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“3D4CE”

3D Printing: a Cultural accelerator for Education

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Intellectual Output 2

Local Cultural Heritage and educational scenarios





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Introduction

In this Output, the local cultural heritage of the geographical region of each partner of the 3D4CE Project will be presented, accompanied by some Activities that can be used to educate Kindergarten pupils and Primary School students about that cultural heritage. The regions that are included in this Output are Attica, Chios, Lesbos, and Rhodes from Greece, the region of Sarzana from Italy, and the region of Leiria from Portugal. Each chapter of that Output concerns one of those regions in particular. It begins with a general presentation of the local cultural heritage, including immovable and movable tangible, intangible, and natural cultural heritage elements. Some basic points are highlighted and some educational activities are proposed about the subject. After that, a characteristic local monument is selected for each region to be described in detail and some more Activities, linked with the aforementioned local monument, are also proposed. Each chapter closes with a series of video links and images related to the subject of each region's local cultural heritage.



Region 1: Attica's local cultural heritage and the Tower of Winds

Contents of the course

A. Local cultural heritage of Attica

- Introduction
- Identity and location of the selected monument
- Who and when created the monument?
- Description of the monument
- The initial function of the monument
- The history of the monument
- Activities to consolidate the knowledge of the pupils
 - Requirements
 - Steps – Educational Activities
 - Results
- Subjects of Activities
 - For Kindergarten
 - A. Creations of the ancient Greek technology
 - B. All those things the Tower of Winds saw
 - C. Through Triton's Eyes
 - For Primary School
 - A. Creations of the ancient Greek technology
 - B. All those things the Tower of Winds saw
 - C. The risks the Tower of Winds faces

B. The Tower of Winds

- Introduction
- Identity and location of the selected monument
- Who and when created the monument?
- Description of the monument
- The initial function of the monument
- The history of the monument
- Activities to consolidate the knowledge of the pupils
 - Requirements
 - Steps – Educational Activities
 - Results
- Subjects of Activities



- For Kindergarten
 - A. Creations of the ancient Greek technology
 - B. All those things the Tower of Winds saw
 - C. Through Triton's Eyes
 - For Primary School
 - A. Creations of the ancient Greek technology
 - B. All those things the Tower of Winds saw
- C. The risks the Tower of Winds faces

Learning Objectives

- ❖ The pupils shall learn about Attica's Cultural Heritage, including the monuments of the region, important artifacts, customs and places of natural beauty.
- ❖ The pupils shall be able to categorize Attica's monuments in categories, related to their age, function, current use and location.
- ❖ The pupils shall understand what Cultural Heritage is and what is the importance of those things that belong to that category.
- ❖ The pupils shall gain a better understanding of the shape of those monuments, by examining via the sense of touch the 3D model they will hold.
- ❖ The pupils, after the course, shall be able to name at least some of Attica's monuments, important artifacts, customs and natural places, as well as to be inspired to see them for themselves in the future.
- ❖ The pupils shall appreciate the value of their local Cultural Heritage, as well as their responsibility, as citizens, to respect and protect that Heritage.
- ❖ The pupils shall be introduced to the usage of 3D-printed objects as a material related to the procedure of learning.
- ❖ The pupils shall raise awareness about important matters, related to Cultural Heritage and mainly for the need of artifacts to be exposed in their cultural context, that is the place to which they are related and belong to.

Local cultural heritage

Description of the local cultural heritage

Tangible cultural heritage

Attica is a land rich in history and tradition. All over Attica, we can find various monuments. In the city of Athens, we can find the Parthenon, along with the other monumental buildings of the Acropolis: the Erechtheum, the Propylaea and the Temple of Athena Niki. In the area of the Classical Agora, there is also the Stoa of Attalus and the Temple of Hephaestus. Not far from there, we can also find the famous Tower of Winds, an ancient meteorological station. On the southern slopes of the Acropolis, we can visit the Theater of Dionysus and the Odeon of Herod Atticus. Nearby, we will find the Hill of Philopappos, with the Philopappos' Monument on its top. To the east of the Acropolis, we can visit the Monument of Lysicrates, while by continuing southwards, we will find the great Temple of Olympian Zeus and the Arc of Emperor Hadrian. By moving eastwards, we will find the Panathenaic



Stadium. In Syntagma square, we can see the old Royal Palace of Greece, now serving as the seat of the Greek Parliament and before that, the Greek Monument of the Unknown Soldier. By moving westwards, we can visit the Church of Panagia Kapnikarea and the Cathedral Church of Athens. Near Omonoia square, there is also the Athens Town Hall.

In the greater area of Athens, we can visit the Church of the Monastery of Daphni and also a Mycenaean tholos tomb in Acharnes, while, by following Mesogeion avenue, we will pass beneath the Kalatrava Footbridge of Katechaki. Finally, on the foothills of Penteli mountain, we can visit the Mansion of the Duchess of Pleasence.

In different regions of Attica, we can find even more monuments. In the area of Brauron, in the East, we can find the Temple of Artemis. In the area of Sounion, in the South, we can visit the Temple of Poseidon and the great silver-mines that were used since antiquity. In the area of Porto Germeno, in the West, there is the ancient Fort of Egosthena and in Oropos, in the North, we can visit its Amphiaraion and admire its ancient hydraulic clock.

In the Museums of Athens, one can also admire various important archaeological artefacts. Among these, we can name some of the sculptures from the Athenian Acropolis, the kouri and the kores, the famous caryatides, the most ancient Greek alphabetic inscription on the Dipylon Oinochoe and the sculptures from the Amphiaraion, near Oropos.

Intangible cultural heritage

Among the customs of Attica, we shall include the custom of May's Wreath, the custom of Perperouna, the Greek Maypole Custom and the recipes for the Lazarakia and the Vasilopita, that are related to the customs of Lazarus Saturday and of the First Day of the Year respectively.

Natural cultural heritage

Finally, we shall name some places of natural beauty one can visit. The most well-known is the Greek National Garden, but some other important parks are Andreas Sigros' Grove, Mount Lycabettus Grove, New Philadelphia Grove and most importantly the Pnyx.

Points to remember

1. The Parthenon as a UNESCO Cultural Heritage monument. The Parthenon is the first Greek monument that was included as a UNESCO world heritage monument, due to its values that are related to Democracy. Both the Parthenon as a monument and ancient Athens democratic legacy is part of our Cultural Heritage and this is a point worth remembering.
2. The Tower of Winds, as the first meteorological and horometrical station. The Tower of Winds is one of the earliest attempts of Mankind to measure time and the elements of nature, through the creation of complex mechanisms. This signifies a new -for that era- worldview that was necessary for the foundations of science to be based upon. So, the Tower of Winds stands through the centuries as a monument of the ancient ingenuity.
3. The Old Royal Palace as an administrative building that changed function in order to follow the change of the system of government. It was and it still is the most important Modern-Era administrative building in Athens. It was built as a royal palace, as a symbol of king's Otto absolute and then constitutional monarchy. But many years later, after the abolition of monarchy in Greece, the same building has been turned into a symbol of the Parliamentary Democracy, serving as the seat of



the Greek Parliament. It is very interesting how the function of a building can change so drastically, by also altering its political identity and symbolism.

4. The theater of Dionysus as an ancient cultural building that played a major role in the forming of the Athenian Democracy. The Theater of Dionysus was both a place of recreation and a sacred place. It was dedicated to Dionysus, the god of wine and theater and it was believed that the god himself was protecting the participants in the writing and acting of a play. This meant that even before the creation of the Athenian democracy, the theatrical poets could be expressed freely in that theater, with no fear of offending the ruling elite of the city, with bad consequences. So, they could educate the common people, through their plays and cultivate in them the ideas of isonomy, free speech and personal freedom, that eventually gave birth to the world's first democratic system.
5. The Panathenaic Stadium with its modern-day use in the context of the Modern Olympic Games. The Stadium was created in Antiquity for the athletic need of the great festival of the Panathenaea. But the Stadium is still in use, in a more ceremonial way, as it is here that once every four years, Greece offers the Olympic Flame to the country that is going to host the Olympic Games. The context of the Olympic Flame, may not have been an ancient one, but this important monument managed to link ancient Greek history and athletic spirit with the most important athletic event of today, that also has its roots in ancient Greece.
6. The custom of Greek Maypole or Gaitanaki. The importance of this custom that is related to the Greek festivities of Apokroia, is that it is originated by old agricultural tradition about the rebirth of nature each spring, as well as that it is a symbol of fraternity and concord. It is also important, as shall we note, about its origin from Asia Minor and Pontus and so also represents the Cultural Heritage of the refugees that were forced to cross the Aegean after the Destruction of Smyrna. Nowadays the civilization of those refugees has been harmonically blended in the local culture of Attica and this specific custom may be also seen as a symbol of that blending.

Activities

All the following activities could be properly adjusted either for pupils of the Kindergarten or for students of the Primary School.

Activity 1

“Placing the monument”

- a. Requirements
 - All the mentioned monuments shall have been presented to the pupils prior to the beginning of the activity.
 - 3D-printed models of those monuments, one per each, have to be printed in the 3D-printer in the correct scale, prior to the course.
 - A map-base, based on a satellite image, have to be printed in multiple laminated papers and those papers have to be joined into a big map.
 - For the older classes of Primary School: additionally, some more 3D printed models may have been prepared, from places outside the limits of our map.



b. Steps:

1. Preparing the room, by removing desks, chaise and other obstacles and by placing on the floor the laminated map. Then, we put the 3D-printed models in a desk, a table or in the teacher's desk.
 2. The pupils shall randomly form a line, in order to participate the one after the other.
 3. We explain to the pupils the rules of this activity.
 4. Each pupil, randomly peaks a 3D-printed model and has to find its proper place on the map and to place it there correctly. If he is a Primary School student, he will also have to recognize the name of that monument and tell it to its classmate, before giving his place to the next pupil.
 5. When all the 3D-printed monument models would be properly placed in their place on the map and if some pupils haven't yet the opportunity of participating, the models are gathered from the map and put back their original place, for the whole procedure to take place ones more.
- Adaption for Kindergarten students: the steps are mainly the same, with the exception that the pupils have to be assisted by the teacher in finding the proper location and in remembering the name of the monument.
 - Adaptation for older classes of Primary School: more monuments are included, both from the depicted area and from other places as well. When a student has to place one of those foreign monuments, he/she has to realize the fact that this monument is not from the area of the map, recognize and tell the name of the monument, as well as the city and/or country where one can find it.

c. Results:

- ✓ By participating to that activity, the pupils could learn the exact location of the studied monuments in the city, something quite important, as any monument is strongly linked with the locus of its construction, that can help in the understanding of its function.
- ✓ The students will also remember the names of the monuments and link them in their minds with a 3D image,
- ✓ The students will also be able of categorizing the monuments in local groups of monuments belonging to the same place (for example: The Acropolis of Athens, or the Classical Agora of Athens).
- ✓ Secondly, the students will also be able of reading a map or a satellite image, enriched with mapping elements. That ability is of course very useful for them to develop.
- ✓ Finally, the students of the older classes of the Primary School, will additionally learn to separate the monuments of the local Cultural Heritage from the monuments of other regions and by extension, they would be able of better terminating the idea of the local Cultural Heritage.



Activity 2

“Painting monuments in 2+1 dimensions”

a. Requirements

- The pupils shall have been told about the monument or the monuments that they will paint.
- We shall show to the pupils some images (preferably colored or even 3D images), depicting how those specific monument(s) was looking in its original form.
- We shall have prepared prior to the course the printed pages in which the pupils will paint.
- We shall have prepared prior to the course the 3D printed model of the monument(s) that the pupils will paint.

b. Steps

1. We present again the images of the monument that is our subject to the pupils and ask them if they remember to tell us something about that monument. If they answer yes, we let them speaking briefly about it. If they answer no, we speak them about it briefly for 1-2 minutes.
 2. Next, we distribute the papers in which the pupils will paint. Each paper will be divided into five or six small images, each one containing a colorless different view of the monument: the view from the front, from behind, from the left, from the right, from above and (optionally) from below.
 3. In order to explain to the pupils the division of the paper, as they start painting, we discuss with them the existence of the three dimensional axes. First, we explain them to the pupils, with simple words (up and down, left and right, front and back) and then we introduce them to their proper names (height, length and width). We also explain that a painting on a paper could not depict at once all the three dimensions, because the painting exists in a two-dimensional space.
 4. When the pupils will finish their paintings, we distribute to them a 3D model of the monument the painted and we give them a few moments to examine the models, by touch.
 5. Then, we ask them to transfer their original paintings to the 3D model, by using the paper in front of them as a guide for how they will paint the 3D object.
- Adaption for Kindergarten: we follow the same steps, but we help as much as possible the students to find in which side of the 3D model, they have to transfer a specific painting from their guide-paper.

c. Results



- ✓ The pupils shall better understand the three dimensions as well as why a 3D object cannot be properly represented in a 2D painting on paper.
- ✓ The pupils shall realize that one painting on paper could equate to the view of one only of the six sides of the 3D model.
- ✓ The pupils shall develop the ability of transferring a painting pattern from a 2D paper to a 3D-printed object, by corresponding each small image with the proper side of the 3D object.
- ✓ The pupils will also develop their artistic imagination and skills.

Activity 3

“Guess the monument”

a. Requirements

- The monuments that will be mentioned, shall have been presented to the students, prior of the beginning of the activity.
- We shall print in the 3D-printer one 3D model of each one of those monuments that shall be at least 7 in total.
- To have with us one bigger and a number of smaller not transparent small bags. For Kindergarten and the first classes of the Primary School, we will need one smaller bag, while for the older classes of the Primary School, we will need 5-6 in total. In both situations, the big bag shall contain all the 3D printed monument models.
- We shall have printed and laminated some cards with photographs of the monuments in the bag. Each card will be printed in both sides, with the same image in both sides, in a blue context on the one side and in a red one on the other. We shall have in total one card for each monument for younger classes, while 5-6 cards of each monument for older classes.
- The class has to be properly prepared for older classes of Primary School. The desks have to be arrayed in a U shaped or in the shape of a circle. That is not necessary for classes of younger pupils.
- For older classes of Primary School: the pupils have to form teams of 3-5 students and to each time is given one of the smaller bags empty.

b. Steps (for older students of Primary School)

1. With a random order, a representative of each team goes to the teacher’s desk and the teacher put randomly in the sack of that team one of the monuments from the big sack.



2. The representatives return to their teammates and share with them -and only with them, what the model in the sack is.
3. Each team is also given a set of cards, containing all the monuments of the game and opens them in front of it, with the blue side on the top.
4. A team is randomly selected to start and to determinate if the order of the switching of the turns of the game will be clockwise or counterclockwise.
5. The first team asks the next one a question related to the monument that is hidden in their sack. The question may be about the monument's date, initial and current use, location and current condition. The answer shall be truthful and can be either "yes" or "no". Depending on the answer, the first team excludes some of the monuments in front of it, in its task to find out the next team's hidden monument, by turning the excluded cards, so that their red side will face upwards.
6. Then is the second team's turn to ask the third about its monument and so the game goes on. The last team asks the first and then the first team asks a second question to the second team. This continues until one of the teams is able of finding out the hidden monument of the next one and name it.
7. If the guessing is right, the next team (the one the hidden monument of which has been revealed) loses and exists the game by giving to the team that exposed their monument, their cards about the hidden monument of the next team in line. In the next turn, it will be that team to which the team that guessed correctly has to ask questions. But if the guessing is wrong, the guessing team loses and exists the game, while its cards go to the previews team that now has to ask questions to the team that managed to keep hidden the identity of their monument.
8. The game ends when all but one teams have lost and exit the game. The remaining team wins.

c. Steps (for kindergarten and first classes of the Primary School)

1. The one set of cards shall be placed somewhere that they will be visible from all the students in the classroom, turned so that they saw their blue side.
2. The teacher transfers one hidden monument from the bid sack to the small one and tells the pupils that in the small sack is the monument that they shall try to name.
3. The pupils raise hands to ask questions to the teacher about the hidden monument. The question may be about the monument's date, initial and current use, location and current condition. The answer shall be truthful and can be either "yes" or "no". Then another pupil raises hands to exclude the cards he thinks that shall be excluded, based on the answer of his/her teacher, by raising up and turning the corresponding cards, so that they show their red face.
4. The same thing repeats again and again, until the class can name the object in the bag. If the guessing is correct, the activity ends successfully.



- Kindergarten adaptation: The teacher helps a lot the students to exclude correctly the cards, based on his answers, in order to help them develop their substantive reasoning.
- Primary School adaptation for first classes: In order to make the activity more challenging, the teacher may set (when the pupils would understand sufficiently the game) a maximum number of questions, so that the pupils, in order to win, shall not waste their turns with less helpful questions.

d. Results:

- ✓ The pupils shall develop the ability to properly categorize the monuments, according to their properties, their age, their initial and actual use and the place in which they were build.
- ✓ The pupils shall develop their substantive reasoning, by exercising the ability to reach a conclusion by subtraction.
- ✓ The pupils shall learn to function as part of a bigger or smaller team.
- ✓ For Primary School pupils: the pupils shall be able of finding the proper questions, in order to exclude as many options as possible, in order to reach a conclusion in the fastest way.



Selected monument: the Tower of Winds

Description of the selected monument

Introduction

A monument is a construction, mainly architectural or sculptural that was created in order to honor and to keep alive in people's memory a/some person(s) or a historical event.

But, more than that, as a monument is characterized any building, considered as archaeologically, historically or aesthetically important and any human creation that is distinguished among other analogous creations, by provoking admiration. Generally, the concept of the monument includes any human construction, preserved from the past (historical monument).

Identity and location of the selected monument

One of the most beautiful archaeological monuments in Athens is the monument known as the "Horologium of Kyrrhestes" or "Aerides" (Anemoi/Winds) or "Tower of Winds". It is located to the North of the Acropolis, in the area of the Roman Agora, at Aeolou street, in Plaka, Athens.

Who and when created the monument?

It is considered as a creation of Andronicus Kyrrhestes, a Greek astronomer from Cyrrhus, Northern Syria, dated to the first half of the 1st century BC

Description of the monument

The Tower of Winds is an eight-sided towered structure from Pentelic marble, of 12 meters high, with sides of length of 3,20 meters. It has a northern and a western entrance and its base consists of three steps.

The monument's interior belongs to the Doric Rhythm, while its exterior belongs to the Corinthian Rhythm (by its column-heads).

Its roof is conical. The building has also a shorter semi-cylindrical attachment to its southern side and two Corinthian-style propyls, to its northeastern and northwestern sides.

Its eight metopes depict sculptural images of the eight Winds. That gave to monument the name "Aerides" ("Winds").

On the top of its roof was originally a bronze vane -lost today- in the form of Triton, a sea-deity, with a human-formed upper-body and fish tail, blowing into a twisted seashell, to calm or raise the waves. By turning around, it was pointing by holding an indicator, to the direction of one of the eight Winds.

The Winds, personified, are depicted winged, in relief, to the upper part of each side of the Tower, bearing their special symbols. Each Wind is depicted in its relief, corresponding to the direction of its origin, in the horizon. The names of the Winds are carved below the corresponding part of the eight-sided molding.



The depicted Winds are:

- Boreas or Aparktion (Vorias/Northern wind): symbolizing winter. Cold and plangent. Its symbol is the great shell.
- Kaikias (Gregos/Northeastern wind): a wind of winter. It is cold and strong, the cause of storms. It is depicted, holding a shield, from which hail drops.
- Apeliotes (Levantes/Eastern wind): a pleasant autumn wind, bearing fruits on its cloak.
- Evros (Sirokos/Southeastern wind): a strong wind, as indicated by its untidy cloths, that creates mighty storms in the Aegean. When gentle, brings humidity and haze, as indicated by tis covered arm and face.
- Notos (Ostria/Southern wind): beloved wind of the farmers, bringing long, mild rains. So, he holds a pot to water the Earth.
- Lips (Garbis/Southwestern wind): a fair wind, beloved by sailors, but also an arid one, disastrous for farmers. He holds an “aflaston”, the ending of a ship’s stern, pushing it towards its destination.
- Zefyros (Pounentes/Western wind): a pleasant wind, depicted bearing flowers. In western Greece, it is an afternoon wind, ideal for sailing in the Ionian Sea.
- Skiron, Argestis, Iapix or Olympias (Maistros/Northwestern wind): the storm-wind, causing disaster. He is depicted either overturning a water-pot or scattering a brazier’s hot coals. It corresponds to the Vardaris of Thessalonica or the French Mistal.

Below the depiction of each Wind, formations of engraved rays consisted sundials.

The initial function of the monument

The Tower of Winds functioned as a meteorological station of its era. It was telling the time, but also pointing the current wind, by its vane.

The monument is considered the first meteorological and horometrical station worldwide. For the time-measurement, there were exterior sundials, but for the cloudy days and for the nights, there was also an interior hydraulic clock, form which today remain only the cylindrical water-tank and some grooves on the floor.

The history of the monument

During the Early Christian Era (1st-4th centuries AD), the Tower of Winds turned into a Christian church or a baptistery of a nearby church.

In the 15th century, Kyriakos Agonites, described the monuments as a temple of Aeolus.

In the 18th century, the monument was used as an Islamic monastery, a tekke, by the dervishes. It is told that the dervishes may have saved the monument from a possible removal of its antiquities by lord Elgin.



In the 19th century, it was officially included in the archaeological sites of Athens. It was fully excavated by the Greek Archaeological Service, while the surrounding Athenian neighborhood was named after it (“Aerides”).

Latter buildings, inspired by the Tower of Winds:

- The Tower of Windows (18th century AD), on the top of the Radcliff Observatory, in Oxford, England.
- The Daniel S. Schank Observatory (1865), as the first observatory of the Rutgers University, in New Brunswick, New Jersey.
- The mausoleum of the founder of the Greek National Library, Panagis Vallianos, in the West Norwood Cemetery, in London, England.
- The Torre del Marzocco Tower (15th century AD) in Livorno, Italy.
- A similar tower (1844), located in Sevastopol.
- The Temple of Winds, on Mt. Stewart, near Newtownards, Northern Ireland.
- The Carnaby Temple (1770) in Carnaby, Yorkshire, England.
- The Maitland Robinson (1992) building in Downing College, Cambridge. It was designed by Quinlan Terry.
- The Tower of Storms (1835) in Bude, Cornwall, England. It was designed by George Wightwick.

Activities for Kindergarten pupils

General Requirements

- Essential participation of the pupils in the configuration of the program that consists an important learning experience and can amplify their enthusiasm

Steps of the Educational Activities

Educational activities are proposed with the following goals:

1. to have an experiential and cooperative nature and to assist the pupils to become emotionally engaged to the raised issues, as well as to deeply understand those issues
2. to originate from the pupil’s natural curiosity
3. to promote the interdisciplinary, holistic approach to the knowledge
4. to support:
 - a. the development of many kinds of intelligence
 - b. the development of communication skills, as well as of other skills
 - c. the development of the cooperation of the pupils and of their skill to work as a team
 - d. the development of a positive attitude towards the public things and



towards the protection of the environment, public spaces and the Cultural Heritage.

Expected results:

- ✓ The pupils shall be interested to the monuments of their city.
- ✓ The pupils shall be informed about air pollution and about the necessity of cleaning, preserving and protecting the ancient monuments.
- ✓ The pupils shall practice in working as a team.
- ✓ The pupils shall express themselves, by creating, by using common materials, visual works, narratives, theatrical acts.
- ✓ The pupils shall connect the meaning of the city (“polis”) with the context of civilization (“politismos”).

Description of Activities

Activity 1

“Creations of the Ancient Greek Technology”

Winds: Boreas and Notos

- The pupils observe the depictions of the Winds Boreas and Notos.
- The pupils answer questions like:
 - What does Boreas hold to his right arm?
 - What does Notos hold?
 - Why Boreas (Vorias/North wind) and Notos (Notias/South wind) are the main winds that affect the climate and the agricultural activities in the region of the Mediterranean Sea?

Didactic utilization:

- Personal or collective visual creations with subject those Winds.

The Activity may be repeated also for other Winds.

Activity 2

“All those things the Tower of Winds saw”

- Via a creative narrative, pupils give to the monument the ability to speak and they develop their first dialogue with the Tower of Winds, by thinking:
 - What would the Towe of Winds tell them?
 - What things does the Tower of Winds witnessed during its long history?
 - What the Tower of Winds would like to do, if coming to life?
- The pupils, divided in teams, prepare questions, in order to take an interview from the Tower of Winds. The teacher guide them so that the resulting questions would



concern various aspects of its “life”: its history, its creation, its relation to the artist creating it, its specific location, its preservation.

- The teams exchange questions and try to answer them, by impersonating the Tower of Winds.

Educational utilization:

- Printing of the Tower of Winds by using the 3D-printer.
- Personal or collective visual creations.

Activity 3

«Through Triton’s Eyes»

- The pupils, through a creative narrative, try to give to the Triton on the top of the Tower of Winds the ability to speak and to develop their first “dialogue” with him, by thinking:
 - What would he tell them about his function on the Tower?
 - What would he reveal to them about his origins?
 - What would he have witnessed happening around him?

Educational utilization:

- Personal or collective visual creations.



Activities for Primary School students

General Requirements

- Essential participation of the pupils in the configuration of the program that consists an important learning experience. The participatory configuration, on the one hand will amplify their enthusiasm and their commitment to the program's goals. On the other, it will promote the pupil's independence of thought and opinion.
- By considering the wider question "What that monument is and why is it here?", pupils would be immediately be able to give answers and versions of what happened with simple means.
- We remind to the pupils the existing connection between the word "μνημείο" (monument) and the word "μνήμη" (memory) and we discuss why during conflicts, some monuments could be damaged or completely destroyed by the use of weapons or by bombardments or even be looted.
- Presentation of various photographs and of the 3D model of the monument, in order to enrich our discussion.

Steps – Educational Activities

Educational activities are proposed with the following goals:

1. to have an experiential and cooperative nature and to assist the pupils to become emotionally engaged to the raised issues, as well as to deeply understand those issues
2. to originate from the pupil's natural curiosity and interests
3. to promote the interdisciplinary, holistic approach to the knowledge
4. to support:
 - a. the development of many kinds of intelligence
 - b. the development of research skills, of communication skills, as well as of other skills
 - c. social, cultural and technological literacy
 - d. the development of the cooperation of the pupils and of their skill to work as a team
 - e. the empowerment of personal independence
 - f. the development of a positive attitude towards the public things and towards the protection of the environment, public spaces and the Cultural Heritage.

For the discussions with the pupils, the use of the socratic method is recommended. The teacher shall not take place. He shall commence by pretending ignorance and urge the pupils to express their opinions, to pose questions, to answer those questions and maybe also to let some of these questions open. But the teacher shall also function as the coordinator of the discussion, by detecting the pupil's opinions, as well as possible contrasts,



contradictions and agreements among those opinions. He shall also point out any conclusion, if it has been reached by the pupils. He shall stimulate the pupils' thoughts, in order to remove possible stereotypical thoughts. For example, he may explain, by using the phrase "If I understood correctly what you said...". He shall also assist the team of pupils to make inductions, to understand the logical consequences of the expressed opinions and of the measures that may have been proposed. So, he will teach to the pupils the active listening.

It is also possible for the subject of the course to be linked with other academic subjects, as, for example, Language, Environmental Studies, History, Natural Sciences (for the preservation of the monument, the properties of the building materials etc.), Mathematics (for measurements, the scale of the building etc.), Aesthetics etc.

Expected results

- The pupils shall be interested to the monuments of their city.
- The pupils shall be informed about air pollution and about the necessity of cleaning, preserving and protecting the ancient monuments.
- The pupils shall explore their city's history and be emotionally engaged to it, in order to develop a sense of belonging.
- The pupils shall learn about the relation between public spaces and monuments through time, to understand those two concepts and to be interested about them.
- The pupils shall develop criteria of aesthetic quality.
- The pupils shall practice in working as a team.
- The pupils shall develop the skills of an active citizen which opposes the degradation of his/her city and its monuments in both a personal and in a collective level, which claims and takes action.
- The pupils shall express themselves, by creating, by using common materials, visual works, photocomics, narratives, theatrical acts.
- The pupils shall connect the meaning of the city ("polis") with the context of civilization ("politismos").

Description of Activities

Activity 1

"Creations of the Ancient Greek Technology"

Winds: Boreas and Notos

- The pupils observe the depictions of the Winds Boreas and Notos.
- The pupils answer questions like:
 - What does Boreas hold to his right arm?
 - What does Notos hold?



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- Why Boreas (Vorias/North wind) and Notos (Notias/South wind) are the main winds that affect the climate and the agricultural activities in the region of the Mediterranean Sea?

The Activity may be repeated also for other Winds.

Hydraulic clock: a miracle of the ancient Greek technology.

- On the occasion of examining the hydraulic clock of the Tower of Winds, we learn about other hydraulic clocks in ancient Attica: for example, the hydraulic clock in the Ancient Agora of Athens or the hydraulic clock (clepsydra) of the Amphiaraeion, near Oropos.
- Comparison of the hydraulic clock to analogous invention of modern technology, namely the common clock and the digital clock.

Educational utilization:

- The pupils shall use the material of their research to create a synthetic essay – presentation.

Activity 2

“All those things the Tower of Winds saw”

- The pupils imagine the important events that the monument “saw” in its location, from the day of its construction, until today and create a timeline, by considering:
 - What events gave joy to the monument?
 - What events gave sorrow to the monument?

Didactic utilization:

- Printing of the Tower of Winds by using the 3D-printer.
- The pupils shall create a collage with the summary of the things they found interesting.
- If the team of the pupils wants to do so, they can imagine a phantastic story and to introduce their own characters. The form of the photocomic is recommended for that, because it puts the pupils to the roles of the actors, the director and the script writer. With the style of the comics, in which cloudy frames allow the characters to speak or to think loudly, well known to the pupils, it could be used in order to create a big variety of stories.



Activity 3

“The risks the Tower of Winds faces”

- The pupils shall understand the dangers that once threatened the monument and for those currently threatening the Tower of Winds. For example, in order to present the dangerous effect of the atmospheric pollutants, we shall present the experiment with the chalk:
 - Materials required: chalk, vinegar, transparent glass vessel.
 - Implementation: In order for the pupils to understand the effect of the acid rain, they put in the glass vessel a big chalk and add enough vinegar to cover it. Next day, they will be able to note its acid wear.
- Preventive and systematic preservation: The goal is that the pupils shall learn the various types of wears that threat antiquities, the reasons for which we intervene to preserve antiquities and the types of interventions that we can made. They shall also learn the professions of the people involved in restorations of antiquities, as well as the modern technologies they use for that purpose.

Educational utilization:

- The pupils shall use the material of their research to create a synthetic essay – presentation.



Pictures

Tower of Winds (photographs)



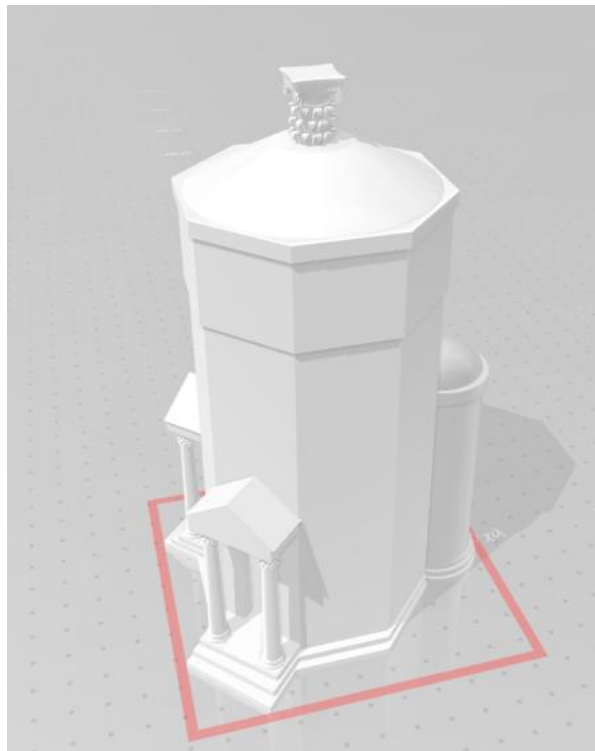
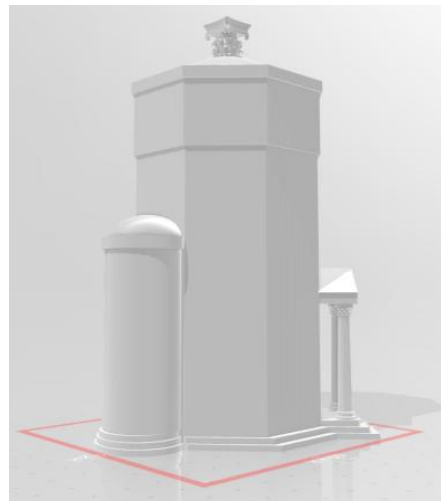
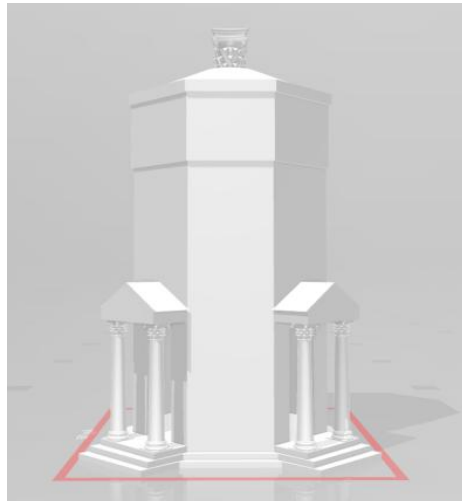
Source: <https://www.flickr.com/photos/carolemage/32891637114>



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Images from the Tower of Winds' 3D model we made in Blender



Related Links

https://www.youtube.com/watch?v=NEHbJL7yRZU&ab_channel=ORFFEAS

https://www.youtube.com/watch?v=GVvkyR321wY&ab_channel=euronews%28%CF%83%CF%84%CE%B1%CE%B5%CE%BB%CE%BB%CE%B7%CE%BD%CE%B9%CE%BA%CE%AC%29

<https://www.youtube.com/shorts/g3PGrq3Mb7U>

<https://www.youtube.com/shorts/rwyvutcTL6w>



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Region 2: Chios' local cultural heritage and the Tabakomilloi windmills

Learning objectives

By the end of this course, students will be able:

- To understand the definition of tangible, intangible and natural cultural heritage and to distinguish the concepts.
- To get in touch with the cultural heritage of their place.
- To cultivate feelings of individual and collective responsibility regarding the management of material, intangible and natural cultural heritage.
- To understand the value of the cultural heritage of the place.
- To cultivate their imagination about the monuments of their place and travel through time and tradition.
- To get to know monuments, natural landscapes and traditions through the activities of their place.
- To connect the function of 3D printing and 3D scanning with the historical monument of the place, the Tabakomilloi.

Local cultural heritage

Description of the local cultural heritage

Chios, the Greek island of the **northeastern Aegean Sea**, is famous for its cultural heritage dating back to antiquity. It has a rich history of different cultures and cultural influences. Its unique identity and character is due to its rich ***tangible, intangible and natural cultural heritage***.

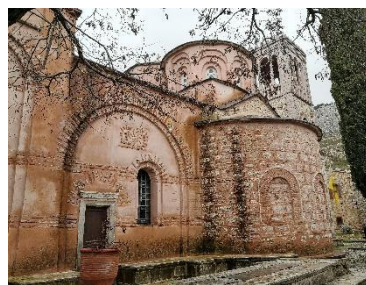
Tangible cultural heritage

Tangible cultural heritage refers to objects of cultural value, monuments, historical sites that are considered worthy of preservation for future generations.

A representative example of its material cultural heritage is the 11th century monastery of **Nea Moni**. It is located in the center of the island and is considered a masterpiece of Byzantine architecture. It is a UNESCO World Heritage Site [1].



Nea Moni – Photo S. Varla



Nea Moni – Photo S. Varla

In the same category belongs the **Castle of Chios** built in the 10th century by the Byzantine Emperor Justinian [2] and the medieval fortified village of **Mesta** of the 14th century. It has winding streets designed to disorientate pirates. This well-preserved, walled settlement remains unchanged to this day. The traditional architecture of the houses is admirable [3].



Castle of
Photo S.



Chios –
Varla



Mesta Village – [Source](#)

Even the village of **Pyrgi** is also famous for its traditional architecture. It includes houses decorated with black and white geometric designs, the Scratchers [4].



Pyrgi Village - [Source](#)



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The **Viglas of Chios** are medieval, cylindrical turrets. Built on coasts and capes, they served the purpose of observing the sea and providing early warning to the inhabitants in case of enemy invasion [5].



Vigles Chios - [Source](#)

The pre-industrial era in Chios is associated with the Tabakika (leather processing factories) and the **windmills** that were built near them, mainly to serve their needs.



Windmills of Chios - [Source](#)

A traditional art practiced in Chios is **pottery**. Potters use local clay to create beautiful, utilitarian objects.



Pottery in Armolia - [Source](#)

Natural cultural heritage

Natural cultural heritage refers to landscapes and natural areas of cultural significance such as the **24 Mastichochoiria** . These villages are located in the south of the island and are inextricably linked to the production of mastic, the cave of Olympi and Mavra Volia Beach.



Olympi Cave – Photo S. Varla

Intangible cultural heritage

Intangible cultural heritage refers to traditions, customs and habits that are passed down from generation to generation. Chios, rich in intangible cultural heritage, includes different cultural expressions such as the **celebration of Easter**, a mixture of religious and secular traditions (**Rocket War**) [6].



Rocket War – [Source](#)

Another example is the **art of mastic cultivation**. Mastic is a resin. It is produced from the mastic tree which grows only in Chios. The island has a long history of mastic cultivation and it is an important part of the local economy. The harvesting and processing of mastic is a time-consuming process and the product is highly valued for its unique taste and health benefits [7].



mastic cultivation – [Source 1](#) – [Source 2](#)

The island is also famous for its music with a variety of traditional instruments (bouzouki, baglama, jura). The traditional dances of syrtos, pyrgousikos, detos and kalamatianos are still danced at local **festivals and events**.



Festival in Mesta - [Source](#)

Another important aspect is its **cuisine** based on local ingredients such as **souma**, **kopanisti**, **mamoulia**, **masourakia** and **tambouropita**.



Souma, Chios – [Source](#)

In conclusion, the unique identity and character of the island is reflected in its monuments, traditions, customs and landscapes. Chios is a cultural treasure worth preserving for future generations.

Points to remember

- **Chios**, the Greek island of the **northeastern Aegean Sea**
- The 11th century monastery of **Nea Moni** considered a masterpiece of Byzantine architecture. It is a **UNESCO World Heritage Site**.
- The **Castle of Chios**, a **monument** in the 10th century by the Byzantine Emperor Justinian.
- **Mesta**, a **medieval village** of the 14th century.
- **Pyrgi**, a village, famous for its black and white architecture, **“ta xysta”**.
- **Viglas of Chios**, medieval towers **for defending the island**
- **“Rocket War”** as a celebration for Easter
- The art of **mastic cultivation**.
- **Tabakomilloi**, a monument of **material cultural heritage**, related to **leather processing industries**.

Activities

Activity 1

“Create an Interactive Map of Chios”

Target group: Primary School

A. Requirements

- Access to internet
- 1 PC or laptop
- Interactive board
- Video projector
- 1 tablet for 2 students

B. Steps

- Use the digital tool Thinglink to create an interactive map.
- Place images of local monuments on the map, in collaboration with the pupils.
- Use the link: <https://www.thinglink.com/scene/169107759866002787> to access the map.
- Zoom in and click on the points.
- Name and describe each monument.
- Discuss basic facts about each monument (location, function, history, tradition).
- Move to other points on the map and repeat.
- Discuss differences and similarities found on the pinned monuments.
- Gather information about a local monument in groups of 2-3 students via online research.



C. Results

Pupils will familiarize with their local cultural heritage and will be able to:

- Learn how to create an interactive map.
- Learn how to read a map.
- Locate monuments of their region on a map.
- Learn local monuments and understand where they are located.
- Understand basic facts about each monument (history, function, location etc.).
- Compare and recognize different local monuments.
- Explore their island history.



Activity 2

“Virtual tour of Chios Island”

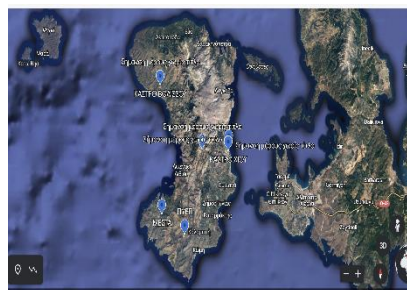
Target group: Primary School

A. Requirements:

- Access to internet
- 1 PC or laptop
- Interactive board
- Video projector
- 1 tablet for 2 students
- Link to Google Earth

B. Steps:

- Use the link:
<https://earth.google.com/web/@38.37586261,25.99698509,49.90619888a,145818.46525524d,35y,0h,0t,0r/data=CkgaRhJACiUweDEOYm1ZGI1NzgxNmFhZDM6MHgxMTQ0ZGM1MTVtKmmY5MGlxGTx705kgLONAlcWXP5WJITpAKgVdAGlvxcgCIAE>
- Put pins on the map on the most popular monuments:
 - Castle of Chios
 - Castle of Volissos
 - Pirgi village
 - Mesta village
 - Windmillss
 - Vigles
 - Nea Moni monastery
- Use street view and explore each monument.
- Ask students to describe what they see.
- Discuss about the characteristics of each monument (history, period, location).
- Compare the two castles (Chios – Volissos).



C. Results:

Pupils will:

- Learn about the immovable Chios cultural heritage.
- Understand the particular characteristics of each monument.
- Understand basic facts about each monument.
- Realize that their identity is influenced by the environment.
- Better comprehend and explore the local history.
- Familiarize with the values of monuments.



Activity 3

“Visit the museum.....”

Target group: Primary School

A. Requirements:

- Access to internet
- Video projector
- Interactive board
- 1 laptop / 1 PC
- 1 Mobile phone or tablet for 2 students
- Photogrammetry software for mobiles or tablets (Kiri Engine)
- 3D Printer
- 3D Pens
- Clay or plasticine

B. Steps:

- Visit the archaeological museum of Chios.
- Scan an exhibit from the museum using photogrammetry and print it.
- Take a virtual tour of another museum.
- Discuss and compare the two museums.
- Learn about the exhibits (history, function, period).
- Try to copy an exhibit using clay or plasticine.
- Create an archeological exhibit using 3D pens.

C. Results:

Pupils will:

- Learn about the movable Chios cultural heritage.
- Understand the characteristics of each exhibit.
- Realize that their identity is influenced by the environment.
- Better comprehend the local history.
- Create their own exhibits.
- Familiarize with photogrammetry.
- Familiarize with the local history.
- Cultivate critical thinking.

Selected monument: the Tabakomilloi windmills

Description of the selected monument

More specifically, **tabakomilloi**, a monument of the **material cultural heritage** of Chios, to which we are referring, belong to the category of the **windmill**, the use of which was quite widespread.



Photos – S Varla

They are buildings with an unspecified date of construction, but definitely after the devastating earthquake of 1881 [8].

From the testimony of Andreas Polemides we are informed that the windmills of Isidoros Lo, George Kaloutas and Liapi operated in the Agia Irini quarter of the tanneries, which no longer exist. However, the ruins of the five windmills near Agios Hypatios are preserved to this day. According to Polemides, a windmill belonged to an old man named Kostari, then it passed to N. Lambros. Also, the windmill of Z. Kaloutas which came to Stefanos Kaloutas, the two windmills of Pantelis Merousis and the mill of Minetta were the mills of the area of Agios Ypatios [8].

Thus, in the late 19th and early 20th centuries a small-scale industrial infrastructure was created [9].

In total there were nine mills in two rows. The northern mills were four and are preserved until today restored. The southern mills or mills of Agios Hypatius of which there were five, three have collapsed and two are in dire condition [10].

Their construction and operation were inextricably linked to the neighboring Tabakika, the industrial area dedicated to the complex work of leather processing.

The mills were used to grind acorns, pine bark (the petika) and leaves of mastic trees (the so-called schinophyllo), i.e. material that was produced and used in the tanning of leather [10].

The mills are built at a distance of 1.5 kilometers north of the city of Chios in the seaside area of <<Tabakiki>>, on the road to Vrontados just before the Hospital of Chios.

In this area today there are private homes, garages and car dealerships, municipal parking

lots, commercial businesses, sports activities area, carpentry, Center for Learning Difficulties, etc. and the General Hospital of Chios.

They belong to the architectural type of the stone Mediterranean tower mill, which has been home to the island since the time of the Genoese occupation (1346-1566). The windmills of Tabakiki are about ten meters high.

A traditional windmill has a tall tower of wood or brick, with a large, horizontal wheel (called a rotor or impeller) on top. The rotor has a series of blades that catch the wind and spin the wheel. The wheel is connected to a shaft, which is used to power various machinery, such as the grain mill.

The soil in this area is considered earthy or sandy. The foundation is of the circumferential footing or footing type where the floor is flush with the ground. The base of the adjacent mill road forms a base which is filled with stones and soil.

The southern mills were five and today three have collapsed. The mill adjacent to the road is very small due to its distance from the sea.

The northern mills were four. They are preserved as they are restored with three or two stories. Each mill has three low-ceilinged spaces (downstairs, loft, upstairs). From the door of the mill we enter the space where the sacks of acorns, petika or sinophyllus were left. These spaces were connected by a narrow staircase. The millstones were under the roof and they ground there. The horizontal partition floors are made of parallel beams, usually chestnut wood, on which a wooden floor covering of thick planks was built. It had warehouses for the deposit and storage of materials, as well as walls as a breakwater for protection from the sea [10].

Today walls and warehouses do not exist. Unfortunately, during their restoration, at the beginning of 1990, the contract did not provide for the preservation-restoration-rescue of grinding and other mechanisms and they were thrown away [10].



Windmills - [Source](#)

Windmills are perhaps among the earliest examples of industrial buildings. The difference between the windmill and other industrial buildings lies in the fact that the shell and machine form an inseparable unit. This particularity is not found in any other type of industrial building.

The work of the mills throughout the years they operated was continuous and uninterrupted on the same object with a short break during the occupation where for a short time they functioned as grist mills for the production of flour [10].

The second world war, the political changes that took place in the Balkans and Eastern Europe - which were the traditional markets of Chios' products - as well as the modernization of industrial production excluded the industries of Chios [9].

Activities

Activity 1

"Create an Interactive Map of Chios"

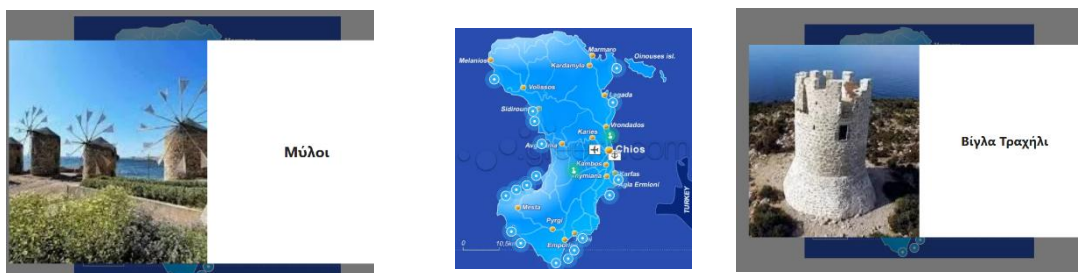
Target group: Primary School

A. Requirements

- Access to internet
- 1 PC or laptop
- Interactive board
- Video projector
- 1 tablet for 2 students

B. Steps

- Use the digital tool Thinglink to create an interactive map.
- Place images of windmills and vigles on the map, in collaboration with pupils.
- Use the link: <https://www.thinglink.com/scene/169107759866002787> to access the map.
- Zoom in and click on the pin.
- Find windmills or vigles on the map.
- Discuss basic facts about each monument (location, function, history, tradition).
- Move to other pins on the map and repeat.
- Discuss differences and similarities found on the pinned monuments.
- Gather information about vigles or windmills in groups of 2-3 students via online research.



C. Results

Pupils will familiarize with their local cultural heritage and will be able to:

- Learn how to create an interactive map.
- Learn how to read a map.
- Locate vigles and windmills on Chios map.

- Learn windmills and vigles and understand where they are located.
- Understand basic facts about windmills and vigles (history, function, location etc.).
- Cultivate critical thinking.

Activity 2

“3D scanning and 3D printing of windmill”

Target group: Primary School

A. Requirements:

- Access to internet
- Smartphone or tablet
- Photogrammetry software (Kiri Engine)
- 3d scanner
- 3d scanning software
- Computer / PC
- Object to be scanned (object that depicts a windmill)
- 3D printer

B. Steps:

- Use photogrammetry by scanning a miniature of a windmill, using a smartphone or a tablet with the photogrammetry software (Kiri Engine).
- Crop the scanned object if it is necessary.
- Export the file to a computer.
- Use meshmixer in order to edit and refine the 3D model, as necessary.
- Print the 3D model, using a 3D printer.
- Scan a miniature of a windmill, using a 3d scanner.
- Export the file and use meshmixer in order to edit and refine the 3D model.
- Print the 3D model, using a 3D printer.
- Discuss the pupils’ impressions of 3D scanning and 3D printing.
- Discuss the pros and the cons of photogrammetry and 3d scanning.
- Discuss the importance of 3D scanning and 3D printing in preserving and studying local cultural heritage.

C. Results:

Pupils will be able to:

- Familiarize with the use of digital tools like Kiri engine and meshmixer.
- Familiarize with the use of 3d scanner.
- Understand the windmill’s architecture, while developing skills in 3D scanning and 3D printing.
- Learn that windmills are part of the local cultural heritage.
- Learn the architecture of the windmills.



- Familiarize themselves with a windmill and understand the role of the windmill on the island.
- Cultivate critical thinking.

Activity 3

“3D modelling and 3D printing of windmill”

Target group: Primary School

A. Requirements:

- Access to internet
- Computer or tablet
- A 3D modelling software (Sketchup, Tinkercad, Blender)
- 3D printer
- A 3D Model of a windmill or a picture

B. Steps:

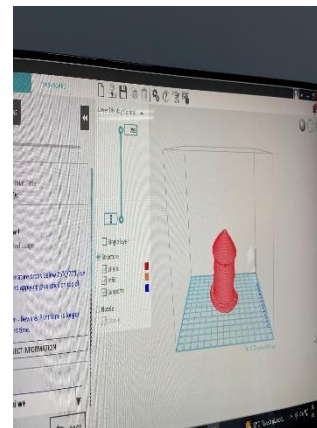
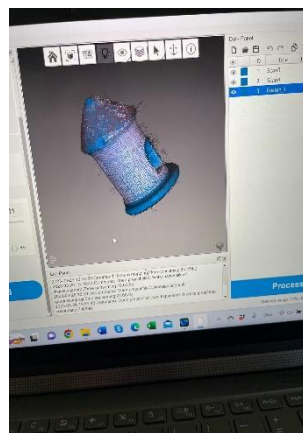
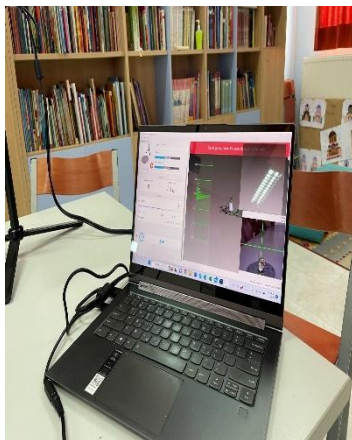
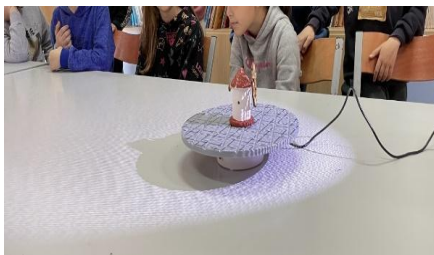
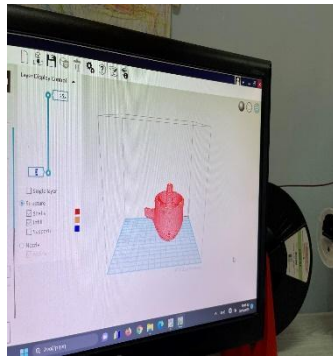
- Show the students the 3D model of the windmill or the picture.
- Ask them to create a 3D model of a windmill.
- Use a 3D modelling software (Sketchup, Tinkercad, Blender) to create a 3D model of a windmill.
- Print the student’s 3D models of the windmill.

C. Results:

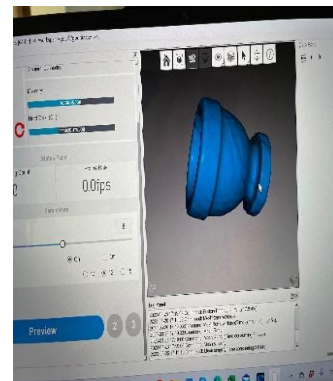
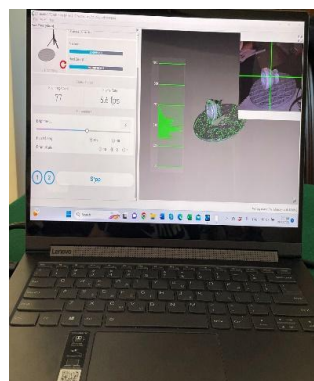
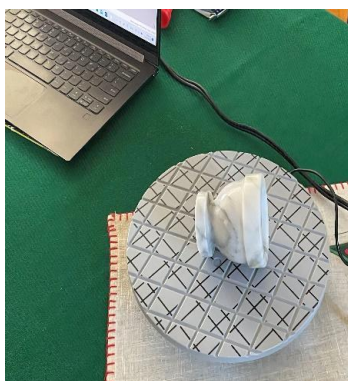
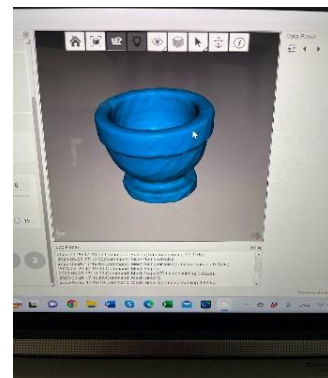
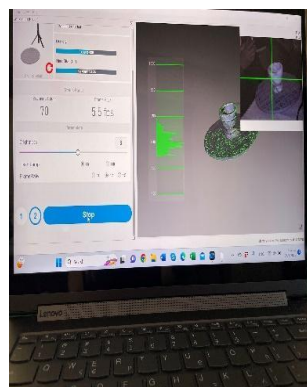
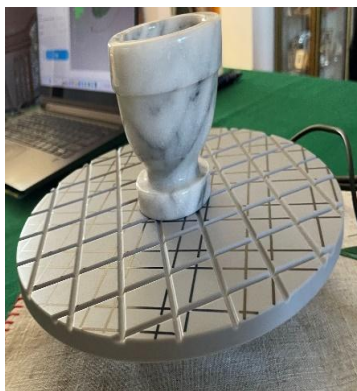
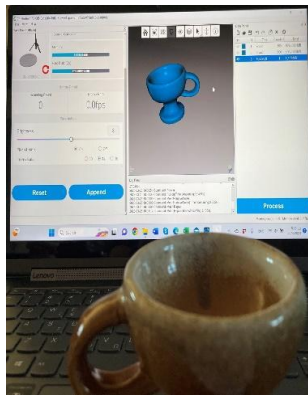
Pupils will be able to:

- Familiarize with the use of a 3D modelling software (Sketchup, Tinkercad, Blender).
- Familiarize with the use of 3d printer.
- Understand better the windmill’s architecture, while developing skills in 3D modelling and 3D printing.
- Familiarize themselves with a windmill and understand the role of the windmill on the island.
- Cultivate critical thinking.
- Create their own models.

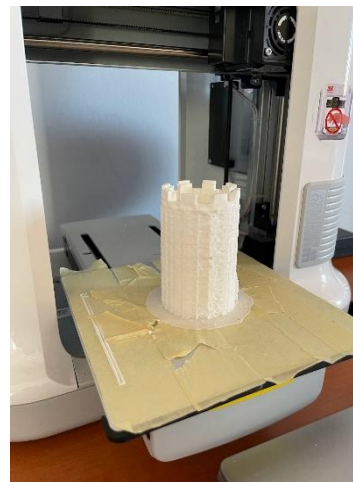
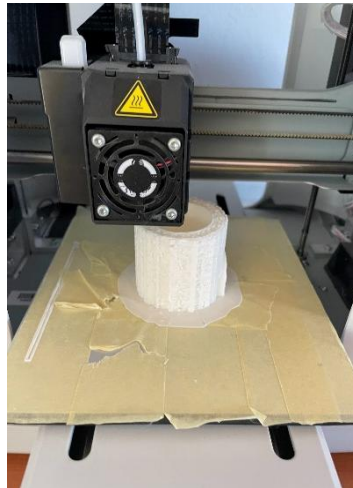
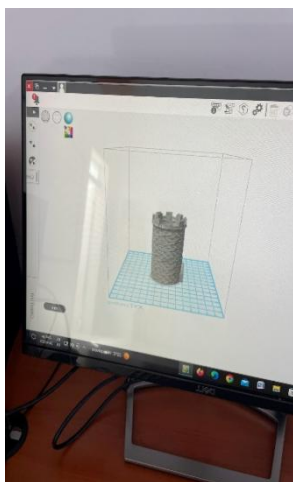
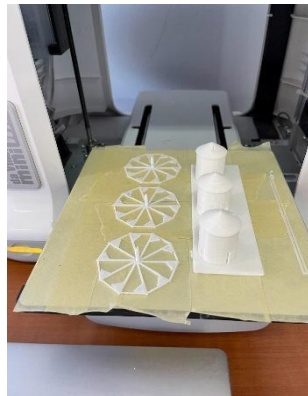
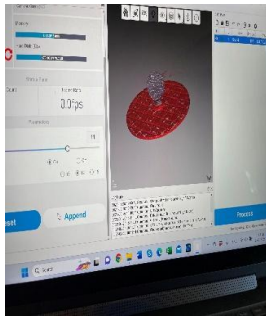
Pictures



Intellectual Output 2: Local Cultural Heritage and Educational Scenarios



Intellectual Output 2: Local Cultural Heritage and Educational Scenarios



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Related Links

Windmills of Chios island: <https://www.youtube.com/watch?v=hJn0TSrSSVU>

Windmills of Chios: <https://www.youtube.com/watch?v=DQsV17tJhXY>

[Explore the nature of Chios island](#)

Chios, a unique island in the Aegean:

<https://www.facebook.com/chiostravelguide/videos/326553318409414/>

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Region 3: Leiria's local cultural heritage and the Leiria Castle

Contents of the course

1. Introduction to Leiria's cultural heritage:
Definition and examples of tangible, intangible and natural heritage
Overview of Leiria's cultural heritage
2. Values and classification of local monuments:
Different values associated with cultural heritage sites
Examples of monuments classified as National Monuments, Monuments of Public Interest and Monuments of Municipal Interest
3. Locating local monuments on a map:
Using maps to locate cultural heritage sites of Leiria
4. The Leiria Castle: history and functionality:
Historical overview of Leiria Castle
Functionality of the Castle throughout history
5. The Leiria Castle: architecture and decoration:
Architectural features and design of the Castle
Decorative elements of the Castle
6. Digital literacy and cultural heritage:
3D modelling/3D scanning/3D printing objects related to Leiria's cultural heritage

Learning objectives

By the end of this course, students will be able to:

- Identify examples of tangible, intangible and natural heritage in Leiria.
- Understand different values associated with some local monuments.
- Recognize examples of local monuments that are classified as National Monuments, Monuments of Public Interest and Monuments of Municipal Interest.
- Locate local monuments on a map.
- Describe some aspects of the history, functionality, architecture and decoration of Leiria Castle.
- Apply 3D modelling, 3D scanning and 3D printing techniques.

Local cultural heritage

Description of the local cultural heritage

The city of Leiria is located in the centre-littoral region of Portugal. It has numerous examples of tangible, intangible and natural heritage that are reflective of its unique identity and history and that are important sources of pride for its residents and an attraction for visitors. Next, are presented some examples.

Tangible cultural heritage

- Classified immovable heritage

Leiria has several examples of immovable heritage that are classified as National Monuments, Monuments of Public Interest and Monuments of Municipal Interest, that are particularly important testimonies of civilisation, identity and national culture.

Regarding National Monuments, there are St Peter's Church, Leiria Castle, Shelter of Lagar Velho and Leiria Cathedral, including the cloister, the surrounding churchyard, the bell tower and the bell ringer's house.

Sant'Ana Market and Misericórdia Church are Monuments of Public Interest.

Monuments of Municipal Interest include *Quinta do Salgueiro* or *Casa do Barão do Salgueiro*, *Dona Julinha* Municipal Agromuseum and *Villa Portela* or *Quinta da Portela*.

There are also several properties of Public Interest: Sanctuary of Our Lady of the Incarnation, Convent of St Augustine and former seminary, Convent of *Santo António dos Capuchos*, St Francis' Church and Convent (remains), Building of the former school Dr. Correia Mateus, Pillory of Monte Real and *Nossa Senhora da Luz* Parish Church.

The Town Hall of Monte Real is a property of Municipal Interest.

- Classified movable heritage

As for local movable heritage, Lapedo Child was an important discovery, considered a National Treasure.

Intangible cultural heritage

- The pottery of Bajouca, from a village of the municipality of Leiria, is currently planned to be proposed to be inscribed in the National Inventory of Intangible Cultural Heritage.

Natural cultural heritage

Considering natural heritage, Leiria boasts several forest resources: National Forest of the Bear, National Forest of Pedrógão, Pine Forest of Galga, Mata das Quintãs, Charneca do Nicho Forest Perimeter and National Forest of Ravasco.

There are also various trees of Public Interest: *Fraxinus Excelsior L.*, commonly known as *freixo*; *Quercus faginea Lambert*, commonly known as Portuguese oak or *cerquinho*; and *Pinus pinaster Aiton*, regionally known as coastal creeping pine.

It is also worth highlighting Azabucho – a Site of Community Importance, that is part of the Natura 2000 Network –, the salt pans (*salinas*) of Junqueira and Ervedeira Lagoon – a Site of interest for Nature Conservation, classified as a CORINE Biotope (European Community Program for Sites of Scientific Interest and Nature Conservation).

Points to remember

Here are some key points to remember about the local cultural heritage of Leiria:

- Leiria has a rich cultural heritage that includes tangible, intangible and natural elements.
- Leiria has several examples of immovable heritage classified as National Monuments, Monuments of Public Interest and Monuments of Municipal Interest.
- Leiria Castle, St Peter's Church, Shelter of Lagar Velho and Leiria Cathedral are classified National Monuments.
- Lapedo Child is a classified movable heritage, considered a National Treasure.
- The pottery of Bajouca is an example of intangible cultural heritage in Leiria.
- Leiria has several trees of Public Interest that, along with Azabucho, various forests, the Ervedeira Lagoon and the *Salinas* (salt pans) of Junqueira, are examples of the it's natural heritage.



Activities

Activity 1

“Virtual tour to local monuments”

Target students:

- Kindergarten and primary

Requirements:

- Computers or tablets with internet access
- Video projector
- Link to Google Earth Web project

Steps:

1. Teacher (in case of younger children) or students (the older ones) click on a link that leads to the project created on Google Earth Web – chapter related to local cultural heritage (pages 72 to 94).
2. Students will see the location on the map and virtually get to know some examples of tangible cultural heritage from their region, specifically immovable heritage classified as National Monuments, Monuments of Public Interest and Monuments of Municipal Interest, using Google Earth Web tools.

Results:

- Students will learn about the immovable classified Leiria’s cultural heritage, locating the monuments on a map and recognizing their value.

Activity 2

“3D scanning and 3D printing of intangible local heritage”

Target students:

- Kindergarten or primary

Requirements:

- 3D scanner (Creality)
- 3D scanning software
- Object to be scanned (pottery of Bajouca)
- 3D printer (Ender)
- Computer

Steps:

1. Teacher and students 3D scan an object that represents intangible local heritage (pottery of Bajouca), using a 3D scanner (Creality).
2. They edit and refine the 3D model as necessary, using the 3D scanner software.
3. They print the 3D model, using a 3D printer.
4. Teacher leads a class discussion on the importance of 3D scanning and 3D printing in preserving and studying local cultural heritage.

Results:

- Students will learn about the intangible heritage of Leiria, while developing their skills in 3D scanning and 3D printing.

Activity 3

“Online quiz about local cultural heritage”

Target students:

- Primary

Requirements:

- Computers or tablets with internet access
- Link to Quizizz quiz

Steps:

1. Teacher (in case of younger children) or students (the older ones) click on a link that leads to a quiz made in Quizizz, questioning about cultural heritage, including local cultural heritage and interest and value related questions.

Results:

- Students will test their knowledge about the cultural heritage of Leiria.

Selected monument: the Leiria Castle

Description of the selected monument

- **Which monument is this?**

Leiria Castle

- **When and who created this monument?**

The construction of Leiria Castle was ordered by the first king of Portugal, Afonso Henriques, during the 12th century.

- **What is it?**

It's a castle.

- **What did its purpose seem to be?**

Leiria Castle was originally built as a defensive structure to protect the region from invasions and attacks. It was also used as a residence for the Portuguese royal family during some periods and it was an important symbol of the country's power and prestige. Today, the Castle is primarily a tourist attraction, and its purpose is to showcase Portugal's rich history and cultural heritage.

- **Where is it?**

The Castle is located on a hill in the centre of Leiria, overlooking the city and surrounding countryside.

- **What is around it?**

The walls of Leiria Castle are surrounded by the historic centre of Leiria, which is an area with narrow streets (like *Rua Direita* – originally called Barão de Viamonte Street), old houses and small shops. There are several historic buildings and monuments nearby, like Saint Peter's Church, *Misericórdia* Church and Leiria Cathedral. Not far, there is Sant'Ana Market and popular places for locals and visitors like Rodrigues Lobo Square and Luís de Camões Garden, with the statues of the famous poets who gave them those names.

- **What does it look like?**

Leiria Castle is an impressive mediaeval fortress that was built on an irregular polygonal plan, with solid walls and towers. It has undergone several renovations and expansions over the centuries, which has resulted in a mix of architectural styles from different periods in

Portuguese history. In its interior, there is the Royal Palace, the Church of Santa Maria da Pena and the Keep.

- **Which are the main elements that make the building important (architectural elements, decoration, set-up)?**

Leiria Castle is important for several architectural elements that make it unique and historically significant. Some of these elements include its mediaeval walls and towers, the central keep, the Gothic chapel, the cistern, the Renaissance palace and the large *loggia* with eight arches of twin capitals.

- **What story does the monument tell us?**

Leiria Castle tells the story of Portugal's defensive capabilities, royal architecture, cultural influences and strategic importance, making it an important historical and cultural monument that is appreciated by both locals and visitors.

- **What are the values embodied in the monument?**

Leiria Castle embodies several significant values in terms of historic, cultural and architectural significance. It is a symbol of Portugal's struggle for independence and played a crucial role in various battles and conflicts. The castle is an architectural masterpiece, with its mediaeval walls and towers providing a glimpse into Portugal's past. Additionally, it has a social value, as it was once used as a prison.

Activities

Activity 1

“Virtual tour to Leiria Castle”

Target students:

- Kindergarten and primary

Requirements:

- Computers or tablets with internet access
- Video projector
- Link to Google Earth Web project

Steps:



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1. Teacher (in case of younger children) or students (the older ones) click on a link that leads to the project created on Google Earth Web, specifically the chapter related to monument analyses – Leiria Castle (pages 46 and 47).
2. Students will see the location on the map and virtually get to know Leiria Castle, using Google Earth Web tools.
3. Complementing the virtual visit, students will see photographs, read historical information and click on links to videos or other related web pages.
4. Teacher leads a discussion with the class on what they have learned about Leiria Castle.

Results:

- Students will increase knowledge and understanding of the Castle's history, functionality, architecture, decoration and embedded values.

Activity 2

“3D scanning and 3D printing of Leiria Castle”

Target students:

- Kindergarten or primary

Requirements:

- Smartphone or tablet
- Photogrammetry software (Kiri Engine)
- Object to be scanned (object that represents Leiria Castle)
- 3D printer (XYZ)
- Computer

Steps:

1. Teachers and students 3D scan an object that represents Leiria Castle, using a smartphone or a tablet with a photogrammetry software (Kiri Engine).
2. The file is exported to a computer, in order to edit and refine the 3D model, as necessary.
3. They print the 3D model, using a 3D printer.
4. Teacher leads a class discussion on the importance of 3D scanning and 3D printing in preserving and studying local cultural heritage.

Results:

- Students will increase understanding of the Castle's architecture, while developing their skills in 3D scanning and 3D printing.
-

Activity 3

“3D modelling and 3D printing of Leiria Castle”

Target students:

- Primary

Requirements:

- Computer with a 3D modelling software (Tinkercad)
- 3D printer (Ender)
- Pictures of Leiria Castle

Steps:

1. Teacher shows the students pictures of Leiria Castle, in order to remember its features.
2. Students use a 3D modelling software (Tinkercad) to create a 3D model of the castle.
3. They print the 3D models using a 3D printer and exhibit them to the class.
4. Teacher leads a class discussion on the importance of 3D modelling and 3D printing in preserving and studying local cultural heritage.

Results:

- Students will increase understanding of the Castle's architecture, while developing their skills in 3D modelling and 3D printing.

Activity 4

“Robot programming”

Target students:

- Primary

Requirements:

- Robot
- Pictures of Leiria Castle
- Acrylic base with drawn squares (size 15cmx15cm)
- List of questions
- 3D printed models of Leiria Castle

Steps:

1. Several pictures of Leiria Castle are placed below an acrylic base with squares drawn.
2. Each group of students at a time programs a robot to move to a different picture.

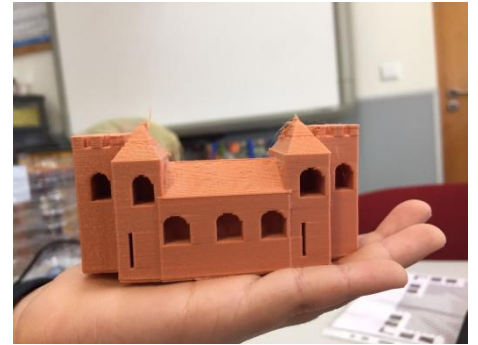
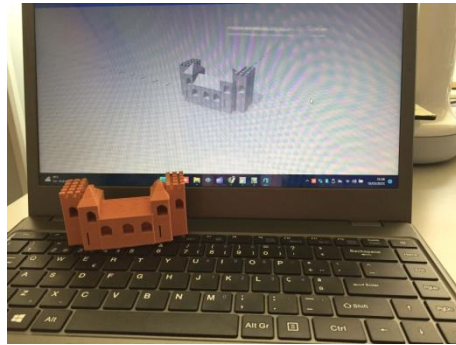
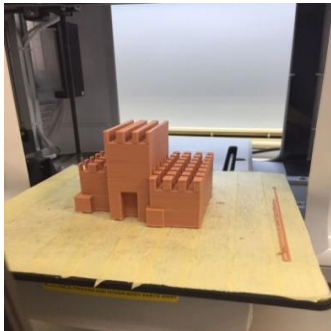
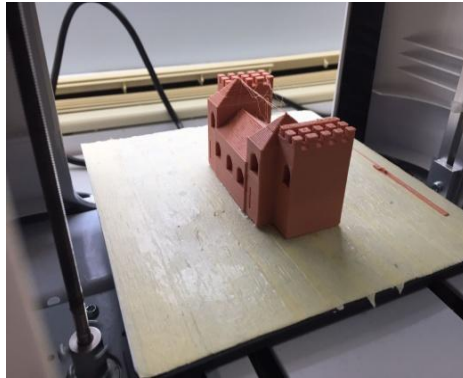
3. Once the robot reaches each picture, students have to answer questions about Leiria Castle.
4. Groups that respond correctly to all the questions, win a 3D model of Leiria Castle previously printed.

Results:

- Students will test their knowledge about Leiria Castle, while programming a robot.



Pictures



3D printed Leiria castles modelled in Tinkercad



3D printed Leiria castles scanned with Kiri Engine



3D printed workpiece of intangible local heritage (Bajouca pottery) scanned with Creality

Related Links

Video showing students making the activities mentioned above:

<https://youtu.be/17laVLjren8>

Link to the project made on Google Earth Web, used in virtual tours activities:

<https://earth.google.com/web/data=Mj8KPQo7CiExZmdCSGwxNEp6U3FXdkdzTIQya194ZVVIUVZKUmp5Tm4SFgoUMDNENUZDMUE0QzlwMzgwNjc3RjY>



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Region 4: Lesvos' local cultural heritage and the Ancient Theater of Mytilene

Contents of the course

1. Introduction to the cultural heritage of Lesvos:

Definition and examples of tangible, intangible and natural heritage

Acquaintance with the main monuments of the cultural heritage of Lesvos

2. Values and classification of local monuments:

Different values attached to heritage sites

Examples of monuments classified according to their era and origin.

3. Locate local monuments on a map:

Using maps to locate cultural heritage monuments of Lesvos

4. Ancient theater of Greece: history and functionality:

Historical overview, familiarity with its structure and use

Functionality of the Theater throughout history

5. Ancient Theater of Mytilene: architecture and decoration

Architectural features and design of the theater

Decorative elements of the theater

6. Digital literacy and cultural heritage:

3D modeling/3D scanning/3D printing of objects related to the cultural heritage of Lesvos

Learning objectives

By the end of this course, students should be able to:

- Identify examples of tangible, intangible and natural heritage in Lesvos.
- Understand different values associated with certain local monuments.
- Recognize examples of local monuments and how they are classified according to their time and origin.
- Locate local monuments on a map.

- Know the history and functionality of the Ancient Greek Theatre.
- Describe some aspects of the history, functionality, architecture and decoration of the Ancient Theater of Mytilene.
- Apply 3D modeling, 3D scanning and 3D printing techniques.

Local cultural heritage

Description of local cultural heritage

Lesvos island is located in the northeast of the Aegean Sea, is the 3rd largest island of Greece and has a long history that goes back more than 3,000 years.

It has numerous examples of tangible, intangible and natural heritage that are reflective of its unique identity and history and that are important sources of pride for its residents and an attraction for visitors. Next are presented some examples.

Tangible cultural heritage

Lesvos has several examples of tangible local heritage.

- Mytilene, the capital, is known for its architectural beauty and also for its ancient monuments and it is built amphitheatrical around the Byzantine castle.
- The 19th century mansions make Mytilene unique, as each of them has a different architectural style and beautiful large gardens, revealing the economic strength of the island during the 20th century.
- Throughout the town there are also many ancient monuments such as the Hellenistic ancient theater with its superb acoustics and capacity of 10,000 people (this is the monument that our pupils made their research),
- The preserved byzantine castle better known as the Fortress of Mytilene,
- The Turkish Hamam Bath House,
- The Turkish Temin
- The temple Agios Therapontas

- The most important galleries are located in the town of Mytilene and it has a very important collection of paintings that have been gifted by George Simos and his sister. George Simos was a collector and very good friend of the biggest painters of our country.
- Museums with exhibits by ancient years, Byzantine years, folklore exhibits and industrial exhibits
- Many old orthodox churches were built during the 18th and 19th centuries.
- Lesvos is also known for being a religious destination as among many there are 2 well known monasteries that attract many tourists from around the world, the Monastery of Agios Rafail and the Monastery of Taxiarchis.

Intangible cultural heritage

Lesvos is also famous for:

- Philosophy flourished in ancient Lesvos since the Archaic years, with the prominent Mytilene Pittacus being included among the seven greatest sages of the ancient world. Twenty great philosophers were born on Lesvos, gaining great fame for their work. In modern times, names such as Argyris Eftaliotis, Stratis Myrivilis, Ilias Venezis and Odysseas Elytis once again glorify the name of the island, while in the field of painting the list is long and glorious: Fotis Kontoglou, Iakovides, Theophilos, Stratis Eleftheriadis.
- The ceramic tradition in Lesvos has a history of five thousand years, as can be seen from the vessels brought to light by the archaeological dig in the prehistoric settlement of Loutropoli Thermi. In the times of classical antiquity, Lesbian amphorae transported the oil and wine of Lesvos throughout the Aegean. During the Byzantine and post-Byzantine period, glazed ladles and jugs were first-rate utilitarian objects, evidence of which can be found in the contemporary production of Agiasos and Mandamados. In the 19th and 20th centuries, with the migrations and returns of population from Asia Minor, in various parts of the island the masters of art established workshops according to their needs and the clay soil that existed nearby. Today, one can still find many workshops following the ancient tradition.

- Lesvos is an unknown, rich and lively musical enclave, which directly refers us to the recent past of the musical life of Asia Minor and especially of Smyrna and provides us with the possibility to approach musical situations that have passed irretrievably
- A basic nutritional element of the culinary culture of Lesvos is fish and shellfish, which are caught in the clean seas of the island. Some of them are internationally rare species, such as scallops, Kalloni sardines (papalines, sardines raw at the moment with salt) and the delicious octopuses of Lesvos.

The famous ouzo, which combines nutrition with culture and tradition, creating a unique culinary experience, could not be missing from the island's rich and particularly tasty table.

The reputation of the cuisine of Lesbos dates back to ancient times. Lucullus, the well-known gourmet Roman general, built a peculiar fish farm in Mytilene to trap and enjoy the famous seafood of the island, while the island was named by the Ottomans "Orchard of the Empire", because it produced everything.

Natural cultural heritage

- One of the largest wetlands in Europe is located in the northern part of the island. The large wetland of Lesvos Island is one of the most important stations for many wading and aquatic birds in the migratory route of the eastern Aegean.
- The salt pans are located in the north of the largest gulf of the island, the Gulf of Kalloni which is a large semi-enclosed gulf that communicates with the open Aegean Sea through a narrow channel. The channel significantly restricts the movement of water masses resulting in the creation of special characteristics inside the gulf, such as bigger salinity from the sea, high productivity and eutrophication.

Lesvos is also known for its unique geological monuments with international recognition that lead Lesvos to become UNESCO's Global Geopark due to:

- 4 volcanoes
- many hot springs
- geological crevasses



- more than 40 waterfalls
- amazingly large number of different kinds of flora become the proof of the geological history of the Aegean

The Petrified Forest is unique on a global scale and it was characterized as a Preservable Natural Monument. The petrified forest ecosystem is made up of large concentrations of fossilized trees and animals which were covered by volcanic material and petrified in place.

Points to remember

Key points for students to remember about the local cultural heritage of Lesbos:

- Lesbos has a rich cultural heritage that includes tangible, intangible and natural elements.
- **Lesbos has several examples of immovable heritage classified as** Ancient Greek and Roman, Medieval or Byzantine, Ottoman and 19th century to the present day.
- The Ancient Theater of Mytilene, its Byzantine Castle, the church of Agios Therapondas and its many mansions built mainly in the 19th century. They are points of reference for the history of the city.
- In Lesbos there is a large number of Archaeological, Byzantine, Folklore and Industrial Museums and 3 important Art Galleries.
- The pottery of Mandamados and Agiasos is an example of intangible cultural heritage in Lesbos.
- Lesbos has monuments of unique geological interest such as the Petrified Forest, a protected natural monument, which together with the 4 volcanoes, the hot springs, its unique flora and fauna and the salt marshes-biotopes of Kalloni, are examples of its natural heritage.

Activities

Activity 1

“Virtual tour of the local monuments”

Target students:

- Kindergarten

Requirements:

- Computers with internet access

- Interactive Whiteboard

Steps:

1. The teacher presents the students with cards depicting cultural heritage monuments of Lesbos and places them on a suitable size map of the island, once they have been identified.
2. Students will see the location on the map and experience some tangible heritage examples from their area using Google Earth Web tools.

Results:

- Students will learn about the immovable classified cultural heritage of Lesbos by locating the monuments on a map and recognizing their value.

Activity 2

“3D scanning and 3D printing of intangible local heritage”

Target students:

- **Kindergarten**

Requirements:

- 3D scanner (Creality)
- 3D scanning software
- Item to Scan (Water Vessel from Mandamados)
- 3D printer (Ender)
- Calculator

Steps:

1. Teacher and students 3D scan an object representing intangible local heritage (pottery from Mandamados), using a 3D scanner (Creality).
2. They edit and refine the 3D model using the 3D scanner software.
3. They print the 3D model, using a 3D printer.
4. The teacher leads a class discussion about the importance of 3D scanning and 3D printing for the preservation and study of local cultural heritage.

Results:

- Students will learn about the intangible heritage of Lesbos while developing their 3D scanning and 3D printing skills.

Activity 3

“Online memory game about local cultural heritage”

Target students:

- Kindergarten

Requirements:

- Computers with internet access
- Link to the memory game

Steps:

1. The teacher clicks on a link that leads to a memory game made on the digital platform Learning apps (<https://learningapps.org/watch?v=pubvemc7a23>) with images about the cultural heritage of Lesvos and asks questions related to the name of the depicted monument and the place where it is located.
2. Students in pairs try to find the pairs of similar pictures and answer about their name and location.

Results:

- Students will test their knowledge of the cultural heritage of Lesvos and their visual memory.



Selected monument: the Ancient Theater of Mytilene

Description of the selected monument

- **What is the monument?**

Ancient Theater of Mytilene

- **When and who created this monument?**

The Hellenistic theater (2nd century BC) is the most prominent public monument of the ancient city of Mytilene. The oldest surviving architectural members indicate that the monument was built in early Hellenistic times. The form in which it is preserved today corresponds to its last building phase, the late Roman.

- **What seems to be its purpose?**

Its ancient theater Mytilini was originally built as a place for theatrical and musical performances, as a place for religious ceremonies but also as a place for municipal assemblies for the functioning of the democratic state or for other social events (celebration of the triumph of the emperor Pompey). Later its use seems to change and it was turned into an arena during the late Roman period.

- **Where is it located?**

It was built at the highest point of the city, next to the inland walls, in an exceptional area, which is believed to have been a grove in ancient times. It was also visible from those who approached the city from the sea, through its two ports.

- **What is around it?**

It is a visitable archaeological site surrounded by a small grove. It is adjacent to the refugee settlement of Agia Kyriaki, the cemetery of the same name, the holy monastery of Prophet Elias, as well as the water supply tank.

- **What does it look like?**

Today, very little remains of its former glory, as its ruins suffered from erosion and their use in the construction of the Castle during the Middle Ages. It was built on a volcanic rock that is particularly friable due to its geological composition and climatic erosion factors. The retaining walls of the passages which held the fill of the hollow have also largely collapsed.

- **What are the main elements that make the building significant (architectural elements, decoration, setting)?**



Architecturally, it has all the characteristics of ancient Greek theaters, such as the hollow for the spectators, the circular orchestra for the dance and the worship of Dionysus, the parades, the proscenium and a luxurious two-story stage building, the lower floor of which was Doric and the upper floor of the Ionic style. The stage consists of 4 buildings separated from each other by 3 corridors. It was entirely of marble. The capacity of the horseshoe-shaped hollow is estimated at approximately 18,000 spectators and has a maximum diameter of 124.60 m, while the orchestra is 25.12 m. In the western part of the orchestra there are two rooms dug into the rock of the hollow. In the middle of the 2nd c. A.D. the front pews were removed and a high retaining wall was built around the perimeter of the orchestra to protect the spectators in the lower seats from the violence, as the theater now functioned as an arena. Also, the marble throne with the engraved inscription of the end of the 1st century is believed to come from the theater. BC: POTAMON OF LESBONAKTOS CHAIR, which was originally intended for the priest of Apollo and finally for the orator Potamon, son of the philosopher Lesbonaktos. Today it is exhibited in the premises of the Ancient Archaeological Museum of Mytilene. The sound was ensured by the resonating vessels that were placed with the help of a mathematical calculation in alcoves under the steps of the cave, divided into fourth, fifth, eighth and double octave vessels, depending on their resonances in the various notes (representation of Aristoxen's musical diagram). It was distinguished for its aesthetic perfection, symmetry and beauty. It is considered one of the most important theaters of the ancient world as according to Plutarch in the *Life of Pompey*, it was the model on which the construction of the permanent stone theaters of Italy was based.

- **What story does the monument tell us?**

The Ancient Theater of Mytilene tells us the story of a glorious past as recorded in the work of the ancient historian Plutarch, *Life of Pompey*. Pompey, having a close relationship with the Lesbian historian and scholar Theophanes, liberated Mytilene in 62 BC. and abolished the existing adverse economic sanctions. The city celebrated the triumph of the Roman emperor in the theater. Pompey admired it and commissioned his architects to design and build it in 55 BC. in Rome a copy of it, larger and more brilliant. This was also the model of the permanent stone Roman theaters. The history of the culture of its time, its architectural perfection, the technological achievements of its construction (audio, visual), its intense political and social character as an institution and its destruction over the centuries make it a very important historical and cultural monument of Lesvos.

- **What are the values embodied in the monument?**

The Ancient Theater of Mytilene embodies values of historical, cultural and architectural importance. A unique symbol of civilization that changes and lasts over the centuries. An architectural masterpiece and a technological marvel of its time, it



shows us with its history, which follows the history of our country, the imperative need to protect our cultural heritage from the destruction brought upon it not only by the various conquerors, but also by the lack of protection and restoration. It needs to return again to its use as a restored cultural space with a bright future.

Activities

Activity 1

“Familiarity with the Ancient Greek Theater, historical overview, familiarity with its structure and use”

Target students:

- -Kindergarten

Requirements:

- -Dummy ancient Greek face (mask)
- -Computers with internet access
- -Interactive Whiteboard
- -Rich photographic material

Steps:

1. The teacher presents the students with a wood-carved mask (mask) by a local artist. This is the reason to investigate its use and origin.
2. It is established that masks were also used in ancient times by actors. The students are encouraged to make masks too, using gauze and plaster, just like in the old days.
3. Students research and discover the form, parts and functionality of ancient theaters in Greece as well as the history of its birth as an institution.
4. They take a virtual tour of some theaters, find historical information and click on links to videos or other relevant websites.
5. They organize a report board where they present the results of their research

Results:

- Students explore and recognize the main parts of the ancient theater, expand their knowledge, develop their critical skills, collaborate and communicate with each other, understand the value of cultural heritage and its sustainable management, come into first contact with excavations and enhance their learning experiences with the use of digital media.



Activity 2

“Virtual tour of the Ancient Theater of Mytilene”

Target students:

- Kindergarten

Requirements:

- Computers with internet access
- Interactive Whiteboard
- Rich supervisory material regarding the structure, architecture and use of the Ancient Theater of Mytilene.

Steps:

1. The teacher s refers to the knowledge the students have already acquired regarding ancient Greek theaters and invites them to investigate whether there is a similar monument on Lesbos, using the Google search engine.
2. Students will see the location on the map and experience the Ancient Theater of Mytilene virtually, using Google Earth web tools.
3. By completing the virtual tour, students will view photos, read historical information, and click on links to videos or other related websites.
4. The teacher together with the students create a histogram in class about what they have learned about the Ancient Theater of Mytilene.

Results:

- Students will increase their knowledge and understanding of the history, functionality, architecture, decoration and embedded values of the Ancient Theater of Mytilene, and understand the value of cultural heritage and its sustainable management.

Activity 3

“3D scanning and 3D printing of the Ancient Theater of Mytilene”

Target students:

- Kindergarten

Requirements:

- 3D scanner (Creality)
- 3D scanning software
- Item to Scan (Item representing the Ancient Theater of Mytilene)
- 3D printer (XYZ)
- Calculator

Steps:

1. Teachers and students 3D scan an object representing the Ancient Theater of Mytilene using a 3D scanner (Creality).
2. The file is exported to a computer to edit and refine the 3D model as needed.
3. They print the 3D model, using a 3D printer.
4. The teacher conducts a class discussion on the importance of 3D scanning and 3D printing for the preservation and study of local cultural heritage and the students' use of the printed models.

Results:

- Students will improve their understanding of the architecture of the Ancient Theater of Mytilene, while developing their skills in 3D scanning and 3D printing.

Activity 4

“Construction by the students of a statue of the monument as well as some puppet theater figures to perform an ancient play”

1. After discussion the students decide to build a model of the ancient theater. They use the printed 3d Model so that their construction has the same architectural features, proportions, decoration, etc.
2. First they use the building material of the class and later they create their own ancient theater with recyclable materials.



3. They also create their own puppet figures based on their knowledge of actors in ancient theatre.
4. They direct and stage their own work.

Results:

- The students experientially demonstrate their new knowledge about the ancient theater by building a replica of it and organizing a puppet show. They use the elements of the theater such as roles, movement, speech, space, time and symbols to express themselves. They develop cooperation and responsibility skills.

Activity 5

“Robot programming”

Target students:

- Kindergarten

Requirements:

- 2 Beebot robots
- Photos from the ancient theater of Mytilene (parts and architectural elements) in duplicate
- 2 acrylic bases with designed squares (size 15cmx15cm)
- 5 questions-riddles (double copies)
- 3D printed models of the ancient theater

Steps:

1. of the parts or architectural elements of the theater were drawn under an acrylic base with squares.
2. Students are divided into two groups and have in front of them 5 cards with questions - riddles. Each group of students each time takes a card and with the help of the teacher reads the question.
3. After giving the answer they program a robot to move to it correct picture.
4. The team of students who answered all the questions and with their robot reached all the images of the theater wins a 3D printed model of the theater.

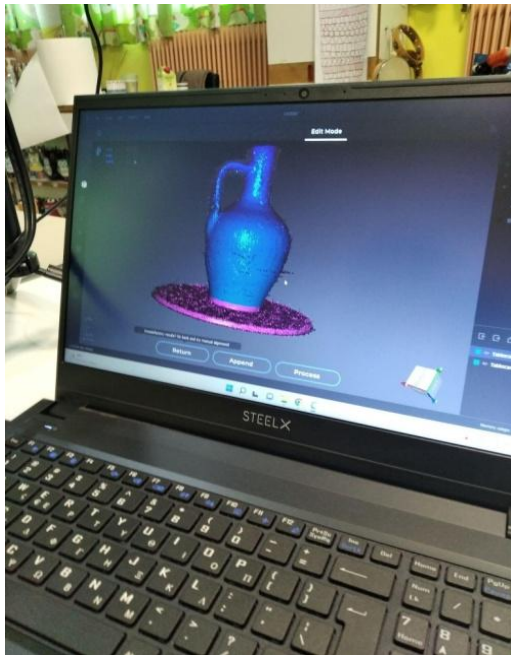
Results:

- Students test their knowledge of the Ancient Theater of Mytilene while programming a robot.

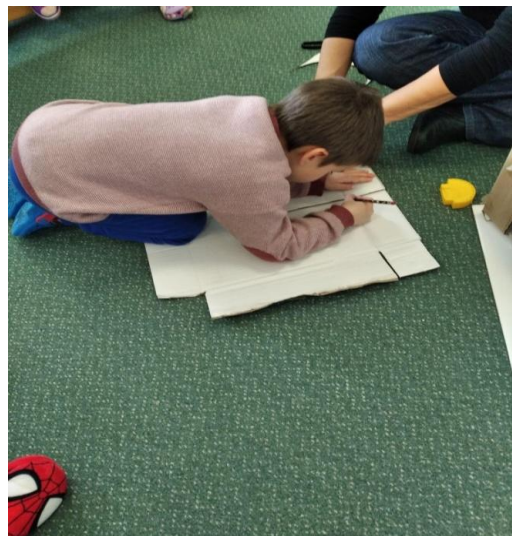
Pictures

(3D model of the ancient theater of [Mytilene](#) and Mandamados ceramic ware)





Photos from pupils' activities



Related Links

- Links to videos used during teaching

https://youtu.be/7clW_ly8tRw

https://youtu.be/4_XPcAwmULg

<https://youtu.be/t9agiHAk80s>



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Region 5: Rhodes' local cultural heritage and the Medieval Castle of Rhodes

The contribution of teaching local history to pupils is important, since it helps to understand cultural elements and peculiarities of the child's homeland, as it is based on the mental and spiritual link of the individual, and especially the pupils, with the place where he lives and develops. The psychic connection with their homeland is the basis of education, from which begins the knowledge and understanding, of the all over the world.

Contents of the course

1. Introduction
2. Learning objectives
3. Local cultural heritage of Rhodes
 - 3.1 Description of the local cultural heritage
 - 3.2 Points to remember
 - 3.3 Activities
4. Medieval Castle of Rhodes
 - 4.1 Description
 - 4.2 Activities
5. Photographs
6. Links

Learning objective

One of the main goals of the Interdisciplinary Common Curriculum Framework for Kindergarten is to awaken children's interest in matters related to cultural heritage, to know and understand, to some extent, the way of life of their ancestors, as well as developing abilities to compare the present with the past and distinguish changes associated with events, daily habits, or other cultural elements. Other major goals are the recognition of basic time concepts, the development of toddlers' perceptual skills, as well as the ability to observe, investigate and describe.

More specifically, our purpose is the development and planning of activities and educational material related with the tradition that will include the specificity of cultural heritage and the importance of preserving it. Another goal is the formation of pupils (tomorrow's citizens) with a variety of experiences and knowledge about culture and tradition, the development of attitudes and behaviors, and abilities to actively participate in the promotion and preservation of our cultural heritage.

After completing the activities our students will be able to:

- To realize the concept of conservation the Cultural Heritage and to propose ways for its quality upgrade.
- To compare the traditional way of life with the modern one and to justify the importance of the continuation of tradition and Folk heritage.
- To recognize the particularities of local cultural elements.
- To realize that the alteration of traditional elements is not a sign of progress, but on the contrary they overturn and stop the progress and development of civilization.
- To get to know the way of life of ancestors.
- Approach and understand their living conditions.
- To undertake initiatives - actions for the rescue - preservation of our cultural heritage.
- Apply 3D scanning and 3D printing techniques.

Local cultural heritage

Description of the local cultural heritage

The island of Rhodes is located at the crossroads of two major sea routes of the Mediterranean, between the Aegean Sea and the coasts of the Middle East such as Cyprus and Egypt. As a meeting point of three cultures, Rhodes has experienced many cultures. Through the long history, all the different peoples who inhabited Rhodes have left their mark on all aspects of the island's culture: in art, language, architecture. Its strategic location brought the island great wealth and made the city of Rhodes one of the prominent cities of ancient Greece. Rhodes is the first Greek city to be included by UNESCO in the list of world cultural heritage sites. Historically, Rhodes was famous for the Colossus of Rhodes, one of the Seven Wonders of the Ancient World.

With a rich cultural heritage from the ancient Greek world, Rhodes hosted the Romans, the Knights of St. John, the Ottoman Turks, and the Italians.

Tangible cultural heritage

Rhodes has great monuments and historical places, for example the Acropolis of Rhodes, the Hotel of Roses (Grande Albergo delle Rose), the Acropolis of Lindos, the Springs of Kallithea, the monastery of Panagia tis Filerimou, Ancient Kamiro, Vroulia and the Medieval City.

Intangible cultural heritage

The island of Rhodes has a rich intangible cultural heritage. In the National Index of Intangible Cultural Heritage of Greece, we will find:

- The melekouni, a traditional sweet of Rhodes, is included in the National Index of Intangible Cultural Heritage of Greece. Specifically, by decision of the Greek Minister of Culture, the melekouni of Rhodes is now registered in the National Index of Intangible Cultural Heritage of Greece.
- The Apollonian Camouzels (or Camouzelles) are a popular Carnival event, consisting of visual, theatrical, musical and poetic actions. Its main feature is disguises, the creation and parade of improvised carnival floats and measured folk satire in the local language idiom, with which current situations and persons are satirized.

Ceramic art was inextricably linked with the name of Rhodes, and this is because the island was a center of ceramic trade in various directions. The ancient Rhodian ceramics stand out for their quality, the diversity of shapes and the variety of subjects that adorn them. In many parts of Rhodes there was abundant clay, suitable for pottery. Its abundance and excellent quality gave the Rhodian potters the opportunity to experiment with it, work with it and learn its secrets. So early on they created wonderful ceramics.

Rhodian potters had created a wide variety of shapes, with the main purpose of better serving the practical needs of everyday life. But without neglecting the aesthetic appearance of their creations. They have always combined usability with the aesthetics of their ceramics.

Natural cultural heritage

The island of Rhodes is famous for its natural beauties and presents a variety of many species of ornamental plants, such as the hibiscus (the symbol of the island).

Rhodes has many protected species of animals such as platon (Dama dama), a rare species of deer, butterflies, the protected, special species of moth (*Panaxia quadripuctata*), the small horse of Rhodes (belonging to the genus *Equus caballus*) and finally the weasel (*Ladigesocypris ghigii* - Pisces, Cyprinidae), a small fish that lives exclusively in the fresh waters of Rhodes.

Points to remember

- The long history of the island and its cultural value can be seen in the buildings, the cobblestones, but also the museum spaces with the rich exhibits.
- Pottery art in Rhodes and especially in Archangelos of Rhodes is an integral element of its history, tradition, and culture.
- The small horse of Rhodes, due to its small physical size but also its long history, is a separate breed of horse, which differentiates it from all animals of its kind. It is the second smallest horse in the world and the smallest in the Greek area. In other words, it is a living monument of the past of great value.
- The medieval city of Rhodes has been a UNESCO World Heritage Site since 1988.

Activities

Activity 1

“Ceramic Art”

➤ **Age group**

Kindergarten

➤ **Requirements**

- Computers or tablets with internet access
- Video projector
- Camera
- 3D scanner
- 3D scanning software
- Items to scan.
- 3D printer

➤ **Steps**

- Watch an educational film.
- Visit to a Ceramic Art Workshop
- Making use of the visit in the classroom
- Print an Ancient Greek Vase
- Scanning with the 3dscanning of a ceramic vase of the Archangelos of Rhodes
- Print it on the 3D Printer after scanning it.
- Presentation of all that they learned about ceramic art. In a small exhibition at the main entrance of the school, they presented the vases they made as well as vases of well-known potters of Archangelos who made them available to the kindergarten, so that their parents could see their work and learn something about ancient Greek ceramics.

➤ **Results**

It is intended for students to:

- become familiar with ceramic art.
- meet basic principles, techniques of pottery, types of ceramic objects, forms, decorative patterns, tools and equipment.
- get to know the tradition, history and evolution of ceramics.
- compare yesterday's and today's labs looking for differences.
- get to know the art of pottery and the traditional profession of the potter.
- distinguish the way of selection, collection and processing of raw materials.
- be inspired by creating and decorating ceramic objects for their Exhibition.



- recognize the use of ceramic vessels through comparison with corresponding contemporary objects.

Activity 2

“Horse of Rhodes”

➤ **Age group**

Kindergarten

➤ Requirements

- Computers or tablets with internet access
- Video projector
- Camera
- Printer
- 3D printer

➤ Step

- Reading the book "Little Dreamer Big Chief"
- Watch an educational film.
- Visit to the Small Horse Protection Association of Rhodes "FAETHON"
- Making use of the visit in the classroom
- 3D Printing of a horse
- Publication of a magazine with information about the horse of Rhodes

➤ Results

Pupils are intended to:

- Realize the value of the island's endangered species for biodiversity conservation.
- To get to know six endangered species of Rhodes.
- To raise awareness of the problem of the disappearance of endangered species.
- Form pro-environmental attitudes and values for endangered species.
- Cultivate abilities and skills to identify and solve problems related to specific endangered species.
- To acquire the possibility to take initiatives for the organization of actions concerning the protection but also the solution of problems faced by endangered species.



Selected monument: the Medieval Castle of Rhodes

Description of the selected monument

The medieval city of Rhodes has been a UNESCO World Heritage Site since 1988, it developed without specific urban planning around the fortress-citadel of the city of Rhodes, probably after the earthquake of 515. The fortress was divided into two distinct urban schemes, the Kollakio north and Chora to the south. Kollakio includes the famous street of the Knights, the Palace of the Grand Master or Kastelo, the Hospital which has been converted into a museum, the temples of the Order and other important buildings. In Chora is the Turkish bazaar around the Suleiman Mosque, the old market, and other buildings of tourist interest.

According to the brief description on the official UNESCO page, the Hospitallers of the Order of Saint John of Jerusalem occupied Rhodes by purchase for two and a half centuries, from 1309 to 1523, transforming the city into a strong fortress due to its fluidity and of the extensive conflicts of the time. Later the city was successively under Turkish and Italian occupation. It is considered one of the oldest active medieval cities and a meeting point of many cultures.

In the medieval Town of Rhodes, architectures from different historical periods coexist. Prominent are those of the order of the Knights of St. John, and the Ottomans. The labyrinthine network of narrow streets and cobbled streets with impressive knightly buildings, from the 15th and 16th centuries, is complemented by churches, mosques, fountains, and shady squares.

It includes important monuments such as the Panagia of the Castle of the 11th century AD which is the largest and oldest surviving temple, the Hospital of the Knights of the 14th century (Symis square), the Hospital of the Knights of the 15th century (square of Alexander the Great) which also functions as the National Archaeological Museum, the Street of the Knights which with the lodgings of different "Languages" of the Chivalric Order is the most well-preserved street in Europe, the Municipal Gallery in Symi Square, Argyrokastro Square with the Early Christian Baptistry, the old Armory of the Knights which today houses the Museum of Folk Art or Folklore Museum, the ruins of the Temple of Aphrodite, the Mosque of Suleiman and the Castellania Palace which today houses the Municipal Library and the Grand Master's Palace.

The Grand Master's Palace is located at the highest point of the Street of the Knights, on the NW side of the Old Town, rises the emblematic Castle, the most important building of the Knighthood. The Grand Master's Palace is a 14th century building built by the John Knights, who occupied Rhodes, on the site of an older Byzantine citadel from the 7th century AD. Apart from being the administrative center of the Knights and the residence of the Grand Master, the palace was also the seat of the ruling social and intellectual class of Rhodes.

According to recent research, the sacred temple of the sun god Helios was in its place, and the famous Colossus of Rhodes may have been erected in this location, contrary to the

previous belief that it was located in the Mandraki area, which is located in the location of one of the three ports of Rhodes.

Turkish rule

When the Ottomans occupied the island, they used the palace as a fortress, command center and prison, while in 1856, after an explosion of ammunition from a lightning strike, which was stored in the basement of the nearby temple of Agios Ioannis of the Knights, a part of it, was destroyed.

Italian occupation

When in 1912 Rhodes became part of the Kingdom of Italy, the Italians repaired the part that had been destroyed, between the years 1937 - 1940 under the supervision of the Italian commander of the Dodecanese De Vecchi, making it the seat of the respective Italian commander of the island as well as a summer residence of King Victor Emmanuel III of Italy, whose name is still on a huge plaque near the entrance.

Today's era

After the annexation of the Dodecanese to Greece in 1948, the first floor of the palace was turned into a museum by the Greek authorities. On the first floor you will see mosaic floors from monuments of Kos, and furniture from the medieval era. On the ground floor there are two permanent exhibitions concerning the history of Rhodes since 408 BC. which was established until it was occupied by the Ottomans in 1522.

Activities

➤ **Age group**

Kindergarten

➤ **Requirements**

- Computers or tablets with internet access
- Video projector
- Camera
- 3D Pen
- 3D scanner
- 3D scanning software
- Object to scan
- 3D printer

➤ **Steps**

- Watching educational films
- Visit to the Medieval Castle of Rhodes



- Making use of the visit in the classroom
- Create a 3D castle with the 3D pen.
- Printing a Medieval Castle on the 3D Printer
- 3dscanning of a miniature of the Grand Master's Palace
- Print it on the 3D Printer after scanning it.
- Presentation of everything they learned about the Medieval Castle of Rhodes. All children present their work, talk about what they have learned and at the same time, answer questions posed by the other children.

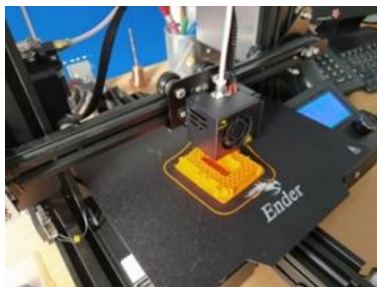
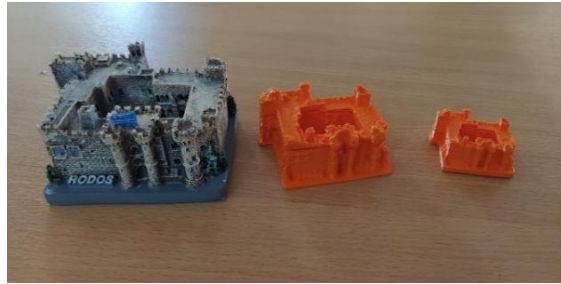
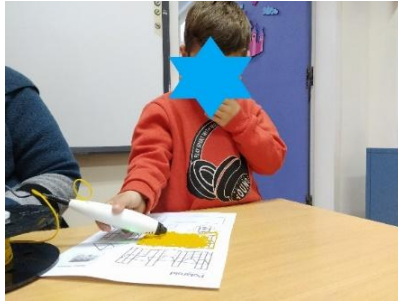
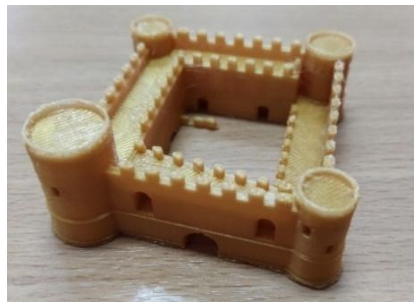
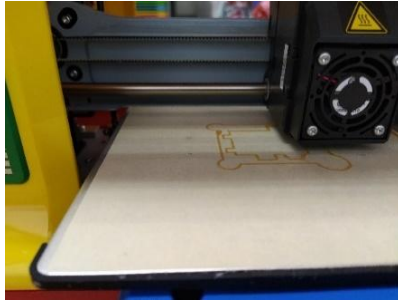
➤ Results

Pupils are intended to:

- To know that castles are part of the cultural heritage of their place.
- Familiarize themselves with the castle and understand the role of the castle in guarding and defending settlements from raids and attacks.
- To get to know the architecture of the Medieval walls through a tour of them.
- To associate stories and elements from their daily life with other times.
- Be aware of the changes in the environment around them over time.



Pictures





Related Links

Videos:

- (<https://www.youtube.com/watch?v=A59oemS3WWA>) Castles of Rhodes
- (https://www.youtube.com/watch?v=5C_92pa4_9w) Palace of the Grand Master
- (<https://www.youtube.com/watch?v=0ab6GTonhzU>) Ceramic art and tradition in Rhodes
- (<https://www.youtube.com/watch?v=iTSLykUzGfU>) "The Horse of Rhodes LIVES"

STL files:

- (<https://www.thingiverse.com/thing:1550977/files>) Ancient Greek Vase
- (<https://www.thingiverse.com/thing:1078786>) Horse
- (<https://www.thingiverse.com/thing:961662>) Medieval Castle

Region 6: Sarzana's local cultural heritage and the Fortress of Sarzanello

Contents of the course

1. Introduction to Sarzana and Val di Magra cultural heritage:
Definition and examples of tangible, intangible and natural heritage
Overview of the cultural heritage of Sarzana
2. Values and classification of local monuments
3. Locating local monuments on a map and through the app POLISarzana:
Using virtual maps and the app POLISarzana to locate cultural heritage sites of Sarzana
4. The Fortress of Sarzanello, history and functionality:
Historical overview of the Fortress
Functionality of the Fortress throughout history
5. Agrifood tradition: how to make pesto and its uses
Going through the main local agrifood tradition
6. Digital literacy and cultural heritage:
3D modelling/3D scanning/3D printing objects related to the cultural heritage of Sarzana

Learning objectives

By the end of this course, students will be able to:

- Discriminate the difference among tangible, intangible and natural heritage of Sarzana.
- Being able to explore the local territory through an app.
- Recognize and classify local monuments.

- Describe some aspects of the history and function of the Fortress of Sarzana.
- Recognize traditional local dishes
- Apply 3D modelling, 3D scanning and 3D printing techniques.

Local cultural heritage

Description of the local cultural heritage

The name 'Sarzana' was mentioned for the first time in a diploma of Emperor Otto I in 963, who recognized Bishop Adalberto di Luni in possession of the "Castrum Sarzanae", located roughly where the Sarzanello Fortress currently stands. This "castrum", castle or, more realistically, a small fortified village, due to its strategic position must have had the function of controlling the important roads at the bottom of the valley.

Sarzana has a long history which makes it full of examples of cultural heritage.

Tangible cultural heritage

The tangible heritage of Sarzana includes a wide variety of monuments including fortresses, theatres, museums and churches. In what follows the most important assets of the tangible heritage of Sarzana are analysed.

Sarzana has always been a borderland, highly coveted for its geographical location; for this, the various rulers of the time had to defend the city by fortifying it. Two splendid fortresses remain from this past: the Firmafede Fortress and the Sarzanello Fortress.

Intangible cultural heritage

Sarzana hosts various events throughout the year, from cultural to food and wine.

Noteworthy are the Festival della Mente and La soffitta nella strada.

The traditional cuisine of Sarzana and the Val di Magra is based on poor ingredients linked to the products of the earth, but it is not a typically Ligurian cuisine as in Sarzana, a border area and since the first centuries of the second millennium an important trading centre, different cultures have always met and contributed to the development of their own tradition, so that in Sarzana there are typical dishes that are not even found in the nearest towns, or if they are found they have different characteristics. So flours, vegetables, legumes, cereals and olive oil are basic ingredients of typical dishes, simple products that, when cooked, take on particular flavours and aromas.

Natural cultural heritage

Sarzana rises in the terminal part of the Magra valley, a few kilometres from the estuary of the river, in a relatively flat area to the east of it, called the plain of Sarzana. The city is also located at the foot of the Sarzanello hill, a relief of about 150 m s.l.m. The surrounding orographic system is represented by the roughness that thins out from the nearby Apuan Alps. The municipality is also included in the Montemarcello-Magra-Vara Regional Natural Park.



Points to remember

- Origins of the city of Sarzana
- Fortresses: their function over time
- Geographical area in which Sarzana is located: Val di Magra
- Classification of local cultural heritage
- The local culinary tradition: the typical dishes
- Cultural events in Sarzana

Activities

Activity 1

“Discovering Sarzana through POLISarzana”

Target students:

- Pre-Primary and Primary school

Requirements:

- Computers or tablets with internet access
- Video projector
- Link to POLISarzana

Steps:

1. Teachers will explain children who and how was developed the app (students of ISA 13 thanks to a project granted by Europe)
2. Children will discover all the monuments and buildings of Sarzana and learn about the most representative.
3. Children will visit Sarzana to see the main monuments and buildings of the city.

Results:

- Students will learn about the immovable cultural heritage of Sarzana.

Link to POLISarzana: <https://polisarzana.goodbarber.app/>

Activity 2

“3D scanning and 3D printing of intangible local heritage: making a mortar for fresh pesto”

Target students:

- Pre-Primary school

Requirements:

- 3D scanner (Creality)
- 3D scanning software
- Photogrammetry software (Kiri Engine)
- Object to be scanned (mortar for pesto)
- 3D printer (Ender)
- Computer

Steps:

1. Children with the help of the teachers will scan an object of the local intangible cultural heritage (mortar for pesto), using both a 3D scanner (Creality) and a mobile phone (Kiri engine).
2. They edit and refine the 3D model as necessary, using the 3D scanner software.
3. They print the 3D model, using a 3D printer.
4. They make a mortar using a 3D pen.
5. Teacher leads a class discussion on the importance of 3D scanning and 3D printing in preserving and studying local cultural heritage.

Results:

- Students will learn about the intangible heritage of Sarzana, while developing their skills in 3D scanning and 3D printing.

Activity 3

«Preparing Home made fresh pesto»

Target students:

- Pre-primary school

Requirements:

- Ingredients for pesto
- A mortar

Steps:

1. Teachers will present the recipe of pesto to the children.
2. Teachers and children will visit a local greengrocer to buy the ingredients. The trip will give the children the opportunity to visit the city
3. Teachers and children will make pesto and taste it on bruschetta, one of the ways pesto is used in the Italian kitchen.

Results:

- children will be able to reflect on the difference between tangible and intangible cultural heritage and will be able to grasp the main aspects of local cultural heritage.

Activity 4

“Spin and win”

Target students:

- Primary school

Requirements:

- Paper
- Colours
- A model of the mortar for pesto previously printed

Steps:

1. In groups, children will resume all the information they gathered about Sarzana and will prepare a list of questions and answers that will be translated with the help of the English teacher.
2. The class, divided in small groups will develop the electric circuit and add the questions.
3. Once the Electro is ready, the class will be divided into two groups and the quiz will start.
4. Groups that respond correctly to all the questions, win a 3D model of the Mortar previously printed.

Results:

- Students will test their knowledge about Sarzana, while learning how to build a spinner.
- children will be able to reflect on the difference between tangible and intangible cultural heritage and will be able to grasp the main aspects of local cultural heritage.

Selected monument: the Fortress of Sarzanello

Description of the selected monument

- **Which monument is this?**

Fortress of Sarzanello

- **When and who created this monument?**

The construction of Leiria Castle was ordered by the first king of Portugal, Afonso Henriques, during the 12th century.

- **What is it?**

It's a fortress.

- **What did its purpose seem to be?**

It is a military fortification that stands near Sarzana and dominates the Val di Magra from above. Its nature and its position make it one of the symbols of the city of Sarzana. With the victory in the Sarzana war, a showdown of Florentine and Genoese aspirations, it was Lorenzo de 'Medici who ordered the construction of the Fortress in its current form. The works, begun in 1493, were completed in 1502 by the Republic of Genoa, under whose control it remained until the unification of Italy. Today the Fortress is open to visits all year round and is home to public and private events.

- **Where is it?**

The Fortress is located in via alla Fortezza on the Sarzanello hill.

- **What is around it?**

The fortress is located on the Sarzanello hill and dominates the Magra valley from above. The city of Sarzana is very close to the Fortress.

The Fortress can be reached via two carriage roads, one called "panoramic", starts from the town viale Mazzini and climbs the hill of Sarzanello providing a 180° panorama of the valley, the other starting from the Bradia district goes up directly to the area behind the Fortress.

Even today its mediaeval towers and ramparts are clearly visible from the historic houses of the valley and from the perched villages up to the peaks of the Tuscan-Emilian Apennines, while the old drawbridge has been destroyed. But that won't stop you from accessing the



castle, built on two triangular-plan fortifications connected by a bridge and surrounded by a moat.

- **What does it look like?**

The fortress is made up of two distinct building elements:

- The first, real castle is the main element of the fortification and has a triangular plan, with three bastions at the top. This element of the building houses the actual structure of the castle;
- The second is a huge ravelin in the form of a triangular fortified embankment, almost the same size as the fortress. Opposite to the first and connected through a flying bridge, so as to form with the first element a sort of rhombus made up of two triangles.

The interior is made up of two eighteenth-century buildings used as accommodation for the military and a small chapel and the large keep, residence of the garrison captain. Also used for representation, the base of the keep leads to the galleries that run through the fortress.

Access to the fortress is by crossing the stone bridge, which crosses the wide and deep fortified moat.

- **Which are the main elements that make the building important (architectural elements, decoration, set-up)?**

The structure of the fortress of Sarzanello could be taken as an example of the military construction techniques of the fifteenth century. Its construction would appear to have been influenced by the theories of the famous military architect Francesco Di Giorgio Martini, which is not documented, but it is certain that Francione, like Martini, had the aim of equipping the fortress with devices and defensive elements suitable for making it safe against the new late mediaeval siege techniques, which saw the use of firearms.

Overall, the complex has a rhomboidal plan, divided into two large triangles, one of which represents the main body of the fortress and the other, placed in front of the access to the first, constitutes a ravelin of considerable size and proportions (side of 16 meters).

- **What story does the monument tell us?**

The fortified plant has never been involved in major war events and this largely explains how it was able to reach the present day while maintaining its original appearance almost intact.

Today the Fortress is open to visits all year round and home to public and private events.

- **What are the values embodied in the monument?**

The first certain news of the existence of a settlement on the hill of Sarzanello dates back to 963 AD. when the emperor Otto I of Saxony recognized Adalberto, bishop of Luni, the possession of the castrum Sarzanae, a fortified site located in the place where the fortress is today.

There is no doubt about the identification of the episcopal castrum with the place where the fortress will rise: it is the Registrum Vetus of Sarzana, the oldest document of the municipality, which tells us that in 1448 the Sarzane castrum “[...] nunc dicitur Sarzanellum [...]” (now it is called Sarzanello).

The fortress is known as the fort of Castruccio but, in reality, the great leader from Lucca Castruccio Castracani degli Antelminelli limited himself to using the castle of Sarzanello as a residence between 1317 and 1328.

The strategic position, dominating the plain of the Magra river, could not remain without a garrison for the control of such an important communication route between northern and southern Italy.

Activities

Activity 1

“Game Based Learning Activity”

Target students:

- Pre-Primary and Primary school

Requirements:

- Computers or tablets with internet access
- Interactive whiteboard
- Video game provided by “Fabrica Lab”

Steps:

1. Teachers and technicians from Fabrica Lab will introduce children to the game, which consists of a virtual reality tour of the Fortress with the opportunity of interaction (Augmented Reality).
2. Children will be able to virtually visit the Fortress playing a video game.
3. Complementing the virtual visit, children, in a playful way, will learn a lot of information about the Fortress, its function and its history.
4. The activity will end with a discussion about the Fortress main characteristics.



Results:

- Students will increase knowledge and understanding of the Fortress history, its function and will experience life during mediaeval times.

Activity 2

“3D printing of Fortezza di Sarzanello”

Target students:

- Primary school

Requirements:

- 3D printer (Ender Max)
- Computer
- Slicer software
- File .stl of the Fortezza provided by Fabrica Lab

Steps:

1. Technicians from Fabrica Lab will show the project they developed to scan the Fortress with professional tools, they will show the steps needed to reproduce the .stl file.
2. Students will upload the .stl file to the slices software and will convert it in .gcode in order to be printed with the Ender Max.
3. Teacher leads a class discussion on the importance of 3D scanning and 3D printing in preserving and studying local cultural heritage.

Results:

- Students will increase their knowledge about the Fortress, while developing their skills in 3D programming and 3D printing.

Activity 3

“Virtual tour of the Fortezza of Sarzanello”

Target students:

- Pre-Primary school

Requirements:

- Interactive whiteboard
- 3D pens

Steps:

1. Teachers tell children stories about a knight living in Sarzanello during the Middle Age.
2. Teachers show children a video about the Fortress.
3. Children reproduce draws of the story.
4. Using 3D pens, children will reproduce the Fortress.
5. Class reflection on life and constructions in other ages.

Results:

- Children will be aware about the local cultural heritage, will be able to reproduce an object in 3D.

Activity 4

“Electro game quiz”

Target students:

- Primary

Requirements:

- A box
- Material for building an electric circuit
- List of questions and answers
- 3D printed models of the Fortress of Sarzanello.

Steps:

1. In groups, children will resume all the information they gathered about the Fortezza and will prepare a list of questions and answers that will be translated with the help of the English teacher.
2. The class, divided in small groups will develop the electric circuit and add the questions.
3. Once the Electro is ready, the class will be divided into two groups and the quiz will start.
4. Groups that respond correctly to all the questions, win a 3D model of the Fortezza previously printed.

Results:

- Students will test their knowledge about the Fortress of Sarzanello, while learning how to build an Electro game.

Pictures

3D scanning and 3D printing of intangible local heritage: mortar for pesto



Trip to Sarzana and the making of fresh pesto:



Electro game quiz



Related Links

Walk around Sarzana:

https://drive.google.com/file/d/1CkIYSnvtbNkgVUr7o3AYIgnNEWDG4fuM/view?usp=share_link

https://drive.google.com/file/d/1MjV4pAdlUFNiYdxnPf7AO0WHN-AgPedm/view?usp=share_link

How to use a 3D pen: https://drive.google.com/file/d/1oKUoiZGT5XoDEfUf2Ua-4Ls-C2BTPXmw/view?usp=share_link

Trip to Sarzana and the making of fresh pesto:

https://drive.google.com/file/d/12EBjuy544GD4wZLq_iUqhuBFYuQ7KIRa/view?usp=share_link

3D printing of Fortezza di Sarzanello

Fabrica Lab: <https://fabricalab.eu/portfolio/rilievo-con-laser-scanner-della-fortezza-di-sarzanello/>

Laser scan of the Fortress of Sarzanello: <https://www.bimportale.com/hbim-la-fortezza-sarzanello/>

Fortress of Sarzanello, virtual tour: <https://youtu.be/kdtBGjRMCGc>

Activities with Fabrica Lab will take place from April until the end of the school year.





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