided into three groups.

The first group will aim to find modern computer and communication technologies that can help in sustainable fishing.

The second group can examine whether fishermen in the region apply these methods.

The third group should prepare a short play showing the relationship of an old fisherman with these methods and how he is treated by the younger members of his family who are going to follow the same profession.

Students discuss with each other and with the teacher how each group can achieve its goal and how to integrate the results of the other groups. The computers of the school computer lab with an internet connection can be used to search for information.

2) Execution

Where the activity takes place: School computer lab, local fishing port, multipurpose hall.

Duration: 200 minutes

Equipment: Computers with internet connection. Mobile phones for recording and/or recording interviews. A video projector.

Digital tools/applications: Browser. Audio-image apps from smartphones. Audio and video editing tools on a computer.

DESCRIPTION: The first group is looking for modern computer and communication technologies that can help in fishing and presenting them to the other groups.

The second group organises interviews with local fishermen to examine the degree of use of the above technologies and presents the result to the other groups.

The third group, using the information of the other groups, constructs a short script, distributes roles and rehearses the play.

All groups present their work in the events hall of the school.

3) Analysis/Results

Where the activity takes place: School computer lab

Duration: 90 minutes

Equipment: Video projector, Computer.

Digital tools/applications: Text processor

DESCRIPTION: The groups discuss the results of their work and the experiences they have gained. The teacher records the main points to form the conclusions.

Conclusions

Duration: 90 minutes
School subjects involved (suggestion): All subjects involved throughout the activities implemented.
Where the activity takes place: Laboratory of Natural Sciences
Method (how students should work): *Students work as a class*
Equipment/Materials: Video projector

DESCRIPTION:

This step aims at drawing conclusions from all the activities implemented and discussing them.
It is a very creative stage, as all groups are invited to present their work resulting from the activities implemented.

The activities took place within the framework of Biology, Language, Chemistry, History, Physics, English, Political Economy, Civic Education, Information Technology.
Teachers from two or three different subjects participate.
It is interesting to hear the conclusions drawn from all these different activities.

Discussion

Duration: 90 minutes
School subjects involved (suggestion): All subjects involved throughout the activities implemented.
Where the activity takes place: School events hall
Method (how students should work): *Students work as a class*
Equipment/Materials: Video projector

DESCRIPTION:

The discussion about the results of the activities of the learning unit is expected with great interest.

Sustainable fishing is a very important issue especially for a coastal town or city.

The results of the activities may be presented at a public event.

It is strongly recommended to invite all the individuals who participated in the activities implemented, both within and outside the school community.

Fishermen, fishmongers, restaurant owners, as well as expert researchers who discussed with the students in the interviews will also be encouraged to participate in the discussion.

Students' parents, teachers, citizens interested in the topic and city officials should also be invited to the event.

The aim is to disseminate the results of the research to the local community and beyond.

The focus is on the students. The promotion of their work will give them confidence and strength to repeat similar actions in the next school year.